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Atomic Energy Act and Related Legislation

September 1, 1992
Revision 6

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ORNL/M-1900

ENVIRONMENTAL GUIDANCE PROGRAM REFERENCE BOOK

ATOMIC ENERGY ACT
AND RELATED LEGISLATION

Prepared for

ASSISTANT SECRETARY FOR ENVIRONMENT,
SAFETY AND HEALTH

OFFICE OF ENVIRONMENTAL GUIDANCE

(B/A No. HA 01 15 00 0; EHHHA002)

Prepared by the

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MARTIN MARIETTA ENERGY SYSTEMS, INC.
for the
U.S. DEPARTMENT OF ENERGY
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PREFACE

This Reference Book contains a current copy of the Atomic Energy Act and Related Legislation and those regulations that implement the statutes and appear to be most relevant to DOE activities. The document is provided to DOE and contractor staff for informational purposes only and should not be interpreted as legal guidance. Updates that include important new requirements will be provided periodically. Questions concerning this Reference Book may be directed to Mark Petts, EH-231 (202/586-2609).

UPDATE INSTRUCTIONS

ENVIRONMENTAL GUIDANCE PROGRAM REFERENCE BOOK

ATOMIC ENERGY ACT AND RELATED LEGISLATION

September 1, 1992

This Reference Book on the Atomic Energy Act and Related Legislation has been completely revised and is current through September 1, 1992.

Instructions for updating the Reference Book with September 1, 1992, revision 6 materials are as follows:

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REFERENCE BOOKS

_____ American Indian Religious Freedom Act

_____ Atomic Energy Act and Related Legislation

_____ Clean Air Act

_____ Clean Water Act (excluding Section 404)

_____ Clean Water Act (Section 404) and the Rivers and Harbors Act (Sections 9 & 10)

_____ Coastal Zone Management Act

_____ Comprehensive Environmental Response, Compensation, and Liability Act

_____ Endangered Species Act and the Fish and Wildlife Coordination Act

_____ Hazardous Materials Transportation Act

_____ Marine Protection, Research, and Sanctuaries Act and the Marine Mammal Protection Act

_____ National Historic Preservation Act and Related Legislation

_____ Resource Conservation and Recovery Act

_____ Safe Drinking Water Act

_____ Toxic Substances Control Act

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SECTION 1—SUMMARY

SECTION 1. SUMMARY AND DESIGNATIONS

This collection of statutes and supporting material pertains to the federal responsibility for control of nuclear energy. The Reference Book emphasizes the environment, safety, and health aspects of the Atomic Energy Act (AEA) of 1954 [Public Law (P.L.) 83-703, as amended], the Energy Reorganization Act of 1974 (as amended), the Department of Energy (DOE) Organization Act of 1977 (as amended), the Uranium Mill Tailings Control Act of 1978 (as amended), and the Nuclear Waste Policy Act of 1982 (as amended).

The purpose of the AEA is to assure the proper management of source, special nuclear, and byproduct material. DOE's authority extends to:

- source material - "The term 'source material' means (1) uranium, thorium, or any other material which is determined by the [Nuclear Regulatory] Commission pursuant to the provisions of Section 61 to be source material; or (2) ores containing one or more of the foregoing materials, in such concentration as the Commission may by regulation determine from time to time." [Atomic Energy Act, Section 11(z)]

- special nuclear material - "The term 'special nuclear material' means (1) plutonium, uranium enriched in the isotope 233 or the isotope 235, and any other material which the Commission, pursuant to the provisions of Section 51 of this Act, determines to be special nuclear material, but does not include source material; or (2) any material artificially enriched by any of the foregoing, but does not include source material." [Atomic Energy Act, Section 11(aa)]

- byproduct material - "The term 'byproduct material' means (1) any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material, and (2) the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content." [Atomic Energy Act, Section 11(e)]

With respect to the first definition under "byproduct material," DOE issued a final rule [10 *Code of Federal Regulations* (*CFR*) 962] setting forth a much narrower interpretation of the term as it applies to any DOE-owned or produced radioactive material having a hazardous waste component (i.e., mixed wastes). Under this part, the term "any radioactive material" as used in the first definition of "byproduct material" refers only to the actual radionuclides suspended or dispersed in the material, not the nonradioactive

hazardous component of the waste substance. This means that although DOE retains authority under AEA for the actual radionuclides in byproduct material, any nonradioactive hazardous component of the material will be subject to regulation by the Environmental Protection Agency (EPA) or its agreement states under the Resource Conservation and Recovery Act. The rule does not apply to (1) byproduct materials as defined in the second definition (i.e., tailings or wastes from ore processing) or (2) substances not owned or produced by DOE.

Section 161 of AEA provides the authority to establish "by rule, regulation, or order, such standards and instructions to govern the possession and use of special nuclear material, source material, and byproduct materials as the ...(AEC) [now the Nuclear Regulatory Commission (NRC)]... may deem necessary or desirable to promote the common defense and security or to protect health or to minimize danger to life or property." This and other Sections such as 2, 3, and 41 allow DOE to set radiation protection standards for itself and its contractors. The NRC licensing powers are defined in Sections 101-111. Sections 91 and 110 of the AEA provide exclusions from licensing for defense production facilities.

The AEA also authorized the Formerly Utilized Sites Remedial Action Program (FUSRAP), which is administered by DOE's Oak Ridge Field Office (Former Sites Restoration Division, Office of Assistant Manager for Environmental Restoration and Waste Management). Guidance for implementing this program is beyond the scope of this Reference Book, but may be obtained from the office designated above.

The Energy Reorganization Act of 1974 (P.L. 93-438) replaced the Atomic Energy Commission with the NRC and a separate agency called the Energy Research and Development Administration (ERDA, which later became the Department of Energy under the Department of Energy Organization Act of 1977). The Energy Reorganization Act authorized NRC to license the following specific classes of DOE facilities:

"(1) Demonstration Liquid Metal Fast Breeder reactors when operated as part of the power generation facilities of an electric utility system, or when operated in any other manner for the purpose of demonstrating the suitability for commercial application of such a reactor.

(2) Other demonstration nuclear reactors—except those in existence on the effective date of the Act—when operated as part of the power generation facilities of an electric utility system, or when operated in any other manner for the purpose of demonstrating the suitability for commercial application of such a reactor.

(3) Facilities used primarily for the receipt and storage of high-level radioactive wastes resulting from activities licensed under the Act.

(4) Retrievable Surface Storage Facilities and other facilities authorized for long-term storage of high-level radioactive waste generated by the Administration [ERDA], which are not used for, or part of, research and development activities."

The Department of Energy Organization Act of 1977 (P.L. 95-91) clarified Congressional intent related to DOE's environmental functions. It states:

> DOE, by consolidating environmental considerations and procedures now within the separate purview of the Federal Energy Administration (FEA), ERDA, Federal Power Commission (FPC), and part of the Department of Interior (DOI), should provide an effective vehicle for identifying potential environmental, health, safety, socioeconomic, institutional, and control technology issues associated with technology development. It will provide a single, coordinated mechanism for determining necessity and timing of environmental impact assessments and environmental impact statements in order to respond to the needs of specific technologies or resources. It will ensure a complete and fully integrated program with respect to environmental, health and safety impact research and engineering applications.

Section 102 of the DOE Organization Act of 1977, the Congressional declaration of purpose, listed some of DOE's fundamental purposes as assuring incorporation of national environmental protection goals in the formulation and implementation of energy programs; advancing the goals of restoring, protecting, and enhancing environmental quality; and assuring public health and safety. The Act authorized the establishment of eleven Assistant Secretaries, including one with environmental responsibilities and functions. The duties involved advising the Secretary with respect to conformance of the Department's activities to environmental protection laws and principles.

The Uranium Mill Tailings Radiation Control Act of 1978 provided for a program of assessment and remedial action at active and inactive uranium mill operations in order to control and stabilize the tailings in a safe and environmentally sound manner. A further purpose was to minimize or eliminate possible radiation health hazards to the public.

The Nuclear Waste Policy Act of 1982 provided for the development of repositories for the disposal of high-level radioactive waste and spent nuclear fuel. It also established a program of research, development, and demonstration on the disposal of high-level radioactive waste and spent nuclear fuel.

The Atomic Energy Act and the statutes that amended it delegate the control of nuclear energy primarily to DOE, NRC, and EPA. The NRC and EPA regulations and DOE guidance issued pursuant to the Acts are contained in the Implementing Regulations Section of this Reference Book. Relevant supporting material important to an under-

standing of basic radiation protection strategies such as a list of International Commission on Radiation Protection (ICRP) reports has also been included.

The Legislative History and Statutes Section of this Reference Book traces the development of federal authority for nuclear-related matters and highlights those amendments of importance to DOE. A final section, entitled "Updates," completes the Reference Book. The "Updates" Section generally includes proposed changes to statutes or regulatory programs. In addition, policy statements, interagency agreements, and other supplementary material are provided when pertinent.

DESIGNATIONS

Prior to 1954, nuclear energy activities were largely confined to the federal government. In that year, the enactment of the Atomic Energy Act made it possible for private commercial firms to enter the field. Because of the hazards, Congress determined that these activities should be regulated under a system of licensing to protect the health and safety of radiation workers and the public. The NRC is charged by Congress with this responsibility.

Protection of the public health and safety has traditionally been a state responsibility, but the 1954 Act did not carve out any specific role for the states. In 1959, P.L. 86-373 added Section 274 to the Atomic Energy Act to spell out a state role and to provide a statutory basis under which the federal government could relinquish to the states portions of its regulatory authority. The 1959 amendments made it possible for the states to license and regulate byproducts, source materials, and small quantities of special nuclear materials.

The mechanism for the transfer of NRC's authority to a state is an agreement between the Governor of the state and the NRC. Before actually signing the document, NRC, by statute, must make a finding that the state's radiation control program is compatible with the Commission's and that it is adequate to protect the public health and safety. It is also necessary that the state establish its authority to enter an agreement (usually by "enabling legislation").

Twenty-nine states have entered into such agreements with NRC. Their programs are routinely reviewed by the Commission to assure that they are effective in protecting the public health and safety. A list of the twenty-nine agreement states as of July 1992 may be found in Table 1-1.

NRC is reviewing its practices concerning the compatibility of Agreement State Programs with NRC Regulatory Programs and has requested comments and recommendations on how to assure this compatibility [December 23, 1991, 56 *Federal Register* (*FR*) 66457]. Comments were requested by March 19, 1992.

TABLE 1-1. AGREEMENT STATES

State	Became an Agreement State On—	Contact
ALABAMA	10/1/66	Mr. Aubrey V. Godwin, Director Division of Radiation Control State Department of Public Health State Office Building 572 East Patton Avenue Montgomery, AL 36130-1701 (205) 242-5315
ARIZONA	5/15/67	Vacant, Acting Director Arizona Radiation Regulatory Agency 4814 South 40th Street Phoenix, AZ 85040 (602)255-4845
ARKANSAS	7/1/63	Ms. Greta J. Dicus, Director Division of Radiation Control and Emergency Management Department of Health 4815 West Markham Street, Slot 30 Little Rock, AR 72205-3876 (501) 661-2301
CALIFORNIA	9/1/62	Mr. Jack S. McGurk, Chief Environmental Health Division State Department of Health Services 714/744 P Street P.O. Box 942732 Sacramento, CA 94234-7320 (916) 322-3482 (916) 322-2073 (Licensing and Inspection)
COLORADO	2/1/68 Amended 4/20/82	Mr. Robert Quillin, Director Radiation Control Division Department of Health 4210 East 11th Avenue Denver, CO 80220 (303) 331-8480
FLORIDA	7/1/64	Mary E. Clark, Ph.D., Chief Office of Radiation Control Department of Health and Rehabilitative Services 1317 Winewood Boulevard Tallahassee, FL 32399-0700 (904) 487-1004

TABLE 1-1. AGREEMENT STATES (Continued)

State	Became an Agreement State On—	Contact
GEORGIA	12/15/69	Mr. Thomas E. Hill, Manager Radioactive Materials Program Department of Natural Resources 4244 International Parkway, Suite 114 Atlanta, GA 30354 (404) 362-2675
ILLINOIS	6/1/87	Mr. Thomas W. Ortciger, Director Department of Nuclear Safety 1035 Outer Park Drive Springfield, IL 62704 (217) 785-9868
IOWA	1/1/86	Mr. Donald A. Flater, Chief Bureau of Environmental Health Iowa Department of Public Health Lucas State Office Building Des Moines, IA 50319 (515) 281-3478
KANSAS	1/1/65	Mr. Gerald W. Allen, Chief X-Ray & Radioactive Materials Control Section Department of Health and Environment Bureau of Environmental Health Services 109 S.W. 9th Street Topeka, KS 66612 (913) 296-1562
KENTUCKY	3/26/62	John Volpe, Ph.D., Manager Radiation Control Branch Cabinet for Human Resources 275 East Main Street Frankfort, KY 40621-1000 (502) 564-3700
LOUISIANA	5/1/67	Mr. Glenn A. Miller, Administrator Radiation Protection Division Office of Air Quality and Radiation Protection 7290 Bluebonnet Road P.O. Box 82135 Baton Rouge, LA 70884-2135 (504) 765-0160
MAINE	4/1/92	Mr. Clough W. Toppan, Manager Radiological Health Program State House, Station 10 Augusta, ME 04333 (207) 289-5676

TABLE 1-1. AGREEMENT STATES (Continued)

State	Became an Agreement State On—	Contact
MARYLAND	1/1/71	Mr. Roland G. Fletcher, Administrator Radiological Health Program Office of Toxics, Environmental Science and Health (TESH) Department of the Environment 2500 Broening Highway Baltimore, MD 21224 (301) 631-3300
MISSISSIPPI	7/1/62	Mr. Eddie S. Fuente, Director Division of Radiological Health State Department of Health 3150 Lawson Street P. O. Box 1700 Jackson, MS 39215-1700 (601) 354-6657
NEBRASKA	10/1/66	Mr. Harold Borchert, Director Division of Radiological Health Department of Health 301 Centennial Mall South P. O. Box 95007 Lincoln, NE 68509 (402) 471-2168
NEVADA	7/1/72	Mr. Stanley R. Marshall, Supervisor Radiological Health Section Health Division Department of Human Resources 505 East King Street Carson City, NV 89710 (702) 687-5394
NEW HAMPSHIRE	5/16/66	Ms. Diane Tefft, Administrator Radiological Health Bureau Division of Public Health Services Health and Welfare Building 6 Hazen Drive Concord, NH 03301-6527 (603) 271-4588

TABLE 1-1. AGREEMENT STATES (Continued)

State	Became an Agreement State On—	Contact
NEW MEXICO	5/1/74	Mr. Benito J. Garcia, Chief Bureau of Hazardous and Radioactive Materials Water and Waste Management Division Department of Environment P. O. Box 26110 Santa Fe, NM 87502 (505) 827-4300
NEW YORK	10/15/62	Ms. Donna Ross, Energy Planner Division of Policy Analysis and Planning 2 Rockefeller Plaza Albany, NY 12223 (518) 473-0048
NORTH CAROLINA	8/1/64	Mr. Dayne H. Brown, Director Division of Radiation Protection Department of Environment, Health and Natural Resources P.O. Box 27687 Raleigh, NC 27611-7687 (919) 571-4141
NORTH DAKOTA	9/1/69	Mr. Dana K. Mount, Director Division of Environmental Engineering Department of Health Program 1200 Missouri Avenue, Room 304 P.O. Box 5520 Bismarck, ND 58502-5520 (701) 221-5188
OREGON	7/1/65	Mr. Ray D. Paris, Manager Radiation Control Section State Health Division Department of Human Resources 800 N.E. Oregon Street P.O. Box 14450 Portland, OR 97214-0450 (503) 229-4014
RHODE ISLAND	1/1/80	Shelley Robinson, Acting Chief Division of Occupational Health and Radiological Health Department of Health 206 Cannon Building 3 Capital Hill Providence, RI 02908-5097 (401) 277-2438

TABLE 1-1. AGREEMENT STATES (Continued)

State	Became an Agreement State On—	Contact
SOUTH CAROLINA	9/15/69	Mr. Heyward G. Shealy, Chief Bureau of Radiological Health Department of Health and Environmental Control 2600 Bull Street Columbia, SC 29201 (803) 734-4700
TENNESSEE	9/1/65	Mr. Michael H. Mobley, Director Division of Radiological Health TERRA Building, Sixth Floor 150 9th Avenue, North Nashville, TN 37219-5404 (615) 741-7812
TEXAS	3/1/63 Amended 3/24/82	Mr. David K. Lacker, Chief Bureau of Radiation Control Texas Department of Health Exchange Building 8407 Wall Street Austin, TX 78756-3189 (512) 834-6688
UTAH	4/1/84	Mr. Larry Anderson, Director Division of Radiation Control Department of Environmental Quality 288 North 1460 West Salt Lake City, UT 84114-4850 (801) 538-6734
WASHINGTON	12/31/66 Amended 2/19/82	Mr. Terry R. Strong, Director Division of Radiation Protection Department of Health, LE-13 Airdustrial Center Building #5 P.O. Box 47827 Olympia, WA 98504-7827 (206) 586-8949

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SECTION 2—
LEGISLATIVE HISTORY
AND STATUTES

SECTION 2. LEGISLATIVE HISTORY AND STATUTES

ATOMIC ENERGY ACT

Nuclear energy first became subject to federal regulations with the passing of the Atomic Energy Act of 1946 (AEA, P.L. 79-585). Its primary purpose was to ensure that the development of nuclear energy was conducted in a manner consistent with the security of the United States. To this end Congress gave the federal government control of the production and use of fissionable material under the Atomic Energy Commission (AEC, established by the Act).

Prompted by accelerated technical and scientific advances in nuclear energy research and development, Congress realized the need to revise the AEA in order to keep pace with nuclear energy development in other countries as well as the United States. Consequently, the AEA was amended in 1954 (P.L. 83-703) to encourage private enterprise in the development and utilization of nuclear energy for peaceful purposes. These amendments allowed non-federal ownership of nuclear production and utilization facilities if an operating license was obtained from the AEC. The amendments also authorized private ownership of byproduct material and the leasing of special nuclear material by AEC-licensed enterprises.

The effect of the 1954 amendments was to remove the monopolistic government control over nuclear energy development and utilization as long as private enterprise complied with all the requirements in the AEC's licensing scheme. Additionally, these amendments ensured federal regulation over processing and use of source, byproduct, and special nuclear material through comprehensive licensing processes.

In 1959, the AEA was further amended (P.L. 86-373) by adding a new Section to (1) define the respective responsibilities of the states and the Commission regarding control of source, byproduct, and special nuclear materials; (2) establish an orderly regulatory system for use by the states and the AEC to regulate radiation hazards associated with the use of these materials; and (3) establish procedures for the transfer of AEC regulatory responsibilities to the states upon approval of a state program. However, provisions were maintained which prohibited the AEC from turning over to the states the responsibility for regulating the discharge of radioactive effluents from any facilities.

In 1964, Congress amended the AEA (P.L. 88-488) by adding a new Section allowing private ownership of special nuclear material by AEC licensees. Other AEA amendments have been passed by Congress dealing largely with commercial licensing by the Nuclear Regulatory Commission (NRC). However, on November 8, 1978, Congress passed the Uranium Mill Tailings Radiation Control Act (UMTRCA, P.L. 95-604). This

law amended AEA by expanding the definition of byproduct material to include tailings and waste produced by the extraction or concentrations of uranium or thorium from any ore processed primarily for its source material content.

Numerous subsequent amendments have been made to the Atomic Energy Act. Most of these changes involved minor word modifications and/or provisions for funding appropriations. In 1983, however, P.L. 97-415 amended many Sections of AEA in addition to appropriating funds. The law authorized the NRC to implement a resident inspector program for quality assurance purposes. A study of commercial nuclear power plant construction was also required to improve quality assurance and quality control. A limitation was placed on the use of special nuclear material, and penalties were set for sabotage of nuclear facilities or fuel. Section 148 of the Act was amended to require the Secretary of Energy to prepare a quarterly report regarding DOE information with respect to nuclear defense programs.

More recent amendments to the Atomic Energy Act include the following:

(1) Public Law 99-399 (August 27, 1986) added three new Sections to the Act:

- Section 132 provides the authority to suspend nuclear cooperation with nations which have not ratified the Convention on the Physical Security of Nuclear Material,

- Section 133 requires consultation with the Department of Defense concerning certain exports and subsequent agreements, and

- Section 149 sets forth requirements for fingerprinting for criminal record checks.

(2) The Price-Anderson Amendments Act of 1988 (P.L. 100-408, August 20, 1988) amended the Price-Anderson provisions of the AEA to extend and improve procedures for liability and indemnification for nuclear incidents.

(3) Public Law 100-456 (September 9, 1988) added Chapter 21 to the Act which established the Defense Nuclear Facilities Safety Board. The Board has five members, appointed by the President, who are respected experts in the field of nuclear safety. The functions of the Board are as follows:

- review and evaluate the standards relating to the design, construction, operation, and decommissioning of defense nuclear facilities of the DOE;

- investigate any event or practice at a DOE defense nuclear facility which the Board determines has adversely affected, or may adversely affect, public health and safety;

- analyze design and operational data;

- review new facility design and construction; and

- make recommendations to the Secretary of Energy with respect to DOE defense nuclear facilities including operations of such facilities, standards, and research needs.

(4) Public Law 101-189 (November 29, 1989) amended Section 91(a) under Title IX (Military Application of Atomic Energy) by adding three new clauses authorizing the Commission to:

- "provide for safe storage, processing, transportation, and disposal of hazardous waste (including radioactive waste) resulting from nuclear materials production, weapons production and surveillance programs, and naval nuclear propulsion programs;

- "carry out research on development of technologies needed for the effective negotiation and verification of international agreements on control of special nuclear materials and nuclear weapons; and

- "...make transfers of federally owned or originated technology to State and local governments, private industry, and universities or other nonprofit organizations so that the prospects for commercialization of such technology are enhanced."

(5) Public Law 101-510 (November 5, 1990) made a technical amendment to Section 313(b) and authorized Fiscal Year 1991 appropriations for the Defense Nuclear Facilities Safety Board operations.

(6) Public Law 101-575 (November 15, 1990) amended the AEA to revise NRC licensing authority and criteria for uranium enrichment

plants. A new Section 193—Licensing of Uranium Enrichment Facilities—was added by this legislation.

> The principal effect of this amendment is that uranium enrichment facilities will be licensed pursuant to the provisions of the Act pertaining to source material and special nuclear material rather than the provisions pertaining to a production facility. Under the new provisions, licensing of uranium enrichment facilities will become a single step licensing process with one license issued pursuant to 10 CFR Parts 40 and 70 rather than a two-part licensing process under 10 CFR Part 50. However, amendments to the Act which address the licensing of uranium enrichment facilities also mandate an environmental review, adjudicatory hearing, inspection before operation, and third party liability insurance. Also, uranium enrichment facilities remain production facilities for other purposes of the Act such as controlling the export of specially designed or prepared uranium enrichment equipment and preservation of Federal authority in Agreement States. [56 *Federal Register* (FR) 46740; September 16, 1991]

(7) Public Law 101-647 (November 29, 1990) revised a stipulation in Section 221(c) pertaining to general provisions of enforcement.

(8) Public Law 102-190 (December 5, 1991) authorized appropriations of $12 million for the operation of the Defense Nuclear Safety Board under Chapter 21 of the AEA and made amendments with regard to the powers and functions of this Board.

ENERGY REORGANIZATION ACT

The Energy Reorganization Act of 1974 (P.L. 93-438) redirected federal energy efforts. Congress determined that the public interest would best be served by separating the licensing and related functions of the AEC from energy development and related functions. This was done by abolishing the AEC and establishing the Energy Research and Development Administration (ERDA) and the NRC. This legislation gave the new NRC certain regulatory authorities over ERDA facilities, including licensing authority over demonstration Liquid Metal Fast Breeder reactors and other demonstration reactors operated as part of an electric utility system. The same Section of the Energy Reorganization Act gave NRC licensing authority for facilities used primarily for the receipt and storage of high-level radioactive wastes. Retrievable surface storage facilities used to contain ERDA high-level waste not associated with research and development activities were also subjected to NRC licensing.

The ERDA was established in response to the severe energy supply problems of the early 1970s. Its mission was to expedite and encourage the development of energy technologies and strategies that would lead the country toward energy self-sufficiency. This was to be accomplished through the work of six Assistant Administrators responsible for fossil energy; nuclear energy; conservation; environment and safety; national security; and solar, geothermal, and advanced energy systems. The NRC was established as an independent regulatory authority to assure the safety and licensing of nuclear reactors and other facilities associated with the processing, transport, and handling of nuclear materials. The NRC's objectives were to be achieved through its Office of Nuclear Reactor Regulation, Office of Nuclear Regulatory Research.

DEPARTMENT OF ENERGY ORGANIZATION ACT

The Department of Energy Organization Act (P.L. 95-91) was enacted after Congress found that:

(1) the United States faced an increasing shortage of nonrenewable energy resources;

(2) this energy shortage and our increasing dependence on foreign energy supplies presented a serious threat to the national security of the United States and to the health, safety, and welfare of its citizens;

(3) a strong national energy program was needed to meet the present and future energy needs of the nation;

(4) responsibility for energy policy, regulation, and research, development, and demonstration was fragmented in many departments and agencies; and

(5) formulation and implementation of a national energy program required the integration of major federal energy functions into a single department in the executive branch.

The Act has been amended many times, revising text regarding armed services personnel, specifying responsibilities of the Inspector General, setting forth reporting requirements, and other wording changes. Recent amendments accomplished the following:

(1) Public Law 100-504 (October 18, 1988) repealed Section 208 of the Act which established the Office of Inspector General of the Department of Energy and the position of Deputy Inspector General.

(2) Public Law 100-531 (October 25, 1988) revised Title VI of the Act by adding Sections 661 and 662 to set guidelines protecting the Strategic Petroleum Reserve.

(3) Public Law 101-271 (April 11, 1990) amended Section 401(b) of the Act to provide for five-year, staggered terms of office for the members of the Federal Energy Regulatory Commission.

(4) Public Law 101-510 (November 5, 1990) amended the Act by authorizing DOE to continue support of programs promoting mathematics, science, and engineering education, including student and teacher research appointments at DOE laboratories and partnerships between DOE laboratories and educational institutions.

(5) Public Law 102-88 (August 14, 1991) amended Section 621 of the Act by adding a new subsection regarding positions devoted to intelligence and intelligence-related activities.

URANIUM MILL TAILINGS RADIATION CONTROL ACT

The Uranium Mill Tailings Radiation Control Act of 1978 (P.L. 95-604, mentioned previously) mandated cleanup of potentially hazardous uranium wastes to provide stricter controls on future handling and disposal of wastes from the processing of uranium. Prior to the enactment of this law, no federal agency had explicit authority to regulate or dispose of wastes at abandoned uranium mills. The NRC licensed and regulated 11 operating mines and mills, and states regulated 14 operating mines and mills. Once the operations closed down, however, the NRC no longer had jurisdiction over the uranium wastes. The EPA had some jurisdiction over the tailings, but a member of the Senate said that EPA would not be able to issue regulations governing the wastes for several years.

The Senate Energy and Natural Resources Committee, the House Commerce Committee, and the House Interior Committee all drafted legislation to cover this issue. The three versions of the bill were similar in that they all:

(1) required federal ownership of uranium mill sites, although the Senate bill allowed states to take over sites after they were cleaned up,

(2) required the federal government to pay 100% of the cleanup costs for waste sites on Indian lands, and

(3) gave states the authority to concur in the type of cleanup activity and the location of disposal sites for tailings.

The major difference in the bills was in the cost to be incurred by the federal government. The issue was resolved when the Senate agreed to accept the House language

which called for the federal government to pay 90% of the cleanup cost, with the remaining 10% to be paid by the states where the wastes were located.

The UMTRCA was amended on January 4, 1983 (P.L. 97-415) to make some minor changes and to designate a uranium mill site in Edgemont, South Dakota as a processing site [as defined by Section 101(6)]. The statute was also amended on November 15, 1988 (P.L. 100-616) when the Uranium Mill Tailings Remedial Action Amendments of 1988 were approved. Section 106 of the Act (Acquisition of Land by Secretary) was amended to state that the Secretary of the Interior may permanently transfer specified public lands under the jurisdiction of the Bureau of Land Management to the Secretary of Energy. The purpose of the transfer was to carry out the purposes of the Act. Section 112 (Termination; Authorization) was also amended by P.L. 100-616 to extend the authority of the Secretary of Energy to perform remedial action under the title until 1994. The authority of the Secretary to perform groundwater restoration activities under this title, however, is not limited.

NUCLEAR WASTE POLICY ACT

The Nuclear Waste Policy Act of 1982 (NWPA, P.L. 97-425) established federal responsibility for the development of repositories for the disposal of high-level radioactive waste and spent nuclear fuel. On December 22, 1987, President Reagan signed the Reconciliation Bill (H.R. 3545) which Congress had passed the previous day. This law, P.L. 100-203, required the DOE to begin evaluating the suitability of Yucca Mountain in Nevada as the nation's permanent high-level waste repository and to stop activities at the other two proposed sites, Hanford, Washington and Deaf Smith County, Texas. If Yucca Mountain meets the stringent siting requirements, then construction would begin there on a permanent repository. The law also provided for a monitored retrievable storage (MRS) facility for storing and packaging spent nuclear fuel before shipment to the permanent facility. A search for an MRS site was to begin anew. Construction of an MRS cannot start until the NRC approves construction of the permanent repository. At no time can more than 15,000 metric tons of waste go into the MRS. The state selected for the permanent waste repository will get preferential treatment for future federal research projects. Another provision included in P. L. 100-203 required the DOE to establish an Office of Subseabed Disposal Research within the Office of Energy research to carry out research, development, and demonstration activities on all aspects of subseabed disposal of high-level radioactive waste and spent nuclear fuel.

The NWPA was also amended on October 18, 1988 (P.L. 100-507) to establish the Office of Nuclear Waste Negotiatior and to require that the report and recommendation of the MRS Commission, as described in Section 143(a) of the NWPA, be transmitted to Congress on November 1, 1989.

The preceding text provides only a very brief synopsis of the history of the Atomic Energy Act of 1954 and other legislation related to nuclear energy. Statutes and amendments relevant to DOE are given particular mention. For a complete listing of a statute's

popular name and its subsequent amendments, consult *The U.S. Code Annotated* Popular Name Table for the current year.

THE ATOMIC ENERGY ACT OF 1954[1]

An Act for the development and control of atomic energy.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SHORT TITLE AND TABLE OF CONTENTS

Section 1. This Act may be cited as the "Atomic Energy Act of 1954".

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[1] This Act consists of the Act of August 1, 1946, ch. 724, as amended by the Act of Aug. 30, 1954, ch. 1073 (68 Stat. 921) Aug. 9, 1955, ch 697; July 14, 1956, ch. 608; Aug. 6, 1956, ch 1015; P.L. 85-14, Apr. 112, 1957; P.L. 85-479, July 2, 1958; P.L. 86-43, June 11, 1959; P.L. 87-206, Sept. 6, 1961; P.L. 867-615, Aug. 29, 1962; P.L. 88-72, July 22, 1963; P.L. 88-294, Mar. 26, 1964; P.L. 89-135, Aug. 24, 1965; P.L. 89-645, Oct. 13, 1966; P.L. 100-408, Aug. 20, 1988; P.L. 101-189, Nov. 29, 1989; 42 U.S.C. 2011-2259. Bracketed notes are used at the end of each section for the convenience of the reader to indicate the United States Code citation.

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TITLE I—DECLARATION, FINDINGS, AND PURPOSE

DECLARATION

Sec. 1. Atomic energy is capable of application for peaceful as well as military purposes. It is therefore declared to be the policy of the United States that—

(a) the development, use, and control of atomic energy shall be directed so as to make the maximum contribution to the general welfare, subject at all times to the paramount objective of making the maximum contribution to the common defense and security; and

(b) the development, use, and control of atomic energy shall be directed so as to promote world peace, improve the general welfare, increase the standard of living, and strengthen free competition in private enterprise.

[42 U.S.C. 2011]

FINDINGS

Sec. 2. The Congress of the United States hereby makes the following findings concerning the development, use, and control of atomic energy:

(a) The development, utilization, and control of atomic energy for military and for all other purposes are vital to the common defense and security.

(b) [Repealed]

(c) The processing and utilization of source, byproduct, and special nuclear material affect interstate and foreign commerce and must be regulated in the national interest.

(d) The processing and utilization of source, byproduct, and special nuclear material must be regulated in the national interest and in order to provide for the common defense and security and to protect the health and safety of the public.

(e) Source and special nuclear material, production facilities, and utilization facilities are affected with the public interest, and regulation by the United States of the production and utilization of atomic energy and of the facilities used in connection therewith is necessary in the national interest to assure the common defense and security and to protect the health and safety of the public.

(f) The necessity for protection against possible interstate damage occurring from the operation of facilities for the production or utilization of source or special nuclear material places the operation of those facilities in interstate commerce for the purposes of this Act.

(g) Funds of the United States may be provided for the development and use of atomic energy under conditions which will provide for the common defense and security and promote the general welfare.

(h) [Repealed]

(i) In order to protect the public and to encourage the development of the atomic energy industry, in the interest of the general welfare and of the common defense and security, the United States may make funds available for a portion of the damages suffered by the public from nuclear incidents, and may limit the liability of those persons liable for such losses.

[42 U.S.C. 2012]

PURPOSE

Sec. 3. It is the purpose of this Act to effectuate the policies set forth above by providing for—

(a) a program of conducting, assisting, and fostering research and development in order to encourage maximum scientific and industrial progress;

(b) a program for the dissemination of unclassified scientific and technical information and for the control, dissemination, and declassification of Restricted Data, subject to appropriate safeguards, so as to encourage scientific and industrial progress;

(c) a program for Government control of the possession, use, and production of atomic energy and special nuclear material, whether owned by the Government or others, so directed as to make the maximum contribution to the common defense and security and the national welfare, and to provide continued assurance of the Government's ability to enter into and enforce agreements with nations or groups of nations for the control of special nuclear materials and atomic weapons.

(d) a program to encourage widespread participation in the development and utilization of atomic energy for peaceful purposes to the maximum extent consistent with the common defense and security and with the health and safety of the public;

(e) a program of international cooperation to promote the common defense and security and to make available to cooperating nations the benefits of peaceful applications of atomic energy as widely as expanding technology and considerations of the common defense and security will permit; and

(f) a program of administration which will be consistent with the foregoing policies and programs, with international arrangements, and with agreements for cooperation, which will enable the Congress to be currently informed so as to take further legislative action as may be appropriate.

[42 U.S.C. 2013]

TITLE II—DEFINITIONS

DEFINITIONS

Sec. 11. The intent of Congress in the definitions as given in this section should be construed from the words or phrases used in the definitions. As used in this Act:

(a) The term "agency of the United States" means the executive branch of the United States, or any Government agency, or the legislative branch of the United States, or any agency, committee, commission, office, or other establishment in the legislative branch, or the judicial branch of the United States, or any office, agency, committee, commission, or other establishment in the judicial branch.

(b) The term "agreement for cooperation" means any agreement with another nation or regional defense organization authorized or permitted by sections 54, 57, 64, 82, 91(c), 103, 104, or 144 [42 U.S.C. 2074, 2077, 2094, 2112, 2121(c), 2133, 2134, 2164], and made pursuant to section 123 [42 U.S.C. 2153].

(c) The term "atomic energy" means all forms of energy released in the course of nuclear fission or nuclear transformation.

(d) The term "atomic weapon" means any device utilizing atomic energy, exclusive of the means for transporting or propelling the device (where such means is a separable and divisible part of the device), the principal purpose of which is for use as, or for development of, a weapon, a weapon prototype, or a weapon test device.

(e) The term "byproduct material" means (1) any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material, and (2) the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content.

(f) The term "Commission" means the Atomic Energy Commission. For transfer of certain functions from the Nuclear Regulatory Commission to the Chairman thereof, see Reorg. Plan No. 1 of 1980, 45 FR 40561, 94 Stat. 3585[1]

(g) The term "common defense and security" means the common defense and security of the United States.

(h) The term "defense information" means any information in any category determined by any Government agency authorized to classify information, as being information respecting, relating to, or affecting the national defense.

(i) The term "design" means (1) specifications, plans, drawings, blueprints, and other items of like nature; (2) the information contained therein; or (3) the research and development data pertinent to the information contained therein.

(j) The term "extraordinary nuclear occurrence" means any event causing a discharge or dispersal of source, special nuclear, or byproduct material from its intended place of confinement in amounts offsite, or causing radiation levels offsite, which the Nuclear Regulatory Commission determines to be substantial, and which the Nuclear Regulatory Commission determines has resulted or will probably result in substantial damages to persons offsite or property offsite. Any determination by the Nuclear Regulatory Commission that such an event has, or has not, occurred shall be final and conclusive, and no other official or any court shall have power or jurisdiction to review any such determination. The Nuclear Regulatory Commission shall establish criteria in writing setting forth the basis upon which such determination shall be made. As used in this subsection, "offsite" means away from "the location" or "the contract location" as defined in the applicable

[1] The Atomic Energy Commission was abolished and all functions under this section were transferred to the Nuclear Regulatory Commission and the Administrator of the Energy Research and Development Administration by sections 104 and 201 of the Energy Reorganization Act of 1974, Pub. L. 93-438. The Energy Research and Development Administration was terminated and functions vested by law in the Administrator thereof were transferred to the Secretary of Energy (unless otherwise specifically provided) by sections 302(a) and 703 of the Department of Energy Organization Act, Pub. L. 95-91.

Nuclear Regulatory Commission indemnity agreement, entered into pursuant to section 170 [42 U.S.C. 2210].

(k) The term "financial protection" means the ability to respond in damages for public liability and to meet the costs of investigating and defending claims and settling suits for such damages.

(l) The term "Government agency" means any executive department, commission, independent establishment, corporation, wholly or partly owned by the United States of America which is an instrumentality of the United States, or any board, bureau, division, service, office, officer, authority, administration, or other establishment in the executive branch of the Government.

(m) The term "indemnitor" means (1) any insurer with respect to his obligations under a policy of insurance furnished as proof of financial protection; (2) any licensee, contractor or other person who is obligated under any other form of financial protection, with respect to such obligations; and (3) the Nuclear Regulatory Commission with respect to any obligation undertaken by it in an indemnity agreement entered into pursuant to section 170 [42 U.S.C. 2210].

(n) The term "international arrangement" means any international agreement hereafter approved by the Congress or any treaty during the time such agreement or treaty is in full force and effect, but does not include any agreement for cooperation.

(o) The term "Joint Committee" means the Joint Committee on Atomic Energy.[1]

(p) The term "licensed activity" means an activity licensed pursuant to this Act and covered by the provisions of section 170(a) [42 U.S.C. 2210(a)].

(q) The term "nuclear incident" means any occurrence, including an extraordinary nuclear occurrence, within the United States causing, within or outside the United States, bodily injury, sickness, disease, or death, or loss of or damage to property, or loss of use of property, arising out of or resulting from the radioactive, toxic, explosive, or other hazardous properties of source, special nuclear, or byproduct material: *Provided, however,* That as the term is used in section 170 l. [42 U.S.C. 2210 (l)], it shall include any such occurrence outside the United States: *And provided further*, That as the term is used in section 170 d. [42 U.S.C. 2210(d)], it shall include any such occurrence outside the United States if such occurrence involves source, special nuclear, or byproduct material owned by, and used by or under contract with, the United States: *And provided further*, That as the term is used in section 170 c. [42 U.S.C. 2210(c)], it shall include any such occurrence outside both the United States and any other nation if such occurrence arises out of or results from the radioactive, toxic, explosive, or other hazardous properties of source, special nuclear, or byproduct material licensed pursuant to chapters 6, 7, 8, and 10 of this Act [42 U.S.C. 2071 et seq.; 2091 et seq.; 2111 et seq.; 2131 et seq.], which is used in connection with the operation of a licensed stationary production or utilization facility or which moves outside the territorial limits of the United States in transit from one person licensed by the Nuclear Regulatory Commission to another person licensed by the Nuclear Regulatory Commission.

(r) The term "operator" means any individual who manipulates the controls of a utilization or production facility.

(s) The term "person" means (1) any individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, Government agency other than the Commission, any State or any political subdivision of, or any political entity within a State, any foreign government or nation or any political subdivision of any such government or nation, or other entity; and (2) any legal successor, representative, agent, or agency of the foregoing.

(t) The term "person indemnified" means (1) with respect to a nuclear incident occurring within the United States or outside the United States as the term is used in section 170 c. [42 U.S.C. 2210(c)], and with respect to any nuclear incident in connection with the design, development, construction, operation, repair, maintenance, or use of the nuclear ship Savannah, the person with whom an indemnity agreement is executed or who is required to maintain financial protection, and any other person who may be liable for public liability or (2) with respect to any other nuclear incident occurring outside the United States, the person

[1] The Joint Committee on Atomic Energy Commission was abolished by Section 301 of the Atomic Energy Act of 1954, on September 20, 1977. References to the Joint Committee are deemed, on or after Sept. 20, 1977, to refer to the committees of the Senate or House of Representatives which, under the rules of the Senate or House, have jurisdiction over the subject matter with records and files of the Joint Committee being transferred to the respective comittees of the House or Senate.

with whom an indemnity agreement is executed and any other person who may be liable for public liability by reason of his activities under any contract with the Secretary of Energy or any project to which indemnification under the provisions of section 170 d. [42 U.S.C. 2210(d)] has been extended or under any subcontract, purchase order, or other agreement, of any tier, under any such contract or project.

(u) The term "produce", when used in relation to special nuclear material, means (1) to manufacture, make, produce, or refine special nuclear material; (2) to separate special nuclear material from other substances in which such material may be contained; or (3) to make or to produce new special nuclear material.

(v) The term "production facility" means (1) any equipment or device determined by rule of the Commission to be capable of the production of special nuclear material in such quantity as to be of significance to the common defense and security, or in such manner as to affect the health and safety of the public; or (2) any important component part especially designed for such equipment or device as determined by the Commission. Except with respect to the export of a uranium enrichment production facility, such term as used in chapters 10 and 16 shall not include any equipment or device (or important component part especially designed for such equipment or device) capable of separating the isotopes of uranium or enriching uranium in the isotope 235.

(w) The term "public liability" means any legal liability arising out of or resulting from a nuclear incident, or precautionary evacuation (including all reasonable additional costs incurred by a State, or a political subdivision of a State in the course of responding to a nuclear incident or a precautionary evacuation) except: (i) claims under State or Federal workmen's compensation acts of employees of persons indemnified who are employed at the site of and in connection with the activity where the nuclear incident occurs; (ii) claims arising out of an act of war; and (iii) whenever used in subsections (a), (c), and (k) of section 170 [42 U.S.C. 2210(a), (c), (k)], claims for loss of, or damage to, or loss of use of property which is located at the site of and used in connection with the licensed activity where the nuclear incident occurs. "Public liability" also includes damage to property of persons indemnified: *Provided*, That such property is covered under the terms of the financial protection required, except property which is located at the site of and used in connection with the activity where the nuclear incident occurs.

(x) The term "research and development" means (1) theoretical analysis, exploration, or experimentation; or (2) the extension of investigative findings and theories of a scientific or technical nature into practical application for experimental and demonstration purposes, including the experimental production and testing of models, devices, equipment, materials, and processes.

(y) The term "Restricted Data" means all data concerning (1) design, manufacture, or utilization of atomic weapons; (2) the production of special nuclear material; or (3) the use of special nuclear material in the production of energy, but shall not include data declassified or removed from the Restricted Data category pursuant to section 142 [42 U.S.C. 2162].

(z) The term "source material" means (1) uranium, thorium, or any other material which is determined by the Commission pursuant to the provisions of section 61 [42 U.S.C. 2091] to be source material; or (2) ores containing one or more of the foregoing materials, in such concentration as the Commission may by regulation determine from time to time.

(aa) The term "special nuclear material" means (1) plutonium, uranium enriched in the isotope 233 or in the isotope 235, and any other material which the Commission, pursuant to the provisions of section 51 [42 U.S.C. 2071], determines to be special nuclear material, but does not include source material; or (2) any material artificially enriched by any of the foregoing, but does not include source material.

(bb) The term "United States" when used in a geographical sense includes all Territories and possessions of the United States, the Canal Zone and Puerto Rico.

(cc) The term "utilization facility" means (1) any equipment or device, except an atomic weapon, determined by rule of the Commission to be capable of making use of special nuclear material in such quantity as to be of significance to the common defense and security, or in such manner as to affect the health and safety of the public, or peculiarly adapted for making use of atomic energy in such quantity as to be of significance to the common defense and security, or in such manner as to affect the health and safety of the public; or (2) any important component part especially designed for such equipment or device as determined by the Commission.

(dd) The terms "high-level radioactive waste" and "spent nuclear fuel" have the meanings given such terms in section 2 of the Nuclear Waste Policy Act of 1982 [42 U.S.C. 10101].

(ee) The term "transuranic waste" means material contaminated with elements that have an atomic number greater than 92, including neptunium, plutonium, americium, and curium, and that are in concentrations

greater than 10 nanocuries per gram, or in such other concentrations as the Nuclear Regulatory Commission may prescribe to protect the public health and safety.

(ff) The term "nuclear waste activities," as used in section 170, means activities subject to an agreement of indemnification under subsection d. of such section, that the Secretary of Energy is authorized to undertake, under this Act or any other law, involving the storage, handling, transportation, treatment, or disposal of, or research and development on, spent nuclear fuel, high-level radioactive waste, or transuranic waste, including (but not limited to) activities authorized to be carried out under the Waste Isolation Pilot Project under section 213 of Public Law 96-164 (93 Stat. 1265).

(gg) The term "precautionary evacuation" means an evacuation of the public within a specified area near a nuclear facility, or the transportation route in the case of an accident involving transportation of source material, special nuclear material, byproduct material, high-level radioactive waste, spent nuclear fuel, or transuranic waste to or from a production or utilization facility, if the evacuation is—

(1) the result of any event that is not classified as a nuclear incident but that poses imminent danger of bodily injury or property damage from the radiological properties of source material, special nuclear material, byproduct material, high-level radioactive waste, spent nuclear fuel, or transuranic waste, and causes an evacuation; and

(2) initiated by an official of a State or a political subdivision of a State, who is authorized by State law to initiate such an evacuation and who reasonably determined that such an evacuation was necessary to protect the public health and safety.

(hh) The term "public liability action", as used in section 170, means any suit asserting public liability. A public liability action shall be deemed to be an action arising under section 170, and the substantive rules for decision in such action shall be derived from the law of the State in which the nuclear incident involved occurs, unless such law is inconsistent with the provisions of such section.

(jj) Legal Costs.—As used in section 170, the term "legal costs" means the costs incurred by a plaintiff or a defendant in initiating, prosecuting, investigating, settling, or defending claims or suits for damage arising under such section.

[42 U.S.C. 2014]

TITLE III—ORGANIZATION

OFFICE

Sec. 23. The principal office of the Commission shall be in or near the District of Columbia, but the Commission or any duly authorized representative may exercise any or all of its powers in any place; however, the Commission shall maintain an office for the service of process and papers within the District of Columbia.

[42 U.S.C. 2033]

GENERAL MANAGER, DEPUTY AND ASSISTANT GENERAL MANAGERS

Sec. 24. There is hereby established within the Commission—

(a) General Manager. a General Manager, who shall be the chief executive officer of the Commission, and who shall discharge such of the administrative and executive functions of the Commission as the Commission may direct. The General Manager shall be appointed by the Commission, shall serve at the pleasure of the Commission, and shall be removable by the Commission.

(b) Deputy General Manager. a Deputy General Manager, who shall act in the stead of the General Manager during his absence when so directed by the General Manager, and who shall perform such other administrative and executive functions as the General Manager shall direct. The Deputy General Manager shall be appointed by the General Manager with the approval of the Commission, shall serve at the pleasure of the General Manager, and shall be removable by the General Manager.

(c) Assistant General Managers. Assistant General Managers, or their equivalents (not to exceed a total of three positions), who shall perform such administrative and executive functions as the General Manager shall direct. They shall be appointed by the General Manager with the approval of the Commission, shall serve at the pleasure of the General Manager, and shall be removable by the General Manager.

[42 U.S.C. 2034]

DIVISIONS, OFFICES, AND POSITIONS

Sec. 25. There is hereby established within the Commission—

(a) Division of Military Application. a Division of Military Application and such other program divisions (not to exceed ten in number) as the Commission may determine to be necessary to the discharge of its responsibilities, including a division or divisions the primary responsibilities of which include the development and application of civilian uses of atomic energy. The Division of Military Application shall be under the direction of an Assistant General Manager for Military Application, who shall be appointed by the Commission and shall be an active commissioned officer of the Armed Forces serving in general or flag officer rank or grade, as appropriate. Each other program division shall be under the direction of a Director who shall be appointed by the Commission. The Commission shall require each such division to exercise such of the Commission's administrative and executive powers as the Commission may determine;

(b) Office of the General Counsel. an Office of the General Counsel under the direction of the General Counsel who shall be appointed by the Commission; and

(c) Inspection Division. an Inspection Division under the direction of a Director who shall be appointed by the Commission. The Inspection Division shall be responsible for gathering information to show whether or not the contractors, licensees, and officers and employees of the Commission are complying with the provisions of this Act (except those provisions for which the Federal Bureau of Investigation is responsible) and the appropriate rules and regulations of the Commission.

(d) Executive management positions. such other executive management positions (not to exceed six in number) as the Commission may determine to be necessary to the discharge of its responsibilities. Such positions shall be established by the General Manager with the approval of the Commission. They shall be appointed by the General Manager with the approval of the Commission, shall serve at the pleasure of the General Manager, and shall be removable by the General Manager.

[42 U.S.C. 2035]

Sec. 27. [Repealed]

[42 U.S.C. 2037]

APPOINTMENT OF ARMY, NAVY, OR AIR FORCE OFFICERS

Sec. 28. Notwithstanding the provisions of any other law, the officer of the Army, Navy, or Air Force serving as Assistant General Manager for Military Application shall serve without prejudice to his commissioned status as such officer. Any such officer serving as Assistant General Manager for Military Application shall receive in addition to his pay and allowances, including special and incentive pays, for which pay and allowances the Commission shall reimburse his service, an amount equal to the difference between such pay and allowances, including special and incentive pays, and the compensation established for this position. Notwithstanding the provisions of any other law, any active or retired officer of the Army, Navy, or Air Force may serve as Chairman of the Military Liaison Committee without prejudice to his active or retired status as such officer. Any such active officer serving as Chairman of the Military Liaison Committee shall receive, in addition to his pay and allowances, including special and incentive pays, an amount equal to the difference between such pay and allowances, including special and incentive pays, and the compensation fixed for such Chairman. Any such retired officer serving as Chairman of the Military Liaison Committee shall receive the compensation fixed for such Chairman and his retired pay, subject to section 201 of the Dual Compensation Act.

[42 U.S.C. 2038]

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

Sec. 29. There is hereby established an Advisory Committee on Reactor Safeguards consisting of a maximum of fifteen members appointed by the Commission for terms of four years each. The Committee shall review safety studies and facility license applications referred to it and shall make reports thereon, shall advise the Commission with regard to the hazards of proposed or existing reactor facilities and the adequacy of proposed reactor safety standards, and shall perform such other duties as the Commission may request. One member shall be designated by the Committee as its Chairman. The members of the Committee shall receive a per diem compensation for each day spent in meetings or conferences, or other work of the Committee, and all members shall receive their necessary traveling or other expenses while engaged in the work of the Committee. The provisions of section 163 [42 U.S.C. 2203] shall be applicable to the Committee. In addition to its other duties under this section, the committee, making use of all available sources, shall undertake a study of reactor safety research and prepare and submit annually to the Congress a report

containing the results of such study. The first such report shall be submitted to the Congress not later than December 31, 1977.
[42 U.S.C. 2039]

TITLE IV—RESEARCH

RESEARCH ASSISTANCE

Sec. 31. (a) The Commission is directed to exercise its powers in such manner as to insure the continued conduct of research and development and training activities in the fields specified below, by private or public institutions or persons, and to assist in the acquisition of an ever-expanding fund of theoretical and practical knowledge in such fields. To this end the Commission is authorized and directed to make arrangements (including contracts, agreements, and loans) for the conduct of research and development activities relating to—

(1) nuclear processes;

(2) the theory and production of atomic energy, including processes, materials, and devices related to such production;

(3) utilization of special nuclear material and radioactive material for medical, biological, agricultural, health, or military purposes;

(4) utilization of special nuclear material, atomic energy, and radioactive material and processes entailed in the utilization or production of atomic energy or such material for all other purposes, including industrial or commercial uses, the generation of usable energy, and the demonstration of advances in the commercial or industrial application of atomic energy;

(5) the protection of health and the promotion of safety during research and production activities; and

(6) the preservation and enhancement of a viable environment by developing more efficient methods to meet the Nation's energy needs.

(b) The Commission is further authorized to make grants and contributions to the cost of construction and operation of reactors and other facilities and other equipment to colleges, universities, hospitals, and eleemosynary or charitable institutions for the conduct of educational and training activities relating to the fields in subsection (a).

(c) The Commission may (1) make arrangements pursuant to this section, without regard to the provisions of section 3709 of the Revised Statutes, as amended [41 U.S.C. 5], upon certification by the Commission that such action is necessary in the interest of the common defense and security, or upon a showing by the Commission that advertising is not reasonably practicable; (2) make partial and advance payments under such arrangements; and (3) make available for use in connection therewith such of its equipment and facilities as it may deem desirable.

(d) The arrangements made pursuant to this section shall contain such provisions (1) to protect health, (2) to minimize danger to life or property, and (3) to require the reporting and to permit the inspection of work performed thereunder, as the Commission may determine. No such arrangement shall contain any provisions or conditions which prevent the dissemination of scientific or technical information, except to the extent such dissemination is prohibited by law.
[42 U.S.C. 2051]

RESEARCH BY THE COMMISSION

Sec. 32. The Commission is authorized and directed to conduct, through its own facilities, activities and studies of the types specified in section 31 [42 U.S.C. 2051].
[42 U.S.C. 2052]

RESEARCH FOR OTHERS

Sec. 33. Where the Commission finds private facilities or laboratories are inadequate for the purpose, it is authorized to conduct for other persons, through its own facilities, such of those activities and studies of the types specified in section 31 [42 U.S.C. 2051] as it deems appropriate to the development of energy. To the extent the Commission determines that private facilities or laboratories are inadequate to the purpose, and that the Commission's facilities, or scientific or technical resources have the potential of lending significant assistance to other persons in the fields of protection of public health and safety, the Commission may also assist other persons in these fields by conducting for such persons, through the Commission's own facilities, research and development or training activities and studies. The Commission is authorized to

determine and make such charges as in its discretion may be desirable for the conduct of the activities and studies referred to in this section.
[42 U.S.C. 2053]

TITLE V—PRODUCTION OF SPECIAL NUCLEAR MATERIAL

OWNERSHIP AND OPERATION OF PRODUCTION FACILITIES

Sec. 41. (a) Ownership of production facilities. The Commission, as agent of and on behalf of the United States, shall be the exclusive owner of all production facilities other than facilities which (1) are useful in the conduct of research and development activities in the fields specified in section 31 [42 U.S.C. 2051], and do not, in the opinion of the Commission, have a potential production rate adequate to enable the user of such facilities to produce within a reasonable period of time a sufficient quantity of special nuclear material to produce an atomic weapon; or (2) are licensed by the Commission pursuant under this Act [42 U.S.C. 2133, 2134].

(b) Operation of the Commission's production facilities. The Commission is authorized and directed to produce or to provide for the production of special nuclear material in its own production facilities. To the extent deemed necessary, the Commission is authorized to make, or to continue in effect, contracts with persons obligating them to produce special nuclear material in facilities owned by the Commission. The Commission is also authorized to enter into research and development contracts authorizing the contractor to produce special nuclear material in facilities owned by the Commission to the extent that the production of such special nuclear material may be incident to the conduct of research and development activities under such contracts. Any contract entered into under this section shall contain provisions (1) prohibiting the contractor from subcontracting any part of the work he is obligated to perform under the contract, except as authorized by the Commission; and (2) obligating the contractor (A) to make such reports pertaining to activities under the contract to the Commission as the Commission may require, (B) to submit to inspection by employees of the Commission of all such activities, and (C) to comply with all safety and security regulations which may be prescribed by the Commission. Any contract made under the provisions of this paragraph may be made without regard to the provisions of section 3709 of the Revised Statutes, as amended [41 U.S.C. 5], upon certification by the Commission that such action is necessary in the interest of the common defense and security, or upon a showing by the Commission that advertising is not reasonably practicable. Partial and advance payments may be made under such contracts.

(c) Operation of other production facilities. Special nuclear material may be produced in the facilities which under this section are not required to be owned by the Commission.
[42 U.S.C. 2061]

IRRADIATION OF MATERIALS

Sec. 42. The Commission and persons lawfully producing or utilizing special nuclear material are authorized to expose materials of any kind to the radiation incident to the processes of producing or utilizing special nuclear material.
[42 U.S.C. 2062]

ACQUISITION OF PRODUCTION FACILITIES

Sec. 43. The Commission is authorized to purchase any interest in facilities for the production of special nuclear materials, or in real property on which such facilities are located, without regard to the provisions of section 3709 of the Revised Statutes, as amended [41 U.S.C. 5], upon certification by the Commission that such action is necessary in the interest of the common defense and security, or upon a showing by the Commission that advertising is not reasonably practicable. Partial and advance payments may be made under contracts for such purposes. The Commission is further authorized to requisition, condemn, or otherwise acquire any interest in such production facilities, or to condemn or otherwise acquire such real property, and just compensation shall be made therefor.
[42 U.S.C. 2063]

DISPOSITION OF ENERGY

Sec. 44. If energy is produced at production facilities of the Commission or is produced in experimental utilization facilities of the Commission, such energy may be used by the Commission, or transferred to other Government agencies, or sold to publicly, cooperatively, or privately owned utilities or users at reasonable and nondiscriminatory prices. If the energy produced is electric energy, the price shall be subject to

regulation by the appropriate agency having jurisdiction. In contracting for the disposal of such energy, the Commission shall give preference and priority to public bodies and cooperatives or to privately owned utilities providing electric utility services to high cost areas not being served by public bodies or cooperatives. Nothing in this Act shall be construed to authorize the Commission to engage in the sale or distribution of energy for commercial use except such energy as may be produced by the Commission incident to the operation of research and development facilities of the Commission, or of production facilities of the Commission.

[42 U.S.C. 2064]

TITLE VI—SPECIAL NUCLEAR MATERIAL

SPECIAL NUCLEAR MATERIAL

Sec. 51. The Commission may determine from time to time that other material is special nuclear material in addition to that specified in the definition as special nuclear material. Before making any such determination, the Commission must find that such material is capable of releasing substantial quantities of atomic energy and must find that the determination that such material is special nuclear material is in the interest of the common defense and security, and the President must have expressly assented in writing to the determination. The Commission's determination, together with the assent of the President, shall be submitted to the Joint Committee and a period of thirty days shall elapse while Congress is in session (in computing such thirty days, there shall be excluded the days on which either House is not in session because of an adjournment for more than three days) before the determination of the Commission may become effective: *Provided, however,* That the Joint Committee, after having received such determination, may by resolution in writing, waive the conditions of or all or any portion of such thirty-day period.

[42 U.S.C. 2071]

DOMESTIC DISTRIBUTION OF SPECIAL NUCLEAR MATERIAL

Sec. 53. (a) Issuance of licenses. The Commission is authorized (i) to issue licenses to transfer or receive in interstate commerce, transfer, deliver, acquire, possess, own, receive possession of or title to, import, or export under the terms of an agreement for cooperation arranged pursuant to section 123 [42 U.S.C. 2153], special nuclear material, (ii) to make special nuclear material available for the period of the license, and, (iii) to distribute special nuclear material within the United States to qualified applicants requesting such material—

(1) for the conduct of research and development activities of the types specified in section 31 [42 U.S.C. 2051];

(2) for use in the conduct of research and development activities or in medical therapy under a license issued pursuant to section 104 [42 U.S.C. 2134];

(3) for use under a license issued pursuant to section 103 [42 U.S.C. 2133];

(4) for such other uses as the Commission determines to be appropriate to carry out the purposes of this Act.

(b) Minimum criteria. The Commission shall establish, by rule, minimum criteria for the issuance of specific or general licenses for the distribution of special nuclear material depending upon the degree of importance to the common defense and security or to the health and safety of the public of—

(1) the physical characteristics of the special nuclear material to be distributed;

(2) the quantities of special nuclear material to be distributed; and

(3) the intended use of the special nuclear material to be distributed.

(c) Distribution.

(1) The Commission may distribute special nuclear material licensed under this section by sale, lease, lease with option to buy, grant, or through the provision of production or enrichment services: *Provided, however,* That unless otherwise authorized by law, the Commission shall not after December 31, 1970, distribute special nuclear material except by sale or through the provision of production or enrichment services to any person who possesses or operates a utilization facility under a license issued pursuant to section 103 or 104(b) [42 U.S.C. 2133 or 2134(b)] for use in the course of activities under such license; nor shall the Commission permit any such person after June 30, 1973, to continue leasing for use in the course of such activities special nuclear material previously leased to such person by the Commission.

(2) The Commission shall establish reasonable sales prices for the special nuclear material licensed and distributed by sale under this section. Such sales prices shall be established on a nondiscriminatory basis which, in the opinion of the Commission, will provide reasonable compensation to the Government for such special nuclear material.

(3) The Commission is authorized to enter into agreements with licensees for such period of time as the Commission may deem necessary or desirable to distribute to such licensees such quantities of special nuclear material as may be necessary for the conduct of the licensed activity. In such agreements, the Commission may agree to repurchase any special nuclear material licensed and distributed by sale which is not consumed in the course of the licensed activity, or any uranium remaining after irradiation of such special nuclear material, at a repurchase price not to exceed the Commission's sale price for comparable special nuclear material or uranium in effect at the time of delivery of such material to the Commission.

(4) The Commission may make a reasonable charge, determined pursuant to this section, for the use of special nuclear material licensed and distributed by lease under subsection 53(a)(1), (2) or (4) [subsec. (a)(1), (2), (4) of this section] and shall make a reasonable charge determined pursuant to this section for the use of special nuclear material licensed and distributed by lease under subsection 53(a)(3) [subsec. (a)(3) of this section]. The Commission shall establish criteria in writing for the determination of whether special nuclear material will be distributed by grant and for the determination of whether a charge will be made for the use of special nuclear material licensed and distributed by lease under subsection 53(a)(1), (2) or (4) [subsec. (a)(1), (2), or (4) of this section], considering, among other things, whether the licensee is a nonprofit or eleemosynary institution and the purposes for which the special nuclear material will be used.

(d) Determination of charges. In determining the reasonable charge to be made by the Commission for the use of special nuclear material distributed by lease to licensees of utilization or production facilities licensed pursuant to section 103 or 104 [42 U.S.C. 2133, 2134], in addition to consideration of the cost thereof, the Commission shall take into consideration—

(1) the use to be made of the special nuclear material;

(2) the extent to which the use of the special nuclear material will advance the development of the peaceful uses of atomic energy;

(3) the energy value of the special nuclear material in the particular use for which the license is issued;

(4) whether the special nuclear material is to be used in facilities licensed pursuant to section 103 or 104 [42 U.S.C. 2133, 2134]. In this respect, the Commission shall, insofar as practicable, make uniform, nondiscriminatory charges for the use of special nuclear material distributed to facilities licensed pursuant to section 103 [42 U.S.C. 2133]; and

(5) with respect to special nuclear material consumed in a facility licensed pursuant to section 103 [42 U.S.C. 2133], the Commission shall make a further charge equivalent to the sale price for similar special nuclear material established by the Commission in accordance with subsection 53(c)(2) [subsec. (c)(2) of this section], and the Commission may make such a charge with respect to such material consumed in a facility licensed pursuant to section 104 [42 U.S.C. 2134].

(e) Conditions. Each license issued pursuant to this section shall contain and be subject to the following conditions—

(1) [Repealed]

(2) no right to the special nuclear material shall be conferred by the license except as defined by the license;

(3) neither the license nor any right under the license shall be assigned or otherwise transferred in violation of the provisions of this Act;

(4) all special nuclear material shall be subject to the right of recapture or control reserved by section 108 [42 U.S.C. 2138] and to all other provisions of this Act;

(5) no special nuclear material may be used in any utilization or production facility except in accordance with the provisions of this Act;

(6) special nuclear material shall be distributed only on terms, as may be established by rule of the Commission, such that no user will be permitted to construct an atomic weapon;

(7) special nuclear material shall be distributed only pursuant to such safety standards as may be established by rule of the Commission to protect health and to minimize danger to life or property; and

(8) except to the extent that the indemnification and limitation of liability provisions of section 170 [42 U.S.C. 2210] apply, the licensee will hold the United States and the Commission harmless from any damages resulting from the use or possession of special nuclear material by the licensee.

(f) Independent research and development activities. The Commission is directed to distribute within the United States sufficient special nuclear material to permit the conduct of widespread independent research and development activities to the maximum extent practicable. In the event that applications for special nuclear material exceed the amount available for distribution, preference shall be given to those activities which are most likely, in the opinion of the Commission, to contribute to basic research, to the development of peacetime uses of atomic energy, or to the economic and military strength of the Nation.

[42 U.S.C. 2037]

FOREIGN DISTRIBUTION OF SPECIAL NUCLEAR MATERIAL

Sec. 54. (a) The Commission is authorized to cooperate with any nation or group of nations by distributing special nuclear material and to distribute such special nuclear material, pursuant to the terms of an agreement for cooperation to which such nation or group of nations is a party and which is made in accordance with section 123 [42 U.S.C. 2153]. Unless hereafter otherwise authorized by law the Commission shall be compensated for special nuclear material so distributed at not less than the Commission's published charges applicable to the domestic distribution of such material, except that the Commission to assist and encourage research on peaceful uses or for medical therapy may so distribute without charge during any calendar year only a quantity of such material which at the time of transfer does not exceed in value $10,000 in the case of one nation or $50,000 in the case of any group of nations. The Commission may distribute to the International Atomic Energy Agency, or to any group of nations, only such amounts of special nuclear materials and for such period of time as are authorized by Congress: *Provided, however,* That, (i) notwithstanding this provision, the Commission is hereby authorized, subject to the provisions of section 123 [42 U.S.C. 2153], to distribute to the Agency five thousand kilograms of contained uranium-235, five hundred grams of uranium-233, and three kilograms of plutonium, together with the amounts of special nuclear material which will match in amount the sum of all quantities of special nuclear materials made available by all other members of the Agency to June 1, 1960; and (ii) notwithstanding the foregoing provisions of this subsection, the Commission may distribute to the International Atomic Energy Agency, or to any group of nations, such other amounts of special nuclear materials and for such other periods of time as are established in writing by the Commission: *Provided, however,* That before they are established by the Commission pursuant to this subdivision (ii), such proposed amounts and periods shall be submitted to the Congress and referred to the Joint Committee and a period of sixty days shall elapse while Congress is in session (in computing such sixty days, there shall be excluded the days on which either House is not in session because of an adjournment of more than three days): *And provided further,* That any such proposed amounts and periods shall not become effective if during such sixty-day period the Congress passes a concurrent resolution stating in substance that it does not favor the proposed action: *And provided further,* That prior to the elapse of the first thirty days of any such sixty-day period the Joint Committee shall submit a report to the Congress of its views and recommendations respecting the proposed amounts and periods and an accompanying proposed concurrent resolution stating in substance that the Congress favors, or does not favor, as the case may be, the proposed amounts or periods. The Commission may agree to repurchase any special nuclear material distributed under a sale arrangement pursuant to this subsection which is not consumed in the course of the activities conducted in accordance with the agreement for cooperation, or any uranium remaining after irradiation of such special nuclear material, at a repurchase price not to exceed the Commission's sale price for comparable special nuclear material or uranium in effect at the time of delivery of such material to the Commission. The Commission may also agree to purchase, consistent with and within the period of the agreement for cooperation, special nuclear material produced in a nuclear reactor located outside the United States through the use of special nuclear material which was leased or sold pursuant to this subsection. Under any such agreement the Commission shall purchase only such material as is delivered to the Commission during any period when there is in effect a guaranteed purchase price for the same material produced in a nuclear reactor by a person licensed under section 104 [42 U.S.C. 2134], established by the Commission pursuant to section 56 [42 U.S.C. 2076], and the price to be paid shall be the price so established by the Commission and in effect for the same material delivered to the Commission.

(b) Notwithstanding the provisions of sections 123, 124, and 125 [42 U.S.C. 2153, 2154, and 2153 note], the Commission is authorized to distribute to any person outside the United States (1) plutonium containing

80 per centum or more by weight of plutonium-238, and (2) other special nuclear material when it has, in accordance with subsection 57d. [42 U.S.C. 2077(d)], exempted certain classes or quantities of such other special nuclear material or kinds of uses or users thereof from the requirements for a license set forth in this chapter. Unless hereafter otherwise authorized by law, the Commission shall be compensated for special nuclear material so distributed at not less than the Commission's published charges applicable to the domestic distribution of such material. The Commission shall not distribute any plutonium containing 80 per centum or more by weight of plutonium-238 to any person under this subsection if, in its opinion, such distribution would be inimical to the common defense and security. The Commission may require such reports regarding the use of material distributed pursuant to the provisions of this subsection as it deems necessary.

(c) The Commission is authorized to license or otherwise permit others to distribute special nuclear material to any person outside the United States under the same conditions, except as to charges, as would be applicable if the material were distributed by the Commission.

(d) The authority to distribute special nuclear material under this section other than under an export license granted by the Nuclear Regulatory Commission shall extend only to the following small quantities of special nuclear material (in no event more than five hundred grams per year of the uranium isotope 233, the uranium isotope 235, or plutonium contained in special nuclear material to any recipient):

(1) which are contained in laboratory samples, medical devices, or monitoring or other instruments; or

(2) the distribution of which is needed to deal with an emergency situation in which time is of the essence.

(e) The authority in this section to commit United States funds for any activities pursuant to any subsequent arrangement under section 131 a. (2)(E) [42 U.S.C. 2160 a. (2)(E)] shall be subject to the requirements of section 131 [42 U.S.C. 2160].

[42 U.S.C. 2074]

ACQUISITION

Sec. 55. The Commission is authorized, to the extent it deems necessary to effectuate the provisions of this Act, to purchase without regard to the limitations in section 54 [42 U.S.C. 2074] or any guaranteed purchase prices established pursuant to section 56 [42 U.S.C. 2076], and to take, requisition, condemn, or otherwise acquire any special nuclear material or any interest therein. Any contract of purchase made under this section may be made without regard to the provisions of section 3709 of the Revised Statutes, as amended [41 U.S.C. 5], upon certification by the Commission that such action is necessary in the interest of the common defense and security, or upon a showing by the Commission that advertising is not reasonably practicable. Partial and advance payments may be made under contracts for such purposes. Just compensation shall be made for any right, property, or interest in property taken, requisitioned, or condemned under this section[:] *Providing*, That the authority in this section to commit United States funds for any activities pursuant to any subsequent arrangement under section 131a. (2)(E) [42 U.S.C. 2160a. (2)(E)] shall be subject to the requirements of section 131 [42 U.S.C. 2160].

[42 U.S.C. 2075]

GUARANTEED PURCHASE PRICES

Sec. 56. The Commission shall establish guaranteed purchase prices for plutonium produced in a nuclear reactor by a person licensed under section 104 [42 U.S.C. 2134] and delivered to the Commission before January 1, 1971. The Commission shall also establish for such periods of time as it may deem necessary, but not to exceed ten years as to any such period, guaranteed purchase prices for uranium enriched in the isotope 233 produced in a nuclear reactor by a person licensed under section 103 or section 104 [42 U.S.C. 2133 or 2134] and delivered to the Commission within the period of the guarantee. Guaranteed purchase prices established under the authority of this section shall not exceed the Commission's determination of the estimated value of plutonium or uranium enriched in the isotope 233 as fuel in nuclear reactors, and such prices shall be established on a nondiscriminatory basis: *Provided*, That the Commission is authorized to establish such guaranteed purchase prices only for such plutonium or uranium enriched in the isotope 233 as the Commission shall determine is produced through the use of special nuclear material which was leased or sold by the Commission pursuant to section 53 [42 U.S.C. 2073].

[42 U.S.C. 2076]

PROHIBITION

Sec. 57. (a) Possession without license. Unless authorized by a general or specific license issued by the Commission, which the Commission is authorized to issue pursuant to section 53 [42 U.S.C. 2073], no person may transfer or receive in interstate commerce, transfer, deliver, acquire, own, possess, receive possession of or title to, or import into or export from the United States any special nuclear materials.

(b) Production. It shall be unlawful for any person to directly or indirectly engage in the production of any special nuclear material outside of the United States except (1) as specifically authorized under an agreement for cooperation made pursuant to section 123 [42 U.S.C. 2153], including a specific authorization in a subsequent arrangement under section 131 of this Act [42 U.S.C. 2160], or (2) upon authorization by the Secretary of Energy after a determination that such activity will not be inimical to the interest of the United States: *Provided,* That any such determination by the Secretary of Energy shall be made only with the concurrence of the Department of State and after consultation with the Arms Control and Disarmament Agency, the Nuclear Regulatory Commission, the Department of Commerce, and the Department of Defense. The Secretary of Energy shall, within ninety days after the enactment of the Nuclear Non-Proliferation Act of 1978 [enacted Mar. 10, 1978], establish orderly and expeditious procedures, including provision for necessary administrative actions and inter-agency memoranda of understanding, which are mutually agreeable to the Secretaries of State, Defense, and Commerce, the Director of the Arms Control and Disarmament Agency, and the Nuclear Regulatory Commission for the consideration of requests for authorization under this subsection. Such procedures shall include, at a minimum, explicit direction on the handling of such requests, express deadlines for the solicitation and collection of the views of the consulted agencies (with identified officials responsible for meeting such deadlines), an interagency coordinating authority to monitor the processing of such requests, predetermined procedures for the expeditious handling of intra-agency and inter-agency disagreements and appeals to higher authorities, frequent meetings of inter-agency administrative coordinators to review the status of all pending requests, and similar administrative mechanisms. To the extent practicable, an applicant should be advised of all the information required of the applicant for the entire process for every agency's needs at the beginning of the process. Potentially controversial requests should be identified as quickly as possible so that any required policy decisions or diplomatic consultations can be initiated in a timely manner. An immediate effort should be undertaken to establish quickly any necessary standards and criteria, including the nature of any required assurances or evidentiary showings, for the decision required under this subsection. The processing of any request proposed and filed as of the date of enactment of the Nuclear Non-Proliferation Act of 1978 [enacted Mar. 10, 1978] shall not be delayed pending the development and establishment of procedures to implement the requirements of this subsection. Any trade secrets or proprietary information submitted by any person seeking an authorization under this subsection shall be afforded the maximum degree of protection allowable by law: *Provided further,* That the export of component parts as defined in subsection 11 v. (2) or 11 cc. (2) [42 U.S.C. 2014(v)(2), or 2014(cc)(2)] shall be governed by sections 109 and 126 of this Act [42 U.S.C. 2139 and 2155]: *Provided further,* That notwithstanding subsection 402(d) of the Department of Energy Organization Act (Public Law 95-91) [42 U.S.C. 7172(d)] the Secretary of Energy and not the Federal Energy Regulatory Commission, shall have sole jurisdiction within the Department of Energy over any matter arising from any function of the Secretary of Energy in this section, section 54 d. [42 U.S.C. 2074d.], section 64 [42 U.S.C. 2094], or section 111 b [42 U.S.C. 2141b.].

(c) Distribution. The Commission shall not—

(1) distribute any special nuclear material to any person for a use which is not under the jurisdiction of the United States except pursuant to the provisions of section 54 [42 U.S.C. 2074]; or

(2) distribute any special nuclear material or issue a license pursuant to section 53 [42 U.S.C. 2073] to any person within the United States if the Commission finds that the distribution of such special nuclear material or the issuance of such license would be inimical to the common defense and security or would constitute an unreasonable risk to the health and safety of the public.

(d) Establishment of classes of special nuclear materials. The Commission is authorized to establish classes of special nuclear material and to exempt certain classes or quantities of special nuclear material or kinds of uses or users from the requirements for a license set forth in this section when it makes a finding that the exemption of such classes or quantities of special nuclear material or such kinds of uses or users would not be inimical to the common defense and security and would not constitute an unreasonable risk to the health and safety of the public.

(c) Special nuclear material, as defined in section 11 [42 U.S.C. 2014], produced in facilities licensed under section 103 or 104 [42 U.S.C. 2133, 2134] may not be transferred, reprocessed, used, or otherwise made available by any instrumentality of the United States or any other person for nuclear explosive purposes.
[42 U.S.C. 2077]

REVIEW

Sec. 58. Before the Commission establishes any guaranteed purchase price or guaranteed purchase price period in accordance with the provisions of section 56 [42 U.S.C. 2076], or establishes any criteria for the waiver of any charge for the use of special nuclear material licensed and distributed under section 53 [42 U.S.C. 2073], the proposed guaranteed purchase price, guaranteed purchase price period, or criteria for the waiver of such charge shall be submitted to the Joint Committee and a period of forty-five days shall elapse while Congress is in session (in computing such forty-five days there shall be excluded the days in which either House is not in session because of adjournment for more than three days): *Provided, however,* That the Joint Committee, after having received the proposed guaranteed purchase price, guaranteed purchase price period, or criteria for the waiver of such charge, may by resolution in writing waive the conditions of, or all or any portion of, such forty-five day period.
[42 U.S.C. 2078]

TITLE VII—SOURCE MATERIAL

SOURCE MATERIAL

Sec. 61. The Commission may determine from time to time that other material is source material in addition to those specified in the definition of source material. Before making such determination, the Commission must find that such material is essential to the production of special nuclear material and must find that the determination that such material is source material is in the interest of the common defense and security, and the President must have expressly assented in writing to the determination. The Commission's determination, together with the assent of the President, shall be submitted to the Joint Committee and a period of thirty days shall elapse while Congress is in session (in computing such thirty days, there shall be excluded the days on which either House is not in session because of an adjournment of more than three days) before the determination of the Commission may become effective: *Provided, however,* That the Joint Committee, after having received such determination, may by resolution in writing waive the conditions of or all or any portion of such thirty-day period.
[42 U.S.C. 2091]

LICENSE FOR TRANSFERS REQUIRED

Sec. 62. Unless authorized by a general or specific license issued by the Commission, which the Commission is hereby authorized to issue, no person may transfer or receive in interstate commerce, transfer, deliver, receive possession of or title to, or import into or export from the United States any source material after removal from its place of deposit in nature, except that licenses shall not be required for quantities of source material which, in the opinion of the Commission, are unimportant.
[42 U.S.C. 2092]

DOMESTIC DISTRIBUTION OF SOURCE MATERIAL

Sec. 63. (a) Licenses. The Commission is authorized to issue licenses for and to distribute source material within the United States to qualified applicants requesting such material—

(1) for the conduct of research and development activities of the types specified in section 31 [42 U.S.C. 2051];

(2) for use in the conduct of research and development activities or in medical therapy under a license issued pursuant to section 104 [42 U.S.C. 2134];

(3) for use under a license issued pursuant to section 103 [42 U.S.C. 2133]; or

(4) for any other use approved by the Commission as an aid to science or industry.

(b) Minimum criteria. The Commission shall establish, by rule, minimum criteria for the issuance of specific or general licenses for the distribution of source material depending upon the degree of importance to the common defense and security or to the health and safety of the public of—

(1) the physical characteristics of the source material to be distributed;

(2) the quantities of source material to be distributed; and

(3) the intended use of the source material to be distributed.

(c) Determination of charges. The Commission may make a reasonable charge determined pursuant to subsection 161(m) [42 U.S.C. 2201(m)] for the source material licensed and distributed under subsection 63(a)(1), subsection 63(a)(2), or subsection 63(a)(4) [subsec. (a)(1), (2), (4), of this section], and shall make a reasonable charge determined pursuant to subsection 161(m) [42 U.S.C. 2201(m)], for the source material licensed and distributed under subsection 63(a)(3) [subsec. (a)(3) of this section]. The Commission shall establish criteria in writing for the determination of whether a charge will be made for the source material licensed and distributed under subsection 63(a)(1), subsection 63(a)(2), or subsection 63(a)(4) [subsec. (a)(1), (2), (4), of this section], considering, among other things, whether the licensee is a nonprofit or eleemosynary institution and the purposes for which the source material will be used.
[42 U.S.C. 2093]

FOREIGN DISTRIBUTION OF SOURCE MATERIAL

Sec. 64. The Commission is authorized to cooperate with any nation by distributing source material and to distribute source material pursuant to the terms of an agreement for cooperation to which such nation is a party and which is made in accordance with section 123 [42 U.S.C. 2153]. The Commission is also authorized to distribute source material outside of the United States upon a determination by the Commission that such activity will not be inimical to the interests of the United States. The authority to distribute source material under this section other than under an export license granted by the Nuclear Regulatory Commission shall in no case extend to quantities of source material in excess of three metric tons per year per recipient.
[42 U.S.C. 2094]

REPORTING

Sec. 65. The Commission is authorized to issue such rules, regulations, or orders requiring reports of ownership, possession, extraction, refining, shipment, or other handling of source material as it may deem necessary, except that such reports shall not be required with respect to (a) any source material prior to removal from its place of deposit in nature, or (b) quantities of source material which in the opinion of the Commission are unimportant or the reporting of which will discourage independent prospecting for new deposits.
[42 U.S.C. 2095]

ACQUISITION

Sec. 66. The Commission is authorized and directed, to the extent it deems necessary to effectuate the provisions of this Act—

(a) to purchase, take, requisition, condemn, or otherwise acquire supplies of source material;

(b) to purchase, condemn, or otherwise acquire any interest in real property containing deposits of source material; and

(c) to purchase, condemn, or otherwise acquire rights to enter upon any real property deemed by the Commission to have possibilities of containing deposits of source material in order to conduct prospecting and exploratory operations for such deposits.

Any purchase made under this section may be made without regard to the provisions of section 3709 of the Revised Statutes, as amended [41 U.S.C. 5], upon certification by the Commission that such action is necessary in the interest of the common defense and security, or upon a showing by the Commission that advertising is not reasonably practicable. Partial and advanced payments may be made under contracts for such purposes. The Commission may establish guaranteed prices for all source material delivered to it within a specified time. Just compensation shall be made for any right, property, or interest in property taken, requisitioned, condemned, or otherwise acquired under this section.
[42 U.S.C. 2096]

OPERATIONS ON LANDS BELONGING TO THE UNITED STATES

Sec. 67. The Commission is authorized, to the extent it deems necessary to effectuate the provisions of this Act, to issue leases or permits for prospecting for, exploration for, mining of, or removal of deposits of source material in lands belonging to the United States: *Provided, however,* That notwithstanding any other provisions of law, such leases or permits may be issued for lands administered for national park, monument,

and wildlife purposes only when the President by Executive Order declares that the requirements of the common defense and security make such action necessary.
[42 U.S.C. 2097]

PUBLIC AND ACQUIRED LANDS

Sec. 68. (a) Benefit by location, entry, or settlement. No individual, corporation, partnership, or association, which had any part, directly or indirectly, in the development of the atomic energy program, may benefit by any location, entry, or settlement upon the public domain made after such individual, corporation, partnership, or association took part in such project, if such individual, corporation, partnership, or association, by reason of having had such part in the development of the atomic energy program, acquired confidential official information as to the existence of deposits of such uranium, thorium, or other materials in the specific lands upon which such location, entry, or settlement is made, and subsequent to the date of the enactment of this Act [Aug. 30, 1954] made such location, entry, or settlement or caused the same to be made for his, or its, or their benefit.
(b) Reservation of mineral rights. Any reservation of radioactive mineral substances, fissionable materials, or source material, together with the right to enter upon the land and prospect for, mine, and remove the same, inserted pursuant to Executive Order 9613 of September 13, 1945, Executive Order 9701 of March 4, 1946, the Atomic Energy Act of 1946, or Executive Order 9908 of December 5, 1947, in any patent, conveyance, lease, permit, or other authorization or instrument disposing of any interest in public or acquired lands of the United States, is hereby released, remised, and quitclaimed to the person or persons entitled upon the date of this Act [Aug. 19, 1958] under the grant from the United States or successive grants to the ownership, occupancy, or use of the land under applicable Federal or State laws: *Provided, however,* That in cases where any such reservation on acquired lands of the United States has been heretofore released, remised, or quitclaimed subsequent to August 12, 1954, in reliance upon authority deemed to have been contained in the Atomic Energy Act of 1946, as amended, or the Atomic Energy Act of 1954, as heretofore amended, the same shall be valid and effective in all respects to the same extent as if public lands and not acquired lands had been involved. The foregoing release shall be subject to any rights which may have been granted by the United States pursuant to any such reservation, but the releasees shall be subrogated to the rights of the United States.
(c) Mining claim for or based upon discovery of source material. Notwithstanding the provisions of the Atomic Energy Act of 1946, as amended, and particularly section 5(b)(7) thereof, or the provisions of the Act of August 12, 1953 (67 Stat. 539) [30 U.S.C. 501 et seq.], and particularly section 3 thereof [30 U.S.C. 503], any mining claim, heretofore located under the mining laws of the United States, for or based upon a discovery of a mineral deposit which is a source material and which, except for the possible contrary construction of said Atomic Energy Act, would have been locatable under such mining laws, shall, insofar as adversely affected by such possible contrary construction, be valid and effective, in all respects to the same extent as if said mineral deposit were locatable mineral deposit other than a source material.
[42 U.S.C. 2098]

PROHIBITION

Sec. 69. The Commission shall not license any person to transfer or deliver, receive possession of or title to, or import into or export from the United States any source material if, in the opinion of the Commission, the issuance of a license to such person for such purpose would be inimical to the common defense and security or the health and safety of the public.
[42 U.S.C. 2099]

TITLE VIII—BYPRODUCT MATERIAL

DOMESTIC DISTRIBUTION

Sec. 81. No person may transfer or receive in interstate commerce, manufacture, produce, transfer, acquire, own, possess, import, or export any byproduct material, except to the extent authorized by this section, section 82 or section 84 [42 U.S.C. 2112 or 2114]. The Commission is authorized to issue general or specific licenses to applicants seeking to use byproduct material for research or development purposes, for medical therapy, industrial uses, agricultural uses, or such other useful applications as may be developed. The Commission may distribute, sell, loan, or lease such byproduct material as it owns to qualified applicants with or without charge: *Provided, however,* That, for byproduct material to be distributed by the

Commission for a charge, the Commission shall establish prices on such equitable basis as, in the opinion of the Commission, (a) will provide reasonable compensation to the Government for such material, (b) will not discourage the use of such material or the development of sources of supply of such material independent of the Commission, and (c) will encourage research and development. In distributing such material, the Commission shall give preference to applicants proposing to use such material either in the conduct of research and development or in medical therapy. The Commission shall not permit the distribution of any byproduct material to any licensee, and shall recall or order the recall of any distributed material from any licensee, who is not equipped to observe or who fails to observe such safety standards to protect health as may be established by the Commission or who uses such material in violation of law or regulation of the Commission or in a manner other than as disclosed in the application therefor or approved by the Commission. The Commission is authorized to establish classes of byproduct material and to exempt certain classes or quantities of material or kinds of uses or users from the requirements for a license set forth in this section when it makes a finding that the exemption of such classes or quantities of such material or such kinds of uses or users will not constitute an unreasonable risk to the common defense and security and to the health and safety of the public.

[42 U.S.C. 2111]

FOREIGN DISTRIBUTION OF BYPRODUCT MATERIAL

Sec. 82. (a) Cooperation with other nations. The Commission is authorized to cooperate with any nation by distributing byproduct material, and to distribute byproduct material, pursuant to the terms of an agreement for cooperation to which such nation is party and which is made in accordance with section 123 [42 U.S.C. 2153].

(b) Distribution. The Commission is also authorized to distribute byproduct material to any person outside the United States upon application therefor by such person and demand such charge for such material as would be charged for the material if it were distributed within the United States: *Provided, however,* That the Commission shall not distribute any such material to any person under this section if, in its opinion, such distribution would be inimical to the common defense and security: *And provided further,* That the Commission may require such reports regarding the use of material distributed pursuant to the provisions of this section as it deems necessary.

(c) Persons licensed to distribute. The Commission is authorized to license others to distribute byproduct material to any person outside the United States under the same conditions, except as to charges, as would be applicable if the material were distributed by the Commission.

[42 U.S.C. 2112]

OWNERSHIP AND CUSTODY OF CERTAIN BYPRODUCT MATERIAL AND DISPOSAL SITES

Sec. 83. (a) Any license issued or renewed after the effective date of this section [see Effective date note] under section 62 or section 81 [42 U.S.C. 2092 or 2111] for any activity which results in the production of any byproduct material, as defined in section 11e. (2) [42 U.S.C. 2014(e)(2)], shall contain such terms and conditions as the Commission determines to be necessary to assure that, prior to termination of such license—

(1) the licensee will comply with decontamination, decommissioning, and reclamation standards prescribed by the Commission for sites (A) at which ores were processed primarily for their source material content and (B) at which such byproduct material is deposited, and

(2) ownership of any byproduct material, as defined in section 11 e. (2) [42 U.S.C. 2014(e)(2)], which resulted from such licensed activity shall be transferred to (A) the United States or (B) in the State in which such activity occurred if such State exercises the option under subsection b. (1) to acquire land used for the disposal of byproduct material.

Any license which is in effect on the effective date of this section and which is subsequently terminated without renewal shall comply with paragraphs (1) and (2) upon termination.

(b) (1) (A) The Commission shall require by rule, regulation, or order that prior to the termination of any license which is issued after the effective date of this section [see Effective date note], title to the land, including any interests therein (other than land owned by the United States or by a State) which is used for the disposal of any byproduct material, as defined by section 11 e. (2) [42 U.S.C. 2014(e)(2)], pursuant to such license shall be transferred to—

(i) the United States, or

(ii) the State in which such land is located, at the option of such State,

unless the Commission determines prior to such termination that transfer of title to such land and such byproduct material is not necessary or desirable to protect the public health, safety, or welfare or to minimize or eliminate danger to life or property. Such determination shall be made in accordance with section 181 of this Act [42 U.S.C. 2231]. Notwithstanding any other provision of law or any such determination, such property and materials shall be maintained pursuant to a license issued by the Commission pursuant to section 81 of this Act [42 U.S.C. 2111] in such manner as will protect the public health, safety, and the environment.

(B) If the Commission determines by order that use of the surface or subsurface estates, or both, of the land transferred to the United States or to a State under subparagraph (A) would not endanger the public health, safety, welfare, or environment, the Commission, pursuant to such regulations as it may prescribe, shall permit the use of the surface or subsurface estates, or both, of such land in a manner consistent with the provisions of this section. If the Commission permits such use of such land, it shall provide the person who transferred such land with the right of first refusal with respect to such use of such land.

(2) If transfer to the United States of title to such byproduct material and such land is required under this section, the Secretary of Energy or any Federal agency designated by the President shall, following the Commission's determination of compliance under subsection (c), assume title and custody of such byproduct material and land transferred as provided in this subsection. Such Secretary or Federal agency shall maintain such material and land in such manner as will protect the public health and safety and the environment. Such custody may be transferred to another officer or instrumentality of the United States only upon approval of the President.

(3) If transfer to a State of title to such byproduct material is required in accordance with this subsection, such State shall, following the Commission's determination of compliance under subsection (d), assume title and custody of such byproduct material and land transferred as provided in this subsection. Such State shall maintain such material and land in such manner as will protect the public health, safety, and the environment.

(4) In the case of any such license under section 62 [42 U.S.C. 2092], which was in effect on the effective date of this section [see Effective date note], the Commission may require, before the termination of such license, such transfer of land and interests therein (as described in paragraph (1) of this subsection) to the United States or a State in which such land is located, at the option of such State, as may be necessary to protect the public health, welfare, and the environment from any effects associated with such byproduct material. In exercising the authority of this paragraph, the Commission shall take into consideration the status of the ownership of such land and interests therein and the ability of the licensee to transfer title and custody thereof to the United States or a State.

(5) The Commission may, pursuant to a license, or by rule or order, require the Secretary or other Federal agency or State having custody of such property and materials to undertake such monitoring, maintenance, and emergency measures as are necessary to protect the public health and safety and such other actions as the Commission deems necessary to comply with the standards promulgated pursuant to section 84 of this Act [42 U.S.C. 2114]. The Secretary or such other Federal agency is authorized to carry out maintenance, monitoring, and emergency measures, but shall take no other action pursuant to such license, rule or order, with respect to such property and materials unless expressly authorized by Congress after the date of enactment of this Act.

(6) The transfer of title to land or byproduct materials, as defined in section 11 (e) (2) [42 U.S.C. 2014(e)(2)], to a State or the United States pursuant to this subsection shall not relieve any licensee of liability for any fraudulent or negligent acts done prior to such transfer.

(7) Material and land transferred to the United States or a State in accordance with this subsection shall be transferred without cost to the United States or a State (other than administrative and legal costs incurred in carrying out such transfer). Subject to the provisions of paragraph (1)(B) of this subsection, the United States or a State shall not transfer title to material or property acquired under this subsection to any person, unless such transfer is in the same manner as provided under section 104(h) of the Uranium Mill Tailings Radiation Control Act of 1978 [42 U.S.C. 7914(h)].

(8) The provisions of this subsection respecting transfer of title and custody to land shall not apply in the case of lands held in trust by the United States for any Indian tribe or lands owned by such Indian tribe subject to a restriction against alienation imposed by the United States. In the case of such lands which are used for the disposal of byproduct material, as defined in section 11 (e) (2) [42 U.S.C.

2014(e)(2)], the licensee shall be required to enter into such arrangements with the Commission as may be appropriate to assure the long-term maintenance and monitoring of such lands by the United States.

(c) Upon termination on any license to which this section applies, the Commission shall determine whether or not the licensee has complied with all applicable standards and requirements under such license.

[42 U.S.C. 2113]

AUTHORITIES OF COMMISSION RESPECTING CERTAIN BYPRODUCT MATERIAL

Sec. 84. (a) The Commission shall insure that the management of any byproduct material, as defined in section 11 (e) (2) [42 U.S.C. 2014 (e)(2)], is carried out in such manner as—

(1) the Commission deems appropriate to protect the public health and safety and the environment from radiological and nonradiological hazards associated with the processing and with the possession and transfer of such material, taking into account the risk to the public health, safety, and the environment, with due consideration of the economic costs and such other factors as the Commission determines to be appropriate,

(2) conforms with applicable general standards promulgated by the Administrator of the Environmental Protection Agency under section 275 [42 U.S.C. 2022], and

(3) conforms to general requirements established by the Commission, with the concurrence of the Administrator, which are, to the maximum extent practicable, at least comparable to requirements applicable to the possession, transfer, and disposal of similar hazardous material regulated by the Administrator under the Solid Waste Disposal Act, as amended.

(b) In carrying outs its authority under this section, the Commission is authorized to—

(1) by rule, regulation, or order require persons, officers, or instrumentalities exempted from licensing under section 81 of this Act [42 U.S.C. 2111] to conduct monitoring, perform remedial work, and to comply with such other measures as it may deem necessary or desirable to protect health or to minimize danger to life or property, and in connection with the disposal or storage of such byproduct material; and

(2) make such studies and inspections and to conduct such monitoring as may be necessary.

Any violation by any person other than the United States or any officer or employee of the United States or a State of any rule, regulation, or order or licensing provision, of the Commission established under this section or section 83 [42 U.S.C. 2113] shall be subject to a civil penalty in the same manner and in the same amount as violations subject to a civil penalty under section 234 [42 U.S.C. 2282]. Nothing in this section affects any authority of the Commission under any other provision of this Act.

(c) In the case of sites at which ores are processed primarily for their source material content or which are used for the disposal of byproduct material as defined in section 11 (e) (2) [42 U.S.C. 2014(e)(2)], a licensee may propose alternatives to specific requirements adopted and enforced by the Commission under this Act. Such alternative proposals may take into account local or regional conditions, including geology, topography, hydrology and meteorology. The Commission may treat such alternatives as satisfying Commission requirements if the Commission determines that such alternatives will achieve a level of stabilization and containment of the sites concerned, and a level of protection for public health, safety, and the environment from radiological and nonradiological hazards associated with such sites, which is equivalent to, to the extent practicable, or more stringent than the level which would be achieved by standards and requirements adopted and enforced by the Commission for the same purpose and any final standards promulgated by the Administrator of the Environmental Protection Agency in accordance with section 275.

[42 U.S.C. 2114]

TITLE IX—MILITARY APPLICATION OF ATOMIC ENERGY

AUTHORITY

Sec. 91. (a) Research and development; production of atomic weapons. The Commission is authorized to—

(1) conduct experiments and do research and development work in the military application of atomic energy;

(2) engage in the production of atomic weapons, or atomic weapon parts, except that such activities shall be carried on only to the extent that the express consent and direction of the President of the United States has been obtained, which consent and direction shall be obtained at least once each year;

(3) provide for safe storage, processing, transportation, and disposal of hazardous waste (including radioactive waste) resulting from nuclear materials production, weapons production and surveillance programs, and naval nuclear propulsion programs;

(4) carry out research on and development of technologies needed for the effective negotiation and verification of international agreements on control of special nuclear materials and nuclear weapons; and

(5) under applicable law (other than this paragraph) and consistent with other missions of the Department of Energy, make transfers of federally owned or originated technology to State and local governments, private industry, and universities or other nonprofit organizations so that the prospects for commercialization of such technology are enhanced.

(b) Delivery of material or weapons to Department of Defense; acquisition of weapon for military purposes. The President from time to time may direct the Commission (1) to deliver such quantities of special nuclear material or atomic weapons to the Department of Defense for such use as he deems necessary in the interest of national defense, or (2) to authorize the Department of Defense to manufacture, produce, or acquire any atomic weapon or utilization facility for military purposes: *Provided, however,* That such authorization shall not extend to the production of special nuclear material other than that incidental to the operation of such utilization facilities.

(c) Cooperation with other nations. The President may authorize the Commission or the Department of Defense, with the assistance of the other, to cooperate with another nation and, notwithstanding the provisions of section 57, 62, or 81 [42 U.S.C. 2077, 2092, or 2111], to transfer by sale, lease, or loan to that nation, in accordance with terms and conditions of a program approved by the President—

(1) nonnuclear parts of atomic weapons provided that such nation has made substantial progress in the development of atomic weapons, and other nonnuclear parts of atomic weapons systems involving Restricted Data provided that such transfer will not contribute significantly to that nation's atomic weapon design, development, or fabrication capability; for the purpose of improving that nation's state of training and operational readiness;

(2) utilization facilities for military applications; and

(3) source, byproduct, or special nuclear material for research on, development of, production of, or use in utilization facilities for military applications; and

(4) source, byproduct, or special nuclear material for research on, development of, or use in atomic weapons: *Provided, however,* That the transfer of such material to that nation is necessary to improve its atomic weapon design, development, or fabrication capability: *And provided further,* That such nation has made substantial progress in the development of atomic weapons,

whenever the President determines that the proposed cooperation and each proposed transfer arrangement for the nonnuclear parts of atomic weapons and atomic weapons systems, utilization facilities or source, byproduct, or special nuclear material will promote and will not constitute an unreasonable risk to the common defense and security, while such other nation is participating with the United States pursuant to an international arrangement by substantial and material contributions to the mutual defense and security: *Provided, however,* That the cooperation is undertaken pursuant to an agreement entered into in accordance with section 123 [42 U.S.C. 2153]: *And provided further,* That if an agreement for cooperation arranged pursuant to this subsection provides for transfer of utilization facilities for military applications the Commission, or the Department of Defense with respect to cooperation it has been authorized to undertake, may authorize any person to transfer such utilization facilities for military applications in accordance with the terms and conditions of this subsection and of the agreement for cooperation.

[42 U.S.C. 2121]

PROHIBITION

Sec. 92. It shall be unlawful, except as provided in section 91 [42 U.S.C. 2121], for any person to transfer or receive in interstate or foreign commerce, manufacture, produce, transfer, acquire, possess, import, or export any atomic weapon. Nothing in this section shall be deemed to modify the provisions of subsection 31(a) or section 101 [42 U.S.C. 2051(a), 2131].

[42 U.S.C. 2122]

TITLE X—ATOMIC ENERGY LICENSES

LICENSE REQUIRED

Sec. 101. It shall be unlawful, except as provided in section 91 [42 U.S.C. 2121], for any person within the United States to transfer or receive in interstate commerce, manufacture, produce, transfer, acquire, possess, use, import, or export any utilization or production facility except under and in accordance with a license issued by the Commission pursuant to section 103 or 104 [42 U.S.C. 2133, 2134].
[42 U.S.C. 2131]

UTILIZATION AND PRODUCTION FACILITIES FOR INDUSTRIAL OR COMMERCIAL PURPOSES

Sec. 102. (a) Except as provided in subsections (b) and (c), or otherwise specifically authorized by law, any license hereafter issued for a utilization or production facility for industrial or commercial purposes shall be issued pursuant to section 103 [42 U.S.C. 2133].
(b) Any license hereafter issued for a utilization or production facility for industrial or commercial purposes, the construction or operation of which was licensed pursuant to subsection 104(b) [42 U.S.C. 2134(b)] prior to enactment into law of this subsection, shall be issued under subsection 104(b) [42 U.S.C. 2134(b)].
(c) Any license for a utilization or production facility for industrial or commercial purposes constructed or operated under an arrangement with the Commission entered into under the Cooperative Power Reactor Demonstration Program shall, except as otherwise specifically required by applicable law, be issued under subsection 104(b) [42 U.S.C. 2134(b)].
[42 U.S.C. 2132]

COMMERCIAL LICENSES

Sec. 103. (a) Conditions. The Commission is authorized to issue licenses to persons applying therefor to transfer or receive in interstate commerce, manufacture, produce, transfer, acquire, possess, use, import, or export under the terms of an agreement for cooperation arranged pursuant to section 123 [42 U.S.C. 2153], utilization or production facilities for industrial or commercial purposes. Such licenses shall be issued in accordance with the provisions of chapter 16 [42 U.S.C. 2231 et seq.] and subject to such conditions as the Commission may by rule or regulation establish to effectuate the purposes and provisions of this Act.
(b) Nonexclusive basis. The Commission shall issue such licenses on a nonexclusive basis to persons applying therefor (1) whose proposed activities will serve a useful purpose proportionate to the quantities of special nuclear material or source material to be utilized; (2) who are equipped to observe and who agree to observe such safety standards to protect health and to minimize danger to life or property as the Commission may by rule establish; and (3) who agree to make available to the Commission such technical information and data concerning activities under such licenses as the Commission may determine necessary to promote the common defense and security and to protect the health and safety of the public. All such information may be used by the Commission only for the purposes of the common defense and security and to protect the health and safety of the public.
(c) License period. Each such license shall be issued for a specified period, as determined by the Commission, depending on the type of activity to be licensed, but not exceeding forty years, and may be renewed upon the expiration of such period.
(d) Limitations. No license under this section may be given to any person for activities which are not under or within the jurisdiction of the United States, except for the export of production or utilization facilities under terms of an agreement for cooperation arranged pursuant to section 123 [42 U.S.C. 2153], or except under the provisions of section 109 [42 U.S.C. 2139]. No license may be issued to an alien or any corporation or other entity if the Commission knows or has reason to believe it is owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government. In any event, no license may be issued to any person within the United States if, in the opinion of the Commission, the issuance of a license to such person would be inimical to the common defense and security or to the health and safety of the public.
[(e)](f) Notice in event of accidents which could result in accidental release of contaminants. Each license issued for a utilization facility under this section or section 104 (b) [42 U.S.C. 2134(b)] shall require as a condition thereof that in case of any accident which could result in an unplanned release of quantities of fission products in excess of allowable limits for normal operation established by the Commission, the licensee shall immediately so notify the Commission. Violation of the condition prescribed by this subsection may, in the Commission's discretion, constitute grounds for license revocation. In accordance with section 187 of this Act [42 U.S.C. 2237], the Commission shall promptly amend each license for a

utilization facility issued under this section or section 104 (b) [42 U.S.C. 2134(b)] which is in effect on the date of enactment of this subsection [enacted June 30, 1980] to include the provisions required under this subsection.

[42 U.S.C. 2133]

MEDICAL THERAPY AND RESEARCH AND DEVELOPMENT

Sec. 104. (a) The Commission is authorized to issue licenses to persons applying therefor for utilization facilities for use in medical therapy. In issuing such licenses the Commission is directed to permit the widest amount of effective medical therapy possible with the amount of special nuclear material available for such purposes and to impose the minimum amount of regulation consistent with its obligations under this Act to promote the common defense and security and to protect the health and safety of the public.

(b) As provided for in subsection 102(b) or 102(c) [42 U.S.C. 2132(b) or (c)], or where specifically authorized by law, the Commission is authorized to issue licenses under this subsection to persons applying therefor for utilization and production facilities for industrial and commercial purposes. In issuing licenses under this subsection, the Commission shall impose the minimum amount of such regulations and terms of license as will permit the Commission to fulfill its obligations under this Act.

(c) The Commission is authorized to issue licenses to persons applying therefor for utilization and production facilities useful in the conduct of research and development activities of the types specified in section 31 [42 U.S.C. 2051] and which are not facilities of the type specified in subsection 104(b) [subsec. (b) of this section]. The Commission is directed to impose only such minimum amount of regulation of the licensee as the Commission finds will permit the Commission to fulfill its obligations under this Act to promote the common defense and security and to protect the health and safety of the public and will permit the conduct of widespread and diverse research and development.

(d) No license under this section may be given to any person for activities which are not under or within the jurisdiction of the United States, except for the export of production or utilization facilities under terms of an agreement for cooperation arranged pursuant to section 123 [42 U.S.C. 2153] or except under the provisions of section 109 [42 U.S.C. 2139]. No license may be issued to any corporation or other entity if the Commission knows or has reason to believe it is owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government. In any event, no license may be issued to any person within the United States if, in the opinion of the Commission, the issuance of a license to such person would be inimical to the common defense and security or to the health and safety of the public.

[42 U.S.C. 2134]

ANTITRUST PROVISIONS

Sec. 105. (a) Nothing contained in this Act shall relieve any person from the operation of the following Acts, as amended, "An Act to protect trade and commerce against unlawful restraints and monopolies" approved July second, eighteen hundred and ninety [15 U.S.C. 1 et seq., 15 note]; sections seventy-three to seventy-seven, inclusive, of an Act entitled "An Act to reduce taxation, to provide revenue for the Government, and for other purposes" approved August twenty-seven, eighteen hundred and ninety-four [15 U.S.C. 8 et seq.]; "An Act to supplement existing laws against unlawful restraints and monopolies, and for other purposes" approved October fifteen, nineteen hundred and fourteen [15 U.S.C. 12, 13, 14 et seq., 20, 21, 22 et seq.; 29 U.S.C. 52, 53]; and "An Act to create a Federal Trade Commission, to define its powers and duties, and for other purposes" approved September twenty-six, nineteen hundred and fourteen [15 U.S.C. 41 et seq., 47, 48, 50 et seq.]. In the event a licensee is found by a court of competent jurisdiction, either in an original action in that court or in a proceeding to enforce or review the findings or orders of any Government agency having jurisdiction under the laws cited above, to have violated any of the provisions of such laws in the conduct of the licensed activity, the Commission may suspend, revoke, or take such other action as it may deem necessary with respect to any license issued by the Commission under the provisions of this Act.

(b) The Commission shall report promptly to the Attorney General any information it may have with respect to any utilization of special nuclear material or atomic energy which appears to violate or to tend toward the violation of any of the foregoing Acts, or to restrict free competition in private enterprise.

(c) (1) The Commission shall promptly transmit to the Attorney General a copy of any license application provided for in paragraph (2) of this subsection, and a copy of any written request provided for in paragraph (3) of this subsection; and the Attorney General shall, within a reasonable time, but in no event to exceed 180 days after receiving a copy of such application or written request, render such

advice to the Commission as he determines to be appropriate in regard to the finding to be made by the Commission pursuant to paragraph (5) of this subsection. Such advice shall include an explanatory statement as to the reasons or basis therefor.

(2) Paragraph (1) of this subsection shall apply to an application for a license to construct or operate a utilization or production facility under section 103 [42 U.S.C. 2133]: *Provided, however,* That paragraph (1) shall not apply to an application for a license to operate a utilization or production facility for which a construction permit was issued under section 103 [42 U.S.C. 2133] unless the Commission determines such review is advisable on the ground that significant changes in the licensee's activities or proposed activities have occurred subsequent to the previous review by the Attorney General and the Commission under this subsection in connection with the construction permit for the facility.

(3) With respect to any Commission permit for the construction of a utilization or production facility issued pursuant to subsection 104(b) [42 U.S.C. 2134(b)] prior to the enactment into law of this subsection [Dec. 19, 1970], any person who intervened or who sought by timely written notice to the Commission to intervene in the construction permit proceeding for the facility to obtain a determination of antitrust considerations or to advance a jurisdictional basis for such determination shall have the right, upon a written request to the Commission, to obtain an antitrust review under this section of the application for an operating license. Such written request shall be made within 25 days after the date of initial Commission publication in the Federal Register of notice of the filing of an application for an operating license for the facility or the date of enactment into law of this subsection [Dec. 19, 1970], whichever is later.

(4) Upon the request of the Attorney General, the Commission shall furnish or cause to be furnished such information as the Attorney General determines to be appropriate for the advise called for in paragraph (1) of this subsection.

(5) Promptly upon receipt of the Attorney General's advice, the Commission shall publish the advice in the Federal Register. Where the Attorney General advises that there may be adverse antitrust aspects and recommends that there be a hearing, the Attorney General or his designee may participate as a party in the proceedings thereafter held by the Commission on such licensing matter in connection with the subject matter of his advice. The Commission shall give due consideration to the advice received from the Attorney General and to such evidence as may be provided during the proceedings in connection with such subject matter, and shall make a finding as to whether the activities under the license would create or maintain a situation inconsistent with the antitrust laws as specified in subsection 105(a) [subsec. (a) of this section].

(6) In the event the Commission's finding under paragraph (5) is in the affirmative, the Commission shall also consider, in determining whether the license should be issued or continued, such other factors, including the need for power in the affected area, as the Commission in its judgment deems necessary to protect the public interest. On the basis of its findings, the Commission shall have the authority to issue or continue a license as applied for, to refuse to issue a license, to rescind a license or amend it, and to issue a license with such conditions as it deems appropriate.

(7) The Commission, with the approval of the Attorney General, may except from any of the requirements of this subsection such classes or types of licenses as the Commission may determine would not significantly affect the applicant's activities under the antitrust laws as specified in subsection 105(a) [subsec. (a) of this section].

(8) With respect to any application for a construction permit on file at the time of enactment into law of this subsection [Dec. 19, 1970], which permit would be for issuance under section 103 [42 U.S.C. 2133], and with respect to any application for an operating license in connection with which a written request for an antitrust review is made as provided for in paragraph (3), the Commission, after consultation with the Attorney General, may, upon determination that such action is necessary in the public interest to avoid unnecessary delay, establish by rule or order periods for Commission notification and receipt of advice differing from those set forth above and may issue a construction permit or operating license in advance of consideration of and findings with respect to the matters covered in this subsection: *Provided,* That any construction permit or operating license so issued shall contain such conditions as the Commission deems appropriate to assure that any subsequent findings and orders of the Commission with respect to such matters will be given full force and effect.

[42 U.S.C. 2135]

CLASSES OF FACILITIES

Sec. 106. The Commission may—

(a) group the facilities licensed either under section 103 or under section 104 [42 U.S.C. 2133, 2134] into classes which may include either production or utilization facilities or both, upon the basis of the similarity of operating and technical characteristics of the facilities;

(b) define the various activities to be carried on at each such class of facility; and

(c) designate the amounts of special nuclear material available for use by each such facility.

[42 U.S.C. 2136]

OPERATORS' LICENSES

Sec. 107. The Commission shall—

(a) prescribe uniform conditions for licensing individuals as operators of any of the various classes of production and utilization facilities licensed in this Act;

(b) determine the qualifications of such individuals;

(c) issue licenses to such individuals in such form as the Commission may prescribe; and

(d) suspend such licenses for violations of any provision of this Act or any rule or regulation issued thereunder whenever the Commission deems such action desirable.

[42 U.S.C. 2137]

WAR OR NATIONAL EMERGENCY

Sec. 108. Whenever the Congress declares that a state of war or national emergency exists, the Commission is authorized to suspend any licenses granted under this Act if in its judgment such action is necessary to the common defense and security. The Commission is authorized during such period, if the Commission finds it necessary to the common defense and security, to order the recapture of any special nuclear material or to order the operation of any facility licensed under section 103 or 104 [42 U.S.C. 2133, 2134], and is authorized to order the entry into any plant or facility in order to recapture such material, or to operate such facility. Just compensation shall be paid for any damages caused by the recapture of any special nuclear material or by the operation of any such facility.

[42 U.S.C. 2138]

COMPONENT AND OTHER PARTS OF FACILITIES

Sec. 109. (a) With respect to those utilization and production facilities which are so determined by the Commission pursuant to subsection 11 v. (2) or 11 cc. (2) [42 U.S.C. 2014(v)(2) or (cc)(2)] the Commission may issue general licenses for domestic activities required to be licensed under section 101 [42 U.S.C. 2131], if the Commission determines in writing that such general licensing will not constitute an unreasonable risk to the common defense and security.

(b) After consulting with the Secretaries of State, Energy, and Commerce and the Director, the Commission is authorized and directed to determine which component parts as defined in subsection 11 v. (2) or 11 cc. (2) [42 U.S.C. 2014(v)(2) or (cc)(2)] and which other items or substances are especially relevant from the standpoint of export control because of their significance for nuclear explosive purposes. Except as provided in section 126 (b) (2) [42 U.S.C. 2155 (b) (2)], no such component, substance, or item which is so determined by the Commission shall be exported unless the Commission issues a general or specific license for its export after finding, based on a reasonable judgment of the assurances provided and other information available to the Federal Government, including the Commission, that the following criteria or their equivalent are met: (1) IAEA safeguards as required by Article III (2) of the Treaty will be applied with respect to such component, substance, or item; (2) no such component, substance, or item will be used for any nuclear explosive device or for research on or development of any nuclear explosive device; and (3) no such component, substance, or item will be retransferred to the jurisdiction of any other nation or group of nations unless the prior consent of the United States is obtained for such retransfer; and after determining in writing that the issuance of each such general or specific license or category of licenses will not be inimical to the common defense and security: *Provided,* That a specific license shall not be required for an export pursuant to this section if the component, item or substance is covered by a facility license issued pursuant to section 126 of this Act [42 U.S.C. 2155].

(c) The Commission shall not issue an export license under the authority of subsection (b if it is advised by the executive branch, in accordance with the procedures established under subsection 126 (a) [42 U.S.C. 2155(a)], that the export would be inimical to the common defense and security of the United States.
[42 U.S.C. 2139]

EXCLUSIONS

Sec. 110. Nothing in this chapter [42 U.S.C. 2131 et seq.] shall be deemed—
(a) to require a license for (1) the processing, fabricating, or refining of special nuclear material, or the separation of special nuclear material, or the separation of special nuclear material from other substances, under contract with and for the account of the Commission; or (2) the construction or operation of facilities under contract with and for the account of the Commission; or
(b) to require a license for the manufacture, production, or acquisition by the Department of Defense of any utilization facility authorized pursuant to section 91 [42 U.S.C. 2121], or for the use of such facility by the Department of Defense or a contractor thereof.
[42 U.S.C. 2140]

DISTRIBUTION OF SPECIAL NUCLEAR MATERIALS

Sec. 111. (a) The Nuclear Regulatory Commission is authorized to license the distribution of special nuclear material, source material, and byproduct material by the Department of Energy pursuant to section 54, 64, and 82 of this Act [42 U.S.C. 2074, 2094, and 2112], respectively, in accordance with the same procedures established by law for the export licensing of such material by any person: *Provided*, That nothing in this section shall require the licensing of the distribution of byproduct material by the Department of Energy under section 82 of this Act [42 U.S.C. 2112].
(b) The Department of Energy shall not distribute any special nuclear material or source material under section 54 or 64 of this Act [42 U.S.C. 2074 or 2094] other than under an export license issued by the Nuclear Regulatory Commission until (1) the Department has obtained the concurrence of the Department of State and has consulted with the Arms Control and Disarmament Agency, the Nuclear Regulatory Commission, and the Department of Defense under mutually agreed procedures which shall be established within not more than ninety days after the date of enactment of this provision [enacted Mar. 10, 1978] and (2) the Department finds based on a reasonable judgment of the assurances provided and the information available to the United States Government, that the criteria in section 127 of this Act [42 U.S.C. 2156] or their equivalent and any applicable criteria in subsection [section] 128 [42 U.S.C. 2157] are met, and that the proposed distribution would not be inimical to the common defense and security.
[42 U.S.C. 2141]

TITLE XI—INTERNATIONAL ACTIVITIES

EFFECT OF INTERNATIONAL ARRANGEMENTS

Sec. 121. Any provision of this Act or any action of the Commission to the extent and during the time that it conflicts with the provisions of any international arrangement made after the date of enactment of this Act [Aug. 30, 1954] shall be deemed to be of no force or effect.
[42 U.S.C. 2151]

POLICIES CONTAINED IN INTERNATIONAL ARRANGEMENTS

Sec. 122. In the performance of its functions under this Act, the Commission shall give maximum effect to the policies contained in any international arrangement made after the date of enactment of this Act [Aug. 30, 1954].
[42 U.S.C. 2152]

COOPERATION WITH OTHER NATIONS

Sec. 123. No cooperation with any nation, group of nations or regional defense organization pursuant to section 53, 54 (a), 57, 64, 82, 91, 103, 104, or 144 [42 U.S.C. 2073, 2074, 2077, 2094, 2112, 2121, 2133, 2134, 2164] shall be undertaken until—
(a) the proposed agreement for cooperation has been submitted to the President, which proposed agreement shall include the terms, conditions, duration, nature, and scope of the cooperation; and shall include the following requirements:

(1) a guaranty by the cooperating party that safeguards as set forth in the agreement for cooperation will be maintained with respect to all nuclear materials and equipment transferred pursuant thereto, and with respect to all special nuclear material used in or produced through the use of such nuclear materials and equipment, so long as the material or equipment remains under the jurisdiction or control of the cooperating party, irrespective of the duration of other provisions in the agreement or whether the agreement is terminated or suspended for any reason;

(2) in the case of non-nuclear-weapon states, a requirement, as a condition of continued United States nuclear supply under the agreement for cooperation, that IAEA safeguards be maintained with respect to all nuclear materials in all peaceful nuclear activities within the territory of such state, under its jurisdiction, or carried out under its control anywhere;

(3) except in the case of those agreements for cooperation arranged pursuant to subsection 91 (c) [42 U.S.C. 2121(c)], a guaranty by the cooperating party that no nuclear materials and equipment or sensitive nuclear technology to be transferred pursuant to such agreement, and no special nuclear material produced through the use of any nuclear materials and equipment or sensitive nuclear technology transferred pursuant to such agreement, will be used for any nuclear explosive device, or for research on or development of any nuclear explosive device, or for any other military purpose;

(4) except in the case of those agreements for cooperation arranged pursuant to subsection 91 (c) [42 U.S.C. 2121(c)] and agreements for cooperation with nuclear-weapon states, a stipulation that the United States shall have the right to require the return of any nuclear materials and equipment transferred pursuant thereto and any special nuclear material produced through the use thereof if the cooperating party detonates a nuclear explosive device or terminates or abrogates an agreement providing for IAEA safeguards;

(5) a guaranty by the cooperating party that any material or any Restricted Data transferred pursuant to the agreement for cooperation and, except in the case of agreements arranged pursuant to subsection 91 (c), 144 (b) or 144 (c) [42 U.S.C. 2121(c), 2164(b),(c)], any production or utilization facility transferred pursuant to the agreement for cooperation or any special nuclear material produced through the use of any such facility or through the use of any material transferred pursuant to the agreement, will not be transferred to unauthorized persons or beyond the jurisdiction or control of the cooperating party without the consent of the United States;

(6) a guaranty by the cooperating party that adequate physical security will be maintained with respect to any nuclear material transferred pursuant to such agreement and with respect to any special nuclear material used in or produced through the use of any material, production facility, or utilization facility transferred pursuant to such agreement;

(7) except in the case of agreements for cooperation arranged pursuant to subsection 91 (c), 144 (b), or 144 (c) [42 U.S.C. 2121(c), 2164(b), (c)], a guaranty by the cooperating party that no material transferred pursuant to the agreement for cooperation and no material used in or produced through the use of any material, production facility, or utilization facility transferred pursuant to the agreement for cooperation will be reprocessed, enriched or (in the case of plutonium, uranium 233, or uranium enriched to greater than twenty percent in the isotope 235, or other nuclear materials which have been irradiated) otherwise altered in form or content without the prior approval of the United States;

(8) except in the case of agreements for cooperation arranged pursuant to subsection 91 (c), 144 (b), or 144 (c), [42 U.S.C. 2121(c), 2164(b), (c)], a guaranty by the cooperating party that no plutonium, no uranium 233, and no uranium enriched to greater than twenty percent in the isotope 235, transferred pursuant to the agreement for cooperation, or recovered from any source or special nuclear material so transferred or from any source or special nuclear material used in any production facility or utilization facility transferred pursuant to the agreement for cooperation, will be stored in any facility that has not been approved in advance by the United States; and

(9) except in the case of agreements for cooperation arranged pursuant to subsection 91 (c), 144 (b) or 144 (c) [42 U.S.C. 2121(c), 2164(b), (c)], a guaranty by the cooperating party that any special nuclear material, production facility, or utilization facility produced or constructed under the jurisdiction of the cooperating party by or through the use of any sensitive nuclear technology transferred pursuant to such agreement for cooperation will be subject to all the requirements specified in this subsection.

The President may exempt a proposed agreement for cooperation (except an agreement arranged pursuant to subsection 91 (c), 144 (b), or 144 (c) [42 U.S.C. 2121(c), 2164 (b), (c)]) from any of the requirements of the foregoing sentence if he determines that inclusion of any such requirement would be seriously prejudicial

to achievement of United States non-proliferation objectives or otherwise jeopardize the common defense and security. Except in the case of those agreements for cooperation arranged pursuant to subsection 91 (c), 144 (b), or 144 (c) [42 U.S.C. 2121(c), 2164(b), (c)], any proposed agreement for cooperation shall be negotiated by the Secretary of State, with the technical assistance and concurrence of the Secretary of Energy and in consultation with the Director of the Arms Control and Disarmament Agency ("the Director"); and after consultation with the Commission shall be submitted to the President jointly by the Secretary of State and the Secretary of Energy accompanied by the views and recommendations of the Secretary of State, the Secretary of Energy, the Nuclear Regulatory Commission, and the Director, who shall also provide to the President an unclassified Nuclear Proliferation Assessment Statement (A) which shall analyze the consistency of the text of the proposed agreement for cooperation with all the requirements of this Act [42 U.S.C. 2011 et seq.], with specific attention to whether the proposed agreement is consistent with each of the criteria set forth in this subsection, and (B) regarding the adequacy of the safeguards and other control mechanisms and the peaceful use assurances contained in the agreement for cooperation to ensure that any assistance furnished thereunder will not be used to further any military or nuclear explosive purpose. In the case of those agreements for cooperation arranged pursuant to subsection 91 (c), 144 (b), or 144 (c) [42 U.S.C. 2121(c), 2164(b),(c)], any proposed agreement for cooperation shall be submitted to the President by the Secretary of Energy or, in the case of those agreements for cooperation arranged pursuant to subsection 91 (c) or 144 (b) [42 U.S.C. 2121(c), 2164(b)] which are to be implemented by the Department of Defense, by the Secretary of Defense;

(b) the President has submitted text of the proposed agreement for cooperation, together with the accompanying unclassified Nuclear Proliferation Assessment Statement, to the Committee on Foreign Relations of the Senate and the Committee on Foreign Affairs of the House of Representatives, the President has consulted with such Committees for a period of not less than thirty days of continuous session (as defined in section 130 (g) of this Act [42 U.S.C. 2159(g)]) concerning the consistency of the terms of the proposed agreement with all the requirements of this Act [42 U.S.C. 2011 et seq.], and the President has approved and authorized the execution of the proposed agreement for cooperation and has made a determination in writing that the performance of the proposed agreement will promote, and will not constitute an unreasonable risk to, the common defense and security;

(c) the proposed agreement for cooperation (if not an agreement subject to subsection (d)), together with the approval and determination of the President, has been submitted to the Committee on International Relations of the House of Representatives[1] and the Committee on Foreign Relations of the Senate for a period of thirty days of continuous session (as defined in subsection 130 (g) [42 U.S.C. 2159g.]): *Provided, however,* That these committees, after having received such agreement for cooperation, may by resolution in writing waive the conditions of all or any portion of such thirty-day period; and

(d) the proposed agreement for cooperation (if arranged pursuant to subsection 91 (c), 144 (b), or 144 (c) [42 U.S.C. 2121(c), 2164(b), (c)], or if entailing implementation of section 53, 54 (a), 103, or 104 [42 U.S.C. 2073, 2074 (a), 2133, or 2134] in relation to a reactor that may be capable of producing more than five thermal megawatts or special nuclear material for use in connection therewith) has been submitted to the Congress, together with the approval and determination of the President, for a period of sixty days of continuous session (as defined in subsection 130 (g) of this Act [42 U.S.C. 2159(g)]) and referred to the Committee on International Relations of the House of Representatives[1] and the Committee on Foreign Relations of the Senate, and in addition, in the case of a proposed agreement for cooperation arranged pursuant to subsection 91 (c), 144 (b), or 144 (c) [42 U.S.C. 2121(c), 2164(b),(c)], the Committee on Armed Services of the House of Representatives and the Committee on Armed Services of the Senate, but such proposed agreement for cooperation shall not become effective if during such sixty-day period the Congress adopts, and there is enacted, a joint resolution stating in substance that the Congress does not favor the proposed agreement for cooperation: *Provided,* That the sixty-day period shall not begin until a Nuclear Proliferation Assessment Statement prepared by the Director of the Arms Control and Disarmament Agency, when required by subsection 123 (a) [42 U.S.C. 2153 (a)], has been submitted to the Congress: *Provided further,* That an agreement for cooperation exempted by the President pursuant to subsection (a)

[1] The name of the Committee on International Relations of the House of Representatives was changed to Committee on Foreign Affairs on Feb. 5, 1979, by House Resoultion 89, 96th Congress.

from any requirement contained in that subsection shall not become effective unless the Congress adopts, and there is enacted, a joint resolution stating that the Congress does favor such agreement. During the sixty-day period the Committee on Foreign Affairs of the House of Representatives and the Committee on Foreign Relations of the Senate shall each hold hearings on the proposed agreement for cooperation and submit a report to their respective bodies recommending whether it should be approved or disapproved. Any such proposed agreement for cooperation shall be considered pursuant to the procedures set forth in section 130(i) of this Act. Following submission of a proposed agreement for cooperation (except an agreement for cooperation arranged pursuant to subsection 91 (c), 144 (b), or 144 (c) [42 U.S.C. 2121(c), 2164(b),(c)]) to the Committee on International Relations of the House of Representatives[1] and the Committee on Foreign Relations of the Senate, the Nuclear Regulatory Commission, the Department of State, the Department of Energy, the Arms Control and Disarmament Agency, and the Department of Defense shall, upon the request of either of those committees, promptly furnish to those committees their views as to whether the safeguards and other controls contained therein provide an adequate framework to ensure that any exports as contemplated by such agreement will not be inimical to or constitute an unreasonable risk to the common defense and security.

If, after the date of enactment of the Nuclear Non-Proliferation Act of 1978, the Congress fails to disapprove a proposed agreement for cooperation which exempts the recipient nation from the requirement set forth in subsection 123 (a) (2) [subsec. (a)(2) of this section], such failure to act shall constitute a failure to adopt a resolution of disapproval pursuant to subsection 128 (b) (3) [42 U.S.C. 2157 (b) (3)] for purposes of the Commission's consideration of applications and requests under section 126 (a) (2) [42 U.S.C. 2155 (a) (2)] and there shall be no congressional review pursuant to section 128 [42 U.S.C. 2157] of any subsequent license or authorization with respect to that state until the first such license or authorization which is issued after twelve months from the elapse of the sixty-day period in which the agreement for cooperation in question is reviewed by the Congress.

[42 U.S.C. 2153]

INTERNATIONAL ATOMIC POOL

Sec. 124. The President is authorized to enter into an international arrangement with a group of nations providing for international cooperation in the nonmilitary applications of atomic energy and he may thereafter cooperate with that group of nations pursuant to sections 54(a), 57, 64, 82, 103, 104, or 144(a) [42 U.S.C. 2074, 2077, 2094, 2112, 2133, 2134, 2164(a)]: *Provided, however,* That the cooperation is undertaken pursuant to an agreement for cooperation entered into in accordance with section 123 [42 U.S.C. 2153].

[42 U.S.C. 2154]

COOPERATION WITH BERLIN

Sec. 125. The President may authorize the Commission to enter into agreements for cooperation with the Federal Republic of Germany in accordance with section 123, on behalf of Berlin, which for the purposes of this Act comprises those areas over which the Berlin Senate exercises jurisdiction (the United States, British, and French sectors) and the Commission may thereafter cooperate with Berlin pursuant to sections 54 (a), 57, 64, 82, 103, or 104: *Provided,* That the guaranties required by section 123 shall be made by Berlin with the approval of allied commandants.

[42 U.S.C. 2153]

EXPORT LICENSING PROCEDURES

Sec. 126. (a) No license may be issued by the Nuclear Regulatory Commission (the "Commission") for the export of any production or utilization facility, or any source material or special nuclear material, including distributions of any material by the Department of Energy under section 54, 64, or 82 [42 U.S.C. 2074, 2094, or 2112], for which a license is required or requested, and no exemption from any requirement for such an export license may be granted by the Commission, as the case may be, until—

(1) the Commission has been notified by the Secretary of State that it is the judgment of the executive branch that the proposed export or exemption will not be inimical to the common defense and security, or that any export in the category to which the proposed export belongs would not be inimical to the common defense and security because it lacks significance for nuclear explosive purposes. The Secretary of State shall, within ninety days after the enactment of this section [enacted Mar. 10, 1978], establish orderly and expeditious procedures, including provision for necessary administrative actions

and inter-agency memoranda of understanding, which are mutually agreeable to the Secretaries of Energy, Defense, and Commerce, the Director of the Arms Control and Disarmament Agency, and the Nuclear Regulatory Commission for the preparation of the executive branch judgment on export applications under this section. Such procedures shall include, at a minimum, explicit direction on the handling of such applications, express deadlines for the solicitation and collection of the views of the consulted agencies (with identified officials responsible for meeting such deadlines), an inter-agency coordinating authority to monitor the processing of such applications, predetermined procedures for the expeditious handling of intra-agency and inter-agency disagreements and appeals to higher authorities, frequent meetings of inter-agency administrative coordinators to review the status of all pending applications, and similar administrative mechanisms. To the extent practicable, an applicant should be advised of all the information required of the applicant for the entire process for every agency's needs at the beginning of the process. Potentially controversial applications should be identified as quickly as possible so that any required policy decisions or diplomatic consultations con be initiated in a timely manner. An immediate effort should be undertaken to establish quickly any necessary standards and criteria, including the nature of any required assurances or evidentiary showings, for the decisions required under this section. The processing of any export application proposed and filed as of the date of enactment of this section shall not be delayed pending the development and establishment of procedures to implement the requirements of this section. The executive branch judgment shall be completed in not more than sixty days from receipt of the application or request, unless the Secretary of State in his discretion specifically authorizes additional time for consideration of the application or request because it is in the national interest to allow such additional time. The Secretary shall notify the Committee on Foreign Relations of the Senate and the Committee on International Relations of the House of Representatives[1] of any such authorization. In submitting any such judgment, the Secretary of State shall specifically address the extent to which the export criteria then in effect are met and the extent to which the cooperating party has adhered to the provisions of the applicable agreement for cooperation. In the event he considers it warranted, the Secretary may also address the following additional factors, among others:

(A) whether issuing the license or granting the exemption will materially advance the non-proliferation policy of the United States by encouraging the recipient nation to adhere to the Treaty, or to participate in the undertakings contemplated by section 403 or 404(a) of the Nuclear Non-Proliferation Act of 1978 [42 U.S.C. 2153b or 2153c(a)];

(B) whether failure to issue the license or grant the exemption would otherwise be seriously prejudicial to the non-proliferation objectives of the United States; and

(C) whether the recipient nation or group of nations has agreed that conditions substantially identical to the export criteria set forth in section 127 of this Act [42 U.S.C. 2156] will be applied by another nuclear supplier nation or group of nations to the proposed United States export, and whether in the Secretary's judgment those conditions will be implemented in a manner acceptable to the United States.

The Secretary of State shall provide appropriate data and recommendations, subject to requests for additional data and recommendations, as required by the Commission or the Secretary of Energy, as the case may be; and

(2) the Commission finds, based on a reasonable judgment of the assurances provided and other information available to the Federal Government, including the Commission, that the criteria in section 127 of this Act [42 U.S.C. 2156] or their equivalent, and any other applicable statutory requirements, are met: *Provided,* That continued cooperation under an agreement for cooperation as authorized in accordance with section 124 of this Act [42 U.S.C. 2154] shall not be prevented by failure to meet the provisions of paragraph (4) or (5) of section 127 [42 U.S.C. 2156(4) or (5)] for a period of thirty days after enactment of this section [enacted Mar. 10, 1978], and for a period of twenty-three months thereafter if the Secretary of State notifies the Commission that the nation or group of nations bound by the relevant agreement has agreed to negotiations as called for in section 404(a) of the Nuclear Non-Proliferation Act of 1978 [42 U.S.C. 2153c(a)]; however, nothing in this subsection shall be deemed to relinquish any rights which the United States may have under agreements for cooperation in force on the date of enactment of this section, [enacted Mar. 10, 1978]: *Provided further,* That if, upon the expiration of such twenty-four month period, the President determines that failure to continue cooperation with any group of nations which has been exempted pursuant to the above proviso from

the provisions of paragraph (4) or (5) of section 127 of this Act [42 U.S.C. 2156(4) or (5)], but which has not yet agreed to comply with those provisions would be seriously prejudicial to the achievement of United States non-proliferation objectives or otherwise jeopardize the common defense and security, he may, after notifying the Congress of his determination, extend by Executive order the duration of the above proviso for a period of twelve months, and may further extend the duration of such proviso by one year increments annually thereafter if he again makes such determination and so notifies the Congress. In the event that the Committee on International Relations of the House of Representatives[1] or the Committee on Foreign Relations of the Senate reports a joint resolution to take any action with respect to any such extension, such joint resolution will be considered in the House or Senate, as the case may be, under procedures identical to those provided for the consideration of resolutions pursuant to section 130 of this Act [42 U.S.C. 2159]; *And additionally provided,* That the Commission is authorized to (A) make a single finding under this subsection for more than a single application or request, where the applications or requests involve exports to the same country, in the same general time frame, of similar significance for nuclear explosive purposes and under reasonably similar circumstances and (B) make a finding under this subsection that there is no material changed circumstance associated with a new application or request from those existing at the time of the last application or request for an export to the same country, where the prior application or request was approved by the Commission using all applicable procedures of this section, and such finding of no material changed circumstance shall be deemed to satisfy the requirement of this paragraph for findings of the Commission. The decision not to make any such finding in lieu of the findings which would otherwise be required to be made under this paragraph shall not be subject to judicial review: *And provided further,* That nothing contained in this section is intended to require the Commission independently to conduct or prohibit the Commission from independently conducting country or site specific visitations in the Commission's consideration of the application of IAEA safeguards.

(b) (1) Timely consideration shall be given by the Commission to requests for export licenses and exemptions and such requests shall be granted upon a determination that all applicable statutory requirements have been met.

(2) If, after receiving the executive branch judgment that the issuance of a proposed export license will not be inimical to the common defense and security, the Commission does not issue the proposed license on a timely basis because it is unable to make the statutory determinations required under this Act, the Commission shall publicly issue its decision to that effect, and shall submit the license application to the President. The Commission's decision shall include an explanation of the basis for the decision and any dissenting or separate views. If, after receiving the proposed license application and reviewing the Commission's decision, the President determines that withholding the proposed export would be seriously prejudicial to the achievement of United States non-proliferation objectives, or would otherwise jeopardize the common defense and security, the proposed export may be authorized by Executive order: *Provided, That prior to any such export, the President shall submit the Executive order, together with his explanation of why, in light of the Commission's decision, the export should nonetheless be made, to the Congress for a period of sixty days of continuous session (as defined in subsection 130 (g) [42 U.S.C. 2159(g)]) and shall be referred to the Committee on International Relations of the House of Representatives*[1] and the Committee on Foreign Relations of the Senate, but any such proposed export shall not occur if during such sixty-day period the Congress adopts a concurrent resolution stating in substance that it does not favor the proposed export. Any such Executive order shall be considered pursuant to the procedures set forth in section 130 of this Act [42 U.S.C. 2159] for the consideration of Presidential submissions: *And provided further,* That the procedures established pursuant to subsection (b) of section 304 of the Nuclear Non-Proliferation Act of 1978 [42 U.S.C. 2155a] shall provide that the Commission shall immediately initiate review of any application for a license under this section and to the maximum extent feasible shall expeditiously process the application concurrently with the executive branch review, while awaiting the final executive branch judgment. In initiating its review, the Commission may identify a set of concerns and requests for information associated with the

[1] The name of the Committee on International Relations of the House of Representatives was changed to Committee on Foreign Affairs of Feb. 5, 1979, by House Resolution 89, 96th Congress.

projected issuance of such license and shall transmit such concerns and requests to the executive branch which shall address such concerns and requests in its written communications with the Commission. Such procedures shall also provide that if the Commission has not completed action on the application within sixty days after the receipt of an executive branch judgment that the proposed export or exemption is not inimical to the common defense and security or that any export in the category to which the proposed export belongs would not be inimical to the common defense and security because it lacks significance for nuclear explosive purposes, the Commission shall inform the applicant in writing of the reason for delay and provide follow-up reports as appropriate. If the Commission has not completed action by the end of an additional sixty days (a total of one hundred and twenty days from receipt of the executive branch judgment), the President may authorize the proposed export by Executive order, upon a finding that further delay would be excessive and upon making the findings required for such Presidential authorizations under this subsection, and subject to the Congressional review procedures set forth herein. However, if the Commission has commenced procedures for public participation regarding the proposed export under regulations promulgated pursuant to subsection (b) of section 304 of the Nuclear Non-Proliferation Act of 1978 [42 U.S.C. 2155a], or—within sixty days after receipt of the executive branch judgment on the proposed export—the Commission has identified and transmitted to the executive branch a set of additional concerns or requests for information, the President may not authorize the proposed export until sixty days after public proceedings are completed or sixty days after a full executive branch response to the Commission's additional concerns or requests has been made consistent with subsection (a) (1) of this section: *Provided further,* That nothing in this section shall affect the right of the Commission to obtain data and recommendations from the Secretary of State at any time as provided in subsection (a) (1) of this section.

(c) In the event that the House of Representatives or the Senate passes a joint resolution which would adopt one or more additional export criteria, or would modify any existing export criteria under this Act, any such joint resolution shall be referred in the other House to the Committee on Foreign Relations of the Senate or the Committee on International Relations of the House of Representatives, as the case may be, and shall be considered by the other House under applicable procedures provided for the consideration of resolutions pursuant to section 130 of this Act [42 U.S.C. 2159].

[42 U.S.C. 2155]

CRITERIA GOVERNING UNITED STATES NUCLEAR EXPORTS

Sec. 127. The United States adopts the following criteria which, in addition to other requirements of law, will govern exports for peaceful nuclear uses from the United States of source material, special nuclear material, production or utilization facilities, and any sensitive nuclear technology:

(1) IAEA safeguards as required by Article III(2) of the Treaty will be applied with respect to any such material or facilities proposed to be exported, to any such material or facilities previously exported and subject to the applicable agreement for cooperation, and to any special nuclear material used in or produced through the use thereof.

(2) No such material, facilities, or sensitive nuclear technology proposed to be exported or previously exported and subject to the applicable agreement for cooperation, and no special nuclear material produced through the use of such materials, facilities, or sensitive nuclear technology, will be used for any nuclear explosive device or for research on or development of any nuclear explosive device.

(3) Adequate physical security measures will be maintained with respect to such material or facilities proposed to be exported and to any special nuclear material used in or produced through the use thereof. Following the effective date of any regulations promulgated by the Commission pursuant to section 304(d) of the Nuclear Non-Proliferation Act of 1978 [42 U.S.C. 2156a], physical security measures shall be deemed adequate if such measures provide a level of protection equivalent to that required by the applicable regulations.

(4) No such materials, facilities, or sensitive nuclear technology proposed to be exported, and no special nuclear material produced through the use of such material, will be retransferred to the jurisdiction of any other nation or group of nations unless the prior approval of the United States is obtained for such retransfer. In addition to other requirements of law, the United States may approve such retransfer only if the nation or group of nations designated to receive such retransfer agrees that it shall be subject to the conditions required by this section.

(5) No such material proposed to be exported and no special nuclear material produced through the use of such material will be reprocessed, and no irradiated fuel elements containing such material removed from a reactor shall be altered in form or content, unless the prior approval of the United States is obtained for such reprocessing or alteration.

(6) No such sensitive nuclear technology shall be exported unless the foregoing conditions shall be applied to any nuclear material or equipment which is produced or constructed under the jurisdiction of the recipient nation or group of nations by or through the use of any such exported sensitive nuclear technology.

[42 U.S.C. 2156]

ADDITIONAL EXPORT CRITERION AND PROCEDURES

Sec. 128.(a)(1) As a condition of continued United States export of source material, special nuclear material, production or utilization facilities, and any sensitive nuclear technology to non-nuclear-weapon states, no such export shall be made unless IAEA safeguards are maintained with respect to all peaceful nuclear activities in, under the jurisdiction of, or carried out under the control of such state at the time of the export.

(2) The President shall seek to achieve adherence to the foregoing criterion by recipient non-nuclear-weapon states.

(b) The criterion set forth in subsection (a) shall be applied as an export criterion with respect to any application for the export of materials, facilities, or technology specified in subsection (a) which is filed after eighteen months from the date of enactment of this section [enacted Mar.10, 1978], or for any such application under which the first export would occur at least twenty-four months after the date of enactment of this section [enacted Mar. 10, 1978], except as provided in the following paragraphs:

(1) If the Commission or the Department of Energy, as the case may be, is notified that the President has determined that failure to approve an export to which this subsection applies because such criterion has not yet been met would be seriously prejudicial to the achievement of United States non-proliferation objectives or otherwise jeopardize the common defense and security, the license or authorization may be issued subject to other applicable requirements of law: *Provided*, That no such export of any production or utilization facility or of any source or special nuclear material (intended for use as fuel in any production or utilization facility) which has been licensed or authorized pursuant to this subsection shall be made to any non-nuclear-weapon state which has failed to meet such criterion until the first such license or authorization with respect to such state is submitted to the Congress (together with a detailed assessment of the reasons underlying the President's determination, the judgment of the executive branch required under section 126 of this Act [42 U.S.C. 2155], and any Commission opinion and views) for a period of sixty days of continuous session (as defined in subsection 130 (g) of this Act [42 U.S.C. 2159(g)]) and referred to the Committee on International Relations of the House of Representatives[1] and the Committee on Foreign Relations of the Senate, but such export shall not occur if during such sixty-day period the Congress adopts a concurrent resolution stating in substance that the Congress does not favor the proposed export. Any such license or authorization shall be considered pursuant to the procedures set forth in section 130 of this Act [42 U.S.C. 2159] for the consideration of Presidential submissions.

(2) If the Congress adopts a resolution of disapproval pursuant to paragraph (1), no further export of materials, facilities, or technology specified in subsection (a) shall be permitted for the remainder of that Congress, unless such state meets the criterion or the President notifies the Congress that he has determined that significant progress has been made in achieving adherence to such criterion by such state or that United States foreign policy interests dictate reconsideration and the Congress, pursuant to the procedure of paragraph (1), does not adopt a concurrent resolution stating in substance that it disagrees with the President's determination.

(3) If the Congress does not adopt a resolution of disapproval with respect to a license or authorization submitted pursuant to paragraph (1), the criterion set forth in subsection (a) shall not be applied as an export criterion with respect to exports of materials, facilities and technology specified in subsection (a) to that state: *Provided*, That the first license or authorization with respect to that state which is issued pursuant to this paragraph after twelve months from the elapse of the sixty-day period specified in paragraph (1), and the first such license or authorization which is issued after each twelve-month period thereafter, shall be submitted to the Congress for review pursuant to the procedures specified in

paragraph (1): *Provided further,* That if the Congress adopts a resolution of disapproval during any review period provided for by this paragraph, the provisions of paragraph (2) shall apply with respect to further exports to such state.

[42 U.S.C. 2157]

CONDUCT RESULTING IN TERMINATION OF NUCLEAR EXPORTS

Sec. 129. No nuclear materials and equipment or sensitive nuclear technology shall be exported to—

(1) any non-nuclear-weapon state that is found by the President to have, at any time after the effective date of this section [enacted Mar. 10, 1978],

(A) detonated a nuclear explosive device; or

(B) terminated or abrogated IAEA safeguards; or

(C) materially violated an IAEA safeguards agreement; or

(D) engaged in activities involving source or special nuclear material and having direct significance for the manufacture or acquisition of nuclear explosive devices, and has failed to take steps which, in the President's judgment, represent sufficient progress toward terminating such activities; or

(2) any nation or group of nations that is found by the President to have, at any time after the effective date of this section [enacted Mar. 10, 1978],

(A) materially violated an agreement for cooperation with the United States, or, with respect to material or equipment not supplied under an agreement for cooperation, materially violated the terms under which such material or equipment was supplied or the terms of any commitments obtained with respect thereto pursuant to section 402(a) of the Nuclear Non-Proliferation Act of 1978 [42 U.S.C. 2153a(a)]; or

(B) assisted, encouraged, or induced any non-nuclear-weapon state to engage in activities involving source or special nuclear material and having direct significance for the manufacture or acquisition of nuclear explosive devices, and has failed to take steps which, in the President's judgment, represent sufficient progress toward terminating such assistance, encouragement, or inducement; or

(C) entered into an agreement after the date of enactment of this section [enacted Mar. 10, 1978] for the transfer of reprocessing equipment, materials, or technology to the sovereign control of a non-nuclear-weapon state except in connection with an international fuel cycle evaluation in which the United States is a participant or pursuant to a subsequent international agreement or understanding to which the United States subscribes;

unless the President determines that cessation of such exports would be seriously prejudicial to the achievement of United States non-proliferation objectives or otherwise jeopardize the common defense and security: *Provided,* That prior to the effective date of any such determination, the President's determination, together with a report containing the reasons for his determination, shall be submitted to the Congress and referred to the Committee on International Relations of the House of Representatives and the Committee on Foreign Relations of the Senate for a period of sixty days of continuous session (as defined in subsection 130 (g) of this Act [42 U.S.C. 2159(g)]), but any such determination shall not become effective if during such sixty-day period the Congress adopts a concurrent resolution stating in substance that it does not favor the determination. Any such determination shall be considered pursuant to the procedures set forth in section 130 of this Act [42 U.S.C. 2159] for the consideration of Presidential submissions.

[42 U.S.C. 2158]

CONGRESSIONAL REVIEW PROCEDURES

Sec. 130. (a) Not later than forty-five days of continuous session of Congress after the date of transmittal to the Congress of any submission of the President required by subsection 126 (a) (2), 126 (b) (2), 128 (b), 129, 131 (a) (3), or 131 (f) (1)(A) of this Act [42 U.S.C. 2155(a)(2), (b)(2), 2157(b), 2158, or 2160(f)(1)(A)], the Committee on Foreign Relations of the Senate and the Committee on International Relations of the House of Representatives[1] shall each submit a report to its respective House on its views and recommendations respecting such Presidential submission together with a resolution, as defined in subsection (f), stating in substance that the Congress approves or disapproves such submission, as the case may be: *Provided,* That if any such committee has not reported such a resolution at the end of such forty-five day period, such committee shall be deemed to be discharged from further consideration of such submission, such committee shall be deemed discharged from further consideration of that resolution. If no such resolution has been reported at the end of such period, the first resolution, as defined in subsection (f), which

is introduced within five days thereafter within such House shall be placed on the appropriate calendar of such House.

(b) When the relevant committee or committees have reported such a resolution (or have been discharged from further consideration of such a resolution pursuant to subsection (a)) or when a resolution has been introduced and placed on the appropriate calendar pursuant to subsection (a), as the case may be, it is at any time thereafter in order (even though a previous motion to the same effect has been disagreed to) for any Member of the respective House to move to proceed to the consideration of the resolution. The motion is highly privileged and is not debatable. The motion shall not be subject to amendment, or to a motion to postpone, or to a motion to proceed to the consideration of other business. A motion to reconsider the vote by which the motion is agreed to or disagreed to shall not be in order. If a motion to proceed to the consideration of the resolution is agreed to, the resolution shall remain the unfinished business of the respective House until disposed of.

(c) Debate on the resolution, and on all debatable motions and appeals in connection therewith, shall be limited to not more than ten hours, which shall be divided equally between individuals favoring and individuals opposing the resolution. A motion further to limit debate is in order and not debatable. An amendment to a motion to postpone, or a motion to recommit the resolution, or a motion to proceed to the consideration of other business is not in order. A motion to reconsider the vote by which the resolution is agreed to or disagreed to shall not be in order. No amendment to any concurrent resolution pursuant to the procedures of this section is in order except as provided in subsection (d).

(d) Immediately following (1) the conclusion of the debate on such concurrent resolution, (2) a single quorum call at the conclusion of debate if requested in accordance with the rules of the appropriate House, and (3) the consideration of an amendment introduced by the Majority Leader or his designee to insert the phrase, "does not" in lieu of the word "does" if the resolution under consideration is a concurrent resolution of approval, the vote on final approval of the resolution shall occur.

(e) Appeals from the decisions of the Chair relating to the application of the rules of the Senate or the House of Representatives, as the case may be, to the procedure relating to such a resolution shall be decided without debate.

(f) For the purposes of subsections (a) through (e) of this section, the term "resolution" means a concurrent resolution of the Congress, the matter after the resolving clause of which is as follows: "That the Congress (does or does not) favor the ———— transmitted to the Congress by the President on ————, ——.", the blank spaces therein to be appropriately filled, and the affirmative or negative phrase within the parenthetical to be appropriately selected.

(g) (1) Except as provided in paragraph (2), for the purposes of this section—

(A) continuity of session is broken only by an adjournment of Congress sine die; and

(B) the days on which either House is not in session because of an adjournment of more than three days to a day certain are excluded in the computation of any period of time in which Congress is in continuous session.

(2) For purposes of this section insofar as it applies to section 123 [42 U.S.C. 2153]—

(A) continuity of session is broken only by an adjournment of Congress sene die at the end of a Congress; and

(B) the days on which either House is not in session because of an adjournment of more than three days are excluded in the computation of any period of time in which Congress is in continuous session.

(h) This section is enacted by Congress—

(1) as an exercise of the rulemaking power of the Senate and the House of Representatives, respectively, and as such they are deemed a part of the rules of each House, respectively, but applicable only with respect to the procedure to be followed in that House in the case of resolutions described by subsection (f) of this section; and they supersede other rules only to the extent that they are inconsistent therewith; and

(2) with full recognition of the constitutional right of either House to change the rules (so far as relating to the procedure of that House) at any time, in the same manner and to the same extent as in the case of any other rule of that House.

(i) (1) For the purposes of this subsection, the term "joint resolution" means a joint resolution, the matter after the resolving clause of which is as follows: "That the Congress (does or does not) favor the proposed agreement for cooperation transmitted to the Congress by the President on .", with the date

of the transmission of the proposed agreement for cooperation inserted in the blank, and the affirmative or negative phrase within the parenthetical appropriately selected.

(2) On the day on which a proposed agreement for cooperation is submitted to the House of Representatives and the Senate under section 123 (d) [42 U.S.C. 2153(d)], a joint resolution with respect to such agreement for cooperation shall be introduced (by request) in the House by the chairman of the Committee on Foreign Affairs, for himself and the ranking minority member of the Committee, or by Members of the House designated by the chairman and ranking minority member; and shall be introduced (by request) in the Senate by the majority leader of the Senate, for himself and the minority leader of the Senate, or by Members of the Senate designated by the majority leader and minority leader of the Senate. If either House is not in session on the day on which such an agreement for cooperation is submitted, the joint resolution shall be introduced in that House, as provided in the preceding sentence, on the first day thereafter on which that House is in session.

(3) All joint resolutions introduced in the House of Representatives shall be referred to the appropriate committee or committees, and all joint resolutions introduced in the Senate shall be referred to the Committee on Foreign Relations and in addition, in the case of a proposed agreement for cooperation arranged pursuant to section 91 (c), 144 (b), or 144 (c) [42 U.S.C. 2121(c), 2164(b), (c)], the Committee on Armed Services.

(4) If the committee of either House to which a joint resolution has been referred has not reported it at the end of 45 days after its introduction, the committee shall be discharged from further consideration of the joint resolution or of any other joint resolution introduced with respect to the same matter; except that, in the case of a joint resolution which has been referred to more than one committee, if before the end of that 45-day period one such committee has reported the joint resolution, any other committee to which the joint resolution was referred shall be discharged from further consideration of the joint resolution or of any other joint resolution introduced with respect to the same matter.

(5) A joint resolution under this subsection shall be considered in the Senate in accordance with the provisions of section 601(b)(4) of the International Security Assistance and Arms Export Control Act of 1976 [unclassified]. For the purpose of expediting the consideration and passage of joint resolutions reported or discharged pursuant to the provisions of this subsection, it shall be in order for the Committee on Rules of the House of Representatives to present for consideration a resolution of the House of Representatives providing procedures for the immediate consideration of a joint resolution under this subsection which may be similar, if applicable, to the procedures set forth in section 601(b)(4) of the International Security Assistance and Arms Export Control Act of 1976 [unclassified].

(6) In the case of a joint resolution described in paragraph (1), if prior to the passage by one House of a joint resolution of that House, that House receives a joint resolution with respect to the same matter from the other House, then—

(A) the procedure in that House shall be the same as if no joint resolution had been received from the other House; but

(B) the vote on final passage shall be on the joint resolution of the other House.

[42 U.S.C. 2159]

SUBSEQUENT ARRANGEMENTS

Sec. 131.(a)(1) Prior to entering into any proposed subsequent arrangement under an agreement for cooperation (other than an agreement for cooperation arranged pursuant to subsection 91 (c), 144 (b), or 144 (c) of this Act [42 U.S.C. 2121(c), 2164(b) or (c)]), the Secretary of Energy shall obtain the concurrence of the Secretary of State and shall consult with the Director, the Commission, and the Secretary of Defense: *Provided*, That the Secretary of State shall have the leading role in any negotiations of a policy nature pertaining to any proposed subsequent arrangement regarding arrangements for the storage or disposition of irradiated fuel elements or approvals for the transfer, for which prior approval is required under an agreement for cooperation, by a recipient of source or special nuclear material, production or utilization facilities, or nuclear technology. Notice of any proposed subsequent arrangement shall be published in the Federal Register, together with the written determination of the Secretary of Energy that such arrangement will not be inimical to the common defense and security, and such proposed subsequent arrangement shall not take effect before fifteen days after publication. Whenever the Director declares that he intends to prepare a Nuclear Proliferation Assessment Statement pursuant to paragraph (2) of this subsection, notice of the proposed subsequent arrangement which is the subject

of the Director's declaration shall not be published until after the receipt by the Secretary of Energy of such Statement or the expiration of the time authorized by subsection (c) for the preparation of such Statement, whichever occurs first.

(2) If in the Director's view a proposed subsequent arrangement might significantly contribute to proliferation, he may prepare an unclassified Nuclear Proliferation Assessment Statement with regard to such proposed subsequent arrangement regarding the adequacy of the safeguards and other control mechanisms and the application of the peaceful use assurances of the relevant agreement to ensure that assistance to be furnished pursuant to the subsequent arrangement will not be used to further any military or nuclear explosive purpose. For the purposes of this section, the term "subsequent arrangements" means arrangements entered into by any agency or department of the United States Government with respect to cooperation with any nation or group of nations (but not purely private or domestic arrangements) involving—

(A) contracts for the furnishing of nuclear materials and equipment;

(B) approvals for the transfer, for which prior approval is required under an agreement for cooperation, by a recipient of any source or special nuclear material, production or utilization facility, or nuclear technology;

(C) authorization for the distribution of nuclear materials and equipment pursuant to this Act which is not subject to the procedures set forth in section 111 (b), section 126, or section 109 (b) [42 U.S.C. 2141(b), 2155, or 2139(b)];

(D) arrangements for physical security;

(E) arrangements for the storage or disposition of irradiated fuel elements;

(F) arrangements for the application of safeguards with respect to nuclear materials and equipment; or

(G) any other arrangement which the President finds to be important from the standpoint of preventing proliferation.

(3) The United States will give timely consideration to all requests for prior approval, when required by this Act, for the reprocessing of material proposed to be exported, previously exported and subject to the applicable agreement for cooperation, or special nuclear material produced through the use of such material or a production or utilization facility transferred pursuant to such agreement for cooperation, or to the altering of irradiated fuel elements containing such material, and additionally, to the maximum extent feasible, will attempt to expedite such consideration when the terms and conditions for such actions are set forth in such agreement for cooperation or in some other international agreement executed by the United States and subject to congressional review procedures comparable to those set forth in section 123 of this Act [42 U.S.C. 2153].

(4) All other statutory requirements under other sections of this Act for the approval or conduct of any arrangement subject to this subsection shall continue to apply and any other such requirements for prior approval or conditions for entering such arrangements shall also be satisfied before the arrangement takes effect pursuant to subsection (a) (1).

(b) With regard to any special nuclear material exported by the United States or produced through the use of any nuclear materials and equipment or sensitive nuclear technology exported by the United States—

(1) the Secretary of Energy may not enter into any subsequent arrangement for the retransfer of any such material to a third country for reprocessing, for the reprocessing of any such material, or for the subsequent retransfer of any plutonium in quantities greater than 500 grams resulting from the reprocessing of any such material, until he has provided the Committee on International Relations of the House of Representatives[1] and the Committee on Foreign Relations of the Senate with a report containing his reasons for entering into such arrangement and a period of 15 days of continuous session (as defined in subsection 130 (g) of this Act [42 U.S.C. 2159(g)] has elapsed: *Provided, however,* That if in the view of the President an emergency exists due to unforeseen circumstances requiring immediate entry into a subsequent arrangement, such period shall consist of fifteen calendar days;

(2) the Secretary of Energy may not enter into any subsequent arrangement for the reprocessing of any such material in a facility which has not processed power reactor fuel assemblies or been the subject of a subsequent arrangement therefor prior to the date of enactment of the Nuclear Non-Proliferation Act of 1978 [enacted Mar. 10, 1978] or for subsequent retransfer to a non-nuclear-weapon state of any plutonium in quantities greater than 500 grams resulting from such reprocessing, unless in his judgment, and that of the Secretary of State, such reprocessing or retransfer will not result in a significant increase

of the risk of proliferation beyond that which exists at the time that approval is requested. Among all the factors in making this judgment, foremost consideration will be given to whether or not the reprocessing or retransfer will take place under conditions that will ensure timely warning to the United States of any diversion well in advance of the time at which the non-nuclear-weapon state could transform the diverted material into a nuclear explosive device; and

(3) the Secretary of Energy shall attempt to ensure, in entering into any subsequent arrangement for the reprocessing of any such material in any facility that has processed power reactor fuel assemblies or been the subject of a subsequent arrangement therefor prior to the date of enactment of the Nuclear Non-Proliferation Act of 1978 [enacted Mar. 10, 1978], or for the subsequent retransfer to any non-nuclear-weapon state of any plutonium in quantities greater than 500 grams resulting from such reprocessing, that such reprocessing or retransfer shall take place under conditions comparable to those which in his view, and that of the Secretary of State, satisfy the standards set forth in paragraph (2).

(c) The Secretary of Energy shall, within ninety days after the enactment of this section [enacted Mar. 10, 1978], establish orderly and expeditious procedures, including provision for necessary administrative actions and inter-agency memoranda of understanding, which are mutually agreeable to the Secretaries of State, Defense, and Commerce, the Director of the Arms Control and Disarmament Agency, and the Nuclear Regulatory Commission for the consideration of requests for subsequent arrangements under this section. Such procedures shall include, at a minimum, explicit direction on the handling of such requests, express deadlines for the solicitation and collection of the views of the consulted agencies (with identified officials responsible for meeting such deadlines), an inter-agency coordinating authority to monitor the processing of such requests, predetermined procedures for the expeditious handling of intra-agency and inter-agency disagreements and appeals to higher authorities, frequent meetings of inter-agency administrative coordinators to review the status of all pending requests, and similar administrative mechanisms. To the extent practicable, an applicant should be advised of all the information required of the applicant for the entire process for every agency's needs at the beginning of the process. Potentially controversial requests should be identified as quickly as possible so that any required policy decisions or diplomatic consultations can be initiated in a timely manner. An immediate effort should be undertaken to establish quickly any necessary standards and criteria, including the nature of any required assurance or evidentiary showings, for the decisions required under this section. Further, such procedures shall specify that if he intends to prepare a Nuclear Proliferation Assessment Statement, the Director shall so declare in his response to the Department of Energy. If the Director declares that he intends to prepare such a Statement, he shall do so within sixty days of his receipt of a copy of the proposed subsequent arrangement (during which time the Secretary of Energy may not enter into the subsequent arrangement), unless pursuant to the Director's request, the President waives the sixty-day requirement and notifies the Committee on International Relations of the House of Representatives and the Committee on Foreign Relations of the Senate of such waiver and the justification therefor. The processing of any subsequent arrangement proposed and filed as of the date of enactment of this section shall not be delayed pending the development and establishment of procedures to implement the requirements of this section.

(d) Nothing in this section is intended to prohibit, permanently or unconditionally, the reprocessing of spent fuel owned by a foreign nation which fuel has been supplied by the United States, to preclude the United States from full participation in the International Nuclear Fuel Cycle Evaluation provided for in section 105 of the Nuclear Non-Proliferation Act of 1978 [22 U.S.C. 3224]; to in any way limit the presentation or consideration in that evaluation of any nuclear fuel cycle by the United States or any other participation; nor to prejudice open and objective consideration of the results of the evaluation.

(e) Notwithstanding subsection 402(d) of the Department of Energy Organization Act (Public Law 95-91) [42 U.S.C. 7172(d)], the Secretary of Energy, and not the Federal Energy Regulatory Commission, shall have sole jurisdiction within the Department of Energy over any matter arising from any function of the Secretary of Energy in this section.

(f) (1) With regard to any subsequent arrangement under subsection (a) (2)(E) (for the storage or disposition of irradiated fuel elements), where such arrangement involves a direct or indirect commitment of the United States for the storage or other disposition, interim or permanent, of any foreign spent nuclear fuel in the United States, the Secretary of Energy may not enter into any such subsequent arrangement, unless:

(A)(i) Such commitment of the United States has been submitted to the Congress for a period of sixty days of continuous session (as defined in subsection 130 (g) of this Act [42 U.S.C. 2159(g)])

and has been referred to the Committee on International Relations of the House of Representatives and the Committee on Foreign Relations of the Senate, but any such commitment shall not become effective if during such sixty-day period the Congress adopts a concurrent resolution stating in substance that it does not favor the commitment, any such commitment to be considered pursuant to the procedures set forth in section 130 of this Act [42 U.S.C. 2159] for the consideration of Presidential submissions; or (ii) if the President has submitted a detailed generic plan for such disposition or storage in the United States to the Congress for a period of sixty days of continuous session (as defined in subsection 130 (g) of this Act [42 U.S.C. 2159(g)]), which plan has been referred to the Committee on International Relations of the House of Representatives and the Committee on Foreign Relations of the Senate and has not been disapproved during such sixty-day period by the adoption of a concurrent resolution stating in substance that Congress does not favor the plan; and the commitment is subject to the terms of an effective plan. Any such plan shall be considered pursuant to the procedures set forth in section 130 of this Act [42 U.S.C. 2159] for the consideration of Presidential submissions;

(B) The Secretary of Energy has complied with subsection (a); and

(C) The Secretary of Energy has complied, or in the arrangement will comply with all other statutory requirements of this Act, under sections 54 and 55 [42 U.S.C. 2074 and 2075] and any other applicable sections, and any other requirements of law.

(2) Subsection (1) shall not apply to the storage or other disposition in the United States of limited quantities of foreign spent nuclear fuel if the President determines that (A) a commitment under section 54 or 55 of this Act [42 U.S.C. 2074 or 2075] of the United States for storage or other disposition of such limited quantities in the United States is required by an emergency situation, (B) it is in the national interest to take such immediate action, and (C) he notifies the Committees on International Relations and Science and Technology of the House of Representatives and the Committees on Foreign Relations and Energy and Natural Resources of the Senate of the determination and action, with a detailed explanation and justification thereof, as soon as possible.

(3) Any plan submitted by the President under subsection (f) (1) shall include a detailed discussion, with detailed information, and any supporting documentation thereof, relating to policy objectives, technical description, geographic information, cost data and justifications, legal and regulatory considerations, environmental impact information and any related international agreements, arrangements or understandings.

(4) For the purposes of this subsection, the term "foreign spent nuclear fuel" shall include any nuclear fuel irradiated in any nuclear power reactor located outside of the United States and operated by any foreign legal entity, government or nongovernment, regardless of the legal ownership or other control of the fuel or the reactor and regardless of the origin or licensing of the fuel or reactor, but not including fuel irradiated in a research reactor.

[42 U.S.C. 2160]

AUTHORITY TO SUSPEND NUCLEAR COOPERATION WITH NATIONS WHICH HAVE NOT RATIFIED THE CONVENTION ON THE PHYSICAL SECURITY OF NUCLEAR MATERIAL

Sec. 132. The President may suspend nuclear cooperation under this Act with any nation or group of nations which has not ratified the Convention on the Physical Security of Nuclear Material.

CONSULTATION WITH THE DEPARTMENT OF DEFENSE CONCERNING CERTAIN EXPORTS AND SUBSEQUENT ARRANGEMENTS

Sec. 133. (a) In addition to other applicable requirements—

(1) a license may be issued by the Nuclear Regulatory Commission under this Act for the export of special nuclear material described in subsection b.; and

(2) approval may be granted by the Secretary of Energy under section 131 of this Act for the transfer of special nuclear material described in subsection b.;

only after the Secretary of Defense has been consulted on whether the physical protection of that material during the export or transfer will be adequate to deter theft, sabotage, and other acts of international terrorism which would result in the diversion of that material. If, in the view of the Secretary of Defense based on all available intelligence information, the export or transfer might be subject to a genuine terrorist threat, the Secretary shall provide to the Nuclear Regulatory Commission or the Secretary of Energy, as appropriate,

his written assessment of the risk and a description of the actions the Secretary of Defense considers necessary to upgrade physical protection measures.

(b) Subsection a. applies to the export or transfer of more than 2 kilograms of plutonium or more than 20 kilograms of uranium enriched to more than 20 percent in the isotope 233 or the isotope 235.

TITLE XII—CONTROL OF INFORMATION

POLICY

Sec. 141. It shall be the policy of the Commission to control the dissemination and declassification of Restricted Data in such a manner as to assure the common defense and security. Consistent with such policy, the Commission shall be guided by the following principles:

(a) Until effective and enforceable international safeguards against the use of atomic energy for destructive purposes have been established by an international arrangement, there shall be no exchange of Restricted Data with other nations except as authorized by section 144 [42 U.S.C. 2164]; and

(b) The dissemination of scientific and technical information relating to atomic energy should be permitted and encouraged so as to provide that free interchange of ideas and criticism which is essential to scientific and industrial progress and public understanding and to enlarge the fund of technical information.

[42 U.S.C. 2161]

CLASSIFICATION AND DECLASSIFICATION OF RESTRICTED DATA

Sec. 142. (a) Determination. The Commission shall from time to time determine the data, within the definition of Restricted Data, which can be published without undue risk to the common defense and security and shall thereupon cause such data to be declassified and removed from the category of Restricted Data.

(b) Review. The Commission shall maintain a continuous review of Restricted Data and of any Classification Guides issued for the guidance of those in the atomic energy program with respect to the areas of Restricted Data which have been declassified in order to determine which information may be declassified and removed from the category of Restricted Data without undue risk to the common defense and security.

(c) Joint determination regarding data relating to military use of atomic weapons. In the case of Restricted Data which the Commission and the Department of Defense jointly determine to relate primarily to the military utilization of atomic weapons, the determination that such data may be published without constituting an unreasonable risk to the common defense and security shall be made by the Commission and the Department of Defense jointly, and if the Commission and the Department of Defense do not agree, the determination shall be made by the President.

(d) Removal of data from Restricted Data category. The Commission shall remove from the Restricted Data category such data as the Commission and the Department of Defense jointly determine relates primarily to the military utilization of atomic weapons and which the Commission and Department of Defense jointly determine can be adequately safeguarded as defense information: *Provided, however,* That no such data so removed from the Restricted Data category shall be transmitted or otherwise made available to any nation or regional defense organization, while such data remains defense information, except pursuant to an agreement for cooperation entered into in accordance with subsection 144(b) [42 U.S.C. 2164(b)].

(e) Removal of information concerning atomic energy programs of other nations from Restricted Data category. The Commission shall remove from the Restricted Data category such information concerning the atomic energy programs of other nations as the Commission and the Director of Central Intelligence jointly determine to be necessary to carry out the provisions of section 102(d) of the National Security Act of 1947, as amended [50 U.S.C. 403(d)], and can be adequately safeguarded as defense information.

[42 U.S.C. 2162]

DEPARTMENT OF DEFENSE PARTICIPATION

Sec. 143. The Commission may authorize any of its employees, or employees of any contractor, prospective contractor, licensee or prospective licensee of the Commission or any other person authorized access to Restricted Data by the Commission under subsections 145(b) and 145(c) [42 U.S.C. 2165(b), (c)] to permit any employee of an agency of the Department of Defense or of its contractors, or any member of the Armed Forces to have access to Restricted Data required in the performance of his duties and so certified by the head of the appropriate agency of the Department of Defense or his designee: *Provided, however,* That the head of the appropriate agency of the Department of Defense or his designee has determined, in accordance with the established personnel security procedures and standards of such agency, that permitting

the member or employee to have access to such Restricted Data will not endanger the common defense and security: *And provided further,* That the Secretary of Defense finds that the established personnel and other security procedures and standards of such agency are adequate and in reasonable conformity to the standards established by the Commission under section 145 [42 U.S.C. 2165].

[42 U.S.C. 2163]

INTERNATIONAL COOPERATION

Sec. 144. (a) Role of Commission. The President may authorize the Commission to cooperate with another nation and to communicate to that nation Restricted Data on—

(1) refining, purification, and subsequent treatment of source material:

(2) civilian reactor development;

(3) production of special nuclear material;

(4) health and safety;

(5) industrial and other applications of atomic energy for peaceful purposes; and

(6) research and development relating to the foregoing:

Provided, however, That no such cooperation shall involve the communication of Restricted Data relating to the design or fabrication of atomic weapons: *And provided further,* That the cooperation is undertaken pursuant to an agreement for cooperation entered into in accordance with section 123 [42 U.S.C. 2153], or is undertaken pursuant to an agreement existing on the effective date of this Act [Aug. 30, 1954].

(b) Role of Department of Defense. The President may authorize the Department of Defense, with the assistance of the Commission, to cooperate with another nation or with a regional defense organization to which the United States is a party, and to communicate to that nation or organization such Restricted Data (including design information) as is necessary to—

(1) the development of defense plans;

(2) the training of personnel in the employment of and defense against atomic weapons and other military applications of atomic energy;

(3) the evaluation of the capabilities of potential enemies in the employment of atomic weapons and other military applications of atomic energy; and

(4) the development of compatible delivery systems for atomic weapons;

whenever the President determines that the proposed cooperation and the proposed communication of the Restricted Data will promote and will not constitute an unreasonable risk to the common defense and security, while such other nation or organization is participating with the United States pursuant to an international arrangement by substantial and material contributions to the mutual defense and security: *Provided, however,* That the cooperation is undertaken pursuant to an agreement entered into in accordance with section 123 [42 U.S.C. 2153].

(c) Exchange of information. In addition to the cooperation authorized in subsections 144(a) and 144(b) [subsecs. (a), (b) of this section], the President may authorize the Commission, with the assistance of the Department of Defense, to cooperate with another nation and—

(1) to exchange with that nation Restricted Data concerning atomic weapons: *Provided,* That communication of such Restricted Data to that nation is necessary to improve its atomic weapon design, development, or fabrication capability and provided that nation has made substantial progress in the development of atomic weapons; and

(2) to communicate or exchange with that nation Restricted Data concerning research, development, or design, of military reactors,

whenever the President determines that the proposed cooperation and the communication of the proposed Restricted Data will promote and will not constitute an unreasonable risk to the common defense and security, while such other nation is participating with the United States pursuant to an international arrangement by substantial and material contributions to the mutual defense and security: *Provided, however,* That the cooperation is undertaken pursuant to an agreement entered into in accordance with section 123 [42 U.S.C. 2153].

(d) Communication by other agencies. The President may authorize any agency of the United States to communicate in accordance with the terms and conditions of an agreement for cooperation arranged pursuant to subsection 144(a), (b), or (c) [subsecs. (a), (b), (c) of this section], such Restricted Data as is determined to be transmissible under the agreement for cooperation involved.

[42 U.S.C. 2164]

RESTRICTIONS

Sec. 145. (a) Agreement by contractor or licensee. No arrangement shall be made under section 31 [42 U.S.C. 2051], no contract shall be made or continued in effect under section 41 [42 U.S.C. 2061], and no license shall be issued under section 103 or 104 [42 U.S.C. 2133, 2134], unless the person with whom such arrangement is made, the contractor or prospective contractor, or the prospective licensee agrees in writing not to permit any individual to have access to Restricted Data until the Civil Service Commissionshall have made an investigation and report to the Commission on the character, associations, and loyalty of such individual, and the Commission shall have determined that permitting such person to have access to Restricted Data will not endanger the common defense and security.

(b) Employment; access to Restricted Data. Except as authorized by the Commission or the General Manager upon a determination by the Commission or General Manager that such action is clearly consistent with the national interest, no individual shall be employed by the Commission nor shall the Commission permit any individual to have access to Restricted Data until the Civil Service Commission[1] shall have made an investigation and report to the Commission on the character, associations, and loyalty of such individual, and the Commission shall have determined that permitting such person to have access to Restricted Data will not endanger the common defense and security.

(c) Acceptance of investigation and report by another Government agency. In lieu of the investigation and report to be made by the Civil Service Commission pursuant to subsection (b) of this section, the Commission may accept an investigation and report on the character, associations, and loyalty of an individual made by another Government agency which conducts personnel security investigations, provided that a security clearance has been granted to such individual by another Government agency based on such investigation and report.

(d) Field investigation by F.B.I. In the event an investigation made pursuant to subsections (a) and (b) of this section develops any data reflecting that the individual who is the subject of the investigation is of questionable loyalty, the Civil Service Commission[1] shall refer the matter to the Federal Bureau of Investigation for the conduct of a full field investigation, the results of which shall be furnished to the Civil Service Commission[1] for its information and appropriate action.

(e) Presidential determination of need for investigation. If the President deems it to be in the national interest he may from time to time determine that investigations of any group or class which are required by subsections (a), (b), and (c) of this section be made by the Federal Bureau of Investigation.

(f) Certification of specific positions for investigation. Notwithstanding the provisions of subsections (a), (b), and (c) of this section, a majority of the members of the Commission shall certify those specific positions which are of a high degree of importance or sensitivity, and upon such certification, the investigation and reports required by such provisions shall be made by the Federal Bureau of Investigation.

(g) Standards and specifications for investigations. The Commission shall establish standards and specifications in writing as to the scope and extent of investigations, the reports of which will be utilized by the Commission in making the determination, pursuant to subsections (a), (b), and (c) of this section, that permitting a person access to restricted data will not endanger the common defense and security. Such standards and specifications shall be based on the location and class or kind of work to be done, and shall, among other considerations, take into account the degree of importance to the common defense and security of the restricted data to which access will be permitted.

(h) Access to Restricted Data in time of war or national disaster. Whenever the Congress declares that a state of war exists, or in the event of a national disaster due to enemy attack, the Commission is authorized during the state of war or period of national disaster due to enemy attack to employ individuals and to permit individuals access to Restricted Data pending the investigation report, and determination required by section 145(b) [subsec. (b) of this section], to the extent that and so long as the Commission finds that such action is required to prevent impairment of its activities in furtherance of the common defense and security.

[42 U.S.C. 2165]

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[1] Reorg. Plan. No. 2 of 1978, §102, 43 F.R. 36037, 92 Stat. 3783, transferred all functions vested by statute in the United States Civil Service Commission to the Director of the Office of Personnel Management (except as otherwise specified) effective Jan. 1, 1979, as provided by section 1-102 of Ex. Ord. No. 12107, Dec. 28, 1978, 44 F.R. 1055.

GENERAL PROVISIONS

Sec. 146. (a) Sections 141 to 145 [42 U.S.C. 2161-2165], inclusive, shall not exclude the applicable provisions of any other laws, except that no Government agency shall take any action under such other laws inconsistent with the provisions of those sections.

(b) The Commission shall have no power to control or restrict the dissemination of information other than as granted by this or any other law.

[42 U.S.C. 2166]

SAFEGUARDS INFORMATION

Sec. 147. (a) In addition to any other authority or requirement regarding protection from disclosure of information, and subject to subsection (b)(3) of section 552 of title 5 of the United States Code [5 U.S.C. 552(b)(3)], the Commission shall prescribe such regulations, after notice and opportunity for public comment, or issue such orders, as necessary to prohibit the unauthorized disclosure of safeguards information which specifically identifies a licensee's or applicant's detailed—

(1) control and accounting procedures or security measures (including security plans, procedures, and equipment) for the physical protection of special nuclear material, by whomever possessed, whether in transit or at fixed sites, in quantities determined by the Commission to be significant to the public health and safety or the common defense and security;

(2) security measures (including security plans, procedures, and equipment) for the physical protection of source material or byproduct material, by whomever possessed, whether in transit or at fixed sites, in quantities determined by the Commission to be significant to the public health and safety or the common defense and security; or

(3) security measures (including security plans, procedures, and equipment) for the physical protection of and the location of certain plant equipment vital to the safety of production or utilization facilities involving nuclear materials covered by paragraphs (1) and (2)

if the unauthorized disclosure of such information could reasonably be expected to have a significant adverse effect on the health and safety of the public or the common defense and security by significantly increasing the likelihood of theft, diversion, or sabotage of such material or such facility. The Commission shall exercise the authority of this subsection—

(A) so as to apply the minimum restrictions needed to protect the health and safety of the public or the common defense and security, and

(B) upon a determination that the unauthorized disclosure of such information could reasonably be expected to have a significant adverse effect on the health and safety of the public or the common defense and security by significantly increasing the likelihood of theft, diversion, or sabotage of such material or such facility.

Nothing in this Act shall authorize the Commission to prohibit the public disclosure of information pertaining to the routes and quantities of shipments of source material, by-product material, high level nuclear waste, or irradiated nuclear reactor fuel. Any person, whether or not a licensee of the Commission, who violates any regulation adopted under this section shall be subject to the civil monetary penalties of section 234 of this Act [42 U.S.C. 2282]. Nothing in this section shall be construed to authorize the withholding of information from the duly authorized committees of the Congress.

(b) For the purposes of section 223 of this Act [42 U.S.C. 2273], any regulations or orders prescribed or issued by the Commission under this section shall also be deemed to be prescribed or issued under section 161 (b) of this Act [42 U.S.C. 2201(b)].

(c) Any determination by the Commission concerning the applicability of this section shall be subject to judicial review pursuant to subsection (a)(4)(B) of section 552 of title 5 of the United States Code [5 U.S.C. 552(a)(4)(B)].

(d) Upon prescribing or issuing any regulation or order under subsection (a) of this section, the Commission shall submit to Congress a report that:

(1) specifically identifies the type of information the Commission intends to protect from disclosure under the regulation or order;

(2) specifically states the Commission's justification for determining that unauthorized disclosure of the information to be protected from disclosure under the regulation or order could reasonably be expected to have a significant adverse effect on the health and safety of the public or the common

defense and security by significantly increasing the likelihood of theft, diversion, or sabotage of such material or such facility, as specified under subsection (a) of this section; and

(3) provides justification, including proposed alternative regulations or orders, that the regulation or order applies only the minimum restrictions needed to protect the health and safety of the public or the common defense and security.

(e) In addition to the reports required under subsection (d) of this section, the Commission shall submit to Congress on a quarterly basis a report detailing the Commission's application during that period of every regulation or order prescribed or issued under this section. In particular, the report shall:

(1) identify any information protected from disclosure pursuant to such regulation or order;

(2) specifically state the Commission's justification for determining that unauthorized disclosure of the information protected from disclosure under such regulation or order could reasonably be expected to have a significant adverse effect on the health and safety of the public or the common defense and security by significantly increasing the likelihood of theft, diversion or sabotage of such material or such facility, as specified under subsection (a) of this section; and

(3) provide justification that the Commission has applied such regulation or order so as to protect from disclosure only the minimum amount of information necessary to protect the health and safety of the public or the common defense and security.

[42 U.S.C. 2167]

PROHIBITION AGAINST THE DISSEMINATION OF CERTAIN UNCLASSIFIED INFORMATION

Sec. 148.(a)(1) In addition to any other authority or requirement regarding protection from dissemination of information, and subject to section 552(b)(3) of title 5, United States Code [5 U.S.C. 552(b)(3)], the Secretary of Energy (hereinafter in this section referred to as the "Secretary"), with respect to atomic energy defense programs, shall prescribe such regulations, after notice and opportunity for public comment thereon, or issue such orders as may be necessary to prohibit the unauthorized dissemination of unclassified information pertaining to—

(A) the design of production facilities or utilization facilities;

(B) security measures (including security plans, procedures, and equipment) for the physical protection of (i) production or utilization facilities, (ii) nuclear material contained in such facilities, or (iii) nuclear material in transit; or

(C) the design, manufacture, or utilization of any atomic weapon or component if the design, manufacture, or utilization of such weapon or component was contained in any information declassified or removed from the Restricted Data category by the Secretary (or the head of the predecessor agency of the Department of Energy) pursuant to section 142 [42 U.S.C. 2162].

(2) The Secretary may prescribe regulations or issue orders under paragraph (1) to prohibit the dissemination of any information described in such paragraph only if and to the extent that the Secretary determines that the unauthorized dissemination of such information could reasonably be expected to have a significant adverse effect on the health and safety of the public or the common defense and security by significantly increasing the likelihood of (A) illegal production of nuclear weapons, or (B) theft, diversion, or sabotage of nuclear materials, equipment, or facilities.

(3) In making a determination under paragraph (2), the Secretary may consider what the likelihood of an illegal production, theft, diversion, or sabotage referred to in such paragraph would be if the information proposed to be prohibited from dissemination under this section were at no time available for dissemination.

(4) The Secretary shall exercise his authority under this subsection to prohibit the dissemination of any information described in subsection (a) (1)—

(A) so as to apply the minimum restrictions needed to protect the health and safety of the public or the common defense and security; and

(B) upon a determination that the unauthorized dissemination of such information could reasonably be expected to result in a significant adverse effect on the health and safety of the public or the common defense and security by significantly increasing the likelihood of (i) illegal production of nuclear weapons, or (ii) theft, diversion, or sabotage of nuclear materials, equipment, or facilities.

(5) Nothing in this section shall be construed to authorize the Secretary to authorize the withholding of information from the appropriate committees of the Congress.

(b) (1) Any person who violates any regulation or order of the Secretary issued under this section with respect to the unauthorized dissemination of information shall be subject to a civil penalty, to be imposed by the Secretary, of not to exceed $100,000 for each such violation. The Secretary may compromise, mitigate, or remit any penalty imposed under this subsection.

(2) The provisions of subsections (b) and (c) of section 234 of this Act [42 U.S.C. 2282(b), (c)] shall be applicable with respect to the imposition of civil penalties by the Secretary under this section in the same manner that such provisions are applicable to the imposition of civil penalties by the Commission under subsection (a) of such section.

(c) For the purposes of section 223 of this Act [42 U.S.C. 2273], any regulation prescribed or order issued by the Secretary under this section shall also be deemed to be prescribed or issued under section 161(b) of this Act [42 U.S.C. 2201(b)].

(d) Any determination by the Secretary concerning the applicability of this section shall be subject to judicial review pursuant to section 552(a)(4)(B) of title 5, United States Code [5 U.S.C. 552(a)(4)(B)].

(e) The Secretary shall prepare on a quarterly basis a report to be made available upon the request of any interested person, detailing the Secretary's application during that period of each regulation or order prescribed or issued under this section. In particular, such report shall—

(1) identify any information protected from disclosure pursuant to such regulation or order;

(2) specifically state the Secretary's justification for determining that unauthorized dissemination of the information protected from disclosure under such regulation or order could reasonably be expected to have a significant adverse effect on the health and safety of the public or the common defense and security by significantly increasing the likelihood of illegal production of nuclear weapons, or theft, diversion, or sabotage of nuclear materials, equipment, or facilities, as specified under subsection (a); and

(3) provide justification that the Secretary has applied such regulation or order so as to protect from disclosure only the minimum amount of information necessary to protect the health and safety of the public or the common defense and security.

[42 U.S.C. 2168]

CRIMINAL HISTORY RECORD CHECKS

Sec. 149. Fingerprinting for Criminal History Record Checks.—

(a) The Nuclear Regulatory Commission (in this section referred to as the "Commission") shall require each licensee or applicant for a license to operate a utilization facility under section 103 or 104 b. to fingerprint each individual who is permitted unescorted access to the facility or is permitted access to safeguards information under section 147. All fingerprints obtained by a licensee or applicant as required in the preceding sentence shall be submitted to the Attorney General of the United States through the Commission for identification and a criminal history records check. The costs of any identification and records check conducted pursuant to the preceding sentence shall be paid by the licensee or applicant. Notwithstanding any other provision of law, the Attorney General may provide all the results of the search to the Commission, and, in accordance with regulations prescribed under this section, the Commission may provide such results to the licensee or applicant submitting such fingerprints.

(b) The Commission, by rule, may relieve persons from the obligations imposed by this section, upon specified terms, conditions, and periods, if the Commission finds that such action is consistent with its obligations to promote the common defense and security and to protect the health and safety of the public

(c) For purposes of administering this section, the Commission shall prescribe, subject to public notice and comment, regulations—

(1) to implement procedures for the taking of fingerprints;

(2) to establish the conditions for use of information received from the Attorney General, in order—

(A) to limit the redissemination of such information;

(B) to ensure that such information is used solely for the purpose of determining whether an individual shall be permitted unescorted access to the facility of a licensee or applicant or shall be permitted access to safeguards information under section 147;

(C) to ensure that no final determination may be made solely on the basis of information provided under this section involving—

(i) an arrest more than 1 year old for which there is no information of the disposition of the case; or

(ii) an arrest that resulted in dismissal of the charge or an acquittal; and

(D) to protect individuals subject to fingerprinting under this section from misuse of the criminal history records; and

(3) to provide each individual subject to fingerprinting under this section with the right to complete, correct, and explain information contained in the criminal history records prior to any final adverse determination.

(d) (1) The Commission may establish and collect fees to process fingerprints and criminal history records under this section.

(2) Notwithstanding section 3302(b) of title 31, United States Code, and to the extent approved in appropriation Acts—

(A) a portion of the amounts collected under this subsection in any fiscal year may be retained and used by the Commission to carry out this section; and

(B) the remaining portion of the amounts collected under this subsection in such fiscal year may be transferred periodically to the Attorney General and used by the Attorney General to carry out this section.

(3) Any amount made available for use under paragraph (2) shall remain available until expended.

[42 U.S.C. 2169]

TITLE XIII—PATENTS AND INVENTIONS

INVENTIONS RELATING TO ATOMIC WEAPONS, AND FILING OF REPORTS

Sec. 151. (a) Denial of patent; revocation. No patent shall hereafter be granted for any invention or discovery which is useful solely in the utilization of special nuclear material or atomic energy in an atomic weapon. Any patent granted for any such invention or discovery is hereby revoked, and just compensation shall be made therefor.

(b) Denial of rights; revocation. No patent hereafter granted shall confer any rights with respect to any invention or discovery to the extent that such invention or discovery is used in the utilization of special nuclear material or atomic energy in atomic weapons. Any rights conferred by any patent heretofore granted for any invention or discovery are hereby revoked to the extent that such invention or discovery is so used, and just compensation shall be made therefor.

(c) Report describing investigation or discovery; filing. Any person who has made or hereafter makes any invention or discovery useful in the production or utilization of special nuclear material or atomic energy, shall file with the Commission a report containing a complete description thereof unless such invention or discovery is described in an application for a patent filed with the Commissioner of Patents[1] by such person within the time required for the filing of such report. The report covering any such invention or discovery shall be filed on or before the one hundred and eightieth day after such person first discovers or first has reason to believe that such invention or discovery is useful in such production or utilization.

(d) Notification of applications for patents; access. The Commissioner of Patents[1] shall notify the Commission of all applications for patents heretofore or hereafter filed which, in his opinion, disclose inventions or discoveries required to be reported under subsection 151(c) [42 U.S.C. 2181(c)], and shall provide the Commission access to all such applications.

(e) Confidentiality of reports and applications. Reports filed pursuant to subsection (c) of this section, and applications to which access is provided under subsection (d) of this section, shall be kept in confidence by the Commission, and no information concerning the same given without authority of the inventor or owner unless necessary to carry out the provisions of any Act of Congress or in such special circumstances as may be determined by the Commission.

[42 U.S.C. 2181]

INVENTIONS MADE OR CONCEIVED DURING COMMISSION CONTRACTS

Sec. 152. Any invention or discovery, useful in the production or utilization of special nuclear material or atomic energy, made or conceived in the course of or under any contract, subcontract, or arrangement

[1] Section 3 of Pub. L. 93-596 deemed references in all laws to "Commissioner of Patents" to mean "Commissioner of Patents and Trademarks".

entered into with or for the benefit of the Commission, regardless of whether the contract, subcontract, or arrangement involved the expenditure of funds by the Commission, shall be vested in, and be the property of, the Commission, except that the Commission may waive its claim to any such invention or discovery under such circumstances as the Commission may deem appropriate, consistent with the policy of this section. No patent for any invention or discovery, useful in the production or utilization of special nuclear material or atomic energy, shall be issued unless the applicant files with the application, or within thirty days after request therefor by the Commissioner of Patents[1] (unless the Commission advises the Commissioner of Patents[1] that its rights have been determined and that accordingly no statement is necessary) a statement under oath setting forth the full facts surrounding the making or conception of the invention or discovery described in the application and whether the invention or discovery was made or conceived in the course of or under any contract, subcontract, or arrangement entered into with or for the benefit of the Commission, regardless of whether the contract, subcontract, or arrangement involved the expenditure of funds by the Commission. The Commissioner of Patents shall[1] as soon as the application is otherwise in condition for allowance forward copies of the application and the statement to the Commission.

The Commissioner of Patents may proceed with the application and issue the patent to the applicant (if the invention or discovery is otherwise patentable) unless the Commission, within 90 days after receipt of copies of the application and statement, directs the Commissioner of Patents[1] to issue the patent to the Commission (if the invention or discovery is otherwise patentable) to be held by the Commission as the agent of and on behalf of the United States.

If the Commission files such a direction with the Commissioner of Patents, and if the applicant's statement claims, and the applicant still believes, that the invention or discovery was not made or conceived in the course of or under any contract, subcontract or arrangement entered into with or for the benefit of the Commission entitling the Commission to the title to the application or the patent the applicant may, within 30 days after notification of the filing of such a direction, request a hearing before the Board of Patent Appeals and Interferences. The Board shall have the power to hear and determine whether the Commission was entitled to the direction filed with the Commissioner of Patents. The Board shall follow the rules and procedures established for interference cases and an appeal may be taken by either the applicant or the Commission from the final order of the Board to the United States Court of Appeals for the Federal Circuit in accordance with the procedures governing the appeals from the Board of Patent Appeals and Interferences.

If the statement filed by the applicant should thereafter be found to contain false material statements any notification by the Commission that it has no objections to the issuance of a patent to the applicant shall not be deemed in any respect to constitute a waiver of the provisions of this section or of any applicable civil or criminal statute, and the Commission may have the title to the patent transferred to the Commission on the records of the Commissioner of Patents[1] in accordance with the provisions of this section. A determination of rights by the Commission pursuant to a contractual provision or other arrangement prior to the request of the Commissioner of Patents[1] for the statement, shall be final in the absence of false material statements or nondisclosure of material facts by the applicant.

[42 U.S.C. 2182]

NONMILITARY UTILIZATION

Sec. 153. (a) Patent affected with public interest. The Commission may, after giving the patent owner an opportunity for a hearing, declare any patent to be affected with the public interest if (1) the invention or discovery covered by the patent is of primary importance in the production or utilization of special nuclear material or atomic energy; and (2) the licensing of such invention or discovery under this section is of primary importance to effectuate the policies and purposes of this Act.

(b) Action by Commission. Whenever any patent has been declared affected with the public interest, pursuant to subsection 153(a) [subsec. (a) of this section]—

(1) the Commission is hereby licensed to use the invention or discovery covered by such patent in performing any of its powers under this Act; and

(2) any person may apply to the Commission for a nonexclusive patent license to use the invention or discovery covered by such patent, and the Commission shall grant such patent license to the extent that it finds that the use of the invention or discovery is of primary importance to the conduct of an activity by such person authorized under this Act.

(c) Application for patent. Any person—

(1) who has made application to the Commission for a license under sections 53, 62, 63, 81, 103, or 104 [42 U.S.C. 2073, 2092, 2093, 2111, 2133, 2134], or a permit or lease under section 67 [42 U.S.C. 2097];

(2) to whom such license, permit, or lease has been issued by the Commission;

(3) who is authorized to conduct such activities as such applicant is conducting or proposes to conduct under a general license issued by the Commission under sections 62 or 81 [42 U.S.C. 2092, 2111]; or

(4) whose activities or proposed activities are authorized under section 31 [42 U.S.C. 2051],

may at any time make application to the Commission for a patent license for the use of an invention or discovery useful in the production or utilization of special nuclear material or atomic energy covered by a patent. Each such application shall set forth the nature and purpose of the use which the applicant intends to make of the patent license, the steps taken by the applicant to obtain a patent license from the owner of the patent, and a statement of the effects, as estimated by the applicant, on the authorized activities which will result from failure to obtain such patent license and which will result from the granting of such patent license.

(d) Hearing. Whenever any person has made an application to the Commission for a patent license pursuant to subsection 153(c) [subsec. (c) of this section]—

(1) the Commission, within 30 days after the filing of such application, shall make available to the owner of the patent all of the information contained in such application, and shall notify the owner of the patent of the time and place at which a hearing will be held by the Commission;

(2) the Commission shall hold a hearing within 60 days after the filing of such application at a time and place designated by the Commission; and

(3) in the event an applicant applies for two or more patent licenses, the Commission may, in its discretion, order the consolidation of such applications, and if the patents are owned by more than one owner, such owners may be made parties to one hearing.

(e) Findings; issuance of license. If, after any hearing conducted pursuant to subsection 153(d) [subsec. (d) of this section], the Commission finds that—

(1) the invention or discovery covered by the patent is of primary importance in the production or utilization of special nuclear material or atomic energy;

(2) the licensing of such invention or discovery is of primary importance to the conduct of the activities of the applicant;

(3) the activities to which the patent license are proposed to be applied by such applicant are of primary importance to the furtherance of policies and purposes of this Act; and

(4) such applicant cannot otherwise obtain a patent license from the owner of the patent on terms which the Commission deems to be reasonable for the intended use of the patent to be made by such applicant,

the Commission shall license the applicant to use the invention or discovery covered by the patent for the purposes stated in such application on terms deemed equitable by the Commission and generally not less fair than those granted by the patentee or by the Commission to similar licensees for comparable use.

(f) Restrictions on issuance of patent. The Commission shall not grant any patent license pursuant to subsection 153(e) [subsec. (e) of this section] for any other purpose than that stated in the application. Nor shall the Commission grant any patent license to any other applicant for a patent license on the same patent without an application being made by such applicant pursuant to subsection 153(c) [subsec. (c) of this section], and without separate notification and hearing as provided in subsection 153(d) [subsec. (d) of this section], and without a separate finding as provided in subsection 153(e) [subsec. (e) of this section].

(g) Royalty fee. The owner of the patent affected by a declaration or a finding made by the Commission pursuant to subsection 153(b) or 153(e) [subsecs. (b), (e) of this section] shall be entitled to a reasonable royalty fee from the licensee for any use of an invention or discovery licensed by this section. Such royalty fee may be agreed upon by such owner and the patent licensee, or in the absence of such agreement shall be determined for each patent license by the Commission pursuant to subsection 157(c) [42 U.S.C. 2187(c)].

(h) Effective date. The provisions of this section shall apply to any patent the application for which shall have been filed before September 1, 1979.

[42 U.S.C. 2183]

INJUNCTIONS

Sec. 154. No court shall have jurisdiction or power to stay, restrain, or otherwise enjoin the use of any invention or discovery by a patent licensee, to the extent that such use is licensed by subsection 153(b) or

153(e) [42 U.S.C. 2183(b), (e)]. If, in any action against such patent licensee, the court shall determine that the defendant is exercising such license, the measure of damages shall be the royalty fee determined pursuant to subsection 157(c) [42 U.S.C. 2187(c)], together with such costs, interest, and reasonable attorney's fees as may be fixed by the court. If no royalty fee has been determined, the court shall stay the proceeding until the royalty fee is determined pursuant to subsection 157(c) [42 U.S.C. 2187(c)]. If any such patent licensee shall fail to pay such royalty fee, the patentee may bring an action in any court of competent jurisdiction for such royalty fee, together with such costs, interest, and reasonable attorney's fees as may be fixed by the court.

[42 U.S.C. 2184]

PRIOR ART

Sec. 155. In connection with applications for patents covered by this Chapter [42 U.S.C. 2181 et seq.], the fact that the invention or discovery was known or used before shall be a bar to the patenting of such invention or discovery even though such prior knowledge or use was under secrecy within the atomic energy program of the United States.

[42 U.S.C. 2185]

COMMISSION PATENT LICENSES

Sec. 156. The Commission shall establish standard specifications upon which it may grant a patent license to use any patent declared to be affected with the public interest pursuant to subsection 153(a) [42 U.S.C. 2183(a)]. Such a patent license shall not waive any of the other provisions of this Act.

[42 U.S.C. 2186]

COMPENSATION, AWARDS, AND ROYALTIES

Sec. 157. (a) Patent Compensation Board. The Commission shall designate a Patent Compensation Board to consider applications under this section. The members of the Board shall receive a per diem compensation for each day spent in meetings or conferences, and all members shall receive their necessary traveling or other expenses while engaged in the work of the Board. The members of the Board may serve as such without regard to the provisions of sections 281, 283, or 284 of Title 18 of the United States Code,[1] except in so far as such sections may prohibit any such member from receiving compensation in respect of any particular matter which directly involves the Commission or in which the Commission is directly interested.

(b) Eligibility.

(1) Any owner of a patent licensed under section 158 or subsections 153(b) or 153(e) [42 U.S.C. 2183(b), (e), 2188], or any patent licensee thereunder may make application to the Commission for the determination of a reasonable royalty fee in accordance with such procedures as the Commission by regulation may establish.

(2) Any person seeking to obtain the just compensation provided in section 151 [42 U.S.C. 2181] shall make application therefor to the Commission in accordance with such procedures as the Commission may by regulation establish.

(3) Any person making any invention or discovery useful in the production or utilization of special nuclear material or atomic energy, who is not entitled to compensation or a royalty therefor under this Act and who has complied with the provisions of section 151(c) hereof [42 U.S.C. 2181(c)] may make application to the Commission for, and the Commission may grant, an award. The Commission may also, after consultation with the General Advisory Committee, and with the approval of the President, grant an award for any especially meritorious contribution to the development, use, or control of atomic energy.

(c) Standards.

(1) In determining a reasonable royalty fee as provided for in subsections 153(b) or 153(e) [42 U.S.C. 2183(b), (e)], the Commission shall take into consideration (A) the advice of the Patent Compensation

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[1] Sections 281, 283, or 284 of title 18, referred to in subsec. (a), were repealed by Pub. L. 87-849, §2, Oct. 23, 1962, 76 Stat. 1126, except as sections 281 and 283 apply to retired officers of the Armed Forces of the United States, and were supplanted by sections 203, 205, and 207, respectively, of title 18, United States Code.

Board; (B) any defense, general or special, that might be pleaded by a defendant in an action for infringement; (C) the extent to which, if any, such patent was developed through federally financed research; and (D) the degree of utility, novelty, and importance of the invention or discovery, and may consider the cost to the owner of the patent of developing such invention or discovery or acquiring such patent.

(2) In determining what constitutes just compensation as provided for in section 151 [42 U.S.C. 2181], or in determining the amount of any award under subsection 157(b)(3) [subsec. (b)(3) of this section], the Commission shall take into account the considerations set forth in subsection 157(c)(1) and the actual use of such invention or discovery. Such compensation may be paid by the Commission in periodic payments or in a lump sum.

(d) Period of limitations. Every application under this section shall be barred unless filed within six years after the date on which first accrues the right to such reasonable royalty fee, just compensation, or award for which such application is filed.

[42 U.S.C. 2187]

MONOPOLISTIC USE OF PATENTS

Sec. 158. Whenever the owner of any patent hereafter granted for any invention or discovery of primary use in the utilization or production of special nuclear material or atomic energy is found by a court of competent jurisdiction to have intentionally used such patent in a manner so as to violate any of the antitrust laws specified in subsection 105(a) [42 U.S.C. 2135(a)], there may be included in the judgment of the court, in its discretion and in addition to any other lawful sanctions, a requirement that such owner license such patent to any other licensee of the Commission who demonstrates a need therefor. If the court, at its discretion, deems that such licensee shall pay a reasonable royalty to the owner of the patent, the reasonable royalty shall be determined in accordance with section 157 [42 U.S.C. 2187].

[42 U.S.C. 2188]

FEDERALLY FINANCED RESEARCH

Sec. 159. Nothing in this Act shall affect the right of the Commission to require that patents granted on inventions, made or conceived during the course of federally financed research or operations, be assigned to the United States.

[42 U.S.C. 2189]

SAVING CLAUSE

Sec. 160. Any patent application on which a patent was denied by the United States Patent Office 11(a)(1), 11(a)(2), or 11(b) of the Atomic Energy Act of 1946, and which is not prohibited by section 151 or section 155 of this Act [42 U.S.C. 2181, 2185] may be reinstated upon application to the Commissioner of Patents within one year after enactment of this Act [one year after Aug. 30, 1954] and shall then be deemed to have been continuously pending since its original filing date: *Provided, however,* That no patent issued upon any patent application so reinstated shall in any way furnish a basis of claim against the Government of the United States.

[42 U.S.C. 2190]

TITLE XIV—GENERAL AUTHORITY OF COMMISSION

GENERAL PROVISIONS

Sec. 161. In the performance of its functions the Commission is authorized to—

(a) Advisory boards. establish advisory boards to advise with and make recommendations to the Commission on legislation, policies, administration, research, and other matters, provided that the Commission issues regulations setting forth the scope, procedure, and limitations of the authority of each such board;

(b) Standards and instructions. establish by rule, regulation, or order, such standards and instructions to govern the possession and use of special nuclear material, source material, and byproduct material as the Commission may deem necessary or desirable to promote the common defense and security or to protect health or to minimize danger to life or property; in addition, the Commission shall prescribe such regulations or orders as may be necessary or desirable to promote the Nation's common defense and security with regard to control, ownership, or possession of any equipment or device, or important component part especially designed for such equipment or device, capable of separating the isotopes of uranium or enriching uranium in the isotope 235;

(c) Studies and investigations. make such studies and investigations, obtain such information, and hold such meetings or hearings as the Commission may deem necessary or proper to assist it in exercising any authority provided in this Act, or in the administration or enforcement of this Act, or any regulations or orders issued thereunder. For such purposes the Commission is authorized to administer oaths and affirmations, and by subpena to require any person to appear and testify, or to appear and produce documents, or both, at any designated place. Witnesses subpoenaed under this subsection shall be paid the same fees and mileage as are paid witnesses in the district courts of the United States;

(d) Officers and employees. appoint and fix the compensation of such officers and employees as may be necessary to carry out the functions of the Commission. Such officers and employees shall be appointed in accordance with the civil-service laws and their compensation fixed in accordance with the Classification Act of 1949,[1] as amended, except that, to the extent the Commission deems such action necessary to the discharge of its responsibilities, personnel may be employed and their compensation fixed without regard to such laws: *Provided, however,* That no officer or employee (except such officers and employees whose compensation is fixed by law, and scientific and technical personnel up to a limit of the highest rate of grade 18 of the General Schedule of the Classification Act of 1949,[1] as amended) whose position would be subject to the Classification Act of 1949,[1] as amended, if such Act were applicable to such position, shall be paid a salary at a rate in excess of the rate payable under such Act for positions of equivalent difficulty or responsibility. Such rates of compensation may be adopted by the Commission as may be authorized by the Classification Act of 1949,[1] as amended, as of the same date such rates are authorized for positions subject to such Act. The Commission shall make adequate provision for administrative review of any determination to dismiss any employee;

(e) Acquisition of property; facilities and services. acquire such material, property, equipment, and facilities, establish or construct such buildings and facilities, and modify such buildings and facilities from time to time, as it may deem necessary, and construct, acquire, provide, or arrange for such facilities and services (at project sites where such facilities and services are not available) for the housing, health, safety, welfare, and recreation of personnel employed by the Commission as it may deem necessary, subject to the provisions of section 174 [42 U.S.C. 2224]: *Provided, however,* That in the communities owned by the Commission, the Commission is authorized to grant privileges, leases and permits upon adjusted terms which (at the time of the initial grant of any privilege grant, lease, or permit, or renewal thereof, or in order to avoid inequities or undue hardship prior to the sale by the United States of property affected by such grant) are fair and reasonable to responsible persons to operate commercial businesses without advertising and [without advertising] and without securing competitive bids, but taking into consideration, in addition to the price, and among other things (1) the quality and type of services required by the residents of the community, (2) the experience of each concession applicant in the community and its surrounding area, (3) the ability of the concession applicant to meet the needs of the community, and (4) the contribution the concession applicant has made or will make to the other activities and general welfare of the community;

(f) Utilization or employment of services or personnel of other agencies or voluntary personnel. with the consent of the agency concerned, utilize or employ the services or personnel of any Government agency or any State or local government, or voluntary or uncompensated personnel, to perform such functions on its behalf as may appear desirable;

(g) Acquisition or disposition of real and personal property. acquire, purchase, lease, and hold real and personal property, including patents, as agent of and on behalf of the United States, subject to the provisions of section 174 [42 U.S.C. 2224], and to sell, lease, grant, and dispose of such real and personal property as provided in this Act;

(h) Consideration of license applications. consider in a single application one or more of the activities for which a license is required by this Act, combine in a single license one or more of such activities, and permit the applicant or licensee to incorporate by reference pertinent information already filed with the Commission;

(i) Regulations or orders. prescribe such regulations or orders as it may deem necessary (1) to protect Restricted Data received by any person in connection with any activity authorized pursuant to this Act, (2) to guard against the loss or diversion of any special nuclear material acquired by any person pursuant to

[1] The Classification Act of 1949 has been codified as chapter 51, and subchapter III of chapter 53, of title 5, United States Code.

section 53 [42 U.S.C. 2073] or produced by any person in connection with any activity authorized pursuant to this Act, to prevent any use or disposition thereof which the Commission may determine to be inimical to the common defense and security, including regulations or orders designating activities, involving quantities of special nuclear material which in the opinion of the Commission are important to the common defense and security, that may be conducted only by persons whose character, associations, and loyalty shall have been investigated under standards and specifications established by the Commission and as to whom the Commission shall have determined that permitting each such person to conduct the activity will not be inimical to the common defense and security, and (3) to govern any activity authorized pursuant to this Act, including standards and restrictions governing the design, location, and operation of facilities used in the conduct of such activity, in order to protect health and to minimize danger to life or property;

(j) Disposition of radioactive materials and other property. without regard to the provisions of the Federal Property and Administrative Services Act of 1949, as amended, except section 207 of that Act [40 U.S.C. 488], or any other law, make such disposition as it may deem desirable of (1) radioactive materials, and (2) any other property, the special disposition of which is, in the opinion of the Commission, in the interest of the national security: *Provided, however,* That the property furnished to licensees in accordance with the provisions of subsection 161(m) [subsec. (m) of this section] shall not be deemed to be property disposed of by the Commission pursuant to this subsection;

(k) Carrying of firearms. authorize such of its members, officers, and employees as it deems necessary in the interest of the common defense and security to carry firearms while in the discharge of their official duties. The Commission may also authorize such of those employees of its contractors and subcontractors (at any tier) engaged in the protection of property under the jurisdiction of the United States located at facilities owned by or contracted to the United States or being transported to or from such facilities as it deems necessary in the interests of the common defense and security to carry firearms while in the discharge of their official duties. A person authorized to carry firearms under this subsection may, while in the performance of, and in connection with, official duties, make arrests without warrant for any offense against the United States committed in that person's presence or for any felony cognizable under the laws of the United States if that person has reasonable grounds to believe that the individual to be arrested has committed or is committing such felony. An employee of a contractor or subcontractor authorized to carry firearms under this subsection may make such arrests only when the individual to be arrested is within, or in direct flight from, the area of such offense. A person granted authority to make arrests by this subsection may exercise that authority only in the enforcement of (1) laws regarding the property of the United States in the custody of the Department of Energy, the Nuclear Regulatory Commission, or a contractor of the Department of Energy or Nuclear Regulatory Commission, or (2) any provision of this Act that may subject an offender to a fine, imprisonment, or both. The arrest authority conferred by this subsection is in addition to any arrest authority under other laws. The Secretary, with the approval of the Attorney General, shall issue guidelines to implement this subsection;

(l) [Repealed]

(m) Agreements with licensees. enter into agreements with persons licensed under section 103, 104, 53(a)(4), or 63(a)(4) [42 U.S.C. 2133, 2134, 2073(a)(4), or 2093(a)(4)] for such periods of time as the Commission may deem necessary or desirable (1) to provide for the processing, fabricating, separating, or refining in facilities owned by the Commission of source, byproduct, or other material or special nuclear material owned by or made available to such licensees and which is utilized or produced in the conduct of the licensed activity, and (2) to sell, lease, or otherwise make available to such licensees such quantities of source or byproduct material, and other material not defined as special nuclear material pursuant to this Act, as may be necessary for the conduct of the licensed activity: *Provided, however,* That any such agreement may be canceled by the licensee at any time upon payment of such reasonable cancellation charges as may be agreed upon by the licensee and the Commission: *And provided further,* That the Commission shall establish prices to be paid by licensees for material or services to be furnished by the Commission pursuant to this subsection, which prices shall be established on such a nondiscriminatory basis as, in the opinion of the Commission, will provide reasonable compensation to the Government for such material or services and will not discourage the development of sources of supply independent of the Commission;

(n) Delegation of functions. delegate to the General Manager or other officers of the Commission any of those functions assigned to it under this Act except those specified in section 51, 57(b), 61, 108, 123, 145(b) [42 U.S.C. 2071, 2077(b), 2091, 2138, 2153, 2165(b)] (with respect to the determination of those persons

to whom the Commission may reveal Restricted Data in the national interest), 145(f) [42 U.S.C. 2165(f)], and 161(a) [subsec. (a) of this section];

(o) Reports and records. require by rule, regulation, or order, such reports, and the keeping of such records with respect to, and to provide for such inspections of, activities and studies of types specified in section 31 [42 U.S.C. 2051] and of activities under licenses issued pursuant to sections 53, 63, 81, 103, and 104 [42 U.S.C. 2073, 2093, 2111, 2133, 2134], as may be necessary to effectuate the purposes of this Act, including section 105 [42 U.S.C. 2135]; and

(p) Rules and regulations. make, promulgate, issue, rescind, and amend such rules and regulations as may be necessary to carry out the purposes of this Act.

(q) Easements for rights-of-way. The Commission is authorized and empowered, under such terms and conditions as are deemed advisable by it, to grant easements for rights-of-way over, across, in, and upon acquired lands under its jurisdiction and control, and public lands permanently withdrawn or reserved for the use of the Commission, to any State, political subdivision thereof, or municipality, or to any individual, partnership, or corporation of any State, Territory, or possession of the United States, for (a) railroad tracks; (b) oil pipe lines; (c) substations for electric power transmission lines, telephone lines, and telegraph lines, and pumping stations for gas, water, sewer, and oil pipe lines; (d) canals; (e) ditches; (f) flumes; (g) tunnels; (h) dams and reservoirs in connection with fish and wildlife programs, fish hatcheries, and other fish-cultural improvements; (i) roads and streets; and (j) for any other purpose or purposes deemed advisable by the Commission: *Provided, That* such rights-of-way shall be granted only upon a finding by the Commission that the same will not be incompatible with the public interest: *Provided further,* That such rights-of-way shall not include any more land than is reasonably necessary for the purpose for which granted: *And provided further,* That all or any part of such rights-of-way may be annulled and forfeited by the Commission for failure to comply with the terms and conditions of any grant hereunder or for nonuse for a period of two consecutive years or abandonment of rights granted under authority hereof. Copies of all instruments granting easements over public lands pursuant to this section shall be furnished to the Secretary of the Interior.

(r) Sale of utilities and related services. Under such regulations and for such periods and at such prices [as] the Commission may prescribe, the Commission may sell or contract to sell to purchasers within Commission-owned communities or in the immediate vicinity of the Commission community, as the case may be, any of the following utilities and related services, if it is determined that they are not available from another local source and that the sale is in the interest of the national defense or in the public interest:

(1) Electric power.
(2) Steam.
(3) Compressed air.
(4) Water.
(5) Sewage and garbage disposal.
(6) Natural, manufactured, or mixed gas.
(7) Ice.
(8) Mechanical refrigeration.
(9) Telephone service.

Proceeds of sales under this subsection shall be credited to the appropriation currently available for the supply of that utility or service. To meet local needs the Commission may make minor expansions and extensions of any distributing system or facility within or in the immediate vicinity of a Commission-owned community through which a utility or service is furnished under this subsection.

(s) Succession of authority. establish a plan for a succession of authority which will assure the continuity of direction of the Commission's operations in the event of a national disaster due to enemy activity. Notwithstanding any other provision of this Act, the person or persons succeeding to command in the event of disaster in accordance with the plan established pursuant to this subsection shall be vested with all of the authority of the Commission: *Provided,* That any such succession to authority, and vesting of authority shall be effective only in the event and as long as a quorum of three or more members of the Commission is unable to convene and exercise direction during the disaster period: *Provided further,* That the disaster period includes the period when attack on the United States is imminent and the post-attack period necessary to reestablish normal lines of command;

(t) Contracts for processing, fabricating, separating, or refining materials. enter into contracts for the processing, fabricating, separating, or refining in facilities owned by the Commission of source, byproduct

or other material, or special nuclear material, in accordance with and within the period of an agreement for cooperation while comparable services are available to persons licensed under section 103 or 104 [42 U.S.C. 2133 or 2134]: *Provided,* That the prices for services under such contracts shall be no less than the prices currently charged by the Commission pursuant to section 161(m) [subsec. (m) of this section];

(u) Contracts for purchase or acquisition of reactor services and supplies and equipment.

(1) enter into contracts for such periods of time as the Commission may deem necessary or desirable, but not to exceed five years from the date of execution of the contract, for the purchase or acquisition of reactor services or services related to or required by the operation of reactors;

(2) (A) enter into contracts for such periods of time as the Commission may deem necessary or desirable for the purchase or acquisition of any supplies, equipment, materials, or services required by the Commission whenever the Commission determines that: (i) it is advantageous to the Government to make such purchase or acquisition from commercial sources; (ii) the furnishing of such supplies, equipment, materials, or services will require the construction or acquisition of special facilities by the vendors or suppliers thereof; (iii) the amortization chargeable to the Commission constitutes an appreciable portion of the cost of contract performance, excluding cost of materials; and (iv) the contract for such period is more advantageous to the Government than a similar contract not executed under the authority of this subsection. Such contracts shall be entered into for periods not to exceed five years each from the date of initial delivery of such supplies, equipment, materials, or services or ten years from the date of execution of the contracts excluding periods of renewal under option.

(B) In entering into such contracts the Commission shall be guided by the following principles: (i) the percentage of the total cost of special facilities devoted to contract performance and chargeable to the Commission should not exceed the ratio between the period of contract deliveries and the anticipated useful life of such special facilities; (ii) the desirability of obtaining options to renew the contract for reasonable periods at prices not to include charges for special facilities already amortized; and (iii) the desirability of reserving in the Commission the right to take title to the special facilities under appropriate circumstances; and

(3) include in contracts made under this subsection provisions which limit the obligation of funds to estimated annual deliveries and services and the unamortized balance of such amounts due for special facilities as the parties shall agree is chargeable to the performance of the contract. Any appropriation available at the time of termination or thereafter made available to the Commission for operating expenses shall be available for payment of such costs which may arise from termination as the contract may provide. The term "special facilities" as used in this subsection means any land and any depreciable buildings, structures, utilities, machinery, equipment, and fixtures necessary for the production or furnishing of such supplies, equipment, materials, or services and not available to the vendors or suppliers for the performance of the contract.

(v) Contracts for producing or enriching special nuclear material.

(A) enter into contracts with persons licensed under sections 53, 63, 103 or 104 [42 U.S.C. 2073, 2093, 2133, 2134] for such periods of time as the Commission may deem necessary or desirable to provide, after December 31, 1968, for the producing or enriching of special nuclear material in facilities owned by the Commission; and

(B) enter into contracts to provide, after December 31, 1968, for the producing or enriching of special nuclear material in facilities owned by the Commission in accordance with and within the period of an agreement for cooperation arranged pursuant to section 123 [42 U.S.C. 2153] while comparable services are made available pursuant to paragraph (A) of this subsection:

Provided, That (i) prices for services under paragraph (A) of this subsection shall be established on a nondiscriminatory basis; (ii) prices for services under paragraph (B) of this subsection shall be no less than prices under paragraph (A) of this subsection; and (iii) any prices established under this subsection shall be on a basis of recovery of the Government's costs over a reasonable period of time: *And provided further,* That the Commission, to the extent necessary to assure the maintenance of a viable domestic uranium industry, shall not offer such services for source or special nuclear materials of foreign origin intended for use in a utilization facility within or under the jurisdiction of the United States. For purposes of this subsection and of section 305 of Public Law 99-591 (100 Stat. 3341-209, 210) 'foreign origin' excludes source or special nuclear material originating in Canada. The Commission shall establish criteria in writing setting forth the terms and conditions under which services provided under this subsection shall be made

available including the extent to which such services will be made available for source or special nuclear material of foreign origin intended for use in a utilization facility within or under the jurisdiction of the United States: *Provided*, That before the Commission establishes such criteria, the proposed criteria shall be submitted to the Joint Committee,[1] and a period of forty-five days shall elapse while Congress is in session (in computing the forty-five days there shall be excluded the days in which either House is not in session because of adjournment for more than three days) unless the Joint Committee[1] by resolution in writing waives the conditions of, or all or any portion of, such forty-five-day period.

(w) Prescription and collection of fees, charges, and prices. prescribe and collect from any other Government agency, which applies for or is issued license for a utilization facility designed to produce electrical or heat energy pursuant to section 103 or 104(b) [42 U.S.C. 2133, 2134(b)], any fee, charge, or price which it may require, in accordance with the provisions of section 483a of title 31 of the United States Code [31 U.S.C. 483a][2] or any other law, of applicants for, or holders of, such licenses.

(x) Authority to establish certain requirements. Establish by rule, regulation, or order, after public notice, and in accordance with the requirements of section 181 of this Act [42 U.S.C. 2231], such standards and instructions as the Commission may deem necessary or desirable to ensure—

(1) that an adequate bond, surety, or other financial arrangement (as determined by the Commission) will be provided, before termination of any license for byproduct material as defined in section 11 (e) (2) [42 U.S.C. 2014(e)(2)], by a licensee to permit the completion of all requirements established by the Commission for the decontamination, decommissioning, and reclamation of sites, structures, and equipment used in conjunction with byproduct material as so defined, and

(2) that—

(A) in the case of any such license issued or renewed after the date of the enactment of this subsection [enacted Nov. 8, 1978], the need for long term maintenance and monitoring of such sites, structures and equipment after termination of such license will be minimized and, to the maximum extent practicable, eliminated; and

(B) in the case of each license for such material (whether in effect on the date of the enactment of this section [enacted Nov. 7, 1978] or issued or renewed thereafter), if the Commission determines that any such long-term maintenance and monitoring is necessary, the licensee, before termination of any license for byproduct material as defined in section 11 (e) (2) [42 U.S.C. 2014(e)(2)], will make available such bonding, surety, or other financial arrangements as may be necessary to assure such long-term maintenance and monitoring.

Such standards and instructions promulgated by the Commission pursuant to this subsection shall take into account, as determined by the Commission, so as to avoid unnecessary duplication and expense, performance bonds or other financial arrangements which are required by other Federal agencies or State agencies and/or other local governing bodies for such decommissioning, decontamination, and reclamation and long-term maintenance and monitoring except that nothing in this paragraph shall be construed to require that the Commission accept such bonds or arrangements if the Commission determines that such bonds or arrangements are not adequate to carry out subparagraphs (1) and (2) of this subsection.

[42 U.S.C. 2201]

CONTRACTS

Sec. 162. The President may, in advance, exempt any specific action of the Commission in a particular matter from the provisions of law relating to contracts whenever he determines that such action is essential in the interest of the common defense and security.

[42 U.S.C. 2202]

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[1] The Joint Committee on Atomic Energy was abolished by section 301 of the Atomic Energy Act of 1954, on September 20, 1977. References to the Joint Committee are on or after Sept. 20, 1977, to refer to the committees of the Senate or House of Representatives which, under the rules of the Senate or House, have jurisdiction over the subject matter with records and files of the Joint Committee being transferred to the respective committees of the House or Senate.

[2] Prior section 438a of title 31, United States Code, has been codified as section 9701 of such title.

ADVISORY COMMITTEES

Sec. 163. The members of the General Advisory Committee established pursuant to section 26[1] [42 U.S.C. 2036] and the members of advisory boards established pursuant to section 161(a) [42 U.S.C. 2201(a)] may serve as such without regard to the provisions of sections 281, 283, or 284 of Title 18 of the United States Code[2] except insofar as such sections may prohibit any such member from receiving compensation from a source other than a nonprofit educational institution in respect of any particular matter which directly involves the Commission or in which the Commission is directly interested.
[42 U.S.C. 2203]

ELECTRIC UTILITY CONTRACTS

Sec. 164. The Commission is authorized in connection with the construction or operation of the Oak Ridge, Paducah, and Portsmouth installations of the Commission, without regard to section 3679 of the Revised Statutes, as amended [31 U.S.C. 665],[3] to enter into new contracts or modify or confirm existing contracts to provide for electric utility services for periods not exceeding twenty-five years, and such contracts shall be subject to termination by the Commission upon payment of cancellation costs as provided in such contracts, and any appropriation presently or hereafter made available to the Commission shall be available for the payment of such cancellation costs. Any such cancellation payments shall be taken into consideration in determination of the rate to be charged in the event the Commission or any other agency of the Federal Government shall purchase electric utility services from the contractor subsequent to the cancellation and during the life of the original contract. The authority of the Commission under this section to enter into new contracts or modify or confirm existing contracts to provide for electric utility services includes, in case such electric utility services are to be furnished to the Commission by the Tennessee Valley Authority, authority to contract with any person to furnish electric utility services to the Tennessee Valley Authority in replacement thereof. Any contract hereafter entered into by the Commission pursuant to this section shall be submitted to the Joint Committee[4] and a period of thirty days shall elapse while Congress is in session (in computing such thirty days, there shall be excluded the days on which either House is not in session because of adjournment for more than three days) before the contract of the Commission shall become effective: *Provided, however,* That the Joint Committee,[4] after having received the proposed contract, may by resolution in writing, waive the conditions of or all or any portion of such thirty-day period.
[42 U.S.C. 2204]

CONTRACT PRACTICES

Sec. 165. (a) In carrying out the purposes of this Act the Commission shall not use the cost-plus-percentage-of-cost system of contracting.

(b) No contract entered into under the authority of this Act shall provide, and no contract entered into under the authority of the Atomic Energy Act of 1946, as amended, shall be modified or amended after the date of enactment of this Act [Aug. 30, 1954] to provide, for direct payment or direct reimbursement by the Commission of any Federal income taxes on behalf of any contractor performing such contract for profit.
[42 U.S.C. 2205]

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[1] Section 26 was repealed by Pub. L. 95-91, title VII, §709(c)(1), Aug. 4, 1977, 91 Stat.608.

[2] Sections 281, 283, and 284 of title 18 were repealed by Pub. L. 87-849,§2, Oct. 23, 1962, 76 Stat. 1126, except as sections 281 and 283 apply to retired officers of the Armed Forces of the United States, and were supplanted by sections 203, 205, and 207, respectively, of title 18, United States Code.

[3] Section 3679 of the Revised Statutes has been codified as sections 1341, 1342, 1349-1351, and subchapter II of chapter 15, of title 31, United States Code.

[4] The Joint Committee on Atomic Energy was abolished by section 301 of the Atomic Energy Act of 1954, on September 20, 1977. References to the Joint Committee are deemed, on or after Sept. 20, 1977, to refer to the committees of the Senate or House of Representatives which, under the rules of the Senate or House, have jurisdiction over the subject matter with records and files of the Joint Committee being transferred to the respective committees of the House or Senate.

COMPTROLLER GENERAL AUDIT

Sec. 166. No moneys appropriated for the purposes of this Act shall be available for payments under any contract with the Commission, negotiated without advertising, except contracts with any foreign government or any agency thereof and contracts with foreign producers, unless such contract includes a clause to the effect that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of three years after final payment, have access to and the right to examine any directly pertinent books, documents, papers, and records of the contractor or any of his subcontractors engaged in the performance of, and involving transactions related to such contracts or subcontracts: *Provided, however,* That no moneys so appropriated shall be available for payment under such contract which includes any provision precluding an audit by the General Accounting Office of any transaction under such contract: *And provided further,* That nothing in this section shall preclude the earlier disposal of contractor and subcontractor records in accordance with records disposal schedules agreed upon between the Commission and the General Accounting Office.
[42 U.S.C. 2206]

CLAIMS SETTLEMENTS

Sec. 167. The Commission, acting on behalf of the United States, is authorized to consider, ascertain, adjust, determine, settle, and pay, any claim for money damage of $5,000 or less against the United States for bodily injury, death, or damage to or loss of real or personal property resulting from any detonation, explosion, or radiation produced in the conduct of any program undertaken by the Commission involving the detonation of an explosive device, where such claim is presented to the Commission in writing within one year after the accident or incident out of which the claim arises: *Provided, however,* That the damage to or loss of property, or bodily injury or death, shall not have been caused in whole or in part by any negligence or wrongful act on the part of the claimant, his agents, or employees. Any such settlement under the authority of this section shall be final and conclusive for all purposes, notwithstanding any other provision of law to the contrary. If the Commission considers that a claim in excess of $5,000 is meritorious and would otherwise be covered by this section, the Commission may report the facts and circumstances thereof to the Congress for its consideration.
[42 U.S.C. 2207]

PAYMENTS IN LIEU OF TAXES

Sec. 168. In order to render financial assistance to those States and localities in which the activities of the Commission are carried on, and in which the Commission has acquired property previously subject to State and local taxation, the Commission is authorized to make payments to State and local governments in lieu of property taxes. Such payments may be in the amounts, at the times, and upon the terms the Commission deems appropriate, but the Commission shall be guided by the policy of not making payments in excess of the taxes which would have been payable for such property in the condition in which it was acquired, except in cases where special burdens have been cast upon the State or local government by activities of the Commission, the Manhattan Engineer District or their agents. In any such case, any benefit accruing to the State or local government by reason of such activities shall be considered in determining the amount of the payment.
[42 U.S.C. 2208]

NO SUBSIDY

Sec. 169. No funds of the Commission shall be employed in the construction or operation of facilities licensed under section 103 or 104 [42 U.S.C. 2133, 2134] except under contract or other arrangement entered into pursuant to section 31 [42 U.S.C. 2051].
[42 U.S.C. 2209]

INDEMNIFICATION AND LIMITATION OF LIABILITY

Sec. 170. (a) Requirement of Financial Protection for Licensees.— Each license issued under section 103 or 104 [42 U.S.C. 2133, 2134] and each construction permit issued under section 185 [42 U.S.C. 2235] shall, and each license issued under section 53, 63, or 81 [42 U.S.C. 2073, 2093, 2111] may, for the public purposes cited in section 2 i the Atomic Energy Act of 1954 have as a condition of the license a requirement that the licensee have and maintain financial protection of such type and in such amounts as the Nuclear Regulatory Commission in the exercise of its licensing and regulatory authority and responsibility shall

require in accordance with subsection b to cover public liability claims. Whenever such financial protection is required, it may be a further condition of the license that the licensee execute and maintain an indemnification agreement in accordance with subsection c. The Nuclear Regulatory Commission may require, as a further condition of issuing a license, that an applicant waive any immunity from public liability conferred by Federal or State law.

(b) (1) Amount and Type of Financial Protection for Licensees.— The amount of primary financial protection required shall be the amount of liability insurance available from private sources, except that the Commission may establish a lesser amount on the basis of criteria set forth in writing, which it may revise from time to time, taking into consideration such factors as the following: (A) the costs and terms of private insurance, (B) the type, size, and location of the licensed activity and other factors pertaining to the hazard, and (C) the nature and purpose of the licensed activity: *Provided,* That for facilities designed for producing substantial amounts of electricity and having a rated capacity of 100,000 electrical kilowatts or more, the amount of primary financial protection required shall be the maximum amount available at reasonable cost and on reasonable terms from private sources (excluding the amount of private liability insurance available under the industry retrospective rating plan required in this subsection. Such financial protection may include private insurance, private contractual indemnities, self-insurance, other proof of financial responsibility, or a combination of such measures and shall be subject to such terms and conditions as the Commission may, by rule, regulation, or order, prescribe. The Commission shall require licensees that are required to have and maintain primary financial protection equal to the maximum amount of liability insurance available from private sources to maintain, in addition to such primary financial protection, private liability insurance available under an industry retrospective rating plan providing for premium charges deferred in whole or major part until public liability from a nuclear incident exceeds or appears likely to exceed the level of the financial protection required of the licensee involved in the nuclear incident: *Provided,* That the maximum amount of the standard deferred premium that may be charged a licensee following any nuclear incident under such a plan shall not be more than $63,000,000 (subject to adjustment for inflation under subsection t.), but not more than $10,000,000 in any 1 year, for each facility for which such licensee is required to maintain the maximum amount of primary financial protection: *And provided further,* That the standard deferred premium which may be charged following any nuclear incident under such a plan shall be not less than $2,000,000 nor more than $5,000,000 for each facility required to maintain the maximum amount of financial protection: *And provided further,* That the amount which may be charged a licensee following any nuclear incident shall not exceed the licensee's pro rata share of the aggregate public liability claims and costs (excluding legal costs subject to subsection o. (1)(D), payment of which has not been authorized under such subsection) arising out of the nuclear incident. Payment of any State premium taxes which may be applicable to any deferred premium provided for in this Act [42 U.S.C. 2011 et seq.] shall be the responsibility of the licensee and shall not be included in the retrospective premium established by the Commission.

(2) (A) The Commission may, on a case by case basis, assess annual deferred premium amounts less than the standard annual deferred premium amount assessed under paragraph (1)—

(i) for any facility, if more than one nuclear incident occurs in any one calendar year; or

(ii) for any licensee licensed to operate more than one facility, if the Commission determines that the financial impact of assessing the standard annual deferred premium amount under paragraph (1) would result in undue financial hardship to such licensee or the ratepayers of such licensee.

(B) In the event that the Commission assesses a lesser annual deferred premium amount under subparagraph (A), the Commission shall require payment of the difference between the standard annual deferred premium assessment under paragraph (1) and any such lesser annual deferred premium assessment within a reasonable period of time, with interest at a rate determined by the Secretary of the Treasury on the basis of the current average market yield on outstanding marketable obligations of the United States of comparable maturities during the month preceding the date that the standard annual deferred premium assessment under paragraph (1) would become due.

(3) The Commission shall establish such requirements as are necessary to assure availability of funds to meet any assessment of deferred premiums within a reasonable time when due, and may provide reinsurance or shall otherwise guarantee the payment of such premiums in the event it appears that the amount of such premiums will not be available on a timely basis through the resources of private industry

and insurance. Any agreement by the Commission with a licensee or indemnitor to guarantee the payment of deferred premiums may contain such terms as the Commission deems appropriate to carry out the purposes of this section and to assure reimbursement to the Commission for its payments made due to the failure of such licensee or indemnitor to meet any of its obligations arising under or in connection with financial protection required under this subsection including without limitation terms creating liens upon the licensed facility and the revenues derived therefrom or any other property or revenues of such licensee to secure such reimbursement and consent to the automatic revocation of any license.

(4) (A) In the event that the funds available to pay valid claims in any year are insufficient as a result of the limitation on the amount of deferred premiums that may be required of a licensee in any year under paragraph (1) or (2), or the Commission is required to make reinsurance or guaranteed payments under paragraph (3), the Commission shall, in order to advance the necessary funds—

(i) request the Congress to appropriate sufficient funds to satisfy such payments; or

(ii) to the extent approved in appropriation Acts, issue to the Secretary of the Treasury obligations in such forms and denominations, bearing such maturities, and subject to such terms and conditions as may be agreed to by the Commission and the Secretary of the Treasury.

(B) Except for funds appropriated for purposes of making reinsurance or guaranteed payments under paragraph (3), any funds appropriated under subparagraph (A)(i) shall be repaid to the general fund of the United States Treasury from amounts made available by standard deferred premium assessments, with interest at a rate determined by the Secretary of the Treasury on the basis of the current average market yield on outstanding marketable obligations of the United States of comparable maturities during the month preceding the date that the funds appropriated under such subparagraph are made available.

(C) Except for funds appropriated for purposes of making reinsurance or guaranteed payments under paragraph (3), redemption of obligations issued under subparagraph (A)(ii) shall be made by the Commission from amounts made available by standard deferred premium assessments. Such obligations shall bear interest at a rate determined by the Secretary of the Treasury by taking into consideration the average market yield on outstanding marketable obligations to the United States of comparable maturities during the month preceding the issuance of the obligations under this paragraph. The Secretary of the Treasury shall purchase any issued obligations, and for such purpose the Secretary of the Treasury may use as a public debt transaction the proceeds from the sale of any securities issued under chapter 31 of title 31, United States Code, and the purposes for which securities may be issued under such chapter are extended to include any purchase of such obligations. The Secretary of the Treasury may at any time sell any of the obligations acquired by the Secretary of the Treasury under this paragraph. All redemptions, purchases, and sales by the Secretary of the Treasury of obligations under this paragraph shall be treated as public debt transactions of the United States.

(c) Indemnification of Licenses by Nuclear Regulatory Commission.—The Commission shall, with respect to licenses issued between August 30, 1954, and August 1, 2002, for which it requires financial protection of less than $560,000,000, agree to indemnify and hold harmless the licensee and other persons indemnified, as their interest may appear, from public liability arising from nuclear incidents which is in excess of the level of financial protection required of the licensee. The aggregate indemnity for all persons indemnified in connection with each nuclear incident shall not exceed $500,000,000 excluding costs of investigating and settling claims and defending suits for damage: *Provided, however,* That this amount of indemnity shall be reduced by the amount that the financial protection required shall exceed $60,000,000. Such a contract of indemnification shall cover public liability arising out of or in connection with the licensed activity. With respect to any production or utilization facility for which a construction permit is issued between August 30, 1954, and August 1, 2002, the requirements of this subsection shall apply to any license issued for such facility subsequent to August 1, 2002.

(d) Indemnification of Contractors by Department of Energy.—

(1) (A) In addition to any other authority the Secretary of Energy (in this section referred to as the 'Secretary') may have, the Secretary shall, until August 1, 2002, enter into agreements of indemnification under this subsection with any person who may conduct activities under a contract with the Department of Energy that involve the risk of public liability and that are not subject to financial

protection requirements under subsection b. or agreements of indemnification under subsection c. or k.

(B)(i)(I) Beginning 60 days after the date of enactment of the Price-Anderson Amendments Act of 1988, agreements of indemnification under subparagraph (A) shall be the exclusive means of indemnification for public liability arising from activities described in such subparagraph, including activities conducted under a contract that contains an indemnification clause under Public Law 85-804 entered into between August 1, 1987, and the date of enactment of the Price-Anderson Amendments Act of 1988.

(II) The Secretary may incorporate in agreements of indemnification under subparagraph (A) the provisions relating to the waiver of any issue or defense as to charitable or governmental immunity authorized in subsection n. (1) to be incorporated in agreements of indemnification. Any such provisions incorporated under this subclause shall apply to any nuclear incident arising out of nuclear waste activities subject to an agreement of indemnification under subparagraph (A).

(ii) Public liability arising out of nuclear waste activities subject to an agreement of indemnification under subparagraph (A) that are funded by the Nuclear Waste Fund established in section 302 of the Nuclear Waste Policy Act of 1982 [42 U.S.C. 10222] shall be compensated from the Nuclear Waste Fund in an amount not to exceed the maximum amount of financial protection required of licensees under subsection b.

(2) In agreements of indemnification entered into under paragraph (1), the Secretary may require the contractor to provide and maintain financial protection of such a type and in such amounts as the Secretary shall determine to be appropriate to cover public liability arising out of or in connection with the contractual activity, and shall indemnify the persons indemnified against such claims above the amount of the financial protection required, to the full extent of the aggregate public liability of the persons indemnified for each nuclear incident, including such legal costs of the contractor as are approved by the Secretary.

(3) (A) Notwithstanding paragraph (2), if the maximum amount of financial protection required of licensees under subsection b. is increased by the Commission, the amount of indemnity, together with any financial protection required of the contractor, shall at all times remain equal to or greater than the maximum amount of financial protection required of licensees under subsection b.

(B) The amount of indemnity provided contractors under this subsection shall not, at any time, be reduced in the event that the maximum amount of financial protection required of licensees is reduced.

(C) All agreements of indemnification under which the Department of Energy (or its predecessor agencies) may be required to indemnify any person, shall be deemed to be amended, on the date of the enactment of the Price-Anderson Amendments Act of 1988, to reflect the amount of indemnity for public liability and any applicable financial protection required of the contractor under this subsection on such date.

(4) Financial protection under paragraph (2) and indemnification under paragraph (1) shall be the exclusive means of financial protection and indemnification under this section for any Department of Energy demonstration reactor licensed by the Commission under section 202 of the Energy Reorganization Act of 1974 [42 U.S.C. 5842].

(5) In the case of nuclear incidents occurring outside the United States, the amount of the indemnity provided by the Secretary under this subsection shall not exceed $100,000,000.

(6) The provisions of this subsection may be applicable to lump sum as well as cost type contracts and to contracts and projects financed in whole or in part by the Secretary.

(7) A contractor with whom an agreement of indemnification has been executed under paragraph (1)(A) and who is engaged in activities connected with the underground detonation of a nuclear explosive device shall be liable, to the extent so indemnified under this subsection, for injuries or damage sustained as a result of such detonation in the same manner and to the same extent as would a private person acting as principal, and no immunity or defense founded in the Federal, State, or municipal character of the contractor or of the work to be performed under the contract shall be effective to bar such liability.".

(e) Limitation on Aggregate Public Liability.—

(1) The aggregate public liability for a single nuclear incident of persons indemnified, including such legal costs as are authorized to be paid under subsection o. (1)(D), shall not exceed—

(A) in the case of facilities designed for producing substantial amounts of electricity and having a rated capacity of 100,000 electrical kilowatts or more, the maximum amount of financial protection required of such facilities under subsection b. (plus any surcharge assessed under subsection o. (1)(E));

(B) in the case of contractors with whom the Secretary has entered into an agreement of indemnification under subsection d., the maximum amount of financial protection required under subsection b. or the amount of indemnity and financial protection that may be required under paragraph (3) of subsection d., whichever amount is more; and

(C) in the case of all other licensees of the Commission required to maintain financial protection under this section—

(i) $500,000,000, together with the amount of financial protection required of the licensee; or

(ii) if the amount of financial protection required of the licensee exceeds $60,000,000, $560,000,000 or the amount of financial protection required of the licensee, whichever amount is more.

(2) In the event of a nuclear incident involving damages in excess of the amount of aggregate public liability under paragraph (1), the Congress will thoroughly review the particular incident in accordance with the procedures set forth in section 170 i. and will in accordance with such procedures, take whatever action is determined to be necessary (including approval of appropriate compensation plans and appropriation of funds) to provide full and prompt compensation to the public for all public liability claims resulting from a disaster of such magnitude.

(3) No provision of paragraph (1) may be construed to preclude the Congress from enacting a revenue measure, applicable to licensees of the Commission required to maintain financial protection pursuant to subsection b., to fund any action undertaken pursuant to paragraph (2).

(4) With respect to any nuclear incident occurring outside of the United States to which an agreement of indemnification entered into under the provisions of subsection d. is applicable, such aggregate public liability shall not exceed the amount of $100,000,000, together with the amount of financial protection required of the contractor.

(f) Collection of fees by Nuclear Regulatory Commission.—The Commission or the Secretary, as appropriate, is authorized to collect a fee from all persons with whom an indemnification agreement is executed under this section. This fee shall be $30 per year per thousand kilowatts of thermal energy capacity for facilities licensed under section 103 [42 U.S.C. 2133]: *Provided*, That the Commission or the Secretary, as appropriate, is authorized to reduce the fee for such facilities in reasonable relation to increases in financial protection required above, a level of $60,000,000. For facilities licensed under section 104 [42 U.S.C. 2134], and for construction permits under section 185 [42 U.S.C. 2235], the Commission is authorized to reduce the fee set forth above. The Commission shall establish criteria in writing for determination of the fee for facilities licensed under section 104 [42 U.S.C. 2134], taking into consideration such factors as (1) the type, size, and location of facility involved, and other factors pertaining to the hazard, and (2) the nature and purpose of the facility. For other licenses, the Commission shall collect such nominal fees as it deems appropriate. No fee under this subsection shall be less than $100 per year.

(g) Use of Services of Private Insurers.—In administering the provisions of this section, the Commission shall use, to the maximum extent practicable, the facilities and services of private insurance organizations, and the Commission may contract to pay a reasonable compensation for such services. Any contract made under the provisions of this subsection may be made without regard to the provisions of section 3709 of the Revised Statutes [41 U.S.C. 5], as amended, upon a showing by the Commission that advertising is not reasonably practicable and advance payments may be made.

(h) Conditions of Agreements of Indemnification.—The agreement of indemnification may contain such terms as the Commission deems appropriate to carry out the purposes of this section. Such agreement shall provide that, when the Commission makes a determination that the United States will probably be required to make indemnity payments under this section, the Commission shall collaborate with any person indemnified any may approve the payment of any claim under the agreement of indemnification, appear through the Attorney General on behalf of the person indemnified, take charge of such action, and settle or defend any such action. The Commission shall have final authority on behalf of the United States to settle or approve the settlement of any such claim on a fair and reasonable basis with due regard for the purposes

of this Act. Such settlement shall not include expenses in connection with the claim incurred by the person indemnified.

(i) Compensation Plans.—

(1) After any nuclear incident involving damages that are likely to exceed the applicable amount of aggregate public liability under subparagraph (A), (B), or (C) of subsection e. (1), the Secretary or the Commisison, as appropriate, shall—

(A) make a survey of the causes and extent of damage; and

(B) expeditiously submit a report setting forth the results of such survey to the Congress, to the Representatives of the affected districts, to the Senators of the affected States, and (except for information that will cause serious damage to the national defense of the United States) to the public, to the parties involved, and to the courts.

(2) Not later than 90 days after any determination by a court, pursuant to subsection o., that the public liability from a single nuclear incident may exceed the applicable amount of aggregate public liability under subparagraph (A), (B), or (C) of subsection e. (1) the President shall submit to the Congress—

(A) an estimate of the aggregate dollar value of personal injuries and property damage that arises from the nuclear incident and exceeds the amount of aggregate public liability under subsection e. (1);

(B) recommendations for additional sources of funds to pay claims exceeding the applicable amount of aggregate public liability under subparagraph (A), (B), or (C) of subsection e. (1), which recommendations shall consider a broad range of possible sources of funds (including possible revenue measures on the sector of the economy, or on any other class, to which such revenue measures might be applied);

(C) 1 or more compensation plans, that either individually or collectively shall provide for full and prompt compensation for all valid claims and contain a recommendation or recommendations as to the relief to be provided, including any recommendations that funds be allocated or set aside for the payment of claims that may arise as a result of latent injuries that may not be discovered until a later date; and

(D) any additional legislative authorities necessary to implement such compensation plan or plans.

(3) (A) Any compensation plan transmitted to the Congress pursuant to paragraph (2) shall bear an identification number and shall be transmitted to both Houses of Congress on the same day and to each House while it is in session.

(B) The provisions of paragraphs (4) through (6) shall apply with respect to consideration in the Senate of any compensation plan transmitted to the Senate pursuant to paragraph (2).

(4) No such compensation plan may be considered approved for purposes of subsection 170 e. (2) unless between the date of transmittal and the end of the first period of sixty calendar days of continuous session of Congress after the date on which such action is transmitted to the Senate, the Senate passes a resolution described in paragraph 6 of this subsection.

(5) For the purpose of paragraph (4) of this subsection—

(A) continuity of session is broken only by an adjournment of Congress sine die; and

(B) the days on which either House is not in session because of an adjournment of more than three days to a day certain are excluded in the computation of the sixty-day calendar period.

(6) (A) This paragraph is enacted—

(i) as an exercise of the rulemaking power of the Senate and as such it is deemed a part of the rules of the Senate, but applicable only with respect to the procedure to be followed in the Senate in the case of resolutions described by subparagraph (B) and it supersedes other rules only to the extent that it is inconsistent therewith; and

(ii) with full recognition of the constitutional right of the Senate to change the rules at any time, in the same manner and to the same extent as in the case of any other rule of the Senate.

(B) For purposes of this paragraph, the term 'resolution' means only a joint resolution of the Congress the matter after the resolving clause of which is as follows: 'That the__ approves the compensation plan numbered submitted to the Congress on , 19 .', the first blank space therein being filled with the name of the resolving House and the other blank spaces being appropriately filled; but does not include a resolution which specifies more than one compensation plan.

(C) A resolution once introduced with respect to a compensation plan shall immediately be referred to a committee (and all resolutions with respect to the same compensation plan shall be referred to the same committee) by the President of the Senate.

(D)(i) If the committee of the Senate to which a resolution with respect to a compensation plan has been referred has not reported it at the end of twenty calendar days after its referral, it shall be in order to move either to discharge the committee from further consideration of such resolution or to discharge the committee from further consideration with respect to such compensation plan which has been referred to the committee.

(ii) A motion to discharge may be made only by an individual favoring the resolution, shall be highly privileged (except that it may not be made after the committee has reported a resolution with respect to the same compensation plan), and debate thereon shall be limited to not more than one hour, to be divided equally between those favoring and those opposing the resolution. An amendment to the motion shall not be in order, and it shall not be in order to move to reconsider the vote by which the motion was agreed to or disagreed to.

(iii) If the motion to discharge is agreed to or disagreed to, the motion may not be renewed, nor may another motion to discharge the committee be made with respect to any other resolution with respect to the same compensation plan.

(E) (i) When the committee has reported, or has been discharged from further consideration of, a resolution, it shall be at any time thereafter in order (even though a previous motion to the same effect has been disagreed to) to move to proceed to the consideration of the resolution. The motion shall be highly privileged and shall not be debatable. An amendment to the motion shall not be in order, and it shall not be in order to move to reconsider the vote by which the motion was agreed to or disagreed to.

(ii) Debate on the resolution referred to in clause (i) of this subparagraph shall be limited to not more than ten hours, which shall be divided equally between those favoring and those opposing such resolution. A motion further to limit debate shall not be debatable. An amendment to, or motion to recommit, the resolution shall not be in order, and it shall not be in order to move to reconsider the vote by which such resolution was agreed to or disagreed to.

(F) (i) Motions to postpone, made with respect to the discharge from committee, or the consideration of a resolution or motions to proceed to the consideration of other business, shall be decided without debate.

(ii) Appeals from the decision of the Chair relating to the application of the rules of the Senate to the procedures relating to a resolution shall be decided without debate.

(j) Contracts in Advance of Appropriations.—In administering the provisions of this section, the Commission may make contracts in advance of appropriations and incur obligations without regard to sections 1341, 1342, 1349, 1350, and 1351, and subchapter II of Charter 15, of title 31, United States Code as amended [31 U.S.C. 665].

(k) Exemption from Financial Protection Requirement for Nonprofit Educational Institutions.—With respect to any license issued pursuant to section 53, 63, 81, 104(a), or 104(c) [42 U.S.C. 2073, 2093, 2111, 2134(a), (c)] for the conduct of educational activities to a person found by the Commission to be a nonprofit educational institution, the Commission shall exempt such licensee from the financial protection requirement of subsection a. With respect to licenses issued between August 30, 1954, and August 1, 2002, for which the Commission grants such exemption:

(1) the Commission shall agree to indemnify and hold harmless the licensee and other persons indemnified, as their interests may appear, from public liability in excess of $250,000 arising from nuclear incidents. The aggregate indemnity for all persons indemnified in connection with each nuclear incident shall not exceed $500,000,000, excluding cost of investigating and settling claims and defending suits for damage;

(2) such contracts of indemnification shall cover public liability arising out of or in connection with the licensed activity; and shall include damage to property of persons indemnified, except property which is located at the site of and used in connection with the activity where the nuclear incident occurs; and

(3) such contracts of indemnification, when entered into with a licensee having immunity from public liability because it is a State agency, shall provide also that the Commission shall make payments under the contract on account of activities of the licensee in the same manner and to the same extent as the Commission would be required to do if the licensee were not such a State agency.

Any licensee may waive an exemption to which it is entitled under this subsection. With respect to any production or utilization facility for which a construction permit is issued between August 30, 1954, and August 1, 2002, the requirements of this subsection shall apply to any license issued for such facility subsequent to August 1, 2002.

(l) Indemnification agreement concerning the "nuclear ship Savannah".The Commission is authorized until August 1, 1977, to enter into an agreement of indemnification with any person engaged in the design, development, construction, operation, repair, and maintenance or use of the nuclear-powered ship authorized by section 716 of the Merchant Marine Act, 1936 [46 U.S.C. 1206], and designated the "nuclear ship Savannah." In any such agreement of indemnification the Commission may require such person to provide and maintain financial protection of such a type and in such amounts as the Commission shall determine to be appropriate to cover public liability arising from a nuclear incident in connection with such design, development, construction, operation, repair, maintenance or use and shall indemnify the person indemnified against such claims above the amount of the financial protection required, in the amount of $500,000,000 including such legal costs of the licensee as are approved by the Commission, in the aggregate for all persons indemnified in connection with each nuclear incident: *Provided*, that this amount of indemnity shall be reduced by the amount that the financial protection required shall exceed $60,000,000.

(m) Coordinated Procedures for Prompt Settlement of Claims and Emergency Assistance.—The Commission is authorized to enter into agreements with other indemnitors to establish coordinated procedures for the prompt handling, investigation, and settlement of claims for public liability. The Commission and other indemnitors may make payments to, or for the aid of, claimants for the purpose of providing immediate assistance following a nuclear incident. Any funds appropriated to the Commission shall be available for such payments. Such payments may be made without securing releases, shall not constitute an admission of the liability of any person indemnified or of any indemnitor, and shall operate as a satisfaction to the extent thereof of any final settlement or judgment.

(n) Waiver of Defense and Judicial Procedures.—

(1) With respect to any extraordinary nuclear occurrence to which an insurance policy or contract furnished as proof of financial protection or an indemnity agreement applies and which—

(A) arises out of or results from or occurs in the course of the construction, possession, or operation of a production or utilization facility,

(B) arises out of or results from or occurs in the course of transportation of source material, byproduct material, or special nuclear material to or from a production or utilization facility,

(C) during the course of the contract activity arises out of or results from the possession, operation, or use by a Department of Energy contractor or subcontractor of a device utilizing special nuclear material or byproduct material,

(D) arises out of, results from, or occurs in the course of, the construction, possession, or operation of any facility licensed under section 53, 63, or 81, for which the Commission or the Secretary, as appropriate, has imposed as a condition of the license a requirement that the licensee have and maintain financial protection under subsection a.,

(E) arises out of, results from, or occurs in the course of, transportation of source material, byproduct material, or special nuclear material to or from any facility licensed under section 53, 63, or 81, for which the Commission has imposed as a condition of the license a requirement that the licensee have and maintain financial protection under subsection a., or

(F) arises out of, results from, or occurs in the course of nuclear waste activities.".

the Commission may incorporate provisions in indemnity agreements with licensees and contractors under this section, and may require provisions to be incorporated in insurance policies or contracts furnished as proof of financial protection, which waive (i) any issue or defense as to conduct of the claimant or fault of persons indemnified, (ii) any issue or defense as to charitable or governmental immunity, and (iii) any issue or defense based on any statute of limitations if suit is instituted within three years from the date on which the claimant first knew, or reasonably could have known, of his injury or damage and the cause thereof. The waiver of any such issue or defense shall be effective regardless of whether such issue or defense may otherwise be deemed jurisdictional or relating to an element in the cause of action. When so incorporated, such waivers shall be judicially enforceable in accordance with their terms by the claimant against the person indemnified. Such waivers shall not preclude a defense based upon a failure to take reasonable steps to mitigate damages, nor shall such waivers apply to injury or damage to a claimant or to a claimant's property which is intentionally

sustained by the claimant or which results from a nuclear incident intentionally and wrongfully caused by the claimant. The waivers authorized in this subsection shall, as to indemnitors, be effective only with respect to those obligations set forth in the insurance policies or the contracts furnished as proof of financial protection and in the indemnity agreements. Such waivers shall not apply to, or prejudice the prosecution or defense of, any claim or portion of claim which is not within the protection afforded under (i) the terms of insurance policies or contracts furnished as proof of financial protection, or indemnity agreements, and (ii) the limit of liability provisions of subsection e.

(2) With respect to any public liability action arising out of or resulting from an a nuclear incident, the United States district court (including any such action pending on the date of the enactment of the Price-Anderson Amendments Act of 1988) in the district where the a nuclear incident takes place, or in the case of an a nuclear incident taking place outside the United States, the United States District Court for the District of Columbia, shall have original jurisdiction with regard to the citizenship of any party or the amount in controversy. Upon motion of the defendant or of the Commission or the Secretary, as appropriate, or any such action pending in any State court or United States district court shall be removed or transferred to the United States district court having venue under this subsection. Process of such district court shall be effective throughout the United States. In any action that is or becomes removable pursuant to this paragraph, a petition for removal shall be filed within the period provided in section 1446 of title 28, United States Code, or within the 30-day period beginning on the date of the enactment of the Price-Anderson Amendments Act of 1988, whichever occurs later.

(3) (A) Following any nuclear incident, the chief judge of the United States district court having jurisdiction under paragraph (2) with respect to public liability actions (or the judicial council of the judicial circuit in which the nuclear incident occurs) may appoint a special caseload management panel (in this paragraph referred to as the 'management panel') to coordinate and assign (but not necessarily hear themselves) cases arising out of the nuclear incident, if—

(i) a court, acting pursuant to subsection o., determines that the aggregate amount of public liability is likely to exceed the amount of primary financial protection available under subsection b. (or an equivalent amount in the case of a contractor indemnified under subsection d.); or

(ii) the chief judge of the United States district court (or the judicial council of the judicial circuit) determines that cases arising out of the nuclear incident will have an unusual impact on the work of the court.

(B) (i) Each management panel shall consist only of members who are United States district judges or circuit judges.

(ii) Members of a management panel may include any United States district judge or circuit judge of another district court or court of appeals, if the chief judge of such other district court or court of appeals consents to such assignment.

(C) It shall be the function of each management panel—

(i) to consolidate related or similar claims for hearing or trial;

(ii) to establish priorities for the handling of different classes of cases;

(iii) to assign cases to a particular judge or special master;

(iv) to appoint special masters to hear particular types of cases, or particular elements or procedural steps of cases;

(v) to promulgate special rules of court, not inconsistent with the Federal Rules of Civil Procedure, to expedite cases or allow more equitable consideration of claims;

(vi) to implement such other measures, consistent with existing law and the Federal Rules of Civil Procedure, as will encourage the equitable, prompt, and efficient resolution of cases arising out of the nuclear incident; and

(vii) to assemble and submit to the President such data, available to the court, as may be useful in estimating the aggregate damages from the nuclear incident.

(o) Plan for Distribution of Funds.—

(1) Whenever the United States district court in the district where a nuclear incident occurs, or the United States District Court for the District of Columbia in case of a nuclear incident occurring outside the United States, determines upon the petition of any indemnitor or other interested person that public liability from a single nuclear incident may exceed the limit of liability under the applicable limit of liability under subparagraph (A), (B), or (C) of subsection e. (1) of this section:

(A) Total payments made by or for all indemnitors as a result of such nuclear incident shall not exceed 15 per centum of such limit of liability without the prior approval of such court;

(B) The court shall not authorize payments in excess of 15 per centum of such limit of liability unless the court determines that such payments are or will be in accordance with a plan of distribution which has been approved by the court or such payments are not likely to prejudice the subsequent adoption and implementation by the court of a plan of distribution pursuant to paragraph (C); and

(C) The Commission or the Secretary, as appropriate, shall, and any other indemnitor or other interested person may, submit to such district court a plan for the disposition of pending claims and for the distribution of remaining funds available. Such a plan shall include an allocation of appropriate amounts for personal injury claims, property damage claims, and possible latent injury claims which may not be discovered until a later time, and shall include establishment of priorities between claimants and classes of claims, as necessary to insure the most equitable allocation of available funds. Such court shall have all power necessary to approve, disapprove, or modify plans proposed, or to adopt another plan; and to determine the proportionate share of funds available for each claimant. The Commission or the Secretary as appropriate, any other indemnitor, and any person indemnified shall be entitled to such orders as may be appropriate to implement and enforce the provisions of this section, including orders limiting the liability of the persons indemnified, orders approving or modifying the plan, orders staying the payment of claims and the execution of court judgments, orders apportioning the payments to be made to claimants, and orders permitting partial payments to be made before final determination of the total claims. The orders of such court shall be effective throughout the United States.

(D) A court may authorize payment of only such legal costs as are permitted under paragraph (2) from the amount of financial protection required by subsection b.

(E) If the sum of public liability claims and legal costs authorized under paragraph (2) arising from any nuclear incident exceeds the maximum amount of financial protection required under subsection b., any licensee required to pay a standard deferred premium under subsection b. (1) shall, in addition to such deferred premium, be charged such an amount as is necessary to pay a pro rata share of such claims and costs, but in no case more than 5 percent of the maximum amount of such standard deferred premium described in such subsection.

(2) A court may authorize the payment of legal costs under paragraph (1)(D) only if the person requesting such payment has—

(A) submitted to the court the amount of such payment requested; and

(B) demonstrated to the court—

(i) that such costs are reasonable and equitable; and

(ii) that such person has—

(I) litigated in good faith;

(II) avoided unnecessary duplication of effort with that of other parties similarly situated;

(III) not made frivolous claims or defenses; and

(IV) not attempted to unreasonably delay the prompt settlement or adjudication of such claims.".

(p) (1) Report to Congress.—The Commission and the Secretary shall submit to the Congress by August 1, 1998, detailed reports concerning the need for continuation or modification of the provisions of this section, taking into account the condition of the nuclear industry, availability of private insurance, and the state of knowledge concerning nuclear safety at that time, among other relevant factors, and shall include recommendations as to the repeal or modification of any of the provisions of this section.

(2) Not later than April 1 of each year, the Commission and the Secretary shall each submit an annual report to the Congress setting forth the activities under this section during the preceding calendar year.

(q) Limitation on Awarding of Precautionary Evacuation Costs.—No court may award costs of a precautionary evacuation unless such costs constitute a public liability.".

(r) Limitation on Liability of Lessors.—No person under a bona fide lease of any utilization or production facility (or part thereof or undivided interest therein) shall be liable by reason of an interest as lessor of such production or utilization facility, for any legal liability arising out of or resulting from a nuclear incident resulting from such facility, unless such facility is in the actual possession and control of such person at the time of the nuclear incident giving rise to such legal liability.

(s) Limitation on Punitive Damages.—No court may award punitive damages in any action with respect to a nuclear incident or precautionary evacuation against a person on behalf of whom the United States is obligated to make payments under an agreement of indemnification covering such incident or evacuation.

(t) Inflation Adjustment.—

(1) The Commission shall adjust the amount of the maximum standard deferred premium under subsection b. (1) not less than once during each 5-year period following the date of the enactment of the Price-Anderson Amendments Act of 1988, in accordance with the aggregate percentage change in the Consumer Price Index since—

(A) such date of enactment, in the case of the first adjustment under this subsection; or

(B) the previous adjustment under this subsection.

(2) For purposes of this subsection, the term "Consumer Price Index" means the Consumer Price Index for all urban consumers published by the Secretary of Labor.

[42 U.S.C. 2210]

CONFLICTS OF INTEREST RELATING TO CONTRACTS AND OTHER ARRANGEMENTS

Sec. 170A. (a) The Commission shall, by rule, require any person proposing to enter into a contract, agreement, or other arrangement, whether by competitive bid or negotiation, under this Act or any other law administered by it for the conduct of research, development, evaluation activities, or for technical and management support services, to provide the Commission, prior to entering into any such contract, agreement, or arrangement, with all relevant information, as determined by the Commission, bearing on whether that person has a possible conflict of interest with respect to—

(1) being able to render impartial, technically sound, or objective assistance or advice in light of other activities or relationships with other persons, or

(2) being given an unfair competitive advantage. Such person shall insure, in accordance with regulations prescribed by the Commission, compliance with this section by any subcontractor (other than a supply subcontractor) of such person in the case of any subcontract for more than $10,000.

(b) The Commission shall not enter into any such contract agreement or arrangement unless it finds, after evaluating all information provided under subsection (a) and any other information otherwise available to the Commission that—

(1) it is unlikely that a conflict of interest would exist, or

(2) such conflict has been avoided after appropriate conditions have been included in such contract, agreement, or arrangement; except that if the Commission determines that such conflict of interest exists and that such conflict of interest cannot be avoided by including appropriate conditions therein, the Commission may enter into such contract, agreement, or arrangement, if the Commission determines that it is in the best interests of the United States to do so and includes appropriate conditions in such contract, agreement, or arrangement to mitigate such conflict.

(c) The Commission shall publish rules for the implementation of this section, in accordance with section 553 of title 5, United States Code [5 U.S.C. 553] (without regard to subsection (a)(2) thereof [5 U.S.C. 553(a)(2)]) as soon as practicable after the date of the enactment of this section [enacted Nov. 6, 1978], but in no event later than 120 days after such date.

[42 U.S.C.2210a]

URANIUM SUPPLY

Sec. 170B. (a) The Secretary of Energy shall monitor and for the years 1983 to 1992 report annually to the Congress and to the President a determination of the viability of the domestic uranium mining and milling industry and shall establish by rule, after public notice and in accordance with the requirements of section 181 of this Act [42 USCS 2231], within 9 months of enactment of this section [enacted Jan. 4, 1983], specific criteria which shall be assessed in the annual reports on the domestic uranium industry's viability. The Secretary of Energy is authorized to issue regulations providing for the collection of such information as the Secretary of Energy deems necessary to carry out the monitoring and reporting requirements of this section.

(b) Upon a satisfactory showing to the Secretary of Energy by any person that any information, or portion thereof obtained under this section, would, if made public, divulge proprietary information of such person, the Secretary shall not disclose such information and disclosure thereof shall be punishable under section 1905 of title 18, United States Code [18 USCS 1905].

(c) The criteria referred to in subsection (a) shall also include, but not be limited to—

(1) an assessment of whether executed contracts or options for source material or special nuclear material will result in greater than 37 1/2 percent of actual or projected domestic uranium requirements for any two-consecutive-year period being supplied by source material or special nuclear material from foreign sources;

(2) projections of uranium requirements and inventories of domestic utilities for a 10 year period;

(3) present and probable future use of the domestic market by foreign imports;

(4) whether domestic economic reserves can supply all future needs for a future 10 year period;

(5) present and projected domestic uranium exploration expenditures and plans;

(6) present and projected employment and capital investment in the uranium industry;

(7) the level of domestic uranium production capacity sufficient to meet projected domestic nuclear power needs for a 10 year period; and

(8) a projection of domestic uranium production and uranium price levels which will be in effect under various assumptions with respect to imports.

(d) The Secretary of Energy, at any time, may determine on the basis of the monitoring and annual reports required under this section that source material or special nuclear material from foreign sources is being imported in such increased quantities as to be a substantial cause of serious injury, or threat thereof, to the United States uranium mining and milling industry. Based on that determination, the United States Trade Representative shall request that the United States International Trade Commission initiate an investigation under section 201 of the Trade Act of 1974 [19 USCS 2251].

(e) (1) If, during the period 1982 to 1992, the Secretary of Energy determines that executed contracts or options for source material or special nuclear material from foreign sources for use in utilization facilities within or under the jurisdiction of the United States represent greater than 37 1/2 percent of actual or projected domestic uranium requirements for any two-consecutive-year period, or if the Secretary of Energy determines the level of contracts or options involving source material and special nuclear material from foreign sources may threaten to impair the national security, the Secretary of Energy shall request the Secretary of Commerce to initiate under section 232 of the Trade Expansion Act of 1962 [19 U.S.C. 1862] an investigation to determine the effects on the national security of imports of source material and special nuclear material. The Secretary of Energy shall cooperate fully with the Secretary of Commerce in carrying out such an investigation and shall make available to the Secretary of Commerce the findings that lead to this request and such other information that will assist the Secretary of Commerce in the conduct of the investigation.

(2) The Secretary of Commerce shall, in the conduct of any investigation requested by the Secretary of Energy pursuant to this section, take into account any information made available by the Secretary of Energy, including information regarding the impact on national security of projected or executed contracts or options for source material or special nuclear material from foreign sources or whether domestic production capacity is sufficient to supply projected national security requirements.

(3) No sooner than 3 years following completion of any investigation by the Secretary of Commerce under paragraph (1), if no recommendation has been made pursuant to such study for trade adjustments to assist or protect domestic uranium production, the Secretary of Energy may initiate a request for another such investigation by the Secretary of Commerce.

[42 U.S.C. 2210b]

TITLE XV—COMPENSATION FOR PRIVATE PROPERTY ACQUIRED

JUST COMPENSATION

Sec. 171. The United States shall make just compensation for any property or interests therein taken or requisitioned pursuant to sections 43, 55, 66, and 108 [42 USCS 2063, 2075, 2096, 2138]. Except in case of real property or any interest therein, the Commission shall determine and pay such just compensation. If the compensation so determined is unsatisfactory to the person entitled thereto, such person shall be paid 75 per centum of the amount so determined, and shall be entitled to sue the United States in the United States Claims Court or in any district court of the United States for the district in which such claimant is a resident in the manner provided by section 1346 of Title 28 of the United States Code [28 USCS 1346] to recover such further sum as added to said 75 per centum will constitute just compensation.

[42 U.S.C. 2221]

CONDEMNATION OF REAL PROPERTY

Sec. 172. Proceedings for condemnation shall be instituted pursuant to the provisions of the Act approved August 1, 1888, as amended, and section 1403 of Title 28 of the United States Code [28 USCS 1403]. The Act approved February 26, 1931, as amended [40 USCS 258a et seq.] shall be applicable to any such proceedings.
[42 U.S.C. 2222]

PATENT APPLICATION DISCLOSURES

Sec. 173. In the event that the Commission communicates to any nation any Restricted Data based on any patent application not belonging to the United States, just compensation shall be paid by the United States to the owner of the patent application. The Commission shall determine such compensation. If the compensation so determined is unsatisfactory to the person entitled thereto, such person shall be paid 75 per centum of the amount so determined, and shall be entitled to sue the United States in the United States Claims Court or in any district court of the United States for the district in which such claimant is a resident in a manner provided by section 1346 of Title 28 of the United States Code [28 USCS 1346] to recover such further sum as added to such 75 per centum will constitute just compensation.
[42 U.S.C. 2223]

ATTORNEY GENERAL APPROVAL OF TITLE

Sec. 174. All real property acquired under this Act shall be subject to the provisions of section 355 of the Revised Statutes, as amended [33 USCS 733; 40 USCS 255; 50 USCS 175]: *Provided, however,* That real property acquired by purchase or donation, or other means of transfer may also be occupied, used, and improved for the purposes of this Act prior to approval of title by the Attorney General in those cases where the President determines that such action is required in the interest of the common defense and security.
[42 U.S.C. 2224]

TITLE XVI—JUDICIAL REVIEW AND ADMINISTRATIVE PROCEDURE

GENERAL

Sec. 181. The provisions of the Administrative Procedure Act (Public Law 404, Seventy-ninth Congress, approved June 11, 1946)[1] shall apply to all agency action taken under this Act, and the terms "agency" and "agency action" shall have the meaning specified in the Administrative Procedure Act:[2] *Provided, however,* That in the case of agency proceedings or actions which involve Restricted Data, defense information, safeguards information protected from disclosure under the authority of section 147 [42 USCS 2167] or information protected from dissemination under the authority of section 148 [42 USCS 2168], the Commission shall provide by regulation for such parallel procedures as will effectively safeguard and prevent disclosure of Restricted Data, defense information, such safeguards information, or information protected from dissemination under the authority of section 148 [42 USCS 2168] to unauthorized persons with minimum impairment of the procedural rights which would be available if Restricted Data, defense information, such safeguards information, or information protected from dissemination under the authority of section 148 [42 USCS 2168] were not involved.
[42 U.S.C. 2231]

LICENSE APPLICATIONS

Sec. 182. (a) Form and contents. Each application for a license hereunder shall be in writing and shall specifically state such information as the Commission, by rule or regulation, may determine to be necessary to decide such of the technical and financial qualifications of the applicant, the character of the applicant, the citizenship of the applicant, or any other qualifications of the applicant as the Commission may deem appropriate for the license. In connection with applications for licenses to operate production or utilization facilities, the applicant shall state such technical specifications, including information of the amount, kind, and source of special nuclear material required, the place of the use, the specific characteristics of the facility,

[1] The Administrative Procedure Act has been codified as subchapter II of chapter 5, and chapter 7, of title 5, United States Code.

[2] These terms are now defined in section 552 of title 5, United States Code.

and such other information as the Commission may, by rule or regulation, deem necessary in order to enable it to find that the utilization or production of special nuclear material will be in accord with the common defense and security and will provide adequate protection to the health and safety of the public. Such technical specifications shall be a part of any license issued. The Commission may at any time after the filing of the original application, and before the expiration of the license, require further written statements in order to enable the Commission to determine whether the application should be granted or denied or whether a license should be modified or revoked. All applications and statements shall be signed by the applicant or licensee. Applications for, and statements made in connection with, licenses under sections 103 and 104 [42 U.S.C. 2133, 2134] shall be made under oath or affirmation. The Commission may require any other applications or statements to be made under oath or affirmation.

(b) Review of application; report. The Advisory Committee on Reactor Safeguards shall review each application under section 103 or section 104(b) [42 U.S.C. 2133, 2134(b)] for a construction permit or an operating license for a facility, any application under section 104(c) [42 U.S.C. 2134(c)] for a construction permit or an operating license for a testing facility, any application under section 104(a) or (c) [42 U.S.C. 2134(a) or (c)] specifically referred to it by the Commission, and any application for an amendment to a construction permit or an amendment to an operating license under section 103 or 104(a), (b), or (c) [42 U.S.C. 2133 or 2134(a)-(c)] specifically referred to it by the Commission, and shall submit a report thereon which shall be made part of the record of the application and available to the public except to the extent that security classification prevents disclosure.

(c) Notice. The Commission shall not issue any license under section 103 [42 U.S.C. 2133] for a utilization or production facility for the generation of commercial power until it has given notice in writing to such regulatory agency as may have jurisdiction over the rates and services incident to the proposed activity; until it has published notice of the application in such trade or news publications as the Commission deems appropriate to give reasonable notice to municipalities, private utilities, public bodies, and cooperatives which might have a potential interest in such utilization or production facility; and until it has published notice of such application once each week for four consecutive weeks in the Federal Register, and until four weeks after the last notice.

(d) Preferred consideration. The Commission, in issuing any license for a utilization or production facility for the generation of commercial power under section 103 [2133 of this title], shall give preferred consideration to applications for such facilities which will be located in high cost power areas in the United States if there are conflicting applications for a limited opportunity for such license. Where such conflicting applications resulting from limited opportunity for such license include those submitted by public or cooperative bodies such applications shall be given preferred consideration.

[42 U.S.C. 2232]

TERMS OF LICENSES

Sec. 183. Each license shall be in such form and contain such terms and conditions as the Commission may, by rule or regulation, prescribe to effectuate the provisions of this Act including the following provisions:

(a) [Repealed]

(b) No right to the special nuclear material shall be conferred by the license except as defined by the license.

(c) Neither the license nor any right under the license shall be assigned or otherwise transferred in violation of the provisions of this Act.

(d) Every license issued under this Act shall be subject to the right of recapture or control reserved by section 108 [42 U.S.C. 2138], and to all

of the other provisions of this Act, now or hereafter in effect and to all valid rules and regulations of the Commission.

[42 U.S.C. 2233]

INALIENABILITY OF LICENSES

Sec. 184. No license granted hereunder and no right to utilize or produce special nuclear material granted hereby shall be transferred, assigned or in any manner disposed of, either voluntarily or involuntarily, directly or indirectly, through transfer of control of any license to any person, unless the Commission shall, after securing full information, find that the transfer is in accordance with the provisions of this Act, and shall give its consent in writing. The Commission may give such consent to the creation of a mortgage, pledge, or other lien upon any facility or special nuclear material, owned or thereafter acquired by a licensee,

or upon any leasehold or other interest in such facility, and the rights of the creditors so secured may thereafter be enforced by any court subject to rules and regulations established by the Commission to protect public health and safety and promote the common defense and security.
[42 U.S.C. 2234]

CONSTRUCTION PERMITS

Sec. 185. All applicants for licenses to construct or modify production or utilization facilities shall, if the application is otherwise acceptable to the Commission, be initially granted a construction permit. The construction permit shall state the earliest and latest dates for the completion of the construction or modification. Unless the construction or modification of the facility is completed by the completion date, the construction permit shall expire, and all rights thereunder be forfeited, unless upon good cause shown, the Commission extends the completion date. Upon the completion of the construction or modification of the facility, upon the filing of any additional information needed to bring the original application up to date, and upon finding that the facility authorized has been constructed and will operate in conformity with the application as amended and in conformity with the provisions of this Act and of the rules and regulations of the Commission, and in the absence of any good cause being shown to the Commission why the granting of a license would not be in accordance with the provisions of this Act, the Commission shall thereupon issue a license to the applicant. For all other purposes of this Act, a construction permit is deemed to be a "license".
[42 U.S.C. 2235]

REVOCATION

Sec. 186. (a) Grounds. Any license may be revoked for any material false statement in the application or any statement of fact required under section 182 [42 U.S.C. 2232], or because of conditions revealed by such application or statement of fact or any report, record, or inspection or other means which would warrant the Commission to refuse to grant a license on an original application, or for failure to construct or operate a facility in accordance with the terms of the construction permit or license or the technical specifications in the application, or for violation of, or failure to observe any of the terms and provisions of this Act or of any regulation of the Commission.
(b) Procedure. The Commission shall follow the provisions of section 9(b) of the Administrative Procedure Act[1] in revoking any license.
(c) Repossession of special nuclear material. Upon revocation of the license, the Commission may immediately retake possession of all special nuclear material held by the licensee. In cases found by the Commission to be of extreme importance to the national defense and security or to the health and safety of the public, the Commission may recapture any special nuclear material held by the licensee or may enter upon and operate the facility prior to any of the procedures provided under the Administrative Procedure Act.[2] Just compensation shall be paid for the use of the facility.
[42 U.S.C. 2236]

MODIFICATION OF LICENSE

Sec. 187. The terms and conditions of all licenses shall be subject to amendment, revision, or modification, by reason of amendments of this Act or by reason of rules and regulations issued in accordance with the terms of this Act.
[42 U.S.C. 2237]

CONTINUED OPERATION OF FACILITIES

Sec. 188. Whenever the Commission finds that the public convenience and necessity or the production program of the Commission requires continued operation of a production facility or utilization facility the license for which has been revoked pursuant to section 186 [42 U.S.C. 2236], the Commission may, after consultation with the appropriate regulatory agency, State or Federal, having jurisdiction, order that possession be taken of and such facility be operated for such period of time as the public convenience and

[1] Section 9(b) of the Administrative Procedure Act has been codified as section 558(c) of title 5, United States Code.

[2] The Administrative Procedure Act has been codified as subchapter II of chapter 5, and chapter 7, of title 5, United States Code.

necessity or the production program of the Commission may, in the judgment of the Commission, require, or until a license for the operation of the facility shall become effective. Just compensation shall be paid for the use of the facility.

[42 U.S.C. 2238]

HEARINGS AND JUDICIAL REVIEW

Sec. 189.(a)(1) In any proceeding under this Act, for the granting, suspending, revoking, or amending of any license or construction permit, or application to transfer control, and in any proceeding for the issuance or modification of rules and regulations dealing with the activities of licensees, and in any proceeding for the payment of compensation, an award or royalties under sections 153, 157, 186(c), or 188 [42 U.S.C. 2183, 2187, 2236(c), 2238], the Commission shall grant a hearing upon the request of any person whose interest may be affected by the proceeding, and shall admit any such person as a party to such proceeding. The Commission shall hold a hearing after thirty days' notice and publication once in the Federal Register, on each application under section 103 or 104(b) [42 U.S.C. 2133 or 2134(b)] for a construction permit for a facility, and on any application under section 104(c) [42 U.S.C. 2134(c)] for a construction permit for a testing facility. In cases where such a construction permit has been issued following the holding of such a hearing, the Commission may, in the absence of a request therefor by any person whose interest may be affected, issue an operating license or an amendment to a construction permit or an amendment to an operating license without a hearing, but upon thirty days' notice and publication once in the Federal Register of its intent to do so. The Commission may dispense with such thirty days' notice and publication with respect to any application for an amendment to a construction permit or an amendment to an operating license upon a determination by the Commission that the amendment involves no significant hazards consideration.

(2) (A) The Commission may issue and make immediately effective any amendment to an operating license, upon a determination by the Commission that such amendment involves no significant hazards consideration, notwithstanding the pendency before the Commission of a request for a hearing from any person. Such amendment may be issued and made immediately effective in advance of the holding and completion of any required hearing. In determining under this section whether such amendment involves no significant hazards consideration, the Commission shall consult with the State in which the facility involved is located. In all other respects such amendment shall meet the requirements of this Act.

(B) The Commission shall periodically (but not less frequently than once every thirty days) publish notice of any amendments issued, or proposed to be issued, as provided in subparagraph (A). Each such notice shall include all amendments issued, or proposed to be issued, since the date of publication of the last such periodic notice. Such notice shall, with respect to each amendment or proposed amendment (i) identify the facility involved; and (ii) provide a brief description of such amendment. Nothing in this subsection shall be construed to delay the effective date of any amendment.

(C) The Commission shall, during the ninety-day period following the effective date of this paragraph, promulgate regulations establishing (i) standards for determining whether any amendment to an operating license involves no significant hazards consideration; (ii) criteria for providing or, in emergency situations, dispensing with prior notice and reasonable opportunity for public comment on any such determination, which criteria shall take into account the exigency of the need for the amendment involved; and (iii) procedures for consultation on any such determination with the State in which the facility involved is located.

(b) Any final order entered in any proceeding of the kind specified in subsection (a) above shall be subject to judicial review in the manner prescribed in the Act of December 29, 1950, as amended (ch. 1189, 64 Stat. 1129),[1] and to the provisions of section 10 of the Administrative Procedure Act,[2] as amended.

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[1] The Act of December 29, 1950, has been codified as chapter 158 of title 28, United States Code.

[2] Section 10 of the Administrative Procedure Act has been codified as chapter 7 of title 5, United States Code.

[3] Court of appeals exclusive jurisdiction respecting final orders of Atomic Energy Commission, now the Nuclear Regulatory Commission and the Secretary of Energy, made reviewable by this section, see section 2342 of title 28, United States Code.

No court or regulatory body to have jurisdiction to compel performance of or to review adequacy of performance of any Nuclear Proliferation Assessment Statement called for by the Atomic Energy Act of 1954 or by the Nuclear Non-Proliferation Act of 1978, Pub. 95-242. Mar. 10, 1978, 92 Stat. 120, see section 406 of the Nuclear Non-Proliferation Act of 1978.[3]

[42 U.S.C. 2239]

LICENSEE INCIDENT REPORTS

Sec. 190. No report by any licensee of any incident arising out of or in connection with a licensed activity made pursuant to any requirement of the Commission shall be admitted as evidence in any suit or action for damages growing out of any matter mentioned in such report.

[42 U.S.C. 2240]

ATOMIC SAFETY AND LICENSING BOARD

Sec. 191. (a) Notwithstanding the provisions of 7(a) and 8(a) of the Administrative Procedure Act,he Commission is authorized to establish one or more atomic safety and licensing boards, each comprised of three members, one of whom shall be qualified in the conduct of administrative proceedings and two of whom shall have such technical or other qualifications as the Commission deems appropriate to the issues to be decided, to conduct such hearings as the Commission may direct and make such intermediate or final decisions as the Commission may authorize with respect to the granting, suspending, revoking or amending of any license or authorization under the provisions of this Act, any other provision of law, or any regulation of the Commission issued thereunder. The Commission may delegate to a board such other regulatory functions as the Commission deems appropriate. The Commission may appoint a panel of qualified persons from which board members may be selected.

(b) Board members may be appointed by the Commission from private life, or designated from the staff of the Commission or other Federal agency. Board members appointed from private life shall receive a per diem compensation for each day spent in meetings or conferences, and all members shall receive their necessary traveling or other expenses while engaged in the work of a board. The provisions of section 163 [42 U.S.C. 2203] shall be applicable to board members appointed from private life.

[42 U.S.C. 2241]

TEMPORARY OPERATING LICENSE.

Sec. 192. (a) In any proceeding upon an application for an operating license for a utilization facility required to be licensed under section 103 or 104 (b) of this Act [42 U.S.C. 2133, 2134(b)], in which a hearing is otherwise required pursuant to section 189 (a) [42 U.S.C. 2239(a)], the applicant may petition the Commission for a temporary operating license for such facility authorizing fuel loading, testing, and operation at a specific power level to be determined by the Commission, pending final action by the Commission on the application. The initial petition for a temporary operating license for each such facility, and any temporary operating license issued for such facility based upon the initial petition, shall be limited to power levels not to exceed 5 percent of rated full thermal power. Following issuance by the Commission of the temporary operating license for each such facility, the licensee may file petitions with the Commission to amend the license to allow facility operation in staged increases at specific power levels, to be determined by the Commission, exceeding 5 percent of rated full thermal power. The initial petition for a temporary operating license for each such facility may be filed at any time after the filing of: (1) the report of the Advisory Committee on Reactor Safeguards required by section 182 (b) [42 U.S.C. 2232(b)]; (2) the filing of the initial Safety Evaluation Report by the Nuclear Regulatory Commission staff and the Nuclear Regulatory Commission staff's first supplement to the report prepared in response to the report of the Advisory Committee on Reactor Safeguards for the facility; (3) the Nuclear Regulatory Commission staff's final detailed statement on the environmental impact of the facility prepared pursuant to section 102(2)(C) of the National Environmental Policy Act of 1969 [42 U.S.C. 4332(2)(C)]; and (4) a State, local, or utility emergency preparedness plan for the facility. Petitions for the issuance of a temporary operating license, or for an amendment to such a license allowing operation at a specific power level greater than that authorized in the initial temporary operating license, shall be accompanied by an affidavit or affidavits setting forth the specific facts upon which the petitioner relies to justify issuance of the temporary operating license or the amendment thereto. The Commission shall publish notice of each such petition in the Federal Register and in such trade or news publications as the Commission deems appropriate to give reasonable notice to persons who might have a potential interest in the grant of such temporary operating license or amendment

thereto. Any person may file affidavits or statements in support of, or in opposition to, the petition within thirty days after the publication of such notice in the Federal Register.

(b) With respect to any petition filed pursuant to subsection (a) of this section, the Commission may issue a temporary operating license, or amend the license to authorize temporary operation at each specific power level greater than that authorized in the initial temporary operating license, as determined by the Commission, upon finding that—

(1) in all respects other than the conduct or completion of any required hearing, the requirements of law are met;

(2) in accordance with such requirements, there is reasonable assurance that operation of the facility during the period of the temporary operating license in accordance with its terms and conditions will provide adequate protection to the public health and safety and the environment during the period of temporary operation; and

(3) denial of such temporary operating license will result in delay between the date on which construction of the facility is sufficiently completed, in the judgment of the Commission, to permit issuance of the temporary operating license, and the date when such facility would otherwise receive a final operating license pursuant to this Act.

The temporary operating license shall become effective upon issuance and shall contain such terms and conditions as the Commission may deem necessary, including the duration of the license and any provision for the extension thereof. Any final order authorizing the issuance or amendment of any temporary operating license pursuant to this section shall recite with specificity the facts and reasons justifying the findings under this subsection, and shall be transmitted upon such issuance to the Committees on Interior and Insular Affairs and Energy and Commerce of the House of Representatives and the Committee on Environment and Public Works of the Senate. The final order of the Commission with respect to the issuance or amendment of a temporary operating license shall be subject to judicial review pursuant to chapter 158 of title 28, United States Code. The requirements of section 189 (a) of this Act [42 U.S.C. 2239(a)] with respect to the issuance or amendment of facility licenses shall not apply to the issuance or amendment of a temporary operating license under this section.

(c) Any hearing on the application for the final operating license for a facility required pursuant to section 189 (a) [42 U.S.C. 2239(a)] shall be concluded as promptly as practicable. The Commission shall suspend the temporary operating license if it finds that the applicant is not prosecuting the application for the final operating license with due diligence. Issuance of a temporary operating license under subsection (b) of this section shall be without prejudice to the right of any party to raise any issue in a hearing required pursuant to section 189 (a) [42 U.S.C. 2239(a)]; and failure to assert any ground for denial or limitation of a temporary operating license shall not bar the assertion of such ground in connection with the issuance of a subsequent final operating license. Any party to a hearing required pursuant to section 189 (a) [42 U.S.C. 2239(a)] on the final operating license for a facility for which a temporary operating license has been issued under subsection (b), and any member of the Atomic Safety and Licensing Board conducting such hearing, shall promptly notify the Commission of any information indicating that the terms and conditions of the temporary operating license are not being met, or that such terms and conditions are not sufficient to comply with the provisions of paragraph (2) of subsection (b).

(d) The Commission is authorized and directed to adopt such administrative remedies as the Commission deems appropriate to minimize the need for issuance of temporary operating licenses pursuant to this section.

(e) The authority to issue new temporary operating licenses under this section shall expire on December 31, 1983.

[42 U.S.C. 2242]

LICENSING OF URANIUM ENRICHMENT FACILITIES

Sec. 193. (a) Environmental Impact Statement.—

(1) Major federal action.—The issuance of a license under sections 53 and 63 for the construction and operation of any uranium enrichment facility shall be considered a major Federal action significantly affecting the quality of the human environment for purposes of the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.).

(2) Timing.—An environmental impact statement prepared under paragraph (1) shall be prepared before the hearing on the issuance of a license for the construction and operation of a uranium enrichment facility is completed.

(b) Adjudicatory Hearing.—

(1) In general.—The Commission shall conduct a single adjudicatory hearing on the record with regard to the licensing of the construction and operation of a uranium enrichment facility under sections 53 and 63.

(2) Timing.—Such hearing shall be completed and a decision issued before the issuance of a license for such construction and operation.

(3) Single proceeding.—No further Commission licensing action shall be required to authorize operation.

(c) Inspection and Operation.—Prior to commencement of operation of a uranium enrichment facility licensed hereunder, the Commission shall verify through inspection that the facility has been constructed in accordance with the requirements of the license for construction and operation. The Commission shall publish notice of the inspection results in the Federal Register.

(d) Insurance and Decommissioning.—

(1) The Commission shall require, as a condition of the issuance of a license under sections 53 and 63 for a uranium enrichment facility, that the licensee have and maintain liability insurance of such type and in such amounts as the Commission judges appropriate to cover liability claims arising out of any occurrence within the United States, causing, within or outside the United States, bodily injury, sickness, disease, or death, or loss of or damage to property, or loss of use of property, arising out of or resulting from the radioactive, toxic, explosive, or other hazardous properties of chemical compounds containing source or special nuclear material.

(2) The Commission shall require, as a condition for the issuance of a license under sections 53 and 63 for a uranium enrichment facility, that the licensee provide adequate assurance of the availability of funds for the decommissioning (including decontamination) of such facility using funding mechanisms that may include, but are not necessarily limited to, the following:

(A) Prepayment (in the form of a trust, escrow account, government fund, certificate of deposit, or deposit of government securities).

(B) Surety (in the form of a surety or performance bond, letter of credit, or line of credit), insurance, or other guarantee (including parent company guarantee) method.

(C) External sinking fund in which deposits are made at least annually.

(e) No Price-Anderson Coverage.—Section 170 of this Act shall not apply to any license under section 53 or 63 for a uranium enrichment facility constructed after the date of enactment of this section.

TITLE XVII—JOINT COMMITTEE ON ATOMIC ENERGY

[Repealed]

TITLE XVIII—ENFORCEMENT

GENERAL PROVISIONS

Sec. 221. (a) To protect against the unlawful dissemination of Restricted Data and to safeguard facilities, equipment, materials, and other property of the Commission, the President shall have authority to utilize the services of any Government agency to the extent he may deem necessary or desirable.

(b) The Federal Bureau of Investigation of the Department of Justice shall investigate all alleged or suspected criminal violations of this Act.

(c) No action shall be brought against any individual or person for any violation under this Act unless and until the Attorney General of the United States has advised the Commission with respect to such action and no such action shall be commenced except by the Attorney General of the United States: *Provided, however,* That nothing in this subsection shall be construed as applying to administrative action taken by the Commission.

[42 U.S.C. 2271]

VIOLATION OF SPECIFIC SECTIONS

Sec. 222. Whoever willfully violates, attempts to violate, or conspires to violate, any provision of sections 57, 92, or 101 [42 U.S.C. 2077, 2122, 2131], or whoever unlawfully interferes, attempts to interfere, or conspires to interfere with any recapture or entry under section 108 [42 U.S.C. 2138], shall, upon conviction thereof, be punished by a fine of not more than $10,000 or by imprisonment for not more than ten years, or both, except that whoever commits such an offense with intent to injure the United States or with intent to

secure an advantage to any foreign nation shall, upon conviction thereof, be punished by imprisonment for life, or by imprisonment for any term of years or a fine of not more than $20,000 or both.
[42 U.S.C. 2272]

VIOLATION OF SECTIONS GENERALLY

Sec. 223. (a) Whoever willfully violates, attempts to violate, or conspires to violate, any provision of this Act for which no criminal penalty is specifically provided or of any regulation or order prescribed or issued under section 65 or subsections 161(b), (i), or (o) [42 U.S.C. 2095, 2201(b), (i), (o)] shall, upon conviction thereof, be punished by a fine of not more than $5,000 or by imprisonment for not more than two years, or both, except that whoever commits such an offense with intent to injure the United States or with intent to secure an advantage to any foreign nation, shall, upon conviction thereof, be punished by a fine of not more than $20,000 or by imprisonment for not more than twenty years, or both.

(b) Any individual director, officer, or employee of a firm constructing, or supplying the components of any utilization facility required to be licensed under section 103 or 104 (b) of this Act [42 U.S.C. 2133 or 2134(b)] who by act or omission, in connection with such construction or supply, knowingly and willfully violates or causes to be violated, any section of this Act, any rule, regulation, or order issued thereunder, or any license condition, which violation results, or if undetected could have resulted, in a significant impairment of a basic component of such a facility shall, upon conviction, be subject to a fine of not more than $25,000 for each day of violation, or to imprisonment not to exceed two years, or both. If the conviction is for a violation committed after a first conviction under this subsection, punishment shall be a fine of not more than $50,000 per day of violation, or imprisonment for not more than two years, or both. For the purposes of this subsection, the term "basic component" means a facility structure, system, component or part thereof necessary to assure—

(1) the integrity of the reactor coolant pressure boundary,

(2) the capability to shut-down the facility and maintain it in a safe shut-down condition, or

(3) the capability to prevent or mitigate the consequences of accidents which could result in an unplanned offsite release of quantities of fission products in excess of the limits established by the Commission.

The provisions of this subsection shall be prominently posted at each site where a utilization facility required to be licensed under section 103 or 104 (b) of this Act [42 U.S.C. 2133 or 2134(b)] is under construction and on the premises of each plant where components for such a facility are fabricated.

(c) Any individual director, officer or employee of a person indemnified under an agreement of indemnification under section 170 d. (or of a subcontractor or supplier thereto) who, by act or omission, knowingly and willfully violates or causes to be violated any section of this Act or any applicable nuclear safety-related rule, regulation or order issued thereunder by the Secretary of Energy (or expressly incorporated by reference by the Secretary for purposes of nuclear safety, except any rule, regulation, or order issued by the Secretary of Transportation), which violation results in or, if undetected, would have resulted in a nuclear incident as defined in subsection 11 q. shall, upon conviction, notwithstanding section 3571 of title 18, United States Code, be subject to a fine of not more than $25,000, or to imprisonment not to exceed two years, or both. If the conviction is for a violation committed after the first conviction under this subsection, notwithstanding section 3571 of title 18, United States Code, punishment shall be a fine of not more than $50,000, or imprisonment for not more than five years, or both.
[42 U.S.C. 2273]

COMMUNICATION OF RESTRICTED DATA

Sec. 224. Whoever, lawfully or unlawfully, having possession of, access to, control over, or being entrusted with any document, writing, sketch, photograph, plan, model, instrument, appliance, note, or information involving or incorporating Restricted Data—

(a) communicates, transmits, or discloses the same to any individual or person, or attempts or conspires to do any of the foregoing, with intent to injure the United States or with intent to secure an advantage to any foreign nation, upon conviction thereof, shall be punished by imprisonment for life, or by imprisonment for any term of years or a fine of not more than $20,000 or both;

(b) communicates, transmits, or discloses the same to any individual or person, or attempts or conspires to do any of the foregoing, with reason to believe such data will be utilized to injure the United States or to

secure an advantage to any foreign nation, shall, upon conviction, be punished by a fine of not more than $10,000 or imprisonment for not more than ten years, or both.
[42 U.S.C. 2274]

RECEIPT OF RESTRICTED DATA

Sec. 225. Whoever, with intent to injure the United States or with intent to secure an advantage to any foreign nation, acquires, or attempts or conspires to acquire any document, writing, sketch, photograph, plan, model, instrument, appliance, note, or information involving or incorporating Restricted Data shall, upon conviction thereof, be punished by imprisonment for life, or by imprisonment for any term of years or a fine of not more than $20,000 or both.
[42 U.S.C. 2275]

TAMPERING WITH RESTRICTED DATA

Sec. 226. Whoever, with intent to injure the United States or with intent to secure an advantage to any foreign nation, removes, conceals, tampers with, alters, mutilates, or destroys any document, writing, sketch, photograph, plan, model, instrument, appliance, or note involving or incorporating Restricted Data and used by any individual or person in connection with the production of special nuclear material, or research or development relating to atomic energy, conducted by the United States, or financed in whole or in part by Federal funds, or conducted with the aid of special nuclear material, shall be punished by imprisonment for life, or by imprisonment for any term of years or a fine of not more than $20,000 or both.
[42 U.S.C. 2276]

DISCLOSURE OF RESTRICTED DATA

Sec. 227. Whoever, being or having been an employee or member of the Commission, a member of the Armed Forces, an employee of any agency of the United States, or being or having been a contractor of the Commission or of an agency of the United States, or being or having been an employee of a contractor of the Commission or of an agency of the United States, or being or having been a licensee of the Commission, or being or having been an employee of a licensee of the Commission, knowingly communicates, or whoever conspires to communicate or to receive, any Restricted Data, knowing or having reason to believe that such data is Restricted Data, to any person not authorized to receive Restricted Data, pursuant to the provisions of this Act or under rule or regulation of the Commission issued pursuant thereto, knowing or having reason to believe such person is not so authorized to receive Restricted Data shall, upon conviction thereof, be punishable by a fine of not more than $2,500.
[42 U.S.C. 2277]

STATUTE OF LIMITATIONS

Sec. 228. Except for a capital offense, no individual or person shall be prosecuted, tried, or punished for any offense prescribed or defined in sections 224 to 226, inclusive, of this Act [42 U.S.C. 2274-2276] unless the indictment is found or the information is instituted within ten years next after such offense shall have been committed.
[42 U.S.C. 2278]

TRESPASS UPON INSTALLATIONS

Sec. 229. (a) The Commission is authorized to issue regulations relating to the entry upon or carrying, transporting, or otherwise introducing or causing to be introduced any dangerous weapon, explosive, or other dangerous instrument or material likely to produce substantial injury or damage to persons or property, into or upon any facility, installation, or real property subject to the jurisdiction, administration, or in the custody of the Commission. Every such regulation of the Commission shall be posted conspicuously at the location involved.

(b) Whoever shall willfully violate any regulation of the Commission issued pursuant to subsection (a) shall, upon conviction thereof, be punishable by a fine of not more than $1,000.

(c) Whoever shall willfully violate any regulation of the Commission issued pursuant to subsection (a) with respect to any installation or other property which is enclosed by a fence, wall, floor, roof, or other structural barrier shall be guilty of a misdemeanor and upon conviction thereof shall be punished by a fine of not to exceed $5,000 or to imprisonment for not more than one year, or both.
[42 U.S.C. 2278a]

PHOTOGRAPHING, ETC. OF COMMISSION INSTALLATIONS

Sec. 230. It shall be an offense, punishable by a fine of not more than $1,000 or imprisonment for not more than one year, or both—

(1) to make any photograph, sketch, picture, drawing, map or graphical representation, while present on property subject to the jurisdiction, administration or in the custody of the Commission, of any installations or equipment designated by the President as requiring protection against the general dissemination of information relative thereto, in the interest of the common defense and security, without first obtaining the permission of the Commission, and promptly submitting the product obtained to the Commission for inspection or such other action as may be deemed necessary; or

(2) to use or permit the use of an aircraft or any contrivance used, or designed for navigation or flight in air, for the purpose of making a photograph, sketch, picture, drawing, map or graphical representation of any installation or equipment designated by the President as provided in the preceding paragraph, unless authorized by the Commission.

[42 U.S.C. 2278b]

OTHER LAWS

Sec. 231. Sections 224 to 230 [42 U.S.C. 2274-2278b] shall not exclude the applicable provisions of any other laws.

[42 U.S.C. 2279]

INJUNCTION PROCEEDINGS

Sec. 232. Whenever in the judgment of the Commission any person has engaged or is about to engage in any acts or practices which constitute or will constitute a violation of any provisions of this Act, or any regulation or order issued thereunder, the Attorney General on behalf of the United States may make application to the appropriate court for an order enjoining such acts or practices, or for an order enforcing compliance with such provision, and upon a showing by the Commission that such person has engaged or is about to engage in any such acts or practices, a permanent or temporary injunction, restraining order, or other order may be granted.

[42 U.S.C. 2280]

CONTEMPT PROCEEDINGS

Sec. 233. In case of failure or refusal to obey a subpena served upon any person pursuant to subsection 161(c) [42 U.S.C. 2201(c)], the district court for any district in which such person is found or resides or transacts business, upon application by the Attorney General on behalf of the United States, shall have jurisdiction to issue an order requiring such person to appear and give testimony or to appear and produce documents, or both, in accordance with the subpoena; and any failure to obey such order of the court may be punished by such court as a contempt thereof.

[42 U.S.C. 2281]

CIVIL MONETARY PENALTIES FOR VIOLATIONS OF LICENSING REQUIREMENTS

Sec. 234. (a) Any person who (1) violates any licensing provision of section 53, 57, 62, 63, 81, 82, 101, 103, 104, 107, or 109 [42 U.S.C. 2073, 2077, 2092, 2093, 2111, 2112, 2131, 2133, 2134, 2137, 2139] or any rule, regulation, or order issued thereunder, or any term, condition, or limitation of any license issued thereunder, or (2) commits any violation for which a license may be revoked under section 186 [42 U.S.C. 2236], shall be subject to a civil penalty, to be imposed by the Commission, of not to exceed $100,000 for each such violation.

(b) Whenever the Commission has reason to believe that a person has become subject to the imposition of a civil penalty under the provisions of this section, it shall notify such person in writing (1) setting forth the date, facts, and nature of each act or omission with which the person is charged, (2) specifically identifying the particular provision or provisions of the section, rule, regulation, order, or license involved in the violation, and (3) advising of each penalty which the Commission proposes to impose and its amount. Such written notice shall be sent by registered or certified mail by the Commission to the last known address of such person. The person so notified shall be granted an opportunity to show in writing, within such reasonable period as the Commission shall by regulation prescribe, why such penalty should not be imposed. The notice shall also advise such person that upon failure to pay the civil penalty subsequently determined by the Commission, if any, the penalty may be collected by civil action.

(c) On the request of the Commission, the Attorney General is authorized to institute a civil action to collect a penalty imposed pursuant to this section. The Attorney General shall have the exclusive power to compromise, mitigate, or remit such civil penalties as are referred to him for collection.
[42 U.S.C. 2282]

CIVIL MONETARY PENALTIES FOR VIOLATIONS OF DEPARTMENT OF ENERGY REGULATIONS

Sec. 234A (a) Any person who has entered into an agreement of indemnification under subsection 170 (d) (or any subcontractor or supplier thereto) who violates (or whose employee violates) any applicable rule, regulation or order related to nuclear safety prescribed or issued by the Secretary of Energy pursuant to this Act (or expressly incorporated by reference by the Secretary for purposes of nuclear safety, except any rule, regulation, or order issued by the Secretary of Transportation) shall be subject to a civil penalty of not to exceed $100,000 for each such violation. If any violation under this subsection is a continuing one, each day of such violation shall constitute a separate violation for the purpose of computing the applicable civil penalty.

(b) (1) The Secretary shall have the power to compromise, modify or remit, with or without conditions, such civil penalties and to prescribe regulations as he may deem necessary to implement this section.

(2) In determining the amount of any civil penalty under this subsection, the Secretary shall take into account the nature, circumstances, extent, and gravity of the violation or violations and, with respect to the violator, ability to pay, effect on ability to continue to do business, any history of prior such violations, the degree of culpability, and such other matters as justice may require. In implementing this section, the Secretary shall determine by rule whether nonprofit educational institutions should receive automatic remission of any penalty under this section.

(c) (1) Before issuing an order assessing a civil penalty against any person under this section, the Secretary shall provide to such person notice of the proposed penalty. Such notice shall inform such person of his opportunity to elect in writing within thirty days after the date of receipt of such notice to have the procedures of paragraph (3) (in lieu of those of paragraph (2)) apply with respect to such assessment.

(2) (A) Unless an election is made within thirty calendar days after receipt of notice under paragraph (1) to have paragraph (3) apply with respect to such penalty, the Secretary shall assess the penalty, by order, after a determination of violation has been made on the record after an opportunity for an agency hearing pursuant to section 554 of title 5, United States Code, before an administrative law judge appointed under section 3105 of such title 5. Such assessment order shall include the administrative law judge's findings and the basis for such assessment.

(B) Any person against whom a penalty is assessed under this paragraph may, within sixty calendar days after the date of the order of the Secretary assessing such penalty, institute an action in the United States court of appeals for the appropriate judicial circuit for judicial review of such order in accordance with chapter 7 of title 5, United States Code. The court shallhave jurisdiction to enter a judgment affirming, modifying, or setting aside in whole or in part, the order of the Secretary, or the court may remand the proceeding to the Secretary for such further action as the court may direct.

(3) (A) In the case of any civil penalty with respect to which the procedures of this paragraph have been elected, the Secretary shall promptly assess such penalty, by order, after the date of the election under paragraph (1).

(B) If the civil penalty has not been paid within sixty calendar days after the assessment order has been made under subparagraph (A), the Secretary shall institute an action in the appropriate district court of the United States for an order affirming the assessment of the civil penalty. The court shall have authority to review de novo the law and facts involved, and shall have jurisdiction to enter a judgment enforcing, modifying, and enforcing as so modified, or setting aside in whole or in part, such assessment.

(C) Any election to have this paragraph apply may not be revoked except with consent of the Secretary.

(4) If any person fails to pay an assessment of a civil penalty after it has become a final and unappealable order under paragraph (2), or after the appropriate district court has entered final judgment in favor of the Secretary under paragraph (3), the Secretary shall institute an action to recover the amount of such penalty in any appropriate district court of the United States. In such action, the validity and appropriateness of such final assessment order or judgment shall not be subject to review.

(d)The provisions of this section shall not apply to:

(1) The University of Chicago (and any subcontractors or suppliers thereto) for activities associated with Argonne National Laboratory;

(2) The University of California (and any subcontractors or suppliers thereto) for activities associated with Los Alamos National Laboratory, Lawrence Livermore National Laboratory, and Lawrence Berkeley National Laboratory;

(3) American Telephone an Telegraph Company and its subsidiaries (and any subcontractors or suppliers thereto) for activities associated with Sandia National Laboratories;

(4) Universities Research Association, Inc. (and any subcontractors or suppliers thereto) for activities associated with FERMI National Laboratory;

(5) Princeton University (and any subcontractors or suppliers thereto) for activities associated with Princeton Plasma Physics Laboratory;

(6) The Associated Universities, Inc. (and any subcontractors or suppliers thereto) for activities associated with the Brookhaven National Laboratory; and

(7) Battelle Memorial Institute (and any subcontractors or suppliers thereto) for activities associated with Pacific Northwest Laboratory.

[42 U.S.C. 2282a]

PROTECTION OF NUCLEAR INSPECTORS

Sec. 235. (a) Whoever kills any person who performs any inspections which—

(1) are related to any activity or facility licensed by the Commission, and

(2) are carried out to satisfy requirements under this Act or under any other Federal law governing the safety of utilization facilities required to be licensed under section 103 or 104 (b), or the safety of radioactive materials,

shall be punished as provided under sections 1111 and 1112 of title 18, United States Code [18 U.S.C. 1111, 1112]. The preceding sentence shall be applicable only if such person is killed while engaged in the performance of such inspection duties or on account of the performance of such duties.

(b) Whoever forcibly assaults, resists, opposes, impedes, intimidates, or interferes with any person who performs inspections as described under subsection (a) of this section, while such person is engaged in such inspection duties or on account of the performance of such duties, shall be punished as provided under section 111 of title 18, United States Code [18 U.S.C. 111].

[42 U.S.C. 2283]

SABOTAGE OF NUCLEAR FACILITIES OR FUEL

Sec. 236. (a) Any person who intentionally and willfully destroys or causes physical damage to, or who intentionally and willfully attempts to destroy or cause physical damage to—

(1) any production facility or utilization facility licensed under this Act;

(2) any nuclear waste storage facility licensed under this Act;

(3) any nuclear fuel for such a utilization facility, or any spent nuclear fuel from such a facility; or

(4) any uranium enrichment facility licensed by the Nuclear Regulatory Commission;

shall be fined not more than $10,000 or imprisoned for not more than ten years, or both.

(b) Any person who intentionally and willfully causes or attempts to cause an interruption of normal operation of any such facility through the unauthorized use of or tampering with the machinery, components, or controls of any such facility, shall be fined not more than $10,000 or imprisoned for not more than ten years, or both.

[42 U.S.C. 2284]

TITLE XIX—GENERAL PROVISIONS

TRANSFER OF PROPERTY

Sec. 241. Nothing in this Act shall be deemed to repeal, modify, amend, or alter the provisions of section 9(a) of the Atomic Energy Act of 1946, as heretofore amended.[1]
[42 U.S.C. 2015]

REPORT TO CONGRESS[2]

Sec. 251. The Commission shall submit to the Congress, in January of each year, a report concerning the activities of the Commission. The Commission shall include in such report, and shall at such other times as it deems desirable submit to the Congress, such recommendations for additional legislation as the Commission deems necessary or desirable.[3]
[42 U.S.C. 2016]

APPROPRIATIONS

Sec. 261. (a) Authorization required. No appropriation shall be made to the Commission, nor shall the Commission waive charges for the use of materials under the Cooperative Power Reactor Demonstration Program, unless previously authorized by legislation enacted by the Congress.
(b) Accounting. Any Act appropriating funds to the Commission may appropriate specified portions thereof to be accounted for upon the certification of the Commission only.
(c) Restoration or replacement of plant or facility. Notwithstanding the provisions of subsection (a), funds are hereby authorized to be appropriated for the restoration or replacement of any plant or facility destroyed or otherwise seriously damaged, and the Commission is authorized to use available funds for such purposes.
(d) Substituted construction projects. Funds authorized to be appropriated for any construction project to be used in connection with the development or production of special nuclear material or atomic weapons may be used to start another construction project not otherwise authorized if the substituted construction project is within the limit of cost of the construction project for which substitution is to be made, and the Commission certifies that—

(1) the substituted project is essential to the common defense and security;
(2) the substituted project is required by changes in weapon characteristics or weapon logistic operations; and
(3) the Commission is unable to enter into a contract with any person on terms satisfactory to it to furnish from a privately owned plant or facility the product or services to be provided by the new project.

[42 U.S.C. 2017]

AGENCY JURISDICTION

Sec. 271. Nothing in this Act shall be construed to affect the authority or regulations of any Federal, State, or local agency with respect to the generation, sale, or transmission of electric power produced through the use of nuclear facilities licensed by the Commission: *Provided*, That this section shall not be deemed

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[1] Section 9(a) of the Atomic Energy Act or 1946, as heretofore amended, referred to in text, provided that: The President shall direct the transfer to the Commission of all interests owned by the United States or any Government agency in the following property: (1) All fissionable material; all atomic weapons and parts thereof; all facilities, equipment, and materials for the processing, production, or utilization of fissionable material or atomic energy; all processes and technical information of any kind, and the source thereof (including data, drawings, specifications, patents, patent applications, and other sources) relating to the processing, production, or utilization of fissionable material or atomic energy; and all contracts, agreements, leases, patents, applications for patents, inventions and discoveries (whether patented or unpatented), and other rights of any kind concerning any such items; (2) All facilities, equipment, and materials, devoted primarily to atomic energy research and development, and (3) Such other property owned by or in the custody or control of the Manhattan Engineer District or other Government agencies as the President may determine.

[2] See also section 307(c) of the Energy Reorganization Act of 1974.

[3] Pub. L. 96-295, title III, §303, June 30, 1980, 94 Stat. 790, provided that: "The Nuclear Regulatory Commission shall include in its annual report to Congress under section 251 of the Atomic Energy Act of 1954 [this section] a statement of—(1) the direct and indirect costs to the Commission for the issuance of any license or permit and for the inspection of any facility, and (2) the fees paid to the Commission for the issuance of any license or permit and for the inspection of any facility."

to confer upon any Federal, State, or local agency any authority to regulate, control, or restrict any activities of the Commission.
[42 U.S.C. 2018]

APPLICABILITY OF FEDERAL POWER ACt

Sec. 272. Every licensee under this Act who holds a license from the Commission for a utilization of production facility for the generation of commercial electric energy under section 103 [42 U.S.C. 2133] and who transmits such electric energy in interstate commerce or sells it at wholesale in interstate commerce shall be subject to the regulatory provisions of the Federal Power Act.
[42 U.S.C. 2019]

LICENSING OF GOVERNMENT AGENCIES

Sec. 273. Nothing in this Act shall preclude any Government agency now or hereafter authorized by law to engage in the production, marketing, or distribution of electric energy from obtaining a license under section 103 [42 U.S.C. 2133], if qualified under the provisions of section 103 [42 U.S.C. 2133], for the construction and operation of production or utilization facilities for the primary purpose of producing electric energy for disposition for ultimate public consumption.
[42 U.S.C. 2020]

COOPERATION WITH STATES

Sec. 274. (a) Purpose. It is the purpose of this section—

(1) to recognize the interests of the States in the peaceful uses of atomic energy, and to clarify the respective responsibilities under this Act of the States and the Commission with respect to the regulation of byproduct, source, and special nuclear materials;

(2) to recognize the need, and establish programs for, cooperation between the States and the Commission with respect to control of radiation hazards associated with use of such materials;

(3) to promote an orderly regulatory pattern between the Commission and State governments with respect to nuclear development and use and regulation of byproduct, source, and special nuclear materials;

(4) to establish procedures and criteria for discontinuance of certain of the Commission's regulatory responsibilities with respect to byproduct, source, and special nuclear materials, and the assumption thereof by the States;

(5) to provide for coordination of the development of radiation standards for the guidance of Federal agencies and cooperation with the States; and

(6) to recognize that, as the States improve their capabilities to regulate effectively such materials, additional legislation may be desirable.

(b) Agreements with Governors. Except as provided in subsection (c), the Commission is authorized to enter into agreements with the Governor of any State providing for discontinuance of the regulatory authority of the Commission under chapters 6, 7, and 8, and section 161 of this Act [42 U.S.C. 2071, 2073 et seq., 2091 et seq., 2111, 2112, 2201], with respect to any one or more of the following materials within the State—

(1) byproduct materials as defined in section 11 (e) (1) [42 U.S.C. 2014(e)(1)];

(2) byproduct materials as defined in section 11 (e) (2) [42 U.S.C. 2014(e)(2)];

(3) source materials;

(4) special nuclear materials in quantities not sufficient to form a critical mass.

During the duration of such an agreement it is recognized that the State shall have authority to regulate the materials covered by the agreement for the protection of the public health and safety from radiation hazards.

(c) Retention of authority and responsibility by Commission. No agreement entered into pursuant to subsection (b) shall provide for discontinuance of any authority and the Commission shall retain authority and responsibility with respect to regulation of—

(1) the construction and operation of any production or utilization facility;

(2) the export from or import into the United States of byproduct, source, or special nuclear material, or of any production or utilization facility;

(3) the disposal into the ocean or sea of byproduct, source, or special nuclear waste materials as defined in regulations or orders of the Commission;

(4) the disposal of such other byproduct, source, or special nuclear material as the Commission determines by regulation or order should, because of the hazards or potential hazards thereof, not be so disposed of without a license from the Commission.

The Commission shall also retain authority under any such agreement to make a determination that all applicable standards and requirements have been met prior to termination of a license for byproduct material, as defined in section 11 (e) (2) [42 U.S.C. 2014(e)(2)]. Notwithstanding any agreement between the Commission and any State pursuant to subsection (b), the Commission is authorized by rule, regulation, or order to require that the manufacturer, processor, or producer of any equipment, device, commodity, or other product containing source, byproduct, or special nuclear material shall not transfer possession or control of such product except pursuant to a license issued by the Commission.

(d) Conditions. The Commission shall enter into an agreement under subsection (b) of this section with any State if—

(1) The Governor of that State certifies that the State has a program for the control of radiation hazards adequate to protect the public health and safety with respect to the materials within the State covered by the proposed agreement, and that the State desires to assume regulatory responsibility for such materials; and

(2) the Commission finds that the State program is in accordance with the requirements of subsection (o) and in all other respects compatible with the Commission's program for the regulation of such materials, and that the State program is adequate to protect the public health and safety with respect to the materials covered by the proposed agreement.

(e) Publication of proposed agreement and exemptions; opportunity for comment.

(1) Before any agreement under subsection (b) is signed by the Commission, the terms of the proposed agreement and of proposed exemptions pursuant to subsection (f) shall be published once each week for four consecutive weeks in the Federal Register; and such opportunity for comment by interested persons on the proposed agreement and exemptions shall be allowed as the Commission determines by regulation or order to be appropriate.

(2) Each proposed agreement shall include the proposed effective date of such proposed agreement or exemptions. The agreement and exemptions shall be published in the Federal Register within thirty days after signature by the Commission and the Governor.

(f) Exemptions. The Commission is authorized and directed, by regulation or order, to grant such exemptions from the licensing requirements contained in chapters 6, 7, and 8 [42 U.S.C. 2071, 2073 et seq. 2091 et seq., 2111, 2112], and from its regulations applicable to licensees as the Commission finds necessary or appropriate to carry out any agreement entered into pursuant to subsection (b) of this section.

(g) Radiation standards. The Commission is authorized and directed to cooperate with the States in the formulation of standards for protection against hazards of radiation to assure that State and Commission programs for protection against hazards of radiation will be coordinated and compatible.

(h) Federal Radiation Council. There is hereby established a Federal Radiation Council, consisting of the Secretary of Health, Education, and Welfare, the Chairman of the Atomic Energy Commission, the Secretary of Defense, the Secretary of Commerce, the Secretary of Labor, or their designees, and such other members as shall be appointed by the President. The Council shall consult qualified scientists and experts in radiation matters, including the President of the National Academy of Sciences, the Chairman of the National Committee on Radiation Protection and Measurement, and qualified experts in the field of biology and medicine and in the field of health physics. The Special Assistant to the President for Science and Technology, or his designee, is authorized to attend meetings, participate in the deliberations of, and to advise the Council. The Chairman of the Council shall be designated by the President, from time to time, from among the members of the Council. The Council shall advise the President with respect to radiation matters, directly or indirectly affecting health, including guidance for all Federal agencies in the formulation of radiation standards and in the establishment and execution of programs of cooperation with States. The Council shall also perform such other functions as the President may assign to it by Executive order.

(i) Inspections; training. The Commission in carrying out its licensing and regulatory responsibilities under this Act is authorized to enter into agreements with any State, or group of States, to perform inspections or other functions on a cooperative basis as the Commission deems appropriate. The Commission is also authorized to provide training, with or without charge, to employees of, and such other assistance to, any State or political subdivision thereof or group of States as the Commission deems appropriate. Any such provision or assistance by the Commission shall take into account the additional expenses that may be

incurred by a State as a consequence of the State's entering into an agreement with the Commission pursuant to subsection (b).

(j) Termination or suspension of agreement with State.

(1) The Commission, upon its own initiative after reasonable notice and opportunity for hearing to the State with which an agreement under subsection (b) has become effective, or upon request of the Governor of such State, may terminate or suspend all or part of its agreement with the State and reassert the licensing and regulatory authority vested in it under this Act, if the Commission finds that (1) such termination or suspension is required to protect the public health and safety, or (2) the State has not complied with one or more of the requirements of this section. The Commission shall periodically review such agreements and actions taken by the States under the agreements to ensure compliance with the provisions of this section.

(2) The Commission, upon its own motion or upon request of the Governor of any State, may, after notifying the Governor, temporarily suspend all or part of its agreement with the State without notice or hearing if, in the judgment of the Commission:

(A) an emergency situation exists with respect to any material covered by such an agreement creating danger which requires immediate action to protect the health or safety of persons either within or outside the State, and

(B) the State has failed to take steps necessary to contain or eliminate the cause of the danger within a reasonable time after the situation arose.

A temporary suspension under this paragraph shall remain in effect only for such time as the emergency situation exists and shall authorize the Commission to exercise its authority only to the extent necessary to contain or eliminate the danger.

(k) State regulation of activities for purposes other than protection against radiation hazards. Nothing in this section shall be construed to affect the authority of any State or local agency to regulate activities for purposes other than protection against radiation hazards.

(l) Notice to States of license application; hearing. With respect to each application for Commission license authorizing an activity as to which the Commission's authority is continued pursuant to subsection (c), the Commission shall give prompt notice to the State or States in which the activity will be conducted of the filing of the license application; and shall afford reasonable opportunity for State representatives to offer evidence, interrogate witnesses, and advise the Commission as to the application without requiring such representatives to take a position for or against the granting of the application.

(m) Limitation of agreements and exemptions. No agreement entered into under subsection (b), and no exemption granted pursuant to subsection (f), shall affect the authority of the Commission under subsection 161(b) or (i) [42 U.S.C. 2201(b) or (i)] to issue rules, regulations, or orders to protect the common defense and security, to protect restricted data or to guard against the loss or diversion of special nuclear material. For purposes of subsection 161(i) [42 U.S.C. 2201(i)], activities covered by exemptions granted pursuant to subsection (f) shall be deemed to constitute activities authorized pursuant to this Act; and special nuclear material acquired by any person pursuant to such an exemption shall be deemed to have been acquired pursuant to section 53 [42 U.S.C. 2073].

(n) Definition. As used in this section, the term "State" means any State, Territory, or possession of the United States, the Canal Zone, Puerto Rico, and the District of Columbia. As used in this section, the term "agreement" includes any amendment to any agreement.

(o) State requirements. In the licensing and regulation of byproduct material, as defined in section 11 (e) (2) of this Act [42 U.S.C. 2014(e)(2)], or of any activity which results in the production of byproduct material as so defined under an agreement entered into pursuant to subsection (b), a State shall require—

(1) compliance with the requirements of subsection (b) of section 83 [42 U.S.C. 2113(b)] (respecting ownership of byproduct material and land), and

(2) compliance with standards which shall be adopted by the State for the protection of the public health, safety, and the environment from hazards associated with such material which are equivalent, to the extent practicable, or more stringent than, standards adopted and enforced by the Commission for the same purpose, including requirements and standards promulgated by the Commission and the Administrator of the Environmental Protection Agency pursuant to sections 83, 84, and 275, [42 U.S.C. 2022, 2113, 2114] and

(3) procedures which—

(A) in the case of licenses, provide procedures under State law which include—

(i) an opportunity, after public notice, for written comments and a public hearing, with a transcript,

(ii) an opportunity for cross examination, and

(iii) a written determination which is based upon findings included in such determination and upon the evidence presented during the public comment period and which is subject to judicial review;

(B) in the case of rulemaking, provide an opportunity for public participation through written comments or a public hearing and provide for judicial review of the rule;

(C) require for each license which has a significant impact on the human environment a written analysis (which shall be available to the public before the commencement of any such proceedings) of the impact of such license, including any activities conducted pursuant thereto, on the environment, which analysis shall include—

(i) an assessment of the radiological and nonradiological impacts to the public health of the activities to be conducted pursuant to such license;

(ii) an assessment of any impact on any waterway and groundwater resulting from such activities;

(iii) consideration of alternatives, including alternative sites and engineering methods, to the activities to be conducted pursuant to such license; and

(iv) consideration of the long-term impacts, including decommissioning, decontamination, and reclamation impacts, associated with activities to be conducted pursuant to such license, including the management of any byproduct material, as defined by section 11 (e) (2) [42 U.S.C. 2014(e)(2)]; and

(D) prohibit any major construction activity with respect to such material prior to complying with the provisions of subparagraph (C).

If any State under such agreement imposes upon any licensee any requirement for the payment of funds to such State for the reclamation or long-term maintenance and monitoring of such material, and if transfer to the United States of such material is required in accordance with section 83 (b) of this Act [42 U.S.C. 2113(b)], such agreement shall be amended by the Commission to provide that such State shall transfer to the United States upon termination of the license issued to such licensee the total amount collected by such State from such licensee for such purpose. If such payments are required, they must be sufficient to ensure compliance with the standards established by the Commission pursuant to section 161 (x) of this Act [42 U.S.C. 2201(x)]. No State shall be required under paragraph (3) to conduct proceedings concerning any license or regulation which would duplicate proceedings conducted by the Commission. In adopting requirements pursuant to paragraph (2) of this subsection with respect to sites at which ores are processed primarily for their source material content or which are used for the disposal of byproduct material as defined in section 11 (e) (2) [42 U.S.C. 2014(e)(2)], the State may adopt alternatives (including, where appropriate, site-specific alternatives) to the requirements adopted and enforced by the Commission for the same purpose if, after notice and opportunity for public hearing, the Commission determines that such alternatives will achieve a level of stabilization and containment of the sites concerned, and a level of protection for public health, safety, and the environment from radiological and nonradiological hazards associated with such sites, which is equivalent to, to the extent practicable, or more stringent than the level which would be achieved by standards and requirements adopted and enforced by the Commission for the same purpose and any final standards promulgated by the Administrator of the Environmental Protection Agency in accordance with section 275 [42 U.S.C. 2022]. Such alternative State requirements may take into account local or regional conditions, including geology, topography, hydrology and meteorology.

[42 U.S.C. 2021]

HEALTH AND ENVIRONMENTAL STANDARDS FOR URANIUM MILL TAILINGS

Sec. 275. (a) As soon as practicable, but not later than October 1, 1982, the Administrator of the Environmental Protection Agency (hereinafter referred to in this section as the "Administrator") shall, by rule, promulgate standards of general application (including standards applicable to licenses under section 104(h) [42 U.S.C. 7914(h)] of the Uranium Mill Tailings Radiation Control Act of 1978) for the protection of the public health, safety, and the environment from radiological and nonradiological hazards associated with residual radioactive materials (as defined in section 101 of the Uranium Mill Tailings Radiation Control Act of 1978 [42 U.S.C. 7911]) located at inactive uranium mill tailings sites and depository sites for such

materials selected by the Secretary of Energy, pursuant to title I of the Uranium Mill Tailings Radiation Control Act of 1978. Standards promulgated pursuant to this subsection shall, to the maximum extent practicable, be consistent with the requirements of the Solid Waste Disposal Act, as amended. In establishing such standards, the Administrator shall consider the risk to the public health, safety, and the environment, the environmental and economic costs of applying such standards, and such other factors as the Administrator determines to be appropriate. The Administrator may periodically revise any standard promulgated pursuant to this subsection. After October 1, 1982, if the Administrator has not promulgated standards in final form under this subsection, any action of the Secretary of Energy under title I of the Uranium Mill Tailings Radiation Control Act of 1978 which is required to comply with, or be taken in accordance with, standards of the Administrator shall comply with, or be taken in accordance with, the standards proposed by the Administrator under this subsection until such time as the Administrator promulgates such standards in final form.

(b) (1) As soon as practicable, but not later than October 31, 1982, the Administrator shall, by rule, propose, and within 11 months thereafter promulgate in final form, standards of general application for the protection of the public health, safety, and the environment from radiological and nonradiological hazards associated with the processing and with the possession, transfer, and disposal of byproduct material, as defined in section 11 (e) (2) of this Act [42 U.S.C. 2014(e)(2)], at sites at which ores are processed primarily for their source material content or which are used for the disposal of such byproduct material. If the Administrator fails to promulgate standards in final form under this subsection by October 1, 1983, the authority of the Administrator to promulgate such standards shall terminate, and the Commission may take actions under this Act without regard to any provision of this Act requiring such actions to comply with, or be taken in accordance with, standards promulgated by the Administrator. In any such case, the Commission shall promulgate, and from time to time revise, any such standards of general application which the Commission deems necessary to carry out its responsibilities in the conduct of its licensing activities under this Act. Requirements established by the Commission under this Act with respect to byproduct material as defined in section 11 (e) (2) [42 U.S.C. 2014(e)(2)] shall conform to such standards. Any requirements adopted by the Commission respecting such byproduct material before promulgation by the Commission of such standards shall be amended as the Commission deems necessary to conform to such standards in the same manner as provided in subsection (f) (3). Nothing in this subsection shall be construed to prohibit or suspend the implementation or enforcement by the Commission of any requirement of the Commission respecting byproduct material as defined in section 11 (e) (2) [42 U.S.C. 2014(e)(2)] pending promulgation by the Commission of any such standard of general application. In establishing such standards, the Administrator shall consider the risk to the public health, safety, and the environment, the environmental and economic costs of applying such standards, and such other factors as the Administrator determines to be appropriate

(2) Such generally applicable standards promulgated pursuant to this subsection for nonradiological hazards shall provide for the protection of human health and the environment consistent with the standards required under subtitle C of the Solid Waste Disposal Act [42 U.S.C. 6921 et seq.], as amended, which are applicable to such hazards: *Provided, however,* That no permit issued by the Administrator is required under this Act or the Solid Waste Disposal Act, as amended, for the processing, possession, transfer, or disposal of byproduct material, as defined in section 11 (e) (2) of this Act [42 U.S.C. 2014(e)(2)]. The Administrator may periodically revise any standard promulgated pursuant to this subsection. Within three years after such revision of any such standard, the Commission and any State permitted to exercise authority under section 274 (b) (2) [42 U.S.C. 2021] shall apply such revised standard in the case of any license for byproduct material as defined in section 11 (e) (2) [42 U.S.C. 2014(e)(2)] or any revision thereof.

(c) (1) Before the promulgation of any rule pursuant to this section, the Administrator shall publish the proposed rule in the Federal Register, together with a statement of the research, analysis, and other available information in support of such proposed rule, and provide a period of public comment of at least thirty days for written comments thereon and an opportunity, after such comment period and after public notice, for any interested person to present oral data, views, and arguments at a public hearing. There shall be a transcript of any such hearing. The Administrator shall consult with the Commission and the Secretary of Energy before promulgation of any such rule.

(2) Judicial review of any rule promulgated under this section may be obtained by any interested person only upon such person filing a petition for review within sixty days after such promulgation in the United States court of appeals for the Federal judicial circuit in which such person resides or has his principal place of business. A copy of the petition shall be forthwith transmitted by the clerk of court to the Administrator. The Administrator thereupon shall file in the court the written submissions to, and transcript of, the written or oral proceedings on which such rule was based as provided in section 2112 of title 28, United States Code [28 U.S.C. 2112]. The court shall have jurisdiction to review the rule in accordance with chapter 7 of title 5, United States Code [5 U.S.C. 701 et seq.], and to grant appropriate relief as provided in such chapter. The judgment of the court affirming, modifying, or setting aside, in whole or in part, any such rule shall be final, subject to judicial review by the Supreme Court of the United States upon certiorari or certification as provided in section 1254 of title 28, United States Code [28 U.S.C. 1254].

(3) Any rule promulgated under this section shall not take effect earlier than sixty calendar days after such promulgation.

(d) Implementation and enforcement of the standards promulgated pursuant to subsection (b) of this section shall be the responsibility of the Commission in the conduct of its licensing activities under this Act. States exercising authority pursuant to section 274 (b) (2) of this Act [42 U.S.C. 2021(b)(2)] shall implement and enforce such standards in accordance with subsection (o) of such section [42 U.S.C. 2021 (o)].

(e) Nothing in this Act applicable to byproduct material, as defined in section 11 (e) (2) of this Act [42 U.S.C. 2014(e)(2)], shall affect the authority of the Administrator under the Clean Air Act of 1970, as amended [42 U.S.C. 7401 et seq.], or the Federal Water Pollution Control Act, as amended [33 U.S.C. 1251 et seq.].

(f) (1) Prior to January 1, 1983, the Commission shall not implement or enforce the provisions of the Uranium Mill Licensing Requirements published as final rules at 45 Federal Register 65521 to 65538 on October 3, 1980 (hereinafter in this subsection referred to as the "October 3 regulations"). After December 31, 1982, the Commission is authorized to implement and enforce the provisions of such October 3 regulations (and any subsequent modifications or additions to such regulations which may be adopted by the Commission), except as otherwise provided in paragraphs (2) and (3) of this subsection.

(2) Following the proposal by the Administrator of standards under subsection (b), the Commission shall review the October 3 regulations, and, not later than 90 days after the date of such proposal, suspend implementation and enforcement of any provision of such regulations which the Commission determines after notice and opportunity for public comment to require a major action or major commitment by licensees which would be unnecessary if—

(A) the standards proposed by the Administrator are promulgated in final form without modification, and

(B) the Commission's requirements are modified to conform to such standards.

Such suspension shall terminate on the earlier of April 1, 1984 or the date on which the Commission amends the October 3 regulations to conform to final standards promulgated by the Administrator under subsection (b). During the period of such suspension, the Commission shall continue to regulate byproduct material (as defined in section 11 (e) (2)) under this Act on a licensee-by-licensee basis as the Commission deems necessary to protect public health, safety, and the environment.

(3) Not later than 6 months after the date on which the Administrator promulgates final standards pursuant to subsection (b) of this section, the Commission shall, after notice and opportunity for public comment, amend the October 3 regulations, and adopt such modifications, as the Commission deems necessary to conform to such final standards of the Administrator.

(4) Nothing in this subsection may be construed as affecting the authority or responsibility of the Commission under section 84 [42 U.S.C. 2114] to promulgate regulations to protect the public health and safety and the environment.

[42 U.S.C. 2022]

TITLE XX—JOINT COMMITTEE ON ATOMIC ENERGY ABOLISHED; FUNCTIONS AND RESPONSIBILITIES REASSIGNED

JOINT COMMITTEE ON ATOMIC ENERGY ABOLISHED

Sec. 301. (a) The Joint Committee on Atomic Energy is abolished.

(b) Any reference in any rule, resolution, or order of the Senate or the House of Representatives or in any law, regulation, or Executive order to the Joint Committee on Atomic Energy shall, on and after the date of enactment of this section [enacted Sept. 20, 1977], be considered as referring to the committees of the Senate and the House of Representatives which, under the rules of the Senate and the House, have jurisdiction over the subject matter of such reference.

(c) All records, data, charts, and files of the Joint Committee on Atomic Energy are transferred to the committees of the Senate and House of Representatives which, under the rules of the Senate and the House, have jurisdiction over the subject matters to which such records, data, charts, and files relate. In the event that any record, data, chart, or file shall be within the jurisdiction of more than one committee, duplicate copies shall be provided upon request.

[42 U.S.C. 2258]

INFORMATION AND ASSISTANCE TO CONGRESSIONAL COMMITTEES

Sec. 303. (a) The Secretary of Energy and the Nuclear Regulatory Commission shall keep the committees of the Senate and the House of Representatives which, under the rules of the Senate and the House, have jurisdiction over the functions of the Secretary or the Commission, fully and currently informed with respect to the activities of the Secretary and the Commission.

(b) The Department of Defense and Department of State shall keep the committees of the Senate and the House of Representatives which, under the rules of the Senate and the House, have jurisdiction over national security considerations of nuclear energy, fully and currently informed with respect to such matters within the Department of Defense and Department of State relating to national security considerations of nuclear technology which are within the jurisdiction of such committees.

(c) Any Government agency shall furnish any information requested by the committees of the Senate and the House of Representatives which, under the rules of the Senate and the House, have jurisdiction over the development, utilization, or application of nuclear energy, with respect to the activities or responsibilities of such agency in the field of nuclear energy which are within the jurisdiction of such committees.

(d) The committees of the Senate and the House of Representatives which, under the rules of the Senate and the House, have jurisdiction over the development, utilization, or application of nuclear energy, are authorized to utilize the services, information, facilities, and personnel of any Government agency which has activities or responsibilities in the field of nuclear energy which are within the jurisdiction of such committees: *Provided, however,* That any utilization of personnel by such committees shall be on a reimbursable basis and shall require, with respect to committees of the Senate, the prior written consent of the Committee on Rules and Administration, and with respect to committees of the House of Representatives, the prior written consent of the Committee on House Administration.

[42 U.S.C. 2259]

TITLE XXI. DEFENSE NUCLEAR FACILITIES SAFETY BOARD

ESTABLISHMENT

Sec. 311 (a) Establishment.—There is hereby established an independent establishment in the executive branch, to be known as the "Defense Nuclear Facilities Safety Board" (hereafter in this chapter referred to as the "Board").

(b) Membership.—

(1) The Board shall be composed of five members appointed from civilian life by the President, by and with the advice and consent of the Senate, from among United States citizens who are respected experts in the field of nuclear safety with a demonstrated competence and knowledge relevant to the independent investigative and oversight functions of the Board. Not more than three members of the Board shall be of the same political party.

(2) Any vacancy in the membership of the Board shall be filled in the same manner in which the original appointment was made.

(3) No member of the Board may be an employee of, or have any significant financial relationship with, the Department of Energy or any contractor of the Department of Energy.

(4) Not later than 180 days after the date of the enactment of this chapter, the President shall submit to the Senate nominations for appointment to the Board. In the event that the President is unable to submit the nominations within such 180-day period, the President shall submit to the Committees on Armed Services and on Appropriations of the Senate and to the Speaker of the House of Representatives a

report describing the reasons for such inability and a plan for submitting the nominations within the next 90 days. If the President is unable to submit the nominations within that 90-day period, the President shall again submit to such committees and the Speaker such a report and plan. The President shall continue to submit to such committees and the Speaker such a report and plan every 90 days until the nominations are submitted.

(c) Chairman and Vice Chairman.—

(1) The President shall designate a Chairman and Vice Chairman of the Board from among members of the Board.

(2) The Chairman shall be the chief executive officer of the Board and, subject to such policies as the Board may establish, shall exercise the functions of the Board with respect to—

(A) the appointment and supervision of employees of the Board;

(B) the organization of any administrative units established by the Board; and

(C) the use and expenditure of funds.

(3) The Chairman may delegate any of the functions under this paragraph to any other member or to any appropriate officer of the Board.

(4) The Vice Chairman shall act as Chairman in the event of the absence or incapacity of the Chairman or in case of a vacancy in the office of Chairman.

(d) Terms.—

(1) Except as provided under paragraph (2), the members of the Board shall serve for terms of five years. Members of the Board may be reappointed.

(2) Of the members first appointed—

(A) one shall be appointed for a term of one year;

(B) one shall be appointed for a term of two years;

(C) one shall be appointed for a term of three years;

(D) one shall be appointed for a term of four years; and

(E) one shall be appointed for a term of five years,

as designated by the President at the time of appointment.

(3) Any member appointed to fill a vacancy occurring before the expiration of the term of office for which such member's predecessor was appointed shall be appointed only for the remainder of such term. A member may serve after the expiration of that member's term until a successor has taken office.

(e) Quorum.—Three members of the Board shall constitute a quorum, but a lesser number may hold hearings.

[42 U.S.C. 2286]

FUNCTIONS OF THE BOARD

Sec. 312. (a) In General.—The Board shall perform the following functions:

(1) Review and evaluation of standards.—The Board shall review and evaluate the content and implementation of the standards relating to the design, construction, operation, and decommissioning of defense nuclear facilities of the Department of Energy (including all applicable Department of Energy orders, regulations, and requirements) at each Department of Energy defense nuclear facility. The Board shall recommend to the Secretary of Energy those specific measures that should be adopted to ensure that public health and safety are adequately protected. The Board shall include in its recommendations necessary changes in the content and implementation of such standards, as well as matters on which additional data or additional research is needed.

(2) Investigations.—

(A) The Board shall investigate any event or practice at a Department of Energy defense nuclear facility which the Board determines has adversely affected, or may adversely affect, public health and safety.

(B) The purpose of any Board investigation under subparagraph (A) shall be—

(i) to determine whether the Secretary of Energy is adequately implementing the standards described in paragraph (1) of the Department of Energy (including all applicable Department of Energy orders, regulations, and requirements) at the facility;

(ii) to ascertain information concerning the circumstances of such event or practice and its implications for such standards;

(iii) to determine whether such event or practice is related to other events or practices at other Department of Energy defense nuclear facilities; and

(iv) to provide to the Secretary of Energy such recommendations for changes in such standards or the implementation of such standards (including Department of Energy orders, regulations, and requirements) and such recommendations relating to data or research needs as may be prudent or necessary.

(3) Analysis of design and operational data.—The Board shall have access to and may systematically analyze design and operational data, including safety analysis reports, from any Department of Energy defense nuclear facility.

(4) Review of facility design and construction.—The Board shall review the design of a new Department of Energy defense nuclear facility before construction of such facility begins and shall recommend to the Secretary, within a reasonable time, such modifications of the design as the Board considers necessary to ensure adequate protection of public health and safety. During the construction of any such facility, the Board shall periodically review and monitor the construction and shall submit to the Secretary, within a reasonable time, such recommendations relating to the construction of that facility as the Board considers necessary to ensure adequate protection of public health and safety. An action of the Board, or a failure to act, under this paragraph may not delay or prevent the Secretary of Energy from carrying out the construction of such a facility.

(5) Recommendations.—The Board shall make such recommendations to the Secretary of Energy with respect to Department of Energy defense nuclear facilities, including operations of such facilities, standards, and research needs, as the Board determines are necessary to ensure adequate protection of public health and safety. In making its recommendations the Board shall consider the technical and economic feasibility of implementing the recommended measures.

(b) Excluded Functions.—The functions of the Board under this chapter do not include functions relating to the safety of atomic weapons. However, the Board shall have access to any information on atomic weapons that is within the Department of Energy and is necessary to carry out the functions of the Board.

[42 U.S.C. 2286a]

POWERS OF BOARD

Sec. 313. (a) Hearings.—

(1) The Board or a member authorized by the Board may, for the purpose of carrying out this chapter, hold such hearings and sit and act at such times and places, and require, by subpoena or otherwise, the attendance and testimony of such witnesses and the production of such evidence as the Board or an authorized member may find advisable.

(2) (A) Subpoenas may be issued only under the signature of the Chairman or any member of the Board designated by him and shall be served by any person designated by the Chairman, any member, or any person as otherwise provided by law. The attendance of witnesses and the production of evidence may be required from any place in the United States at any designated place of hearing in the United States.

(B) Any member of the Board may administer oaths or affirmations to witnesses appearing before the Board.

(C) If a person issued a subpoena under paragraph (1) refuses to obey such subpoena or is guilty of contumacy, any court of the United States within the judicial district within which the hearing is conducted or within the judicial district within which such person is found or resides or transacts business may (upon application by the Board) order such person to appear before the Board to produce evidence or to give testimony relating to the matter under investigation. Any failure to obey such order of the court may be punished by such court as a contempt of the court.

(D) The subpoenas of the Board shall be served in the manner provided for subpoenas issued by a United States district court under the Federal Rules of Civil Procedure for the United States district courts.

(E) All process of any court to which application may be made under this section may be served in the judicial district in which the person required to be served resides or may be found.

(b) Staff.—

(1) The Board may, for the purpose of performing its responsibilities under this chapter—

(A) hire such staff as it considers necessary to perform the functions of the Board, including such scientific and technical personnel as the Board may determine necessary, but not more than the equivalent of 150 full-time employees; and

(B) procure the temporary and intermittent services of experts and consultants to the extent authorized by section 3109(b) of title 5, United States Code, at rates the Board determines to be reasonable.

(2) The authority and requirements provided in section 161d. with respect to officers and employees of the Commission shall apply with respect to scientific and technical personnel hired under paragraph (1)(A).

(c) Regulations.—The Board may prescribe regulations to carry out the responsibilities of the Board under this chapter.

(d) Reporting Requirements.—The Board may establish reporting requirements for the Secretary of Energy which shall be binding upon the Secretary. The information which the Board may require the Secretary of Energy to report under this subsection may include any information designated as classified information, or any information designated as safeguards information and protected from disclosure under section 147 or 148 of this Act.

(e) Use of Government Facilities, Etc.—The Board may, for the purpose of carrying out its responsibilities under this chapter, use any facility, contractor, or employee of any other department or agency of the Federal Government with the consent of and under appropriate support arrangements with the head of such department or agency and, in the case of a contractor, with the consent of the contractor.

(f) Assistance From Certain Agencies of the Federal Government.—With the consent of and under appropriate support arrangements with the Nuclear Regulatory Commission, the Board may obtain the advice and recommendations of the staff of the Commission on matters relating to the Board's responsibilities and may obtain the advice and recommendations of the Advisory Committee on Reactor Safeguards on such matters.

(g) Assistance From Organizations Outside the Federal Government.—Notwithstanding any other provisions of law relating to the use of competitive procedures, the Board may enter into an agreement with the National Research Council of the National Academy of Sciences or any other appropriate group or organization of experts outside the Federal Government chosen by the Board to assist the Board in carrying out its responsibilities under this chapter.

(h) Resident Inspectors.—The Board may assign staff to be stationed at any Department of Energy defense nuclear facility to carry out the functions of the Board.

(i) Special studies.—The Board may conduct special studies pertaining to adequate protection of public health and safety at any Department of Energy defense nuclear facility.

(j) Evaluation of information.—The Board may evaluate information received from the scientific and industrial communities, and from the interested public, with respect to—

(1) events or practices at any Department of Energy defense nuclear facility; or

(2) suggestions for specific measures to improve the content of standards described in section 312(1), the implementation of such standards, or research relating to such standards at Department of Energy defense nuclear facilities.

[42 U.S.C. 2286b]

RESPONSIBILITIES OF THE SECRETARY OF ENERGY

Sec. 314. (a) Cooperation.—The Secretary of Energy shall fully cooperate with the Board and provide the Board with ready access to such facilities, personnel, and information as the Board considers necessary to carry out its responsibilities under this chapter. Each contractor operating a Department of Energy defense nuclear facility under a contract awarded by the Secretary shall, to the extent provided in such contract or otherwise with the contractor's consent, fully cooperate with the Board and provide the Board with ready access to such facilities, personnel, and information of the contractor as the Board considers necessary to carry out its responsibilities under this chapter.

(b) Access to Information.—The Secretary of Energy may deny access to information provided to the Board to any person who—

(1) has not been granted an appropriate security clearance or access authorization by the Secretary of Energy; or

(2) does not need such access in connection with the duties of such person.

[42 U.S.C. 2286c]

BOARD RECOMMENDATIONS

Sec. 315. (a) Public Availability and Comment.—Subject to subsections (g) and (h) and after receipt by the Secretary of Energy of any recommendations from the Board under section 312, the Board promptly shall make such recommendations available to the public in the Department of Energy's regional public reading rooms and shall publish in the Federal Register such recommendations and a request for the submission to the Board of public comments on such recommendations. Interested persons shall have 30 days after the date of the publication of such notice in which to submit comments, data, views, or arguments to the Board concerning the recommendations.

(b) Response by Secretary.—

(1) The Secretary of Energy shall transmit to the Board, in writing, a statement on whether the Secretary accepts or rejects, in whole or in part, the recommendations submitted to him by the Board under section 312, a description of the actions to be taken in response to the recommendations, and his views on such recommendations. The Secretary of Energy shall transmit his response to the Board within 45 days after the date of the publication, under subsection (a), of the notice with respect to such recommendations or within such additional period, not to exceed 45 days, as the Board may grant.

(2) At the same time as the Secretary of Energy transmits his response to the Board under paragraph (1), the Secretary, subject to subsection (h), shall publish such response, together with a request for public comment on his response, in the Federal Register.

(3) Interested persons shall have 30 days after the date of the publication of the Secretary of Energy's response in which to submit comments, data, views, or arguments to the Board concerning the Secretary's response.

(4) The Board may hold hearings for the purpose of obtaining public comments on its recommendations and the Secretary of Energy's response.

(c) Provision of Information to Secretary.—The Board shall furnish the Secretary of Energy with copies of all comments, data, views, and arguments submitted to it under subsection (a) or (b).

(d) Final Decision.—If the Secretary of Energy, in a response under subsection (b)(1), rejects (in whole or part) any recommendation made by the Board under section 312, the Board shall either reaffirm its original recommendation or make a revised recommendation and shall notify the Secretary of its action. Within 30 days after receiving the notice of the Board's action under this subsection, the Secretary shall consider the Board's action and make a final decision on whether to implement all or part of the Board's recommendations. Subject to subsection (h), the Secretary shall publish the final decision and the reasoning for such decision in the Federal Register and shall transmit to the Committees on Armed Services and on Appropriations of the Senate and to the Speaker of the House of Representatives a written report containing that decision and reasoning.

(e) Implementation Plan.—The Secretary of Energy shall prepare a plan for the implementation of each Board recommendation, or part of a recommendation, that is accepted by the Secretary in his final decision. The Secretary shall transmit the implementation plan to the Board within 90 days after the date of the publication of the Secretary's final decision on such recommendation in the Federal Register. The Secretary may have an additional 45 days to transmit the plan if the Secretary submits to the Board and to the Committees on Armed Services and on Appropriations of the Senate and to the Speaker of the House of Representatives a notification setting forth the reasons for the delay and describing the actions the Secretary is taking to prepare an implementation plan under this subsection. The Secretary may implement any such recommendation (or part of any such recommendation) before, on, or after the date on which the Secretary transmits the implementation plan to the Board under this subsection.

(f) Implementation.—

(1) Subject to paragraph (2), not later than one year after the date on which the Secretary of Energy transmits an implementation plan with respect to a recommendation (or part thereof) under subsection (e), the Secretary shall carry out and complete the implementation plan. If complete implementation of the plan takes more than 1 year, the Secretary of Energy shall submit a report to the Committees on Armed Services and on Appropriations of the Senate and to the Speaker of the House of Representatives setting forth the reasons for the delay and when implementation will be completed.

(2) If the Secretary of Energy determines that the implementation of a Board recommendation (or part thereof) is impracticable because of budgetary considerations, or that the implementation would affect the Secretary's ability to meet the annual nuclear weapons stockpile requirements established pursuant to section 91 of this Act, the Secretary shall submit to the President, to the Committees on Armed

Services and on Appropriations of the Senate, and to the Speaker of the House of Representatives a report containing the recommendation and the Secretary's determination.

(g) Imminent or Severe Threat.—

(1) In any case in which the Board determines that a recommendation submitted to the Secretary of Energy under section 312 relates to an imminent or severe threat to public health and safety, the Board and the Secretary of Energy shall proceed under this subsection in lieu of subsections (a) through (d).

(2) At the same time that the Board transmits a recommendation relating to an imminent or severe threat to the Secretary of Energy, the Board shall also transmit the recommendation to the President and for information purposes to the Secretary of Defense. The Secretary of Energy shall submit his recommendation to the President. The President shall review the Secretary of Energy's recommendation and shall make the decision concerning acceptance or rejection of the Board's recommendation.

(3) After receipt by the President of the recommendation from the Board under this subsection, the Board promptly shall make such recommendation available to the public and shall transmit such recommendation to the Committees on Armed Services and on Appropriations of the Senate and to the Speaker of the House of Representatives. The President shall promptly notify such committees and the Speaker of his decision and the reasons for that decision.

(h) Limitation.—Notwithstanding any other provision of this section, the requirements to make information available to the public under this section—

(1) shall not apply in the case of information that is classified; and

(2) shall be subject to the orders and regulations issued by the Secretary of Energy under sections 147 and 148 of this Act to prohibit dissemination of certain information.

[42 U.S.C. 2286d]

REPORTS

Sec. 316. (a) Board Report.—

(1) The Board shall submit to the Committees on Armed Services and on Appropriations of the Senate and to the Speaker of the House of Representatives each year, at the same time that the President submits the budget to Congress pursuant to section 1105(a) of title 31, United States Code, a written report concerning its activities under this chapter, including all recommendations made by the Board, during the year preceding the year in which the report is submitted. The Board may also issue periodic unclassified reports on matters within the Board's responsibilities.

(2) The annual report under paragraph (1) shall include an assessment of—

(A) the improvements in the safety of Department of Energy defense nuclear facilities during the period covered by the report;

(B) the improvements in the safety of Department of Energy defense nuclear facilities resulting from actions taken by the Board or taken on the basis of the activities of the Board; and

(C) the outstanding safety problems, if any, of Department of Energy defense nuclear facilities.

(b) DOE Report.—The Secretary of Energy shall submit to the Committees on Armed Services and on Appropriations of the Senate and to the Speaker of the House of Representatives each year, at the same time that the President submits the budget to Congress pursuant to section 1105(a) of title 31, United States Code, a written report concerning the activities of the Department of Energy under this chapter during the year preceding the year in which the report is submitted.

[42 U.S.C. 2286e]

JUDICIAL REVIEW

Sec. 317 Chapter 7 of title 5, United States Code, shall apply to the activities of the Board under this chapter.

[42 U.S.C. 2286f]

DEFINITION

Sec. 318. As used in this chapter, the term "Department of Energy defense nuclear facility" means any of the following:

(1) A production facility or utilization facility (as defined in section 11 of this Act) that is under the control or jurisdiction of the Secretary of Energy and that is operated for national security purposes, but the term does not include—

(A) any facility or activity covered by Executive Order No. 12344, dated February 1, 1982, pertaining to the Naval nuclear propulsion program;

(B) any facility or activity involved with the transportation of nuclear explosives or nuclear material; or

(C) any facility that does not conduct atomic energy defense activities.

(2) A nuclear waste storage facility under the control or jurisdiction of the Secretary of Energy, but the term does not include a facility developed pursuant to the Nuclear Waste Policy Act of 1982 [42 U.S.C. 10101 et seq.] and licensed by the Nuclear Regulatory Commission.

[42 U.S.C. 2286g]

CONTRACT AUTHORITY SUBJECT TO APPROPRIATIONS

Sec. 319. The authority of the Board to enter into contracts under this chapter is effective only to the extent that appropriations (including transfers of appropriations) are provided in advance for such purpose.

[42 U.S.C. 2286h]

ANNUAL AUTHORIZATION OF APPROPRIATIONS

Sec. 320. Authorizations of appropriations for the Board for fiscal years beginning after fiscal year 1989 shall be provided annually in authorization Acts.

(b) Salary for Board Members at Executive Schedule Level III.—Section 5314 of title 5, United States Code, is amended by inserting after Members, Nuclear Regulatory Commission. the following: Members, Defense Nuclear Facilities Safety Board.

(c) Requirements for First Annual Report.—

(1) Before submission of the first annual report by the Defense Nuclear Facilities Safety Board under section 316(a) of the Atomic Energy Act of 1954 (as added by subsection (a)), the Board shall conduct a study on whether nuclear facilities of the Department of Energy that are excluded from the definition of Department of Energy defense nuclear facility in section 318(1)(C) of such Act (hereafter in this subsection referred to as non-defense nuclear facilities) should be subject to independent external oversight. The Board shall include in such first annual report the results of such study and the recommendation of the Board on whether non-defense nuclear facilities should be subject to independent external oversight.

(2) If the Board recommends in the report that non-defense nuclear facilities should be subject to such oversight, the report shall include a discussion of alternative mechanisms for implementing such oversight, including mechanisms such as a separate executive agency and oversight as a part of the Board's responsibilities. The discussion of alternative mechanisms of oversight also shall include considerations of budgetary costs, protection of the security of sensitive nuclear weapons information, and the similarities and differences in the design, construction, operation, and decommissioning of defense and non-defense nuclear facilities of the Department of Energy.

(d) Requirements for Fifth Annual Report.—The fifth annual report submitted by the Defense Nuclear Facilities Safety Board under section 316(a) of the Atomic Energy Act of 1954 [as added by subsection (a)] shall include—

(1) an assessment of the degree to which the overall administration of the Board's activities are believed to meet the objectives of Congress in establishing the Board;

(2) recommendations for continuation, termination, or modification of the Board's functions and programs, including recommendations for transition to some other independent oversight arrangement if it is advisable; and

(3) recommendations for appropriate transition requirements in the event that modifications are recommended.

[42 U.S.C. 2286i]

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ENERGY REORGANIZATION ACT OF 1974[1]

An Act to reorganize and consolidate certain functions of the Federal Government in a new Energy Research and Development Administration and in a new Nuclear Regulatory Commission in order to promote more efficient management of such functions.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SHORT TITLE AND TABLE OF CONTENTS

Section 1. This Act may be cited as the Energy Reorganization Act of 1974, as amended.

Sec. 1. Short title and table of contents.
Sec. 2. Congressional declaration of policy and purpose.

TITLE I—ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

Sec. 101. Establishment of energy research and development administration.
Sec. 102. Officers of the Administration.
Sec. 103. Responsibilities of the Administrator.
Sec. 104. Abolition and transfers.
Sec. 105. Administrative provisions.
Sec. 106. Personnel and services.
Sec. 107. Powers of the Administration.
Sec. 109. Report to Congres on future reorganization.
Sec. 110. Coordination with environmental efforts.
Sec. 111. Annual authorization Acts.

TITLE II—NUCLEAR REGULATORY COMMISSION

Sec. 201. Establishment and transfers.
Sec. 202. Licensing and related regulatory functions respecting selected Administration facilities.
Sec. 203. Office of Nuclear Reactor Regulation.
Sec. 204. Office of Nuclear Safety and Safeguards.
Sec. 205. Office of Nuclear Regulatory Research
Sec. 206. Compliance with safety regulations.
Sec. 207. Nuclear energy center site survey.
Sec. 208. Abnormal occurrence reports.
Sec. 209. Other officers.
Sec. 210. Unresolved safety issues plan.
Sec. 211. Employee protection.

TITLE III—MISCELLANEOUS AND TRANSITIONAL PROVISIONS

Sec. 301. Transitional provisions.
Sec. 302. Transfer of personnel.
Sec. 303. Director of the Office of Management and Budget; power to make dispositions.
Sec. 304. Definitions.
Sec. 305. Authorization of appropriations.
Sec. 306. Comptroller General audit.
Sec. 307. Reports to President for submission to Congress.
Sec. 308. Information to Congressional committees.

[1]This act consists of Public Law 93-438 (88 Stat. 1233) enacted on Oct. 11, 1974, and subsequent amendments. Bracketed notes are used at the end of each section for the convenience of the reader to indicate the United States Code citation.

Sec. 309. Transfer of funds.

TITLE IV—SEX DISCRIMINATION

Sec. 401. Sex discrimination prohibited.

CONGRESSIONAL DECLARATION OF POLICY AND PURPOSE

Sec. 2. (a) Development and utilization of energy sources. The Congress hereby declares that the general welfare and the common defense and security require effective action to develop, and increase the efficiency and reliability of use of, all energy sources to meet the needs of present and future generations, to increase the productivity of the national economy and strengthen its position in regard to international trade, to make the Nation self-sufficient in energy, to advance the goals of restoring, protecting, and enhancing environmental quality, and to assure public health and safety.

(b) Necessity of establishing Energy Research and Development Administration. The Congress finds that, to best achieve these objectives, improve Government operations, and assure the coordinated and effective development of all energy sources, it is necessary to establish an Energy Research and Development Administration to bring together and direct Federal activities relating to research and development on the various sources of energy, to increase the efficiency and reliability in the use of energy, and to carry out the performance of other functions, including but not limited to the Atomic Energy Commission's military and production activities and its general basic research activities. In establishing an Energy Research and Development Administration to achieve these objectives, the Congress intends that all possible sources of energy be developed consistent with warranted priorities.

(c) Separation of licensing and regulatory functions of the Atomic Energy Commission. The Congress finds that it is in the public interest that the licensing and related regulatory functions of the Atomic Energy Commission be separated from the performance of the other functions of the Commission, and that this separation be effected in an orderly manner, pursuant to this Act, assuring adequacy of technical and other resources necessary for the performance of each.

(d) Small business participation. The Congress declares that it is in the public interest and the policy of Congress that small business concerns be given a reasonable opportunity to participate, insofar as is possible, fairly and equitably in grants, contracts, purchases, and other Federal activities relating to research, development, and demonstration of sources of energy efficiency, and utilization and conservation of energy. In carrying out this policy, to the extent practicable, the Administrator shall consult with the Administrator of the Small Business Administration.

(e) Priorities. Determination of priorities which are warranted should be based on such considerations as power-related values of an energy source, preservation of material resources, reduction of pollutants, export market potential (including reduction of imports), among others. On such a basis, energy sources warranting priority might include, but not be limited to, the various methods of utilizing solar energy.

[42 U.S.C. 5801]

TITLE I—ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

ESTABLISHMENT OF ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

Sec. 101. There is hereby established an independent executive agency to be known as the Energy Research and Development Administration (hereinafter in this Act referred to as the "Administration").

[42 U.S.C. 5811]

OFFICERS OF THE ADMINISTRATION

Sec. 102. (a) Administrator; appointment. There shall be at the head of the Administration an Administrator of Energy Research and Development (hereinafter in this Act referred to as the "Administrator"), who shall be appointed from civilian life by the President by and with the advice and consent of the Senate. A person may not be appointed as Administrator within two years after release from active duty as a commissioned officer of a regular component of an Armed Force. The Administration shall be administered under the supervision and direction of the Administrator, who shall be responsible for the efficient and coordinated management of the Administration.

(b) Deputy Administrator. There shall be in the Administration a Deputy Administrator, who shall be appointed by the President, by and with the advice and consent of the Senate.

(c) Qualifications of Administrator and Deputy Administrator. The President shall appoint the Administrator and Deputy Administrator from among individuals who, by reason of their general background and experience are specially qualified to manage a full range of energy research and development programs.
(d) Assistant Administrators; number; appointment; qualifications. There shall be in the Administration six Assistant Administrators, one of whom shall be responsible for fossil energy, another for nuclear energy, another for environment and safety, another for conservation, another for solar, geothermal, and advanced energy systems, and another for national security. The Assistant Administrators shall be appointed by the President, by and with the advice and consent of the Senate. The President shall appoint each Assistant Administrator from among individuals who, by reason of general background and experience, are specially qualified to manage the energy technology area assigned to such Assistant Administrator.
(e) General Counsel. There shall be in the Administration a General Counsel who shall be appointed by the Administrator and who shall serve at the pleasure of and be removable by the Administrator.
(f) Additional officers. There shall be in the Administration not more than eight additional officers appointed by the Administrator. The positions of such officers shall be considered career positions and be subject to subsection 161d. of the Atomic Energy Act [42 U.S.C. 2201(d)].
(g) Director of Military Application; functions; qualifications; compensation. The Division of Military Application transferred to and established in the Administration by section 104(d) of this Act [42 U.S.C. 5814(d)] shall be under the direction of a Director of Military Application, who shall be appointed by the Administrator and who shall serve at the pleasure of and be removable by the Administrator and shall be an active commissioned officer of the Armed Forces serving in general or flag officer rank or grade. The functions, qualifications, and compensation of the Director of Military Application shall be the same as those provided under the Atomic Energy Act of 1954, as amended, for the Assistant General Manager for Military Application.
(h) Allocation of functions; responsibility for international cooperation. Officers appointed pursuant to this section shall perform such functions as the Administrator shall specify from time to time. The Administrator shall delegate to one such officer the special responsibility for international cooperation in all energy and related environmental research and development.
(i) Order of succession. The Deputy Administrator (or in the absence or disability of the Deputy Administrator, or in the event of a vacancy in the office of the Deputy Administrator, an Assistant Administrator, the General Counsel or such other official, determined according to such order as the Administrator shall prescribe) shall act for and perform the functions of the Administrator during any absence or disability of the Administrator or in the event of a vacancy in the office of the Administrator.
[42 U.S.C. 5812]

RESPONSIBILITIES OF THE ADMINISTRATOR

Sec. 103. The responsibilities of the Administrator shall include, but not be limited to—

(1) exercising central responsibility for policy planning, coordination, support, and management of research and development programs respecting all energy sources, including assessing the requirements for research and development in regard to various energy sources in relation to near-term and long-range needs, policy planning in regard to meeting those requirements, undertaking programs for the optimal development of the various forms of energy sources, managing such programs, and disseminating information resulting therefrom;
(2) encouraging and conducting research and development, including demonstration of commercial feasibility and practical applications of the extraction, conversion, storage, transmission, and utilization phases related to the development and use of energy from fossil, nuclear, solar, geothermal, and other energy sources;
(3) engaging in and supporting environmental, biomedical, physical, and safety research related to the development of energy sources and utilization technologies;
(4) taking into account the existence, progress, and results of other public and private research and development activities, including those activities of the Federal Energy Administration relating to the development of energy resources using currently available technology in promoting increased utilization of energy resources, relevant to the Administration's mission in formulating its own research and development programs;

(5) participating in and supporting cooperative research and development projects which may involve contributions by public or private persons or agencies, of financial or other resources to the performance of the work;

(6) developing, collecting, distributing, and making available for distribution, scientific and technical information concerning the manufacture or development of energy and its efficient extraction, conversion, transmission, and utilization;

(7) establishing, in accordance with the National Energy Extension Service Act [42 U.S.C. 7001 et seq.], an Energy Extension Service to provide technical assistance, instruction, and practical demonstrations on energy conservation measures and alternative energy systems to individuals, businesses, and State and local government officials;

(8) creating and encouraging the development of general information to the public on all energy conservation technologies and energy sources as they become available for general use, and the Administrator, in conjunction with the Administrator of the Federal Energy Administration shall, to the extent practicable, disseminate such information through the use of mass communications;

(9) encouraging and conducting research and development in energy conservation, which shall be directed toward the goals of reducing total energy consumption to the maximum extent practicable, and toward maximum possible improvement in the efficiency of energy use. Development of new and improved conservation measures shall be conducted with the goal of the most expeditious possible application of these measures;

(10) encouraging and participating in international cooperation in energy and related environmental research and development;

(11) helping to assure an adequate supply of manpower for the accomplishment of energy research and development programs, by sponsoring and assisting in education and training activities in institutions of higher education, vocational schools, and other institutions, and by assuring the collection, analysis, and dissemination of necessary manpower supply and demand data;

(12) encouraging and conducting research and development in clean and renewable energy sources.

[42 U.S.C. 5813]

ABOLITION AND TRANSFERS

Sec. 104. (a) Abolition of Atomic Energy Commission. The Atomic Energy Commission is hereby abolished. Sections 21 and 22 of the Atomic Energy Act of 1954, as amended [42 U.S.C. 2031 and 2032] are repealed.

(b) Transfer or lapse of functions of Atomic Energy Commission. All other functions of the Commission, the Chairman and members of the Commission, and the officers and components of the Commission are hereby transferred or allowed to lapse pursuant to the provisions of this Act.

(c) Functions of Atomic Energy Commission transferred to Administrator. There are hereby transferred to and vested in the Administrator all functions of the Atomic Energy Commission, the Chairman and members of the Commission, and the officers and components of the Commission, except as otherwise provided in this Act.

(d) Transfer of General Advisory Committee, Patent Compensation Board, and Divisions of Military Application and Naval Reactors to Administration. The General Advisory Committee established pursuant to section 26 of the Atomic Energy Act of 1954, as amended [42 U.S.C. 2036], the Patent Compensation Board established pursuant to section 157 of the Atomic Energy Act of 1954, as amended [42 U.S.C. 2187], and the Divisions of Military Application and Naval Reactors established pursuant to section 25 of the Atomic Energy Act of 1954, as amended [42 U.S.C. 2035], are transferred to the Energy Research and Development Administration and the functions of the Commission with respect thereto, and with respect to relations with the Military Liaison Committee established by section 27 of the Atomic Energy Act of 1954, as amended [42 U.S.C. 2037], are transferred to the Administrator.

(e) Transfer to Administrator of certain functions of Secretary of the Interior and Department of the Interior; study of potential energy application of helium; report to President and Congress. There are hereby transferred to and vested in the Administrator such functions of the Secretary of the Interior, the Department of the Interior, and officers and components of such department—

(1) as relate to or are utilized by the Office of Coal Research established pursuant to the Act of July 1, 1960 [74 Stat. 336; 30 U.S.C. 661-668];

(2) as relate to or are utilized in connection with fossil fuel energy research and development programs and related activities conducted by the Bureau of Mines "energy centers" and synthane plant to provide greater efficiency in the extraction, processing, and utilization of energy resources for the purpose of conserving those resources, developing alternative energy resources, such as oil and gas secondary and tertiary recovery, oil shale and synthetic fuels, improving methods of managing energy-related wastes and pollutants, and providing technical guidance needed to establish and administer national energy policies; and

(3) as relate to or are utilized for underground electric power transmission research. The Administrator shall conduct a study of the potential energy applications of helium and, within six months from the date of the enactment of this Act [enacted Oct. 11, 1974], report to the President and Congress his recommendations concerning the management of the Federal helium programs, as they relate to energy.

(f) Transfer to Administrator of certain functions of National Science Foundation. There are hereby transferred to and vested in the Administrator such functions of the National Science Foundation as relate to or are utilized in connection with—

(1) solar heating and cooling development; and

(2) geothermal power development.

(g) Transfer to Administrator of certain functions of Environmental Protection Agency. There are hereby transferred to and vested in the Administrator such functions of the Environmental Protection Agency and the officers and components thereof as relate to or are utilized in connection with research, development, and demonstration, but not assessment or monitoring for regulatory purposes, of alternative automotive power systems.

(h) Exercise of authority necessary or appropriate to perform transferred functions and carry out transferred programs. To the extent necessary or appropriate to perform functions and carry out programs transferred by this Act, the Administrator and Commission may exercise, in relation to the functions so transferred, any authority or part thereof available by law, including appropriation Acts, to the official or agency from which such functions were transferred.

(i) Utilization of technical and management capabilities of other executive agencies; assignment of specific programs or projects in energy research and development. In the exercise of his responsibilities under section 103 [42 U.S.C. 5813], the Administrator shall utilize, with their consent, to the fullest extent he determines advisable the technical and management capabilities of other executive agencies having facilities, personnel, or other resources which can assist or advantageously be expanded to assist in carrying out such responsibilities. The Administrator shall consult with the head of each agency with respect to such facilities, personnel, or other resources, and may assign, with their consent, specific programs or projects in energy research and development as appropriate. In making such assignments under this subsection, the head of each such agency shall insure that—

(1) such assignments shall be in addition to and not detract from the basic mission responsibilities of the agency, and

(2) such assignments shall be carried out under such guidance as the Administrator deems appropriate.

[42 U.S.C. 5814]

ADMINISTRATIVE PROVISIONS

Sec. 105. (a) Rules and regulations. The Administrator is authorized to prescribe such policies, standards, criteria, procedures, rules, and regulations as he may deem to be necessary or appropriate to perform functions now or hereafter vested in him.

(b) Policy planning and evaluation. The Administrator shall engage in such policy planning, and perform such program evaluation analyses and other studies, as may be necessary to promote the efficient and coordinated administration of the Administration and properly assess progress toward the achievement of its missions.

(c) Delegation of functions. Except as otherwise expressly provided by law, the Administrator may delegate any of his functions to such officers and employees of the Administration as he may designate, and may authorize such successive redelegations of such functions as he may deem to be necessary or appropriate.

(d) Organization. Except as provided in section 102 [42 U.S.C. 5812] and in section 104(d) [42 U.S.C. 5814(d)], the Administrator may organize the Administration as he may deem to be necessary or appropriate.

(c) Field offices. The Administrator is authorized to establish, maintain, alter, or discontinue such State, regional, district, local, or other field offices as he may deem to be necessary or appropriate to perform functions now or hereafter vested in him.

(f) Seal. The Administrator shall cause a seal of office to be made for the Administration of such device as he shall approve, and judicial notice shall be taken of such seal.

(g) Working capital fund. The Administrator is authorized to establish a working capital fund, to be available without fiscal year limitation, for expenses necessary for the maintenance and operation of such common administrative services as he shall find to be desirable in the interests of economy and efficiency. There shall be transferred to the fund the stocks of supplies, equipment, assets other than real property, liabilities, and unpaid obligations relating to the services which he determines will be performed through the fund. Appropriations to the fund, in such amounts as may be necessary to provide additional working capital, are authorized. The working capital fund shall recover, from the appropriations and funds for which services are performed, either in advance or by way of reimbursement, amounts which will approximate the costs incurred, including the accrual of annual leave and the depreciation of equipment. The fund shall also be credited with receipts from the sale or exchange of its property, and receipts in payment for loss or damage to property owned by the fund.

(h) Information from other agencies. Each department, agency, and instrumentality of the executive branch of the Government is authorized to furnish to the Administrator, upon his request, any information or other data which the Administrator deems necessary to carry out his duties under this title.

[42 U.S.C. 5815]

PERSONNEL AND SERVICES

Sec. 106. (a) Appointment and compensation of officers and employees. The Administrator is authorized to select, appoint, employ, and fix the compensation of such officers and employees, including attorneys, pursuant to section 161 d. of the Atomic Energy Act of 1954, as amended [42 U.S.C. 2201(d)] as are necessary to perform the functions now or hereafter vested in him and to prescribe their functions.

(b) Employment of experts and consultants. The Administrator is authorized to obtain services as provided by section 3109 of title 5 of the United States Code [5 U.S.C. 3109].

(c) Participation of military personnel. The Administrator is authorized to provide for participation of military personnel in the performance of his functions. Members of the Army, the Navy, the Air Force, or the Marine Corps may be detailed for service in the Administration by the appropriate military Secretary, pursuant to cooperative agreements with the Secretary, for service in the Administration in positions other than a position the occupant of which must be approved by and with the advice and consent of the Senate.

(d) Status of military personnel unaffected. Appointment, detail, or assignment to, acceptance of, and service in, any appointive or other position in the Administration under this section shall in no way affect the status, office, rank, or grade which such officers or enlisted men may occupy or hold, or any emolument, perquisite, right, privilege, or benefit incident to or arising out of any such status, office, rank, or grade. A member so appointed, detailed, or assigned shall not be subject to direction or control by his Armed Force, or any officer thereof, directly or indirectly, with respect to the responsibilities exercised in the position to which appointed, detailed, or assigned.

(e) Transportation and per diem expenses. The Administrator is authorized to pay transportation expenses, and per diem in lieu of subsistence expenses, in accordance with chapter 57 of title 5 of the United States Code [5 U.S.C. 5701 et seq.] for travel between places of recruitment and duty, and while at places of duty, of persons appointed for emergency, temporary, or seasonal services in the field service of the Administration.

(f) Personnel of other agencies. The Administrator is authorized to utilize, on a reimbursable basis, the services of any personnel made available by any department, agency, or instrumentality, including any independent agency of the Government.

(g) Advisory boards. The Administrator is authorized to establish advisory boards, in accordance with the provisions of the Federal Advisory Committee Act (Public Law 92-463) [5 U.S.C. Appx. 1 et seq.], to advise with and make recommendations to the Administrator on legislation, policies, administration, research, and other matters.

(h) Employment of noncitizens. The Administrator is authorized to employ persons who are not citizens of the United States in expert, scientific, technical, or professional capacities whenever he deems it in the public interest.

[42 U.S.C. 5816]

POWERS OF THE ADMINISTRATION

Sec. 107. (a) Research and development. The Administrator is authorized to exercise his powers in such manner as to insure the continued conduct of research and development and related activities in areas or fields deemed by the Administrator to be pertinent to the acquisition of an expanded fund of scientific, technical, and practical knowledge in energy matters. To this end, the Administrator is authorized to make arrangements (including contracts, agreements, and loans) for the conduct of research and development activities with private or public institutions or persons, including participation in joint or cooperative projects of a research, developmental, or experimental nature; to make payments (in lump sum or installments, and in advance or by way of reimbursement, with necessary adjustments on account of overpayments or underpayments); and generally to take such steps as he may deem necessary or appropriate to perform functions now or hereafter vested in him. Such functions of the Administrator under this Act as are applicable to the nuclear activities transferred pursuant to this title shall be subject to the provisions of the Atomic Energy Act of 1954, as amended, and to other authority applicable to such nuclear activities. The nonnuclear responsibilities and functions of the Administrator referred to in sections 103 and 104 of this Act [42 U.S.C. 5813, 5814] shall be carried out pursuant to the provisions of this Act, applicable authority existing immediately before the effective date of this Act (see "effective date" note at 42 U.S.C. 5801), or in accordance with the provisions of chapter 4 of the Atomic Energy Act of 1954, as amended [42 U.S.C. 2051 et seq.].

(b) Facilities and real property. Except for public buildings as defined in the Public Buildings Act of 1959, as amended, and with respect to leased space subject to the provisions of Reorganization Plan Numbered 18 of 1950 [5 U.S.C. 903 note], the Administrator is authorized to acquire (by purchase, lease, condemnation, or otherwise), construct, improve, repair, operate, and maintain facilities and real property as the Administrator deems to be necessary in and outside of the District of Columbia. Such authority shall apply only to facilities required for the maintenance and operation of laboratories, research and testing sites and facilities, quarters, and related accommodations for employees and dependents of employees of the Administration, and such other special-purpose real property as the Administrator deems to be necessary in and outside the District of Columbia. Title to any property or interest therein, real, personal, or mixed, acquired pursuant to this section, shall be in the United States.

(c) Services for employees at remote locations.

(1) The Administrator is authorized to provide, construct, or maintain, as necessary and when not otherwise available, the following for employees and their dependents stationed at remote locations:

(A) Emergency medical services and supplies.

(B) Food and other subsistence supplies.

(C) Messing facilities.

(D) Audiovisual equipment, accessories, and supplies for recreation and training.

(E) Reimbursement for food, clothing, medicine, and other supplies furnished by such employees in emergencies for the temporary relief of distressed persons.

(F) Living and working quarters and facilities.

(G) Transportation for school-age dependents of employees to the nearest appropriate educational facilities.

(2) The furnishing of medical treatment under subparagraph (A) of paragraph (1) and the furnishing of services and supplies under paragraphs (B) and (C) of paragraph (1) shall be at prices reflecting reasonable value as determined by the Administrator.

(3) Proceeds from reimbursements under this section shall be deposited in the Treasury and may be withdrawn by the Administrator to pay directly the cost of such work or services, to repay or make advances to appropriations or funds which do or will bear all or a part of such cost, or to refund excess sums when necessary; except that such payments may be credited to a service or working capital fund otherwise established by law, and used under the law governing such funds, if the fund is available for use by the Administrator for performing the work or services for which payment is received.

(d) Acquisition of copyrights and patents. The Administrator is authorized to acquire any of the following described rights if the property acquired thereby is for use in, or is useful to, the performance of functions vested in him:

(1) Copyrights, patents, and applications for patents, designs, processes, specifications, and data.

(2) Licenses under copyrights, patents, and applications for patents.

(3) Releases, before suit is brought, for past infringement of patents or copyrights.

(e) Dissemination of information. Subject to the provisions of chapter 12 of the Atomic Energy Act of 1954, as amended [42 U.S.C. 2161 et seq.], and other applicable law, the Administrator shall disseminate scientific, technical, and practical information acquired pursuant to this title through information programs and other appropriate means, and shall encourage the dissemination of scientific, technical, and practical information relating to energy so as to enlarge the fund of such information and to provide that free interchange of ideas and criticism which is essential to scientific and industrial progress and public understanding.

(f) Gifts and bequests. The Administrator is authorized to accept, hold, administer, and utilize gifts, and bequests of property, both real and personal, for the purpose of aiding or facilitating the work of the Administration. Gifts and bequests of money and proceeds from sales of other property received as gifts or bequests shall be deposited in the Treasury and shall be disbursed upon the order of the Administrator. For the purposes of Federal income, estate, and gift taxes, property accepted under this section shall be considered as a gift or bequest to the United States.

[42 U.S.C. 5817]

Sec. 108. [Repealed by Public Law 95-91 (1977)].

REPORT TO CONGRESS ON FUTURE REORGANIZATION

Sec. 109. (a) The President shall transmit to the Congress as promptly as possible, but not later than June 30, 1975, such additional recommendations as he deems advisable for organization of energy and related functions in the Federal Government, including, but not limited to, whether or not there shall be established (1) a Department of Energy and Natural Resources, (2) an Energy Policy Council, and (3) a consolidation in whole or in part of regulatory functions concerning energy.

(b) This report shall replace and serve the purposes of the report required by section 15(a)(4) of the Federal Energy Administration Act [15 U.S.C. 774(a)(4)].

[42 U.S.C. 5819]

COORDINATION WITH ENVIRONMENTAL EFFORTS

Sec. 110. The Administrator is authorized to establish programs to utilize research and development performed by other Federal agencies to minimize the adverse environmental effects of energy projects. The Administrator of the Environmental Protection Agency, as well as other affected agencies and departments, shall cooperate fully with the Administrator in establishing and maintaining such programs, and in establishing appropriate interagency agreements to develop cooperative programs and to avoid unnecessary duplication.

[42 U.S.C. 5820]

ANNUAL AUTHORIZATION ACTS

Sec. 111. (a) General requirements; applicability to appropriations. All appropriations made to the Energy Research and Development Administration or the Administrator shall, except as otherwise provided by law, be subject to annual authorization in accordance with section 261 of the Atomic Energy Act of 1954 [42 U.S.C. 2017], section 16 of the Federal Nonnuclear Energy Research and Development Act of 1974 [42 U.S.C. 5915], and section 305 of this Act [42 U.S.C. 5875]. The provisions of this section shall apply with respect to appropriations made pursuant to the Act providing such authorization (hereinafter in this section referred to as "annual authorization Acts").

(b) Requirements and limitations respecting funds appropriated for operating expenses.

(1) Funds appropriated pursuant to an annual authorization Act for "Operating expenses" may be used for—

(A) the construction or acquisition of any facilities, or major items of equipment, which may be required at locations other than installations of the Administration, for the performance of research, development, and demonstration activities, and

(B) grants to any organization for purchase or construction of research facilities.

No such funds shall be used under this subsection for the acquisition of land. Fee title to all such facilities and items of equipment shall be vested in the United States, unless the Administrator or his designee determines in writing that the research, development, and demonstration authorized by such Act would best be implemented by permitting fee title or any other property interest to be vested in an entity other than the United States; but before approving the vesting of such title or interest in such entity, the

Administrator shall (i) transmit such determination, together with all pertinent data, to the Committee on Science and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate and (ii) wait a period of thirty calendar days (not including any day in which either House of Congress is not in session because of adjournment of more than three calendar days to a day certain), unless prior to the expiration of such period each such committee has transmitted to the Administrator written notice to the effect that such committee has no objection to the proposed action.

(2) No funds shall be used under paragraph (1) for any facility or major item of equipment, including collateral equipment, if the estimated cost to the Federal Government exceeds $5,000,000 in the case of such a facility or $2,000,000 in the case of such an item of equipment, unless such facility or item has been previously authorized by the appropriate committees of the House of Representatives and the Senate, or the Administrator—

(A) transmit [transmits] to the appropriate committees of the House of Representatives and the Senate a report on such facility or item showing its nature, purpose, and estimated cost, and

(B) waits a period of thirty calendar days (not including any day in which either House of Congress is not in session because of adjournment of more than three calendar days to a day certain), unless prior to the expiration of such period each such committee has transmitted to the Administrator written notice to the effect that such committee has no objection to the proposed action.

(c) Additional requirements and limitations respecting funds appropriated for operating expenses.

(1) Not to exceed 1 per centum of all funds appropriated pursuant to any annual authorization Act for "Operating expenses" may be used by the Administrator to construct, expand, or modify laboratories and other facilities, including the acquisition of land, at any location under the control of the Administrator, if the Administrator determines that (A) such action would be necessary because of changes in the national programs authorized to be funded by such Act or because of new scientific or engineering developments, and (B) deferral of such action until the enactment of the next authorization Act would be inconsistent with the policies established by Congress for the Administration.

(2) No funds may be obligated for expenditure or expended under paragraph (1) for activities described in such paragraph unless—

(A) a period of thirty calendar days (not including any day in which either House of Congress is not in session because of adjournment of more than three calendar days to a day certain) has passed after the Administrator has transmitted to the appropriate committees of the House of Representatives and the Senate a written report containing a full and complete statement concerning (i) the nature of the construction, expansion, or modification involved, (ii) the cost thereof, including the cost of any real estate action pertaining thereto, and (iii) the reason why such construction, expansion, or modification is necessary and in the national interest, or

(B) each such committee before the expiration of such period has transmitted to the Administrator a written notice to the effect that such committee has no objection to the proposed action;

except that this paragraph shall not apply to any project the estimated total cost of which does not exceed $50,000.

(d) Requirements respecting amounts appropriated in annual appropriation Act for use in programs in excess of amount actually authorized for use in program not presented to, or requested of Congress; reduction in aggregate amount available for categories of coal, etc., from sums appropriated.

(1) Except as otherwise provided in the authorization Act involved—

(A) no amount appropriated pursuant to any annual authorization Act may be used for any program in excess of the amount actually authorized for that particular program by such Act, and

(B) no amount appropriated pursuant to any annual authorization Act may be used for any program which has not been presented to, or requested of the Congress,

unless (i) a period of thirty calendar days (not including any day in which either House of Congress is not in session because of adjournment of more than three calendar days to a day certain) has passed after the receipt by the appropriate committees of the House of Representatives and the Senate of notice given by the Administrator containing a full and complete statement of the action proposed to be taken and the facts and circumstances relied upon in support of such proposed action, or (ii) each such committee before the expiration of such period has transmitted to the Administrator written notice to the effect that such committee has no objection to the proposed action.

(2) Notwithstanding any other provision of this section or the authorization Act involved, the aggregate amount available for use within the categories of coal, petroleum and natural gas, oil shale, solar,

geothermal, nuclear energy (non-weapons), environment and safety, and conservation from sums appropriated pursuant to an annual authorization Act may not, as a result of reprogramming, be decreased by more than 10 per centum of the total of the sums appropriated pursuant to such Act for those categories.

(e) Requirements and limitations respecting merger of amounts appropriated for operating expenses or for plant and capital equipment. Subject to the applicable requirements and limitations of this section and the authorization Act involved, when so specified in an appropriation Act, amounts appropriated pursuant to any annual authorization Act for "Operating expenses" or for "Plant and capital equipment" may be merged with any other amounts appropriated for like purposes pursuant to any other Act authorizing appropriations for the Administration: *Provided,* That no such amounts appropriated for "Plant and capital equipment" may be merged with amounts appropriated for "Operating expenses".

(f) Availability until expended of amounts appropriated for operating expenses or for plant and capital equipment. When so specified in an appropriation Act, amounts appropriated pursuant to any annual authorization Act for "Operating expenses" or for "Plant and capital equipment" may remain available until expended.

(g) Performance of construction design services by Administrator. The Administrator is authorized to perform construction design services for any administration construction project whenever (1) such construction project has been included in a proposed authorization bill transmitted to the Congress by the Administration, and (2) the Administration determines that the project is of such urgency in order to meet the needs of national defense or protection of life and property or health and safety that construction of the project should be initiated promptly upon enactment of legislation appropriating funds for its construction.

(h) Retention and use for operating expenses, and availability until expended, of moneys received by Administration; exceptions. When so specified in appropriation Acts, any moneys received by the Administration may be retained and used for operating expenses, and may remain available until expended, notwithstanding the provisions of section 3617 of the Revised Statutes (31 U.S.C. 484) [31 U.S.C. 484]; except that—

(1) this subsection shall not apply with respect to sums received from disposal of property under the Atomic Energy Community Act of 1955 or the Strategic and Critical Materials Stockpiling Act, as amended, or with respect to fees received for tests or investigations under the Act of May 16, 1910, as amended [42 U.S.C. 2301; 50 U.S.C. 98h; 30 U.S.C. 7]; and

(2) revenues received by the Administration from the enrichment of uranium shall (when so specified) be retained and used for the specific purpose of offsetting costs incurred by the Administration in providing uranium enrichment service activities.

(i) Requirements respecting transfers of sums appropriated for operating expenses to other Governmental agencies; merger of transferred sums. When so specified in an appropriation Act, transfers of sums from the "Operating expenses" appropriation made pursuant to an annual authorization Act may be made to other agencies of the Government for the performance of the work for which the appropriation is made, and in such cases the sums so transferred may be merged with the appropriations to which they are transferred.

[42 U.S.C. 5821]

TITLE II—NUCLEAR REGULATORY COMMISSION

ESTABLISHMENT AND TRANSFERS

Sec. 201. (a) Composition; Chairman; Acting Chairman; quorum; official spokesman; seal; functions of Chairman and Commission.

(1) There is established an independent regulatory commission to be known as the Nuclear Regulatory Commission which shall be composed of five members, each of whom shall be a citizen of the United States. The President shall designate one member of the Commission as Chairman thereof to serve as such during the pleasure of the President. The Chairman may from time to time designate any other member of the Commission as Acting Chairman to act in the place and stead of the Chairman during his absence. The Chairman (or the Acting Chairman in the absence of the Chairman) shall preside at all meetings of the Commission and a quorum for the transaction of business shall consist of at least three members present. Each member of the Commission, including the Chairman, shall have equal responsibility and authority in all decisions and actions of the Commission, shall have full access to all information relating to the performance of his duties or responsibilities, and shall have one vote. Action of the Commission shall be determined by a majority vote of the members present. The Chairman (or

Acting Chairman in the absence of the Chairman) shall be the official spokesman of the Commission in its relations with the Congress, Government agencies, persons, or the public, and, on behalf of the Commission, shall see to the faithful execution of the policies and decisions of the Commission, and shall report thereon to the Commission from time to time or as the Commission may direct. The Commission shall have an official seal which shall be judicially noticed.

(2) The Chairman of the Commission shall be the principal executive officer of the Commission, and he shall exercise all of the executive and administrative functions of the Commission, including functions of the Commission with respect to (a) the appointment and supervision of personnel employed under the Commission (other than personnel employed regularly and full time in the immediate offices of commissioners other than the Chairman, and except as otherwise provided in the Energy Reorganization Act of 1974), (b) the distribution of business among such personnel and among administrative units of the Commission, and (c) the use and expenditure of funds.

(3) In carrying out any of his functions under the provisions of this section the Chairman shall be governed by general policies of the Commission and by such regulatory decisions, findings, and determinations as the Commission may by law be authorized to make.

(4) The appointment by the Chairman of the heads of major administrative units under the Commission shall be subject to the approval of the Commission.

(5) There are hereby reserved to the Commission its functions with respect to revising budget estimates and with respect to determining upon the distribution of appropriated funds according to major programs and purposes.

(b) Appointment of members.

(1) Members of the Commission shall be appointed by the President, by and with the advice and consent of the Senate.

(2) Appointments of members pursuant to this subsection shall be made in such a manner that not more than three members of the Commission shall be members of the same political party.

(c) Term of office. Each member shall serve for a term of five years, each such term to commence on July 1, except that of the five members first appointed to the Commission, one shall serve for one year, one for two years, one for three years, one for four years, and one for five years, to be designated by the President at the time of appointment; and except that any member appointed to fill a vacancy occurring prior to the expiration of the term for which his predecessor was appointed, shall be appointed for the remainder of such term. For the purpose of determining the expiration date of the terms of office of the five members first appointed to the Nuclear Regulatory Commission, each such term shall be deemed to have begun July 1, 1975.

(d) Submission of appointments to Senate. Such initial appointments shall be submitted to the Senate within sixty days of the signing of this Act [enacted Oct. 11, 1974]. Any individual who is serving as a member of the Atomic Energy Commission at the time of the enactment of this Act [enacted Oct. 11, 1974], and who may be appointed by the President to the Commission, shall be appointed for a term designated by the President, but which term shall terminate not later than the end of his present term as a member of the Atomic Energy Commission, without regard to the requirements of subsection (b)(2) of this section. Any subsequent appointment of such individuals shall be subject to the provisions of this section.

(e) Removal of members; prohibition against engagement in business or other employment. Any member of the Commission may be removed by the President for inefficiency, neglect of duty, or malfeasance in office. No member of the Commission shall engage in any business, vocation, or employment other than that of serving as a member of the Commission.

(f) Transfer of licensing and regulatory functions of the Atomic Energy Commission. There are hereby transferred to the Commission all the licensing and related regulatory functions of the Atomic Energy Commission, the Chairman and members of the Commission, the General Counsel, and other officers and components of the Commission—which functions officers, components, and personnel are excepted from the transfer to the Administrator by section 104(c) of this Act [42 U.S.C. 5814(c)].

(g) Additional transfers. In addition to other functions and personnel transferred to the Commission, there are also transferred to the Commission—

(1) the functions of the Atomic Safety and Licensing Board Panel and the Atomic Safety and Licensing Appeal Board;

(2) such personnel as the Director of the Office of Management and Budget determines are necessary for exercising responsibilities under section 205 [42 U.S.C. 5845], relating to, research, for the purpose

of confirmatory assessment relating to licensing and other regulation under the provisions of the Atomic Energy Act of 1954, as amended, and of this Act.

(h) [Deleted]

[42 U.S.C. 5841]

LICENSING AND RELATED REGULATORY FUNCTIONS RESPECTING SELECTED ADMINISTRATION FACILITIES

Sec. 202. Notwithstanding the exclusions provided for in section 110 a. or any other provisions of the Atomic Energy Act of 1954, as amended [42 U.S.C. 2140(a)], the Nuclear Regulatory Commission shall, except as otherwise specifically provided by section 110 b. of the Atomic Energy Act of 1954, as amended [42 U.S.C. 2140(b)], or other law, have licensing and related regulatory authority pursuant to chapters 6, 7, 8, and 10 of the Atomic Energy Act of 1954, as amended [42 U.S.C. 2071 et seq., 2091 et seq., 2111 et seq., 2131 et seq.], as to the following facilities of the Administration:

(1) Demonstration Liquid Metal Fast Breeder reactors when operated as part of the power generation facilities of an electric utility system, or when operated in any other manner for the purpose of demonstrating the suitability for commercial application of such a reactor.

(2) Other demonstration nuclear reactors—except those in existence on the effective date of this Act—when operated as part of the power generation facilities of an electric utility system, or when operated in any other manner for the purpose of demonstrating the suitability for commercial application of such a reactor.

(3) Facilities used primarily for the receipt and storage of high-level radioactive wastes resulting from activities licensed under such Act.

(4) Retrievable Surface Storage Facilities and other facilities authorized for the express purpose of subsequent long-term storage of high-level radioactive waste generated by the Administration, which are not used for, or are part of, research and development activities.

[42 U.S.C. 5842]

OFFICE OF NUCLEAR REACTOR REGULATION

Sec. 203. (a) Establishment; appointment of Director. There is hereby established in the Commission an Office of Nuclear Reactor Regulation under the direction of a Director of Nuclear Reactor Regulation, who shall be appointed by the Commission, who may report directly to the Commission, as provided in section 209 [42 U.S.C. 5849], and who shall serve at the pleasure of and be removable by the Commission.

(b) Functions of Director. Subject to the provisions of this Act, the Director of Nuclear Reactor Regulation shall perform such functions as the Commission shall delegate including:

(1) Principal licensing and regulation involving all facilities, and materials licensed under the Atomic Energy Act of 1954, as amended, associated with the construction and operation of nuclear reactors licensed under the Atomic Energy Act of 1954, as amended;

(2) Review the safety and safeguards of all such facilities, materials, and activities, and such review functions shall include, but not be limited to—

(A) monitoring, testing and recommending upgrading of systems designed to prevent substantial health or safety hazards; and

(B) evaluating methods of transporting special nuclear and other nuclear materials and of transporting and storing high-level radioactive wastes to prevent radiation hazards to employees and the general public.

(3) Recommend research necessary for the discharge of the functions of the Commission.

(c) Responsibility for safe operation of facilities. Nothing in this section shall be construed to limit in any way the functions of the Administration relating to the safe operation of all facilities resulting from all activities within the jurisdiction of the Administration pursuant to this Act.

[42 U.S.C. 5843]

OFFICE OF NUCLEAR SAFETY AND SAFEGUARDS

Sec. 204. (a) Establishment; appointment of Director. There is hereby established in the Commission an Office of Nuclear Material Safety and Safeguards under the direction of a Director of Nuclear Material Safety and Safeguards, who shall be appointed by the Commission, who may report directly to the Commission as provided in section 209 [42 U.S.C. 5849], and who shall serve at the pleasure of and be removable by the Commission.

(b) Functions of Director. Subject to the provisions of this Act, the Director of Nuclear Material Safety and Safeguards shall perform such functions as the Commission shall delegate including:

(1) Principal licensing and regulation involving all facilities and materials, licensed under the Atomic Energy Act of 1954, as amended, associated with the processing, transport, and handling of nuclear materials, including the provision and maintenance of safeguards against threats, thefts, and sabotage of such licensed facilities, and materials.

(2) Review safety and safeguards of all such facilities and materials licensed under the Atomic Energy Act of 1954, as amended, and such review shall include, but not be limited to—

(A) monitoring, testing, and recommending upgrading of internal accounting systems for special nuclear and other nuclear materials licensed under the Atomic Energy Act of 1954, as amended;

(B) developing, in consultation and coordination with the Administration, contingency plans for dealing with threats, thefts, and sabotage relating to special nuclear materials, high-level radioactive wastes and nuclear facilities resulting from all activities licensed under the Atomic Energy Act of 1954, as amended;

(C) assessing the need for, and the feasibility of, establishing a security agency within the office for the performance of the safeguards functions, and a report with recommendations on this matter shall be prepared within one year of the effective date of this Act and promptly transmitted to the Congress by the Commission.

(3) Recommending research to enable the Commission to more effectively perform its functions.

(c) Responsibility for safeguarding special nuclear materials; high-level radioactive wastes and nuclear facilities. Nothing in this section shall be construed to limit in any way the functions of the Administration relating to the safeguarding of special nuclear materials, high-level radioactive wastes and nuclear facilities resulting from all activities within the jurisdiction of the Administration pursuant to this Act.

[42 U.S.C. 5844]

OFFICE OF NUCLEAR REGULATORY RESEARCH

Sec. 205. (a) Establishment; appointment of Director. There is hereby established in the Commission an Office of Nuclear Regulatory Research under the direction of a Director of Nuclear Regulatory Research, who shall be appointed by the Commission, who may report directly to the Commission as provided in section 209 [42 U.S.C. 5849], and who shall serve at the pleasure of and be removable by the Commission.

(b) Functions of Director. Subject to the provisions of this Act, the Director of Nuclear Regulatory Research shall perform such functions as the Commission shall delegate including:

(1) Developing recommendations for research deemed necessary for performance by the Commission of its licensing and related regulatory functions.

(2) Engaging in or contracting for research which the Commission deems necessary for the performance of its licensing and related regulatory functions.

(c) Cooperation of federal agencies. The Administrator of the Administration and the head of every other Federal agency shall—

(1) cooperate with respect to the establishment of priorities for the furnishing of such research services as requested by the Commission for the conduct of its functions;

(2) furnish to the Commission, on a reimbursable basis, through their own facilities or by contract or other arrangement, such research services as the Commission deems necessary and requests for the performance of its functions; and

(3) consult and cooperate with the Commission on research and development matters of mutual interest and provide such information and physical access to its facilities as will assist the Commission in acquiring the expertise necessary to perform its licensing and related regulatory functions.

(d) Responsibility for safety of activities. Nothing in subsections (a) and (b) of this section or section 201 of this Act [42 U.S.C. 5841] shall be construed to limit in any way the functions of the Administration relating to the safety of activities within the jurisdiction of the Administration.

(e) Information and research services. Each Federal agency, subject to the provisions of existing law, shall cooperate with the Commission and provide such information and research services, on a reimbursable basis, as it may have or be reasonably able to acquire.

(f) Improved safety systems research. The Commission shall develop a long-term plan for projects for the development of new or improved safety systems for nuclear powerplants.

[42 U.S.C. 5845]

COMPLIANCE WITH SAFETY REGULATIONS

Sec. 206. (a) Notification to the Commission of noncompliance. Any individual director, or responsible officer of a firm constructing, owning, operating, or supplying the components of any facility or activity which is licensed or otherwise regulated pursuant to the Atomic Energy Act of 1954, as amended, or pursuant to this Act, who obtains information reasonably indicating that such facility or activity or basic components supplied to such facility or activity—

(1) fails to comply with the Atomic Energy Act of 1954, as amended, or any applicable rule, regulation, order, or license of the Commission relating to substantial safety hazards, or

(2) contains a defect which could create a substantial safety hazard, as defined by regulations which the Commission shall promulgate,

shall immediately notify the Commission of such failure to comply, or of such defect, unless such person has actual knowledge that the Commission has been adequately informed of such defect or failure to comply.

(b) Penalty for failure to notify. Any person who knowingly and consciously fails to provide the notice required by subsection (a) of this section shall be subject to a civil penalty in an amount equal to the amount provided by section 234 of the Atomic Energy Act of 1954, as amended [42 U.S.C. 2282].

(c) Posting of requirements. The requirements of this section shall be prominently posted on the premises of any facility licensed or otherwise regulated pursuant to the Atomic Energy Act of 1954, as amended.

(d) Inspection and enforcement. The Commission is authorized to conduct such reasonable inspections and other enforcement activities as needed to insure compliance with the provisions of this section.

[42 U.S.C. 5846]

NUCLEAR ENERGY CENTER SITE SURVEY

Sec. 207. (a)(1) The Commission is authorized and directed to make or cause to be made under its direction, a national survey, which shall include consideration of each of the existing or future electric reliability regions, or other appropriate regional areas, to locate and identify possible nuclear energy center sites. This survey shall be conducted in cooperation with other interested Federal, State, and local agencies, and the views of interested persons, including electric utilities, citizens' groups, and others, shall be solicited and considered.

(2) For purposes of this section, the term "nuclear energy center site" means any site, including a site not restricted to land, large enough to support utility operations or other elements of the total nuclear fuel cycle, or both including, if appropriate, nuclear fuel reprocessing facilities, nuclear fuel fabrication plants, retrievable nuclear waste storage facilities, and unranium [uranium] enrichment facilities.

(3) The survey shall include—

(A) a regional evaluation of natural resources, including land, air, and water resources, available for use in connection with nuclear energy center sites; estimates of future electric power requirements that can be served by each nuclear energy center site; an assessment of the economic impact of each nuclear energy site; and consideration of any other relevant factors, including but not limited to population distribution, proximity to electric load centers and to other elements of the fuel cycle, transmission line rights-of-way, and the availability of other fuel resources;

(B) an evaluation of the environmental impact likely to result from construction and operation of such nuclear energy centers, including an evaluation whether such nuclear energy centers will result in greater or lesser environmental impact than separate siting of the reactors and/or fuel cycle facilities; and

(C) consideration of the use of federally owned property and other property designated for public use, but excluding national parks, national forests, national wilderness areas, and national historic monuments.

(4) A report of the results of the survey shall be published and transmitted to the Congress and the Council on Environmental Quality not later than one year from the date of the enactment of this Act [enacted Oct. 11, 1974] and shall be made available to the public, and shall be updated from time to time thereafter as the Commission, in its discretion, deems advisable. The report shall include the Commission's evaluation of the results of the survey and any conclusions and recommendations, including recommendations for legislation, which the Commission may have concerning the feasibility and practicality of locating nuclear power reactors and/or other elements of the nuclear fuel cycle on nuclear energy center sites. The Commission is authorized to adopt policies which will encourage the

location of nuclear power reactors and related fuel cycle facilities on nuclear energy center sites insofar as practicable.

[42 U.S.C. 5847]

ABNORMAL OCCURRENCE REPORTS

Sec. 208. The Commission shall submit to the Congress each quarter a report listing for that period any abnormal occurrences at or associated with any facility which is licensed or otherwise regulated pursuant to the Atomic Energy Act of 1954, as amended, or pursuant to this Act. For the purposes of this section an abnormal occurrence is an unscheduled incident or event which the Commission determines is significant from the standpoint of public health or safety. Nothing in the preceding sentence shall limit the authority of a court to review the determination of the Commission. Each such report shall contain—

(1) the date and place of each occurrence;

(2) the nature and probable consequence of each occurrence;

(3) the cause or causes of each; and

(4) any action taken to prevent reoccurrence;

the Commission shall also provide as wide dissemination to the public of the information specified in clauses (1) and (2) of this section as reasonably possible within fifteen days of its receiving information of each abnormal occurrence and shall provide as wide dissemination to the public as reasonably possible of the information specified in clauses (3) and (4) as soon as such information becomes available to it.

[42 U.S.C. 5848]

OTHER OFFICERS

Sec. 209. (a) Executive Director. The Commission shall appoint an Executive Director for Operations, who shall serve at the pleasure of and be removable by the Commission.

(b) Functions of Executive Director. The Executive Director shall perform such functions as the Commission may direct, except that the Executive Director shall not limit the authority of the director of any component organization provided in this Act to communicate with or report directly to the Commission when such director of a component organization deems it necessary to carry out his responsibilities. Notwithstanding the preceding sentence, each such director shall keep the Executive Director fully and currently informed concerning the content of all such direct communications with the Commission.

(c) Equal employment opportunity report. The Executive Director shall report to the Commission at semiannual public meetings on the problems, progress, and status of the Commission's equal employment opportunity efforts.

(d) Annual status report. The Executive Director shall prepare and forward to the Commission an annual report (for the fiscal year 1978 and each succeeding fiscal year) on the status of the Commission's programs concerning domestic safeguards matters including an assessment of the effectiveness and adequacy of safeguards at facilities and activities licensed by the Commission. The Commission shall forward to the Congress a report under this section prior to February 1, 1979, as a separate document, and prior to February 1 of each succeeding year as a separate chapter of the Commission's annual report (required under section 307(c) of the Energy Reorganization Act of 1974 [42 U.S.C. 5877(c)]) following the fiscal year to which such report applies.

(e) Additional officers. There shall be in the Commission not more than five additional officers appointed by the Commission. The positions of such officers shall be considered career positions and be subject to subsection 161 d. of the Atomic Energy Act [42 U.S.C. 2201(d)].

[42 U.S.C. 5849]

UNRESOLVED SAFETY ISSUES PLAN

Sec. 210. The Commission shall develop a plan providing for the specification and analysis of unresolved safety issues relating to nuclear reactors and shall take such action as may be necessary to implement corrective measures with respect to such issues. Such plan shall be submitted to the Congress on or before January 1, 1978 and progress reports shall be included in the annual report of the Commission thereafter.

[42 U.S.C. 5850]

EMPLOYEE PROTECTION

Sec. 211 (a) Discrimination against employee. No employer, including a Commission licensee, an applicant for a Commission license, or a contractor or a subcontractor of a Commission licensee or applicant,

may discharge any employee or otherwise discriminate against any employee with respect to his compensation, terms, conditions, or privileges of employment because the employee (or person acting pursuant to a request of the employee)—

(1) commenced, caused to be commenced, or is about to commence or cause to be commenced a proceeding under this Act or the Atomic Energy Act of 1954, as amended, or a proceeding for the administration or enforcement of any requirement imposed under this Act or the Atomic Energy Act of 1954, as amended;

(2) testified or is about to testify in any such proceeding or;

(3) assisted or participated or is about to assist or participate in any manner in such a proceeding or in any other manner in such a proceeding or in any other action to carry out the purposes of this Act or the Atomic Energy Act of 1954, as amended.

(b) Complaint, filing and notification.

(1) Any employee who believes that he has been discharged or otherwise discriminated against by any person in violation of subsection (a) may, within thirty days after such violation occurs, file (or have any person file on his behalf) a complaint with the Secretary of Labor (hereinafter in this subsection referred to as the "Secretary") alleging such discharge or discrimination. Upon receipt of such a complaint, the Secretary shall notify the person named in the complaint of the filing of the complaint and the Commission.

(2)(A) Upon receipt of a complaint filed under paragraph (1), the Secretary shall conduct an investigation of the violation alleged in the complaint. Within thirty days of the receipt of such complaint, the Secretary shall complete such investigation and shall notify in writing the complainant (and any person acting in his behalf) and the person alleged to have committed such violation of the results of the investigation conducted pursuant to this subparagraph. Within ninety days of the receipt of such complaint the Secretary shall, unless the proceeding on the complaint is terminated by the Secretary on the basis of a settlement entered into by the Secretary and the person alleged to have committed such violation, issue an order either providing the relief prescribed by subparagraph (B) or denying the complaint. An order of the Secretary shall be made on the record after notice and opportunity for public hearing. The Secretary may not enter into a settlement terminating a proceeding on a complaint without the participation and consent of the complainant.

(B) If, in response to a complaint filed under paragraph (1), the Secretary determines that a violation of subsection (a) has occurred, the Secretary shall order the person who committed such violation to (i) take affirmative action to abate the violation, and (ii) reinstate the complainant to his former position together with the compensation (including back pay), terms, conditions, and privileges of his employment, and the Secretary may order such person to provide compensatory damages to the complainant. If an order is issued under this paragraph, the Secretary, at the request of the complainant shall assess against the person against whom the order is issued a sum equal to the aggregate amount of all costs and expenses (including attorneys' and expert witness fees) reasonably incurred, as determined by the Secretary, by the complainant for, or in connection with, the bringing of the complaint upon which the order was issued.

(c) Review.

(1) Any person adversely affected or aggrieved by an order issued under subsection (b) may obtain review of the order in the United States court of appeals for the circuit in which the violation, with respect to which the order was issued, allegedly occurred. The petition for review must be filed within sixty days from the issuance of the Secretary's order. Review shall conform to chapter 7 of title 5 of the United States Code [5 U.S.C. 701 et seq.]. The commencement of proceedings under this subparagraph shall not, unless ordered by the court, operate as a stay of the Secretary's order.

(2) An order of the Secretary with respect to which review could have been obtained under paragraph (1) shall not be subject to judicial review in any criminal or other civil proceeding.

(d) Jurisdiction. Whenever a person has failed to comply with an order issued under subsection (b)(2), the Secretary may file a civil action in the United States district court for the district in which the violation was found to occur to enforce such order. In actions brought under this subsection, the district courts shall have jurisdiction to grant all appropriate relief including, but not limited to, injunctive relief, compensatory, and exemplary damages.

(e) Commencement of action.

(1) Any person on whose behalf an order was issued under paragraph (2) of subsection (b) may commence a civil action against the person to whom such order was issued to require compliance with such order. The appropriate United States district court shall have jurisdiction, without regard to the amount in controversy or the citizenship of the parties, to enforce such order.

(2) The court, in issuing any final order under this subsection, may award costs of litigation (including reasonable attorney and expert witness fees) to any party whenever the court determines such award is appropriate.

(f) Enforcement. Any nondiscretionary duty imposed by this section shall be enforceable in a mandamus proceeding brought under section 1361 of title 28 of the United States Code [28 U.S.C. 1361].

(g) Deliberate violations. Subsection (a) shall not apply with respect to any employee who, acting without direction from his or her employer (or the employer's agent), deliberately causes a violation of any requirement of this Act or of the Atomic Energy Act of 1954, as amended.

[42 U.S.C. 5851]

TITLE III—MISCELLANEOUS AND TRANSITIONAL PROVISIONS

TRANSITIONAL PROVISIONS

Sec. 301. (a) Lapse of agency or other body from which functions or programs have been transferred and positions or offices therein. Except as otherwise provided in this Act, whenever all of the functions or programs of an agency, or other body, or any component thereof, affected by this Act, have been transferred from that agency, or other body, or any component thereof by this Act, the agency, or other body, or component thereof shall lapse. If an agency, or other body, or any component thereof, lapses pursuant to the preceding sentence, each position and office therein which was expressly authorized by law, or the incumbent of which was authorized to receive compensation at the rate prescribed for an office or position at level II, III, IV, or V of the Executive Schedule [5 U.S.C. 5313 et seq.], shall lapse.

(b) Continuation of orders, determinations, rules, etc. All orders, determinations, rules, regulations, permits, contracts, certificates, licenses,and privileges—

(1) which have been issued, made, granted, or allowed to become effective by the President, any Federal department or agency or official thereof, or by a court of competent jurisdiction, in the performance of functions which are transferred under this Act, and

(2) which are in effect at the time this Act takes effect,

shall continue in effect according to their terms until modified, terminated, superseded, set aside, or revoked by the President, the Administrator, the Commission, or other authorized officials, a court of competent jurisdiction, or by operation of law.

(c) Effect of 42 U.S.C. 5801 et seq. on proceedings pending before Atomic Energy Commission or other department or agency. The provisions of this Act shall not affect any proceeding pending, at the time this section takes effect, before the Atomic Energy Commission or any department or agency (or component thereof) functions of which are transferred by this Act; but such proceedings, to the extent that they relate to functions so transferred, shall be continued. Orders shall be issued in such proceedings, appeals shall be taken therefrom, and payments shall be made pursuant to such orders, as if this Act had not been enacted; and orders issued in any such proceedings shall continue in effect until modified, terminated, superseded, or revoked by a duly authorized official, by a court of competent jurisdiction, or by operation of law. Nothing in this subsection shall be deemed to prohibit the discontinuance or modification of any such proceeding under the same terms and conditions and to the same extent that such proceeding could have been discontinued if this Act had not been enacted.

(d) Effect of 42 U.S.C. 5801 et seq. on suits commenced prior to effective date. Except as provided in subsection (f)—

(1) the provisions of this Act shall not affect suits commenced prior to the date this Act takes effect, and

(2) in all such suits proceedings shall be had, appeals taken, and judgments rendered, in the same manner and effect as if this Act had not been enacted.

(e) Abatement of suits, actions, or other proceedings by or against officer, department, or agency. No suit, action, or other proceeding commenced by or against any officer in his official capacity as an officer of any department or agency, functions of which are transferred by this Act, shall abate by reason of the enactment of this Act. No cause of action by or against any department or agency, functions of which are transferred by this Act, or by or against any officer thereof in his official capacity shall abate by reason of the enactment

of this Act. Causes of actions, suits, actions, or other proceedings may be asserted by or against the United States or such official as may be appropriate and, in any litigation pending when this section takes effect, the court may at any time, on its own motion or that of any party, enter any order which will give effect to the provisions of this section.

(f) Continuation of suits; substitution of parties. If, before the date on which this Act takes effect, any department or agency, or officer thereof in his official capacity, is a party to a suit, and under this Act any function of such department, agency, or officer is transferred to the Administrator or Commission, or any other official, then such suit shall be continued as if this Act had not been enacted, with the Administrator or Commission, or other official, as the case may be, substituted.

(g) Judicial review of orders and actions in performance of transferred functions; statutory requirements relating to notices, hearings, action upon record, or administrative review. Final orders and actions of any official or component in the performance of functions transferred by this Act shall be subject to judicial review to the same extent and in the same manner as if such orders or actions had been made or taken by the officer, department, agency, or instrumentality in the performance of such functions immediately preceding the effective date of this Act. Any statutory requirements relating to notices, hearings, action upon the record, or administrative review that apply to any function transferred by this Act shall apply to the performance of those functions by the Administrator or Commission, or any officer or component.

(h) References in other laws to department, agency, officer, or office whose functions have been transferred deemed reference to Administration, Administrator, or Commission. With respect to any function transferred by this Act and performed after the effective date of this Act, reference in any other law to any department or agency, or any officer or office, the functions of which are so transferred, shall be deemed to refer to the Administration, the Administrator or Commission, or other office or official in which this Act vests such functions.

(i) Limitation, curtailment, etc., of presidential functions or authority. Nothing contained in this Act shall be construed to limit, curtail, abolish, or terminate any function of the President which he had immediately before the effective date of this Act; or to limit, curtail, abolish, or terminate his authority to perform such function; or to limit, curtail, abolish, or terminate his authority to delegate, redelegate, or terminate any delegation of functions.

(j) References in chapter to provision of law deemed to include references thereto as amended or supplemented. Any reference in this Act to any provision of law shall be deemed to include, as appropriate, references thereto as now or hereafter amended or supplemented.

(k) Functions conferred by 42 U.S.C. 5801 et seq. deemed in addition to and not in substitution for functions existing before effective date. Except as may be otherwise expressly provided in this Act, all functions expressly conferred by this Act shall be in addition to and not in substitution for functions existing immediately before the effective date of this Act and transferred by this Act.

[42 U.S.C. 5871]

TRANSFER OF PERSONNEL

Sec. 302. (a) Provisions of law applicable. Except as provided in the next sentence, the personnel employed in connection with, and the personnel positions, assets, liabilities, contracts, property, records, and unexpended balances of appropriations, authorizations, allocations, and other funds employed, held, used, arising from, available to or to be made available in connection with the functions and programs transferred by this Act, are, subject to section 202 of the Budget and Accounting Procedures Act of 1950 [31 U.S.C. 581c], correspondingly transferred for appropriate allocation. Personnel positions expressly created by law, personnel occupying those positions on the effective date of this Act, and personnel authorized to receive compensation at the rate prescribed for offices and positions at levels II, III, IV, or V of the Executive Schedule [5 U.S.C. 5313 et seq.] on the effective date of this Act shall be subject to the provisions of subsection (c) of this section and section 301 of this Act [42 U.S.C. 5871].

(b) Prohibition against separation or reduction in grade or compensation for one year after transfer. Except as provided in subsection (c), transfer of nontemporary personnel pursuant to this Act shall not cause any such employee to be separated or reduced in grade or compensation for one year after such transfer.

(c) Compensation in new position at not less than rate provided for previous position. Any person who, on the effective date of this Act, held a position compensated in accordance with the Executive Schedule prescribed in chapter 53 of title 5 of the United States Code [5 U.S.C. 5301 et seq.], and who, without a break in service, is appointed in the Administration to a position having duties comparable to those

performed immediately preceding his appointment shall continue to be compensated in his new position at not less than the rate provided for his previous position.
[42 U.S.C. 5872]

DIRECTOR OF THE OFFICE OF MANAGEMENT AND BUDGET; POWER TO MAKE DISPOSITIONS

Sec. 303. The Director of the Office of Management and Budget is authorized to make such additional incidental dispositions of personnel, personnel positions, assets, liabilities, contracts, property, records, and unexpended balances of appropriations, authorizations, allocations, and other funds held, used, arising from, available to or to be made available in connection with functions transferred by this Act, as he may deem necessary or appropriate to accomplish the intent and purpose of this Act.
[42 U.S.C. 5873]

DEFINITIONS

Sec. 304. As used in this Act—

(1) any reference to "function" or "functions" shall be deemed to include references to duty, obligation, power, authority, responsibility, right, privilege, and activity, or the plural thereof, as the case may be; and

(2) any reference to "perform" or "performance", when used in relation to functions, shall be deemed to include the exercise of power, authority, rights, and privileges.
[42 U.S.C. 5874]

AUTHORIZATION OF APPROPRIATIONS

Sec. 305. (a) Except as otherwise provided by law, appropriations made under this Act shall be subject to annual authorization.

(b) Authorization of appropriations to the Commission shall reflect the need for effective licensing and other regulation of the nuclear power industry in relation to the growth of such industry.
[42 U.S.C. 5875]

COMPTROLLER GENERAL AUDIT

Sec. 306. (a) Section 166. "Comptroller General Audit" of the Atomic Energy Act of 1954, as amended [42 U.S.C. 2206], shall be deemed to be applicable, respectively, to the nuclear and nonnuclear activities under title I [42 U.S.C. 5811 et seq.] and to the activities under title II [42 U.S.C. 5841 et seq.].

(b) The Comptroller General of the United States shall audit, review, and evaluate the implementation of the provisions of title II of this Act [42 U.S.C. 5841 et seq.] by the Nuclear Safety and Licensing Commission not later than sixty months after the effective date of this Act, the Comptroller General shall prepare and submit to the Congress a report on his audit, which shall contain, but not be limited to—

(1) an evaluation of the effectiveness of the licensing and related regulatory activities of the Commission and the operations of the Office of Nuclear Safety Research and the Bureau of Nuclear Materials Security;

(2) an evaluation of the effect of such Commission activities on the efficiency, effectiveness, and safety with which the activities licensed under the Atomic Energy Act of 1954, as amended are carried out;

(3) recommendations concerning any legislation he deems necessary, and the reasons therefor, for improving the implementation of title II [42 U.S.C. 5841 et seq.].
[42 U.S.C. 5876]

REPORTS TO PRESIDENT FOR SUBMISSION TO CONGRESS

Sec. 307. (a) Report by Administrator on activities of Administration. The Administrator shall, as soon as practicable after the end of each fiscal year, make a report to the President for submission to the Congress on the activities of the Administration during the preceding fiscal year. Such report shall include a statement of the short-range and long-range goals, priorities, and plans of the Administration together with an assessment of the progress made toward the attainment of those objectives and toward the more effective and efficient management of the Administration and the coordination of its functions.

(b) Review of desirability and feasibility of transferring functions of Administrator respecting military application and restricted data to Department of Defense or other Federal agencies; report by Administrator. During the first year of operation of the Administration, the Administrator, in collaboration with the Secretary of Defense, shall conduct a thorough review of the desirability and feasibility of transferring to the Department of Defense or other Federal agencies the functions of the Administrator respecting military

application and restricted data, and within one year after the Administrator first takes office the Administrator shall make a report to the President, for submission to the Congress, setting forth his comprehensive analysis, the principal alternatives, and the specific recommendations of the Administrator and the Secretary of Defense.

(c) Report by Commission on activities of Commission. The Commission shall, as soon as practicable after the end of each fiscal year, make a report to the President for submission to the Congress on the activities of the Commission during the preceding fiscal year. Such report shall include a clear statement of the short-range and long-range goals, priorities, and plans of the Commission as they relate to the benefits, costs, and risks of commercial nuclear power. Such report shall also include a clear description of the Commission's activities and findings in the following areas—

(1) insuring the safe design of nuclear powerplants and other licensed facilities;

(2) investigating abnormal occurrences and defects in nuclear powerplants and other licensed facilities;

(3) safeguarding special nuclear materials at all stages of the nuclear fuel cycle;

(4) investigating suspected, attempted, or actual thefts of special nuclear materials in the licensed sector and developing contingency plans for dealing with such incidents;

(5) insuring the safe, permanent disposal of high-level radioactive wastes through the licensing of nuclear activities and facilities;

(6) protecting the public against the hazards of low-level radioactive emissions from licensed nuclear activities and facilities.

[42 U.S.C. 5877]

INFORMATION TO CONGRESSIONAL COMMITTEES

Sec. 308. The Administrator shall keep the appropriate congressional committees fully and currently informed with respect to all of the Administration's activities.

[42 U.S.C. 5878]

TRANSFER OF FUNDS

Sec. 309. The Administrator, when authorized in an appropriation Act, may, in any fiscal year, transfer funds from one appropriation to another within the Administration; except, that no appropriation shall be either increased or decreased pursuant to this section by more than 5 per centum of the appropriation for such fiscal year.

[42 U.S.C. 5879]

TITLE IV—SEX DISCRIMINATION

SEX DISCRIMINATION PROHIBITED

Sec. 401. No person shall on the ground of sex be excluded from participation in, be denied a license under, be denied the benefits of, or be subjected to discrimination under any program or activity carried on or receiving Federal assistance under any title of this Act. This provision will be enforced through agency provisions and rules similar to those already established, with respect to racial and other discrimination, under title VI of the Civil Rights Act of 1964 [42 U.S.C. 2000d et seq.]. However, this remedy is not exclusive and will not prejudice or cut off any other legal remedies available to a discriminatee.

[42 U.S.C. 5891]

DEPARTMENT OF ENERGY ORGANIZATION ACT[1]

An Act to establish a Department of Energy in the executive branch by the reorganization of energy functions within the Federal Government in order to secure effective management to assure a coordinated national energy policy, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SHORT TITLE AND TABLE OF CONTENTS

Section 1. This Act may be cited as the "Department of Energy Organization Act".

Sec. 1. Short title and table of contents.
Sec. 2. Definitions.

TITLE I—DECLARATION OF FINDINGS AND PURPOSES

Sec. 101. Congressional findings.
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[1]This Act consists of Public Law 95-91, as amended. Bracketed notes are used at the end of each section for the convenience of the reader to indicate the United States Code citation.

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Sec. 901. Effective date.
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TITLE X—SUNSET PROVISIONS

Sec. 1001. Submission of comprehensive review.
Sec. 1002. Contents of review.

[42 U.S.C. 7101 note.]

DEFINITIONS

Sec. 2. (a) As used in this Act, unless otherwise provided or indicated by the context, the term the "Department" means the Department of Energy or any component thereof, including the Federal Energy Regulatory Commission.

(b) As used in this Act (1) reference to "function" includes reference to any duty, obligation, power, authority, responsibility, right, privilege, and activity, or the plural thereof, as the case may be; and (2) reference to "perform", when used in relation to functions, includes the undertaking, fulfillment, or execution of any duty or obligation; and the exercise of power, authority, rights, and privileges.

(c) As used in this Act, "Federal lease" means an agreement which, for any consideration, including but not limited to, bonuses, rents, or royalties conferred and covenants to be observed, authorizes a person to explore for, or develop, or produce (or to do any or all of these) oil and gas, coal, oil shale, tar sands, and geothermal resources on lands or interests in lands under Federal jurisdiction.

[42 U.S.C. 7101]

TITLE I—DECLARATION OF FINDINGS AND PURPOSES

CONGRESSIONAL FINDINGS

Sec. 101. The Congress of the United States finds that—

(1) the United States faces an increasing shortage of nonrenewable energy resources;

(2) this energy shortage and our increasing dependence on foreign energy supplies present a serious threat to the national security of the United States and to the health, safety and welfare of its citizens;

(3) a strong national energy program is needed to meet the present and future energy needs of the Nation consistent with overall national economic, environmental and social goals;

(4) responsibility for energy policy, regulation, and research, development and demonstration is fragmented in many departments and agencies and thus does not allow for the comprehensive, centralized focus necessary for effective coordination of energy supply and conservation programs; and

(5) formulation and implementation of a national energy program require the integration of major Federal energy functions into a single department in the executive branch.

[42 U.S.C. 7111]

CONGRESSIONAL DECLARATION OF PURPOSE

Sec. 102. The Congress therefore declares that the establishment of a Department of Energy is in the public interest and will promote the general welfare by assuring coordinated and effective administration of Federal energy policy and programs. It is the purpose of this Act:

(1) To establish a Department of Energy in the executive branch.

(2) To achieve, through the Department, effective management of energy functions of the Federal Government, including consultation with the heads of other Federal departments and agencies in order to encourage them to establish and observe policies consistent with a coordinated energy policy, and to promote maximum possible energy conservation measures in connection with the activities within their respective jurisdictions.

(3) To provide for a mechanism through which a coordinated national energy policy can be formulated and implemented to deal with the short-, mid- and long-term energy problems of the Nation; and to develop plans and programs for dealing with domestic energy production and import shortages.

(4) To create and implement a comprehensive energy conservation strategy that will receive the highest priority in the national energy program.

(5) To carry out the planning, coordination, support, and management of a balanced and comprehensive energy research and development program, including—

(A) assessing the requirements for energy research and development;

(B) developing priorities necessary to meet those requirements;

(C) undertaking programs for the optimal development of the various forms of energy production and conservation; and

(D) disseminating information resulting from such programs, including disseminating information on the commercial feasibility and use of energy from fossil, nuclear, solar, geothermal, and other energy technologies;

(6) To place major emphasis on the development and commercial use of solar, geothermal, recycling and other technologies utilizing renewable energy resources.

(7) To continue and improve the effectiveness and objectivity of a central energy data collection and analysis program within the Department.

(8) To facilitate establishment of an effective strategy for distributing and allocating fuels in periods of short supply and to provide for the administration of a national energy supply reserve.

(9) To promote the interests of consumers through the provision of an adequate and reliable supply of energy at the lowest reasonable cost.

(10) To establish and implement through the Department, in coordination with the Secretaries of State, Treasury, and Defense, policies regarding international energy issues that have a direct impact on research, development, utilization, supply, and conservation of energy in the United States and to undertake activities involving the integration of domestic and foreign policy relating to energy, including provision of independent technical advice to the President on international negotiations involving energy resources, energy technologies, or nuclear weapons issues, except that the Secretary of State shall continue to exercise primary authority for the conduct of foreign policy relating to energy and nuclear nonproliferation, pursuant to policy guidelines established by the President.

(11) To provide for the cooperation of Federal, State, and local governments in the development and implementation of national energy policies and programs.

(12) To foster and assure competition among parties engaged in the supply of energy and fuels.

(13) To assure incorporation of national environmental protection goals in the formulation and implementation of energy programs, and to advance the goals of restoring, protecting, and enhancing environmental quality, and assuring public health and safety.

(14) To assure, to the maximum extent practicable, that the productive capacity of private enterprise shall be utilized in the development and achievement of the policies and purposes of this Act.

(15) To provide for, encourage, and assist public participation in the development and enforcement of national energy programs.

(16) To create an awareness of, and responsibility for, the fuel and energy needs of rural and urban residents as such needs pertain to home heating and cooling, transportation, agricultural production, electrical generation, conservation, and research and development.

(17) To foster insofar as possible the continued good health of the Nation's small business firms, public utility districts, municipal utilities, and private cooperatives involved in energy production, transportation, research, development, demonstration, marketing, and merchandising.

(18) To provide for the administration of the functions of the Energy Research and Development Administration related to nuclear weapons and national security which are transferred to the Department by this Act.

(19) To ensure that the Department can continue current support of mathematics, science and engineering education programs by using the personnel, facilities, equipment, and resources of its laboratories and by working with State and local education agencies, institutions of higher education, and business and industry. The Departments's involvement with its main mission and should be coordinated with all Federal efforts in mathematics, science, and engineering education, especially with the Department of Education and the National Science Foundation (which have the primary Federal responsibility for mathematics, science, and engineering education).

[42 U.S.C. 7112]

RELATION WITH STATES

Sec. 103. Whenever any proposed action by the Department conflicts with the energy plan of any State, the Department shall give due consideration to the needs of such State, and where practicable, shall attempt to resolve such conflict through consultations with appropriate State officials. Nothing in this Act shall affect the authority of any State over matters exclusively within its jurisdiction.

[42 U.S.C. 7113]

TITLE II—ESTABLISHMENT OF THE DEPARTMENT

ESTABLISHMENT

Sec. 201. There is hereby established at the seat of government an executive department to be known as the Department of Energy. There shall be at the head of the Department a Secretary of Energy (hereinafter in this Act referred to as the "Secretary"), who shall be appointed by the President by and with the advice and consent of the Senate. The Department shall be administered, in accordance with the provisions of this Act, under the supervision and direction of the Secretary.

[42 U.S.C. 7131]

PRINCIPAL OFFICERS

Sec. 202. (a) There shall be in the Department a Deputy Secretary, who shall be appointed by the President, by and with the advice and consent of the Senate, and who shall be compensated at the rate provided for level II of the Executive Schedule under section 5313 of title 5, United States Code [5 U.S.C. 5313]. The Deputy Secretary shall act for and exercise the functions of the Secretary during the absence or disability of the Secretary or in the event the office of Secretary becomes vacant. The Secretary shall designate the order in which the Under Secretary and other officials shall act for and perform the functions of the Secretary during the absence or disability of both the Secretary and Deputy Secretary or in the event of vacancies in both of those offices.

(b) There shall be in the Department an Under Secretary and a General Counsel, who shall be appointed by the President, by and with the advice and consent of the Senate, and who shall perform such functions and duties as the Secretary shall prescribe. The Under Secretary shall bear primary responsibility for energy conservation. The Under Secretary shall be compensated at the rate provided for level III of the Executive Schedule under section 5314 of title 5, United States Code [5 U.S.C. 5314], and the General Counsel shall be

compensated at the rate provided for level IV of the Executive Schedule under section 5315 of title 5, United States Code [5 U.S.C. 5315].

[42 U.S.C. 7132]

ASSISTANT SECRETARIES; APPOINTMENT AND CONFIRMATION; IDENTIFICATION OF RESPONSIBILITIES

Sec. 203. (a) There shall be in the Department eight Assistant Secretaries, each of whom shall be appointed by the President, by and with the advice and consent of the Senate; who shall be compensated at the rate provided for at level IV of the Executive Schedule under section 5315 of title 5, United States Code [5 U.S.C. 5315]; and who shall perform, in accordance with applicable law, such of the functions transferred or delegated to, or vested in, the Secretary as he shall prescribe in accordance with the provisions of this Act. The functions which the Secretary shall assign to the Assistant Secretaries include, but are not limited to, the following:

(1) Energy resource applications, including functions dealing with management of all forms of energy production and utilization, including fuel supply, electric power supply, enriched uranium production, energy technology programs, and the management of energy resource leasing procedures on Federal lands.

(2) Energy research and development functions, including the responsibility for policy and management of research and development for all aspects of—

(A) solar energy resources;

(B) geothermal energy resources;

(C) recycling energy resources;

(D) the fuel cycle for fossil energy resources; and

(E) the fuel cycle for nuclear energy resources.

(3) Environmental responsibilities and functions, including advising the Secretary with respect to the conformance of the Department's activities to environmental protection laws and principles, and conducting a comprehensive program of research and development on the environmental effects of energy technologies and programs.

(4) International programs and international policy functions, including those functions which assist in carrying out the international energy purposes described in section 102 of this Act [42 U.S.C. 7112].

(5) National security functions, including those transferred to the Department from the Energy Research and Development Administration which relate to management and implementation of the nuclear weapons program and other national security functions involving nuclear weapons research and development.

(6) Intergovernmental policies and relations, including responsibilities for assuring that national energy policies are reflective of and responsible to the needs of State and local governments, and for assuring that other components of the Department coordinate their activities with State and local governments, where appropriate, and develop intergovernmental communications with State and local governments.

(7) Competition and consumer affairs, including responsibilities for the promotion of competition in the energy industry and for the protection of the consuming public in the energy policymaking processes, and assisting the Secretary in the formulation and analysis of policies, rules, and regulations relating to competition and consumer affairs.

(8) Nuclear waste management responsibilities, including—

(A) the establishment of control over existing Government facilities for the treatment and storage of nuclear wastes, including all containers, casks, buildings, vehicles, equipment, and all other materials associated with such facilities;

(B) the establishment of control over all existing nuclear waste in the possession or control of the Government and all commercial nuclear waste presently stored on other than the site of a licensed nuclear power electric generating facility, except that nothing in this paragraph shall alter or effect title to such waste;

(C) the establishment of temporary and permanent facilities for storage, management, and ultimate disposal of nuclear wastes;

(D) the establishment of facilities for the treatment of nuclear wastes;

(E) the establishment of programs for the treatment, management, storage, and disposal of nuclear wastes;

(F) the establishment of fees or user charges for nuclear waste treatment or storage facilities, including fees to be charged Government agencies; and

(G) the promulgation of such rules and regulations to implement theauthority described in this paragraph, except that nothing in this section shall be construed as granting to the Department regulatory functions presently within the Nuclear Regulatory Commission, or any additional functions than those already conferred by law.

(9) Energy conservation functions, including the development of comprehensive energy conservation strategies for the Nation, the planning and implementation of major research and demonstration programs for the development of technologies and processes to reduce total energy consumption, the administration of voluntary and mandatory energy conservation programs, and the dissemination to the public of all available information on energy conservation programs and measures.

(10) Power marketing functions, including responsibility for marketing and transmission of Federal power.

(11) Public and congressional relations functions, including responsibilities for providing a continuing liaison between the Department and the Congress and the Department and the public.

(b) At the time the name of any individual is submitted for confirmation to the position of Assistant Secretary, the President shall identify with particularity the function or functions described in subsection (a) (or any portion thereof) for which such individual will be responsible.

[42 U.S.C. 7133]

FEDERAL ENERGY REGULATORY COMMISSION

Sec. 204. There shall be within the Department, a Federal Energy Regulatory Commission established by title IV of this Act (hereinafter referred to in this Act as the "Commission"). The Chairman shall be compensated at the rate provided for level III of the Executive Schedule under section 5314 of title 5, United States Code. The other members of the Commission shall be compensated at the rate provided for level IV of the Executive Schedule under section 5315 of title 5, United States Code. The Chairman and members of the Commission shall be individuals who, by demonstrated ability, background, training, or experience, are specially qualified to assess fairly the needs and concerns of all interests affected by Federal energy policy.

[42 U.S.C. 7134]

ENERGY INFORMATION ADMINISTRATION

Sec. 205. (a) Establishment; appointment of Administrator; compensation; qualifications; duties.

(1) There shall be within the Department an Energy Information Administration to be headed by an Administrator who shall be appointed by the President, by and with the advice and consent of the Senate, and who shall be compensated at the rate provided for in level IV of the Executive Schedule under section 5315 of title 5, United States Code [5 U.S.C. 5315]. The Administrator shall be a person who, by reason of professional background and experience, is specially qualified to manage an energy information system.

(2) The Administrator shall be responsible for carrying out a central, comprehensive, and unified energy data and information program which will collect, evaluate, assemble, analyze, and disseminate data and information which is relevant to energy resource reserves, energy production, demand, and technology, and related economic and statistical information, or which is relevant to the adequacy of energy resources to meet demands in the near and longer term future for the Nation's economic and social needs.

(b) Delegation of functions. The Secretary shall delegate to the Administrator (which delegation may be on a nonexclusive basis as the Secretary may determine may be necessary to assure the faithful execution of his authorities and responsibilities under law) the functions vested in him by law relating to gathering, analysis, and dissemination of energy information (as defined in section 11 of the Energy Supply and Environmental Coordination Act of 1974) [15 U.S.C. 796] and the Administrator may act in the name of the Secretary for the purpose of obtaining enforcement of such delegated functions.

(c) Functions of Director of the Office of Energy Information and Analysis. In addition to, and not in limitation of the functions delegated to the Administrator pursuant to other subsections of this section, there shall be vested in the Administrator, and he shall perform, the functions assigned to the Director of the Office of Energy Information and Analysis under part B of the Federal Energy Administration Act of 1974 [15 U.S.C. 790], and the provisions of sections 53(d) and 59 [15 U.S.C. 790b(d) and 790h] thereof shall be applicable to the Administrator in the performance of any function under this Act.

(d) Collection or analysis of information and preparation of reports without approval. The Administrator shall not be required to obtain the approval of any other officer or employee of the Department in connection with the collection or analysis of any information; nor shall the Administrator be required, prior to publication, to

obtain the approval of any other officer or employee of the United States with respect to the substance of any statistical or forecasting technical reports which he has prepared in accordance with law.

(e) Annual audit. The Energy Information Administration shall be subject to an annual professional audit review of performance as described in section 55 of part B of the Federal Energy Administration Act of 1974 [15 U.S.C. 790d].

(f) Furnishing information or analysis to any other administration, commission, or office within the Department. The Administrator shall, upon request, promptly provide any information or analysis in his possession pursuant to this section to any other administration, commission, or office within the Department which such administration, commission, or office determines relates to the functions of such administration, commission, or office.

(g) Availability of information to public. Information collected by the Energy Information Administration shall be cataloged and, upon request, any such information shall be promptly made available to the public in a form and manner easily adaptable for public use, except that this subsection shall not require disclosure of matters exempted from mandatory disclosure by section 552(b) of title 5, United States Code [5 U.S.C. 552(b)]. The provisions of section 11(d) of the Energy Supply and Environmental Coordination Act of 1974 [15 U.S.C. 796(d)], and section 17 of the Federal Nonnuclear Energy Research and Development Act of 1974 [42 U.S.C. 5916], shall continue to apply to any information obtained by the Administrator under such provisions.

(h) Identification and designation of "major energy producing companies"; format for financial report; accounting practices; filing of financial report; annual report of Department; definitions; confidentiality.

(1) (A) In addition to the acquisition, collection, analysis, and dissemination of energy information pursuant to this section, the Administrator shall identify and designate "major energy-producing companies" which alone or with their affiliates are involved in one or more lines of commerce in the energy industry so that the energy information collected from such major energy-producing companies shall provide a statistically accurate profile of each line of commerce in the energy industry in the United States.

(B) In fulfilling the requirements of this subsection the Administrator shall—

(i) utilize, to the maximum extent practicable, consistent with the faithful execution of his responsibilities under this Act, reliable statistical sampling techniques; and

(ii) otherwise give priority to the minimization of the reporting of energy information by small business.

(2) The Administrator shall develop and make effective for use during the second full calendar year following the date of enactment of this Act [enacted Aug. 4, 1977] the format for an energy-producing company financial report. Such report shall be designed to allow comparison on a uniform and standardized basis among energy-producing companies and shall permit for the energy-related activities of such companies—

(A) an evaluation of company revenues, profits, cash flow, and investments in total, for the energy-related lines of commerce in which such company is engaged and for all significant energy-related functions within such company;

(B) an analysis of the competitive structure of sectors and functional groupings within the energy industry;

(C) the segregation of energy information, including financial information, describing company operations by energy source and geographic area;

(D) the determination of costs associated with exploration, development, production, processing, transportation, and marketing and other significant energy-related functions within such company; and

(E) such other analyses or evaluations as the Administrator finds is necessary to achieve the purposes of this Act.

(3) The Administrator shall consult with the Chairman of the Securities and Exchange Commission with respect to the development of accounting practices required by the Energy Policy and Conservation Act to be followed by persons engaged in whole or in part in the production of crude oil and natural gas and shall endeavor to assure that the energy-producing company financial report described in paragraph (2) of this subsection, to the extent practicable and consistent with the purposes and provisions of this Act, is consistent with such accounting practices where applicable.

(4) The Administrator shall require each major energy-producing company to file with the Administrator an energy-producing company financial report on at least an annual basis and may request energy

information described in such report on a quarterly basis if he determines that such quarterly report of information will substantially assist in achieving the purposes of this Act.

(5) A summary of information gathered pursuant to this section, accompanied by such analysis as the Administrator deems appropriate, shall be included in the annual report of the Department required by subsection (a) of section 657 of this Act [42 U.S.C. 7267].

(6) As used in this subsection the term—

(A) "energy-producing company" means a person engaged in:

(i) ownership or control of mineral fuel resources or nonmineral energy resources;

(ii) exploration for, or development of, mineral fuel resources;

(iii) extraction of mineral fuel or nonmineral energy resources;

(iv) refining, milling, or otherwise processing mineral fuels or nonmineral energy resources;

(v) storage of mineral fuels or nonmineral energy resources;

(vi) the generation, transmission, or storage of electrical energy;

(vii) transportation of mineral fuels or nonmineral energy resources by any means whatever; or

(viii) wholesale or retail distribution of mineral fuels, nonmineral energy resources or electrical energy;

(B) "energy industry" means all energy-producing companies; and

(C) "person" has the meaning as set forth in section 11 of the Energy Supply and Environmental Coordination Act of 1974 [15 U.S.C. 796].

(7) The provisions of section 1905 of title 18, United States Code (18 U.S.C. 1905] shall apply in accordance with its terms to any information obtained by the Administration pursuant to this subsection.

(i) (1) The Administrator shall conduct and publish the results of a survey of energy consumption in the manufacturing industries in the United States on at least a triennial basis and in a manner designed to protect the confidentiality of individual responses. In conducting the survey, the Administrator shall collect information, including—

(A) quantity of fuels consumed;

(B) energy expenditures;

(C) fuel switching capabilities; and

(D) use of nonpurchased sources of energy, such a cogeneration and waste by-products.

(2) This subsection does not affect the authority of the Administrator to collect data under section 52 of the Federal Energy Administration Act of 1974 [15 U.S.C. 790a].

[42 U.S.C. 7135]

ECONOMIC REGULATORY ADMINISTRATION; APPOINTMENT OF ADMINISTRATOR; COMPENSATION; QUALIFICATIONS; FUNCTIONS

Sec. 206. (a) There shall be within the Department an Economic Regulatory Administration to be headed by an Administrator, who shall be appointed by the President, by and with the advice and consent of the Senate, and who shall be compensated at a rate provided for level IV of the Executive Schedule under section 5315 of title 5, United States Code [5 U.S.C. 5315]. Such Administrator shall be, by demonstrated ability, background, training, or experience, an individual who is specially qualified to assess fairly the needs and concerns of all interests affected by Federal energy policy. The Secretary shall by rule provide for a separation of regulatory and enforcement functions assigned to, or vested in, the Administration.

(b) Consistent with the provisions of title IV [42 U.S.C. 7171 et seq.] the Secretary shall utilize the Economic Regulatory Administration to administer such functions as he may consider appropriate.

[42 U.S.C. 7136]

FUNCTIONS OF COMPTROLLER GENERAL

Sec. 207. The functions of the Comptroller General of the United States under section 12 of the Federal Energy Administration Act of 1974 [15 U.S.C. 771] shall apply with respect to the monitoring and evaluation of all functions and activities of the Department under this Act or any other Act administered by the Department.

[42 U.S.C. 7137]

OFFICE OF INSPECTOR GENERAL

Sec. 208. Repealed.

OFFICE OF ENERGY RESEARCH; ESTABLISHMENT; APPOINTMENT OF DIRECTOR;COMPENSATION; DUTIES

Sec. 209. (a) There shall be within the Department an Office of Energy Research to be headed by a Director, who shall be appointed by the President, by and with the advice and consent of the Senate, and who shall be compensated at the rate provided for level IV of the Executive Schedule under section 5315 of title 5, United States Code [5 U.S.C. 5315].

(b) It shall be the duty and responsibility of the Director—

(1) to advise the Secretary with respect to the physical research program transferred to the Department from the Energy Research and Development Administration;

(2) to monitor the Department's energy research and development programs in order to advise the Secretary with respect to any undesirable duplication or gaps in such programs;

(3) to advise the Secretary with respect to the well-being and management of the multipurpose laboratories under the jurisdiction of the Department, excluding laboratories that constitute part of the nuclear weapons complex;

(4) to advise the Secretary with respect to education and training activities required for effective short- and long-term basic and applied research activities of the Department;

(5) to advise the Secretary with respect to grants and other forms of financial assistance required for effective short- and long-term basic and applied research activities of the Department; and

(6) to carry out such additional duties assigned to the Office by the Secretary relating to basic and applied research, including but not limited to supervision or support of research activities carried out by any of the Assistant Secretaries designated by section 203 of this Act [42 U.S.C. 7133], as the Secretary considers advantageous.

[42 U.S.C. 7139]

LEASING LIAISON COMMITTEE; ESTABLISHMENT; COMPOSITION

Sec. 210. There is hereby established a Leasing Liaison Committee which shall be composed of an equal number of members appointed by the Secretary and the Secretary of the Interior.

[42 U.S.C. 7140]

OFFICE OF MINORITY ECONOMIC IMPACT

Sec. 211. (a) There shall be established within the Department an Office of Minority Economic Impact. The Office shall be headed by a Director, who shall be appointed by the President, by and with the advice and consent of the Senate. The Director shall be compensated at the rate provided for level IV of the Executive Schedule under section 5315 of title 5, United States Code.

(b) The Director shall have the duty and responsibility to advise the Secretary on the effect of energy policies, regulations, and other actions of the Department and its components on minorities and minority business enterprises and on ways to insure that minorities are afforded an opportunity to participate fully in the energy programs of the Department.

(c) The Director shall conduct an ongoing research program, with the assistance of the Administrator of the Energy Information Administration, and such other Federal agencies as the Director determines appropriate, to determine the effects (including the socio-economic and environmental effects) of national energy program, policies, and regulations of the Department on minorities. In conduction such program, the Director shall, from time to time, develop and recommend to the Secretary policies to assist, where appropriate, such minorities and minority business enterprises concerning such effects. In addition, the Director shall, to the greatest extent practicable—

(1) determine the average energy consumption and use patterns of minorities relative to other population categories;

(2) evaluate the percentage of disposable income spent on energy by minorities relative to other population categories; and

(3) determines how programs, policies, and actions of the Department and its components affect such consumption and use patterns and such income.

(d) The Director may provide the management any technical assistance he considers appropriate to minority educational institutions and minority business enterprises to enable these enterprises and institutions to

participate in the research, development, demonstration, and contract activities of the Department. In carrying out his functions under this section, the Director may enter into contracts, in accordance with section 7256 of this title an other applicable provision of law, with any persons, including minority educational institutions, minority business enterprises, and organizations the primary purpose of which is to assist the development of minority communities. The management and technical assistance may include—

(1) a national information clearinghouse which will develop and disseminate information on the aspects of energy programs to minority business enterprises, minority educational institutions and other appropriate minority organizations;

(2) market research, planning economic and business analysis, and feasibility studies to identify and define economic opportunities for minorities in energy research, production, conservation, and development;

(3) technical assistance programs to encourage, promote, and assist minority business enterprises in establishing and expanding energy-related business opportunities which are located in minority communities and that can provide jobs to workers in such communities; and

(4) programs to assist minority business enterprises in the commercial application of energy-related technologies.

(e) (1) The Secretary, acting through the Office, may provide financial assistance in the form of loans to any minority business enterprise under such rules as he shall prescribe to assist such enterprises in participating fully in research, development, demonstration, and contract activities of the Department to the extent he considers appropriate. He shall limit the use of financial assistance to providing funds necessary for such enterprises to bid for and obtain contracts or other agreements, and shall limit the amount of the financial assistance to any recipient to not more than 75 percent of such costs.

(2) The Secretary shall determine the rate of interest on loans under this section in consultation with the Secretary of the Treasury.

(3) The Secretary shall deposit into the Treasury as miscellaneous receipt amounts received in connection with the repayment and satisfaction of such loans.

(f) As used in this section, the term—

(1) "minority" means any individual who is a citizen of the United States and who is a Negro, Puerto Rican, American Indian, Eskimo, Oriental, or Aluet or is a Spanish speaking individual of Spanish descent;

(2) "minority business enterprise" means a firm, corporation, association, or partnership which is at least 50 percent owned or controlled by a minority or group of minorities; and

(3) "minority educational institution" means an education institution with an enrollment in which a substantial proportion (as determined by the Secretary) of the students are minorities.

(g) There is authorized to be appropriated to the Secretary to carry out the functions of the Office not to exceed $3,000,000 for fiscal year 1979, not to exceed $5,000,000 for fiscal year 1980, and not to exceed $6,000,000 for fiscal year 1981. Of the amounts so appropriated each fiscal year, not less than 50 percent shall be available for purposes of financial assistance under subsection (e) of this section.

TITLE III—TRANSFERS OF FUNCTIONS

GENERAL TRANSFERS

Sec. 301. (a) Except as otherwise provided in this Act, there are hereby transferred to, and vested in, the Secretary all of the functions vested by law in the Administrator of the Federal Energy Administration or the Federal Energy Administration, the Administrator of the Energy Research and Development Administration or the Energy Research and Development Administration; and the functions vested by law in the officers and components of either such Administration.

(b) Except as provided in title IV [42 U.S.C. 7171 et seq.], there are hereby transferred to, and vested in, the Secretary the function of the Federal Power Commission, or of the members, officers, or components thereof. The Secretary may exercise any power described in section 402(a)(2) [42 U.S.C. 7171(a)(2)] to the extent the Secretary determines such power to be necessary to the exercise of any function within his jurisdiction pursuant to the preceding sentence.

[42 U.S.C. 7151]

TRANSFERS FROM THE DEPARTMENT OF THE INTERIOR

Sec. 302. (a) Functions relating to electric power.

(1) There are hereby transferred to, and vested in, the Secretary all functions of the Secretary of the Interior under section 5 of the Flood Control Act of 1944 [16 U.S.C. 825s], and all other functions of the Secretary of the Interior, and officers and components of the Department of the Interior, with respect to—

(A) the Southeastern Power Administration;

(B) the Southwestern Power Administration;

(C) the Alaska Power Administration;

(D) the Bonneville Power Administration including but not limited to the authority contained in the Bonneville Project Act of 1937 [16 U.S.C. 832] and the Federal Columbia River Transmission System Act [16 U.S.C. 838 et seq.];

(E) the power marketing functions of the Bureau of Reclamation [Water and Power Resources Service], including the construction, operation, and maintenance of transmission lines and attendant facilities; and

(F) the transmission and disposition of the electric power and energy generated at Falcon Dam and Amistad Dam, international storage reservoir projects on the Rio Grande, pursuant to the Act of June 18, 1954, [unclassified], as amended by the Act of December 23, 1963 [unclassified].

(2) The Southeastern Power Administration, the Southwestern Power Administration, the Bonneville Power Administration, and the Alaska Power Administration shall be preserved as separate and distinct organizational entities within the Department. Each such entity shall be headed by an Administrator appointed by the Secretary. The functions transferred to the Secretary in paragraphs (1)(A), (1)(B), (1)(C), and (1)(D) shall be exercised by the Secretary, acting by and through such Administrators. Each such Administrator shall maintain his principal office at a place located in the region served by his respective Federal power marketing entity.

(3) The functions transferred in paragraphs (1)(E) and (1)(F) of this subsection shall be exercised by the Secretary, acting by and through a separate and distinct Administration within the Department which shall be headed by an Administrator appointed by the Secretary. The Administrator shall establish and shall maintain such regional offices as necessary to facilitate the performance of such functions. Neither the transfer of functions effected by paragraph (1)(E) of this subsection nor any changes in cost allocation or project evaluation standards shall be deemed to authorize the reallocation of joint costs of multipurpose facilities theretofore allocated unless and to the extent that such change is hereafter approved by Congress.

(b), (c) [Repealed]

(d) Functions of Bureau of Mines. There are hereby transferred to, and vested in, the Secretary those functions of the Secretary of the Interior, the Department of the Interior, and officers and components of that Department under the Act of May 15, 1910, and other authorities, exercised by the Bureau of Mines, but limited to—

(1) fuel supply and demand analysis and data gathering;

(2) research and development relating to increased efficiency of production technology of solid fuel minerals, other than research relating to mine health and safety and research relating to the environmental and leasing consequences of solid fuel mining (which shall remain in the Department of the Interior); and

(3) coal preparation and analysis.

[42 U.S.C. 7152]

ADMINISTRATION OF LEASING TRANSFERS

Sec. 303. (a) Authority retained by Secretary of the Interior. The Secretary of the Interior shall retain any authorities not transferred under section 302(b) of this Act [42 U.S.C. 7152(b)] and shall be solely responsible for the issuance and supervision of Federal leases and the enforcement of all regulations applicable to the leasing of mineral resources, including but not limited to lease terms and conditions and production rates. No regulation promulgated by the Secretary shall restrict or limit any authority retained by the Secretary of the Interior under section 302(b) of this Act [42 U.S.C. 7152(b)] with respect to the issuance or supervision of Federal leases. Nothing in section 302(b) of this Act [42 U.S.C. 7152(b)] shall be construed to affect Indian lands and resources or to transfer any functions of the Secretary of the Interior concerning such lands and resources.

(b) Consultation with Secretary of the Interior with respect to promulgation of regulations. In exercising the authority under section 302(b) of this Act [42 U.S.C. 7152(b)] to promulgate regulations, the Secretary shall consult with the Secretary of the Interior during the preparation of such regulations and shall afford the Secretary of the Interior not less than thirty days, prior to the date on which the Department first publishes or otherwise prescribes regulations, to comment on the content and effect of such regulations.

(c) [Repealed]

(d) Preparation of environmental impact statement. The Department of the Interior shall be the lead agency for the purpose of preparation of an environmental impact statement required by section 102(2)(C) of the National Environmental Policy Act of 1969 [42 U.S.C. 4332(2)(C)] for any action with respect to the Federal leases taken under the authority of this section, unless the action involves only matters within the exclusive authority of the Secretary.

[42 U.S.C. 7153]

TRANSFERS FROM THE DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Sec. 304. (a) There is hereby transferred to, and vested in, the Secretary the functions vested in the Secretary of Housing and Urban Development pursuant to section 304 of the Energy Conservation Standards for New Buildings Act of 1976 [42 U.S.C. 6833], to develop and promulgate energy conservation standards for new buildings. The Secretary of Housing and Urban Development shall provide the Secretary with any necessary technical assistance in the development of such standards. All other responsibilities, pursuant to title III of the Energy Conservation and Production Act [42 U.S.C. 6831 et seq.], shall remain with the Secretary of Housing and Urban Development, except that the Secretary shall be kept fully and currently informed of the implementation of the promulgated standards.

(b) There is hereby transferred to, and vested in, the Secretary the functions vested in the Secretary of Housing and Urban Development pursuant to section 509 of the Housing and Urban Development Act of 1970 [12 U.S.C. 1701z-8].

[42 U.S.C. 7154]

COORDINATION WITH THE DEPARTMENT OF TRANSPORTATION

Sec. 305. [Amends Section 502 of the Motor Vehicle Information and Cost Savings Act.]

TRANSFER FROM THE INTERSTATE COMMERCE COMMISSION

Sec. 306. Except as provided in title IV [42 U.S.C. 7171 et seq.], there are hereby transferred to the Secretary such functions set forth in the Interstate Commerce Act and vested by law in the Interstate Commerce Commission or the Chairman and members thereof as relate to transportation of oil by pipeline.

[42 U.S.C. 7155]

TRANSFERS FROM THE DEPARTMENT OF THE NAVY

Sec. 307. There are hereby transferred to and vested in the Secretary all functions vested by chapter 641 of title 10, United States Code [10 U.S.C. 7421 et seq.] in the Secretary of the Navy as they relate to the administration of and jurisdiction over—

(1) Naval Petroleum Reserve Numbered 1 (Elk Hills), located in Kern County, California, established by Executive order of the President, dated September 2, 1912;

(2) Naval Petroleum Reserve Numbered 2 (Buena Vista), located in Kern County, California, established by Executive order of the President, dated December 13, 1912;

(3) Naval Petroleum Reserve Numbered 3 (Teapot Dome), located in Wyoming, established by Executive order of the President, dated April 30, 1915;

(4) Oil Shale Reserve Numbered 1, located in Colorado, established by Executive order of the President, dated December 6, 1916, as amended by Executive order dated June 12, 1919;

(5) Oil Shale Reserve Numbered 2, located in Utah, established by Executive order of the President, dated December 6, 1916; and

(6) Oil Shale Reserve Numbered 3, located in Colorado, established by Executive order of the President, dated September 27, 1924.

In the administration of any of the functions transferred to, and vested in, the Secretary by this section the Secretary shall take into consideration the requirements of national security.
[42 U.S.C. 7156]

TRANSFERS FROM THE DEPARTMENT OF COMMERCE

Sec. 308. There are hereby transferred to, and vested in, the Secretary all functions of the Secretary of Commerce, the Department of Commerce, and officers and components of that Department, as relate to or are utilized by the Office of Energy Programs, but limited to industrial energy conservation programs.
[42 U.S.C. 7157]

NAVAL REACTOR AND MILITARY APPLICATION PROGRAMS

Sec. 309. (a) The Division of Naval Reactors established pursuant to section 25 of the Atomic Energy Act of 1954 [42 U.S.C. 2035], and responsible for research, design, development, health, and safety matters pertaining to naval nuclear propulsion plants and assigned civilian power reactor programs is transferred to the Department under the Assistant Secretary to whom the Secretary has assigned the function listed in section 203(a)(2)(E) [42 U.S.C. 7133(a)(2)(E)], and such organizational unit shall be deemed to be an organizational unit established by this Act.

(b) The Division of Military Application, established by section 25 of the Atomic Energy Act of 1954 [42 U.S.C. 2035], and the functions of the Energy Research and Development Administration with respect to the Military Liaison Committee, established by section 27 of the Atomic Energy Act of 1954 [42 U.S.C. 2037], are transferred to the Department under the Assistant Secretary to whom the Secretary has assigned those functions listed in section 203(a)(5) [42 U.S.C. 7133(a)(5)] and such organizational units shall be deemed to be organizational units established by this Act.
[42 U.S.C. 7158]

TRANSFER TO THE DEPARTMENT OF TRANSPORTATION

Sec. 310. Notwithstanding section 301(a) [42 U.S.C. 7151(a)], there are hereby transferred to, and vested in, the Secretary of Transportation all of the functions vested in the Administrator of the Federal Energy Administration by section 381(b)(1)(B) of the Energy Policy and Conservation Act [42 U.S.C. 6361(b)(1)(B)].
[42 U.S.C. 7159]

TITLE IV—FEDERAL ENERGY REGULATORY COMMISSION

APPOINTMENT AND ADMINISTRATION

Sec. 401. (a) Federal Energy Regulatory Commission; establishment. There is hereby established within the Department an independent regulatory commission to be known as the Federal Energy Regulatory Commission.

(b) (1) Composition; term of office; conflict of interest. The Commission shall be composed of five members appointed by the President, by and with the advice and consent of the Senate. One of the members shall be designated by the President as Chairman. Members shall hold office for a term of five years and may be removed by the President only for inefficiency, neglect of duty, or malfeasance in office. Not more than three members of the Commission shall be members of the same political party. Any Commissioner appointed to fill a vacancy occurring prior to the expiration of the term for which his predecessor was appointed shall be appointed only for the remainder of such term. A Commissioner may continue to serve after the expiration of his term until his successor is appointed and has been confirmed and taken the oath of Office, except that such Commissioner shall not serve beyond the end of the session of the Congress in which such term expires. Members of the Commission shall not engage in any other business, vocation, or employment while serving on the Commission.

(2) Notwithstanding the third sentence of paragraph (1), the terms of members first taking office after the date of enactment of the Federal Energy Regulatory Commission Member Term Act of 1990 shall expire as follows:

(A) In the case of members appointed to succeed members whose terms expire in 1991, one such member's term shall expire on June 30, 1994, and one such member's term shall expire on June 30, 1995, as designated by the President at the time of appointment.

(B) In the case of members appointed to succeed members whose terms expire in 1992, one such member's term shall expire on June 30, 1996, and one such member's term shall expire on June 30, 1997, as designated by the President at the time of appointment.

(C) In the case of the member appointed to succeed the member whose term expires in 1993, such member's term shall expire on June 30, 1998.

(c) Duties and responsibilities of Chairman. The Chairman shall be responsible on behalf of the Commission for the executive and administrative operation of the Commission, including functions of the Commission with respect to (1) the appointment and employment of hearing examiners in accordance with the provisions of title 5, United States Code [5 U.S.C. 1 et seq.], (2) the selection, appointment, and fixing of the compensation of such personnel as he deems necessary, including an executive director, (3) the supervision of personnel employed by or assigned to the Commission, except that each member of the Commission may select and supervise personnel for his personal staff, (4) the distribution of business among personnel and among administrative units of the Commission, and (5) the procurement of services of experts and consultants in accordance with section 3109 of title 5, United States Code [5 U.S.C. 3109]. The Secretary shall provide to the Commission such support and facilities as the Commission determines it needs to carry out its functions.

(d) Supervision and direction of members, employees, or other personnel of Commission. In the performance of their functions, the members, employees, or other personnel of the Commission shall not be responsible to or subject to the supervision or direction of any officer, employee, or agent of any other part of the Department.

(e) Designation of acting Chairman; quorum; seal. The Chairman of the Commission may designate any other member of the Commission as Acting Chairman to act in the place and stead of the Chairman during his absence. The Chairman (or the Acting Chairman in the absence of the Chairman) shall preside at all sessions of the Commission and a quorum for the transaction of business shall consist of at least three members present. Each member of the Commission, including the Chairman, shall have one vote. Actions of the Commission shall be determined by a majority vote of the members present. The Commission shall have an official seal which shall be judicially noticed.

(f) Rules. The Commission is authorized to establish such procedural and administrative rules as are necessary to the exercise of its functions. Until changed by the Commission, any procedural and administrative rules applicable to particular functions over which the Commission has jurisdiction shall continue in effect with respect to such particular functions.

(g) Powers of Commission. In carrying out any of its functions, the Commission shall have the powers authorized by the law under which such function is exercised to hold hearings, sign and issue subpoenas, administer oaths, examine witnesses, and receive evidence at any place in the United States it may designate. The Commission may, by one or more of its members or by such agents as it may designate, conduct any hearing or other inquiry necessary or appropriate to its functions, except that nothing in this subsection shall be deemed to supersede the provisions of section 556 of title 5, United States Code relating to hearing examiners [5 U.S.C. 556].

(h) Principal office of Commission. The principal office of the Commission shall be in or near the District of Columbia, where its general sessions shall be held, but the Commission may sit anywhere in the United States.

(i) Commission deemed agency; attorney for Commission. For the purpose of section 552b of title 5, United States Code [5 U.S.C. 552b], the Commission shall be deemed to be an agency. Except as provided in section 518 of title 28, United States Code [28 U.S.C. 518], relating to litigation before the Supreme Court, attorneys designated by the Chairman of the Commission may appear for, and represent the Commission in, any civil action brought in connection with any function carried out by the Commission pursuant to this Act or as otherwise authorized by law.

(j) Annual authorization and appropriation request. In each annual authorization and appropriation request under this Act, the Secretary shall identify the portion thereof intended for the support of the Commission and include a statement by the Commission (1) showing the amount requested by the Commission in its budgetary presentation to the Secretary and the Office of Management and Budget and (2) an assessment of the budgetary needs of the Commission. Whenever the Commission submits to the Secretary, the President, or the Office of Management and Budget, any legislative recommendation or testimony, or comments on legislation, prepared

for submission to Congress, the Commission shall concurrently transmit a copy thereof to the appropriate committees of Congress.

[42 U.S.C. 7171]

JURISDICTION OF COMMISSION

Sec. 402. (a) Transfer of functions from Federal Power Commission.

(1) There are hereby transferred to, and vested in, the Commission the following functions of the Federal Power Commission or of any member of the Commission or any officer or component of the Commission:

(A) the investigation, issuance, transfer, renewal, revocation, and enforcement of licenses and permits for the construction, operation, and maintenance of dams, water conduits, reservoirs, powerhouses, transmission lines, or other works for the development and improvement of navigation and for the development and utilization of power across, along, from, or in navigable waters under part I of the Federal Power Act [16 U.S.C. 792 et seq.];

(B) the establishment, review, and enforcement of rates and charges for the transmission or sale of electric energy, including determinations on construction work in progress, under part II of the Federal Power Act [16 U.S.C. 824 et seq.], and the interconnection, under section 202(b), of such Act [16 U.S.C. 824a(b)], of facilities for the generation, transmission, and sale of electric energy (other than emergency interconnection);

(C) the establishment, review, and enforcement of rates and charges for the transportation and sale of natural gas by a producer or gatherer or by a natural gas pipeline or natural gas company under sections 1, 4, 5, and 6 of the Natural Gas Act [15 U.S.C. 717, 717c, 717d, 717e];

(D) the issuance of a certificate of public convenience and necessity, including abandonment of facilities or services, and the establishment of physical connections under section 7 of the Natural Gas Act [15 U.S.C. 717f];

(E) the establishment, review, and enforcement of curtailments, other than the establishment and review of priorities for such curtailments, under the Natural Gas Act [15 U.S.C. 717 et seq.]; and

(F) the regulation of mergers and securities acquisition under the Federal Power Act [16 U.S.C. 791a et seq.] and Natural Gas Act [15 U.S.C. 717 et seq.].

(2) The Commission may exercise any power under the following sections to the extent the Commission determines such power to be necessary to the exercise of any function within the jurisdiction of the Commission:

(A) sections 4, 301, 302, 306 through 309, and 312 through 316 of the Federal Power Act [16 U.S.C. 797, 825, 825a, 825e-825h, 825k-825o]; and

(B) sections 8, 9, 13 through 17, 20, and 21 of the Natural Gas Act [15 U.S.C. 717g, 717h, 717l-717p, 717s, 717t].

(b) Transfer of functions from Interstate Commerce Commission. There are hereby transferred to, and vested in, the Commission all functions and authority of the Interstate Commerce Commission or any officer or component of such Commission where the regulatory function establishes rates or charges for the transportation of oil by pipeline or establishes the valuation of any such pipeline.

(c) Consideration of proposals made by Secretary to amend regulations issued under 15 U.S.C. 753; exception.

(1) Pursuant to the procedures specified in section 404 [42 U.S.C. 7174] and except as provided in paragraph (2), the Commission shall have jurisdiction to consider any proposal by the Secretary to amend the regulation required to be issued under section 4(a) of the Emergency Petroleum Allocation Act of 1973 [15 U.S.C. 753(a)] which is required by section 8 or 12 of such Act [15 U.S.C. 757 or 760a] to be transmitted by the President to, and reviewed by, each House of Congress, under section 551 of the Energy Policy and Conservation Act [42 U.S.C. 6421].

(2) In the event that the President determines that an emergency situation of overriding national importance exists and requires the expeditious promulgation of a rule described in paragraph (1), the President may direct the Secretary to assume sole jurisdiction over the promulgation of such rule, and such rule shall be transmitted by the President to, and reviewed by, each House of Congress under section 8 or 12 of the Emergency Petroleum Allocation Act of 1973 [15 U.S.C. 757 or 760a], and section 551 of the Energy Policy and Conservation Act [42 U.S.C. 6421].

(d) Matters involving agency determinations to be made on record after agency hearing. The Commission shall have jurisdiction to hear and determine any other matter arising under any other function of the Secretary—

(1) involving any agency determination required by law to be made on the record after an opportunity for an agency hearing; or

(2) involving any other agency determination which the Secretary determines shall be made on the record after an opportunity for an agency hearing, except that nothing in this subsection shall require that functions under sections 105 and 106 of the Energy Policy and Conservation Act [42 U.S.C. 6213, 6214] shall be within the jurisdiction of the Commission unless the Secretary assigns such a function to the Commission.

(e) Matters assigned by Secretary after public notice and matters referred under 42 U.S.C. 7174. In addition to the other provisions of this section, the Commission shall have jurisdiction over any other matter which the Secretary may assign to the Commission after public notice, or which are required to be referred to the Commission pursuant to section 404 of this Act [42 U.S.C. 7174].

(f) Limitation. No function described in this section which regulates the exports or imports of natural gas or electricity shall be within the jurisdiction of the Commission unless the Secretary assigns such a function to the Commission.

(g) Final agency action. The decision of the Commission involving any function within its jurisdiction, other than action by it on a matter referred to it pursuant to section 404 [42 U.S.C. 7174], shall be final agency action within the meaning of section 704 of title 5, United States Code [5 U.S.C. 704], and shall not be subject to further review by the Secretary or any officer or employee of the Department.

(h) Rules, regulations, and statements of policy. The Commission is authorized to prescribe rules, regulations, and statements of policy of general applicability with respect to any function under the jurisdiction of the Commission pursuant to section 402 [this section].

[42 U.S.C. 7172]

INITIATION OF RULEMAKING PROCEEDINGS BEFORE COMMISSION

Sec. 403. (a) Proposal of rules, regulations, and statements of policy of general applicability by Secretary and Commission. The Secretary and the Commission are authorized to propose rules, regulations, and statements of policy of general applicability with respect to any function within the jurisdiction of the Commission under section 402 of this Act [42 U.S.C. 7172].

(b) Consideration and final action on proposals of Secretary. The Commission shall have exclusive jurisdiction with respect to any proposal made under subsection (a), and shall consider and take final action on any proposal made by the Secretary under such subsection in an expeditious manner in accordance with such reasonable time limits as may be set by the Secretary for the completion of action by the Commission on any such proposal.

(c) Utilization of rulemaking procedures for establishment of rates and charges under Federal Power Act [16 U.S.C. 791a et seq.] and Natural Gas Act [15 U.S.C. 717 et seq.].Any function described in section 402 of this Act [42 U.S.C. 7172] which relates to the establishment of rates and charges under the Federal Power Act [16 U.S.C. 791a et seq.] or the Natural Gas Act [15 U.S.C. 717 et seq.], may be conducted by rulemaking procedures. Except as provided in subsection (d), the procedures in such a rulemaking proceeding shall assure full consideration of the issues and an opportunity for interested persons to present their views.

(d) Submission of written questions by interested persons. With respect to any rule or regulation promulgated by the Commission to establish rates and charges for the first sale of natural gas by a producer or gatherer to a natural gas pipeline under the Natural Gas Act [15 U.S.C. 717 et seq.], the Commission may afford any interested person a reasonable opportunity to submit written questions with respect to disputed issues of fact to other interested persons participating in the rulemaking proceedings. The Commission may establish a reasonable time for both the submission of questions and responses thereto.

[42 U.S.C.7173]

REFERRAL OF OTHER RULEMAKING PROCEEDINGS TO COMMISSION

Sec. 404. (a) Notification of Commission of proposed action; public comment. Except as provided in section 403 [42 U.S.C. 7173], whenever the Secretary proposes to prescribe rules, regulations, and statements of policy of general applicability in the exercise of any function which is transferred to the Secretary under section 301 or 306 of this Act [42 U.S.C. 7151 or @ 7155], he shall notify the Commission of the proposed action. If the Commission, in its discretion, determines within such period as the Secretary may prescribe, that the proposed action may significantly affect any function within the jurisdiction of the Commission pursuant to section 402(a)(1), (b), and (c)(1) [42 U.S.C. 7172(a)(1), (b), and (c)(1)], the Secretary shall immediately refer the matter to the Commission, which shall provide an opportunity for public comment.

(b) Recommendations of Commission; publication. Following such opportunity for public comment the Commission, after consultation with the Secretary, shall either—

(1) concur in adoption of the rule or statement as proposed by the Secretary;

(2) concur in adoption of the rule or statement only with such changes as it may recommend; or

(3) recommend that the rule or statement not be adopted.

The Commission shall promptly publish its recommendations, adopted under this subsection, along with an explanation of the reason for its actions and an analysis of the major comments, criticisms, and alternatives offered during the comment period.

(c) Options of Secretary; final agency action. Following publication of the Commission's recommendations the Secretary shall have the option of—

(1) issuing a final rule or statement in the form initially proposed by the Secretary if the Commission has concurred in such rule pursuant to subsection (b)(1);

(2) issuing a final rule or statement in amended form so that the rule conforms in all respects with the changes proposed by the Commission if the Commission has concurred in such rule or statement pursuant to subsection (b)(2); or

(3) ordering that the rule shall not be issued.

The action taken by the Secretary pursuant to this subsection shall constitute a final agency action for purposes of section 704 of title 5, United States Code [5 U.S.C. 704].

[42 U.S.C. 7174]

RIGHT OF SECRETARY TO INTERVENE IN COMMISSION PROCEEDINGS

Sec. 405. The Secretary may as a matter of right intervene or otherwise participate in any proceeding before the Commission. The Secretary shall comply with rules of procedure of general applicability governing the timing of intervention or participation in such proceeding or activity and, upon intervening or participating therein, shall comply with rules of procedure of general applicability governing the conduct thereof. The intervention or participation of the Secretary in any proceeding or activity shall not affect the obligation of the Commission to assure procedure fairness to all participants.

[42 U.S.C. 7175]

REORGANIZATION

Sec. 406. For the purposes of chapter 9 of title 5, United States Code [5 U.S.C. 901 et seq.], the Commission shall be deemed to be an independent regulatory agency.

[42 U.S.C. 7176]

ACCESS TO INFORMATION

Sec. 407. (a) The Secretary, each officer of the Department, and each Federal agency shall provide to the Commission, upon request, such existing information in the possession of the Department or other Federal agency as the Commission determines is necessary to carry out its responsibilities under this Act.

(b) The Secretary, in formulating the information to be requested in the reports or investigations under section 304 and section 311 of the Federal Power Act [16 U.S.C. 825c, 825j] and section 10 and section 11 of the Natural Gas Act [15 U.S.C. 717i, 717j], shall include in such reports and investigations such specific information as requested by the Federal Energy Regulatory Commission and copies of all reports, information, results of investigations and data under said sections shall be furnished by the Secretary to the Federal Energy Regulatory Commission.

[42 U.S.C. 7177]

TITLE V—ADMINISTRATIVE PROCEDURES AND JUDICIAL REVIEW

PROCEDURES FOR ISSUANCE OF RULES, REGULATIONS, OR ORDERS

Sec. 501. (a) Applicability of 5 U.S.C. 551 et seq.

(1) Subject to the other requirements of this title, the provisions of subchapter II of chapter 5 of title 5, United States Code [5 U.S.C. 551 et seq.], shall apply in accordance with its terms to any rule or regulation, or any order having the applicability and effect of a rule (as defined in section 551(4) of title 5, United States Code) [5 U.S.C. 551(4)], issued pursuant to authority vested by law in, or transferred or delegated to, the Secretary, or required by this Act or any other Act to be carried out by any other officer, employee,

or component of the Department, other than the Commission, including any such rule, regulation, or order of a State, or local government agency or officer thereof, issued pursuant to authority delegated by the Secretary in accordance with this title. If any provision of any Act, the functions of which are transferred, vested, or delegated pursuant to this Act, provides administrative procedure requirements in addition to the requirements provided in this title, such additional requirements shall also apply to actions under that provision.

(2) Notwithstanding paragraph (1), this title [42 U.S.C. 7191 et seq.] shall apply to the Commission to the same extent this title [42 U.S.C. 7191 et seq.] applies to the Secretary in the exercise of any of the Commission's functions under section 402(c)(1) [42 U.S.C. 7172(c)(1)] or which the Secretary has assigned under section 402(e) [42 U.S.C. 7172(e)].

(b) Publication of proposed rules, regulations, or orders in Federal Register; statement; minimum comment period; additional notice requirement; availability of exception.

(1) In addition to the requirements of subsection (a) of this section, notice of any proposed rule, regulation, or order described in subsection (a) shall be given by publication of such proposed rule, regulation, or order in the Federal Register. Such publication shall be accompanied by a statement of the research, analysis, and other available information in support of, the need for, and the probable effect of, any such proposed rule, regulation, or order. Other effective means of publicity shall be utilized as may be reasonably calculated to notify concerned or affected persons of the nature and probable effect of any such proposed rule, regulation, or order. In each case, a minimum of thirty days following such publication shall be provided for an opportunity to comment prior to promulgation of any such rule, regulation, or order.

(2) Public notice of all rules, regulations, or orders described in subsection (a) which are promulgated by officers of a State or local government agency pursuant to a delegation under this Act shall be provided by publication of such proposed rules, regulations, or orders in at least two newspapers of statewide circulation. If such publication is not practicable, notice of any such rule, regulation, or order shall be given by such other means as the officer promulgating such rule, regulation, or order determines will reasonably assure wide public notice.

(3) For the purposes of this title [42 U.S.C. 7191 et seq.], the exception from the requirements of section 553 of title 5, United States Code [5 U.S.C. 553], provided by subsection (a)(2) of such section with respect to public property, loans, grants, or contracts shall not be available.

(c) Substantial issue of fact or law or likelihood of substantial impact on Nation's economy, etc.; oral presentation.

(1) If the Secretary determines, on his own initiative or in response to any showing made pursuant to paragraph (2) (with respect to a proposed rule, regulation, or order described in subsection (a)) that no substantial issue of fact or law exists and that such rule, regulation, or order is unlikely to have a substantial impact on the Nation's economy or large numbers of individuals or businesses, such proposed rule, regulation, or order may be promulgated in accordance with section 553 of title 5, United States Code [5 U.S.C. 553]. If the Secretary determines that a substantial issue of fact or law exists or that such rule, regulation, or order is likely to have a substantial impact on the Nation's economy or large numbers of individuals or businesses, an opportunity for oral presentation of views, data, and arguments shall be provided.

(2) Any person, who would be adversely affected by the implementation of any proposed rule, regulation, or order who desires an opportunity for oral presentation of views, data, and arguments, may submit material supporting the existence of such substantial issues or such impact.

(3) A transcript shall be kept of any oral presentation with respect to a rule, regulation, or order described in subsection (a).

(d) Promulgation of rule if accompanied by explanation. Following the notice and comment period, including any oral presentation required by this subsection, the Secretary may promulgate a rule if the rule is accompanied by an explanation responding to the major comments, criticisms, and alternatives offered during the comment period.

(e) Waiver of requirements.The requirements of subsections (b), (c), and (d) of this section may be waived where strict compliance is found by the Secretary to be likely to cause serious harm or injury to the public health, safety, or welfare, and such finding is set out in detail in such rule, regulation, or order. In the event the requirements of this section are waived, the requirements shall be satisfied within a reasonable period of time subsequent to the promulgation of such rule, regulation, or order.

(f) Effects confined to single unit of local government, geographic area within State, or State; hearing or oral presentation.

(1) With respect to any rule, regulation, or order described in subsection (a), the effects of which, except for indirect effects of an inconsequential nature, are confined to—

(A) a single unit of local government or the residents thereof;

(B) a single geographic area within a State or the residents thereof; or

(C) a single State or the residents thereof

the Secretary shall, in any case where appropriate, afford an opportunity for a hearing or the oral presentation of views, and provide procedures for the holding of such hearing or oral presentation within the boundaries of the unit of local government, geographic area, or State described in paragraphs (A) through (C) of this paragraph as the case may be.

(2) For the purposes of this subsection—

(A) the term "unit of local government" means a county, municipality, town, township, village, or other unit of general government below the State level; and

(B) the term "geographic area within a State" means a special purpose district or other region recognized for governmental purposes within such State which is not a unit of local government.

(3) Nothing in this subsection shall be construed as requiring a hearing or an oral presentation of views where none is required by this section or other provision of law.

(g) Prescription of procedures for State and local government agencies. Where authorized by any law vested, transferred, or delegated pursuant to this Act, the Secretary may, by rule, prescribe procedures for State or local government agencies authorized by the Secretary to carry out such functions as may be permitted under applicable law. Such procedures shall apply to such agencies in lieu of this section, and shall require that prior to taking any action, such agencies shall take steps reasonably calculated to provide notice to persons who may be affected by the action, and shall afford an opportunity for presentation of views (including oral presentation of views where practicable) within a reasonable time before taking the action.

[42 U.S.C. 7191]

JUDICIAL REVIEW

Sec. 502. (a) Agency action. Judicial review of agency action taken under any law the functions of which are vested by law in, or transferred or delegated to the Secretary, the Commission or any officer, employee, or component of the Department shall, notwithstanding such vesting, transfer, or delegation, be made in the manner specified in or for such law.

(b) Review by district court of United States; removal. Notwithstanding the amount in controversy, the district courts of the United States shall have exclusive original jurisdiction of all other cases or controversies arising exclusively under this Act, or under rules, regulations, or orders issued exclusively thereunder, other than any actions taken to implement or enforce any rule, regulation, or order by any officer of a State or local government agency under this Act, except that nothing in this section affects the power of any court of competent jurisdiction to consider, hear, and determine in any proceeding before it any issue raised by way of defense (other than a defense based on the unconstitutionality of this Act or the validity of action taken by any agency under this Act). If in any such proceeding an issue by way of defense is raised based on the unconstitutionality of this Act or the validity of agency action under this Act, the case shall be subject to removal by either party to a district court of the United States in accordance with the applicable provisions of chapter 89 of title 28, United States Code [28 U.S.C. 1441 et seq.]. Cases or controversies arising under any rule, regulation, or order of any officer of a State or local government agency may be heard in either (A) any appropriate State court, or (B) without regard to the amount in controversy, the district courts of the United States.

(c) Litigation supervision by Attorney General. Subject to the provisions of section 401(i) of this Act [42 U.S.C. 7171(i)], and notwithstanding any other law, the litigation of the Department shall be subject to the supervision of the Attorney General pursuant to chapter 31 of title 28, United States Code [28 U.S.C. 501 et seq.]. The Attorney General may authorize any attorney of the Department to conduct any civil litigation of the Department in any Federal court except the Supreme Court.

[42 U.S.C. 7192]

REMEDIAL ORDERS

Sec. 503. (a) Violations of rules, regulations, or orders promulgated pursuant to Emergency Petroleum Allocation Act of 1973 [15 U.S.C. 751 et seq.]. If upon investigation the Secretary or his authorized

representative believes that a person has violated any regulation, rule, or order described in section 501(a) [42 U.S.C. 7191(a)] promulgated pursuant to the Emergency Petroleum Allocation Act of 1973 [15 U.S.C. 751 et seq.] he may issue a remedial order to the person. Each remedial order shall be in writing and shall describe with particularity the nature of the violation, including a reference to the provision of such rule, regulation, or order alleged to have been violated. For purposes of this section "person" includes any individual, association, company, corporation, partnership, or other entity however organized.

(b) Notice of intent to contest; final order not subject to review. If within thirty days after the receipt of the remedial order issued by the Secretary, the person fails to notify the Secretary that he intends to contest the remedial order, the remedial order shall become effective and shall be deemed a final order of the Secretary and not subject to review by any court or agency.

(c) Notice of contestation to Commission; stay; hearing; cross examination; final order; enforcement and review. If within thirty days after the receipt of the remedial order issued by the Secretary, the person notifies the Secretary that he intends to contest a remedial order issued under subsection (a) of this section, the Secretary shall immediately advise the Commission of such notification. Upon such notice, the Commission shall stay the effect of the remedial order, unless the Commission finds the public interest requires immediate compliance with such remedial order. The Commission shall, upon request, afford an opportunity for a hearing, including, at a minimum, the submission of briefs, oral or documentary evidence, and oral arguments. To the extent that the Commission in its discretion determines that such is required for a full and true disclosure of the facts, the Commission shall afford the right of cross examination. The Commission shall thereafter issue an order, based on findings of fact, affirming, modifying, or vacating the Secretary's remedial order, or directing other appropriate relief, and such order shall, for the purpose of judicial review, constitute a final agency action, except that enforcement and other judicial review of such action shall be the responsibility of the Secretary.

(d) Time limits. The Secretary may set reasonable time limits for the Commission to complete action on a proceeding referred to it pursuant to this section.

(e) Effect on procedural action taken by Secretary prior to issuance of initial remedial order. Nothing in preceding provisions of this section shall be construed to affect any procedural action taken by the Secretary prior to or incident to initial issuance of a remedial order which is the subject of the hearing provided in this section, but such procedures shall be reviewable in the hearing.

(f) Savings provision. The provisions of preceding provisions of this section shall be applicable only with respect to proceedings initiated by a notice of probable violation issued after the effective date of this Act.

(g) Retroactive application; marketing of petroleum products. With respect to any person whose sole petroleum industry operation relates to the marketing of petroleum products, the Secretary or any person acting on his behalf may not exercise discretion to maintain a civil action (other than an action for injunctive relief) or issue a remedial order against such person for any violation of any rule or regulation if—

(1) such civil action or order is based on a retroactive application of such rule or regulation or is based upon a retroactive interpretation of such rule or regulation; and

(2) such person relied in good faith upon rules, regulations, or ruling in effect on the date of the violation interpreting such rules or regulations.

[42 U.S.C. 7193]

REQUESTS FOR ADJUSTMENTS

Sec. 504. (a) The Secretary or any officer designated by him shall provide for the making of such adjustments to any rule, regulation or order described in section 501(a)[42 U.S.C. 7191(a)] issued under the Federal Energy Administration Act [15 U.S.C. 761 et seq.], the Emergency Petroleum Allocation Act of 1973 [15 U.S.C. 751 et seq.], the Energy Supply and Environmental Coordination Act of 1974, or the Energy Policy and Conservation Act, consistent with the other purposes of the relevant Act, as may be necessary to prevent special hardship, inequity, or unfair distribution of burdens, and shall by rule, establish procedures which are available to any person for the purpose of seeking an interpretation, modification, or recision of, exception to, or exemption from, such rule, regulation or order. The Secretary or any such officer shall additionally insure that each decision on any application or petition requesting an adjustment shall specify the standards of hardship, inequity, or unfair distribution of burden by which any disposition was made, and the specific application of such standards to the facts contained in any such application or petition.

(b) (1) If any person is aggrieved or adversely affected by a denial of a request for adjustment under subsection (a) such person may request a review of such denial by the Commission and may obtain judicial review in accordance with this title [42 U.S.C. 7191 et seq.] when such a denial becomes final.

(2) The Commission shall, by rule, establish appropriate procedures, including a hearing when requested, for review of a denial. Action by the Commission under this section shall be considered final agency action within the meaning of section 704 of title 5, United States Code [5 U.S.C. 704], and shall not be subject to further review by the Secretary or any officer or employee of the Department. Litigation involving judicial review of such action shall be the responsibility of the Secretary.

[42 U.S.C. 7194]

TITLE VI—ADMINISTRATIVE PROVISIONS

PART A—CONFLICT OF INTEREST PROVISIONS

DEFINITIONS

Sec. 601. (a) Supervisory employees. For the purposes of this title [42 U.S.C. 7211 et seq.], the following officers or employees of the Department are supervisory employees:

(1) an individual holding a position in the Department at GS-16, GS-17, or GS-18 of the General Schedule [5 U.S.C. 5332 note] or at level I, II, III, IV, or V of the Executive Schedule [5 U.S.C. 5312-5316], or who is in a position at a comparable or higher level on any other Federal pay scale, or who holds a position pursuant to subsection (b) or (d) of section 621 [42 U.S.C. 7321(b) or (d)], or who is an expert or consultant employed pursuant to section 3109 of title 5, United States Code [5 U.S.C. 3109], for more than ninety days in any calendar year and receives compensation at an annual rate equal to or in excess of the minimum rate prescribed for individuals at GS-16 of the General Schedule [5 U.S.C. 5332 note];

(2) the Director or Deputy Director of any State, regional, district, local, or other field office maintained pursuant to section 650 of this Act [42 U.S.C. 7260];

(3) an employee or officer who has primary responsibility for the award, review, modification, or termination of any grant, contract, award, or fund transfer within the authority of the Secretary; and

(4) any other employee or officer who, in the judgment of the Secretary, exercises sufficient decisionmaking or regulatory authority so that the provisions of this title [42 U.S.C. 7211 et seq.] should apply to such individual.

(b) Energy concern. For purposes of this title [42 U.S.C. 7211 et seq.] the term "energy concern" includes—

(1) any person significantly engaged in the business of developing, extracting, producing, refining, transporting by pipeline, converting into synthetic fuel, distributing, or selling minerals for use as an energy source, or in the generation or transmission of energy from such minerals or from wastes or renewable resources;

(2) any person holding an interest in property from which coal, natural gas, crude oil, nuclear material or a renewable resource is commercially produced or obtained;

(3) any person significantly engaged in the business of producing, generating, transmitting, distributing, or selling electric power;

(4) any person significantly engaged in development, production, processing, sale, or distribution of nuclear materials, facilities, or technology;

(5) any person—

(A) significantly engaged in the business of conducting research, development, or demonstration related to an activity described in paragraph (1), (2), (3), or (4); or

(B) significantly engaged in conducting such research, development, or demonstration with financial assistance under any Act the functions of which are vested in or delegated or transferred to the Secretary or the Department.

(c) Publication of list of energy concerns.

(1) The Secretary shall prepare and periodically publish a list of persons which the Secretary has determined to be energy concerns as defined by subsection (b). The absence of any particular energy concern from such list shall not exempt any officer or employee from the requirements of sections 602 through 606 of this Act [42 U.S.C. 7212-7216].

(2) At the request of any officer or employee of the Department, the Secretary shall determine whether any person is an energy concern as defined by subsection (b).

(d) Knowledge of interest, status, or position. For the purposes of sections 602(a), 603(a), 605(a), and 606 [42 U.S.C. 7212(a), 7213(a), 7215(a), and 7216] an individual shall be deemed to have known of or knowingly committed a described act or to have known of or knowingly held a described interest, status, or position if the employee knew or should have known of such act, interest, status, or position. For the purposes of section

602(a) [42 U.S.C. 7212(a)] an officer or employee shall be deemed to have known of or knowingly held an interest in an energy concern if such interest is sold or otherwise transferred to his spouse or dependent while such officer or employee is, or within six months prior to the date on which such officer or employee becomes, an officer or employee of the Department. The placing of an interest under a trust by an individual shall not satisfy the requirement of section 602 [42 U.S.C. 7212] or waive the requirements of section 603 [42 U.S.C. 7213] as to such interest unless none of the interests placed under such trust by such individual consists of known financial interests in any energy concern.

[42 U.S.C. 7211]

DIVESTITURE OF ENERGY HOLDINGS BY SUPERVISORY OFFICIALS

Sec. 602. (a) Prohibitions with respect to energy holdings. No supervisory employee shall knowingly receive compensation from, or hold any official relation with, any energy concern, or own stocks or bonds of any energy concern, or have any pecuniary interest therein.

(b) Compliance by transferred personnel; notice. Personnel transferred to the Department pursuant to section 701 of this Act [42 U.S.C. 7291] shall have six months to comply with the provisions of subsection (a) with respect to prohibited property holdings. Any person transferred pursuant to section 701 of this Act [42 U.S.C. 7291] shall notify the Secretary or his designee of all known circumstances which would be violative of the restrictions set forth in subsection (a) not later than thirty days after the date of such transfer, as determined by the United States Civil Service Commission [Director of the Office of Personnel Management].

(c) Waiver requirements. Where exceptional hardship would result, or where the interest is a pension, insurance or other similarly vested interest, the Secretary is authorized to waive the requirements of this section for such period as he may prescribe with respect to any supervisory employee covered. Such waiver shall:

(1) be published in the Federal Register;

(2) contain a finding by the Secretary that exceptional hardship would result or that there is such a vested interest; and

(3) state the period of the waiver and indicate the actions taken to minimize or eliminate the conflict of interest during such period.

(d) Disclosure. Any supervisory employee who continues to receive income from any energy concern, or continues to own property directly or indirectly in any such concern shall disclose such income or ownership pursuant to section 603 [42 U.S.C. 7213].

[42 U.S.C. 7212]

DISCLOSURE OF ENERGY ASSETS

Sec. 603. (a) Report; contents; time to file; form and manner. Each individual who at any time during the calendar year serves as an officer or employee of the Department shall disclose to the Secretary—

(1) the amount of income and the identity of the source of income knowingly received by such individual, his spouse, or dependent from any energy concern, and

(2) the identity and value of interest knowingly held in any such concern

during such calendar year. Such report shall be filed not later than thirty days after commencing service in the Department and on May 15 following each such calendar year. Each report under this subsection shall be in such form and manner as the Secretary shall, by rule, prescribe.

(b) Duties of Secretary. The Secretary shall—

(1) act, within ninety days after the effective date of this Act, by rule to establish the methods by which the requirement to file written statements specified in subsection (a) will be monitored and enforced, including appropriate provisions for the filing by such officers and employees of such statements, for the recording by the reviewing official of any action taken to eliminate any potential conflict, and for the signing of such statement by the reviewing official; and

(2) include, as part of the report made pursuant to section 657 [42 U.S.C. 7267], a report with respect to such disclosures and the actions taken in regard thereto during the preceding calendar year.

(c) Identification of exempt positions. In the rules prescribed in subsection (b), the Secretary shall identify specific positions, or classes thereof, within the Department which are of a nonregulatory or nonpolicymaking nature at or below GS-12 of the General Schedule [5 U.S.C. 5332 note] and shall exempt such positions and the individuals occupying those positions from the requirements of this section.

(d) Report of employee or officer whose employment ceased during any calendar year; time to file. Each individual required to file a report under this section who during any calendar year ceases to be an officer or

employee of the Department shall file a report covering that portion of such year beginning on January 1 and ending on the date on which he ceases to be such an officer or employee, and such report shall be filed with the Secretary not later than thirty days after such date.

(e) Extensions of time for filing. The Secretary may grant one or more reasonable extensions of time for filing any such report under this section but the total of such extensions shall not exceed ninety days.

[42 U.S.C. 7213]

REPORT ON PRIOR EMPLOYMENT; CONTENTS; EXCEPTIONS

Sec. 604. (a) Within sixty days of becoming a supervisory employee of the department, each supervisory employee shall file with the Secretary, in such form and manner as the Secretary shall prescribe, a report identifying any energy concern which paid the reporting individual compensation in excess of $2,500 in any of the previous five calendar years. The individual shall include in the report—

(1) the name and address of each source of such compensation;

(2) the period during which the reporting individual was receiving such compensation from each such source;

(3) the title of each position or relationship the reporting individual held with each compensating source; and

(4) a brief description of the duties performed or services rendered by the reporting individual in each such position.

(b) Subsection (a) shall not require any individual to include in such report any information which is considered confidential as a result of a privileged relationship, recognized by law, between such individual and any person; nor shall it require an individual to report any information with respect to any person for whom services were provided by any firm or association of which such individual was a member, partner, or employee unless such individual was directly involved in the provision of such services.

[42 U.S.C. 7214]

POSTEMPLOYMENT PROHIBITIONS AND REPORTING REQUIREMENTS

Sec. 605. (a)(1) Except as provided in paragraph (2) or (3), no supervisory employee shall, within one year after his employment with the Department has ceased, knowingly—

(A) make any appearance or attendance before, or

(B) make any written or oral communication to, and with the intent to influence the action of;

the Department if such appearance or communication relates to any particular matter which is pending before the Department.

(2) Paragraph (1) shall not apply to any appearance, attendance, or communication made, during any part of such year that such individual is employed by, and is on behalf of, the United States; nor shall it apply to an appearance or communication by the former supervisory employee where such appearance or communication is made in response to a subpena, or concerns any matter of an exclusively personal and individual nature such as pension benefits.

(3) Paragraph (1) shall not prohibit a former supervisory employee with outstanding scientific or technological qualifications from making any appearance, attendance, or written or oral communication in connection with a particular matter in a scientific or technological field if the Secretary or the Commission, as the case may be, makes a certification in writing, published in the Federal Register, that the national interest would be served by such action or appearance by such former supervisory employee.

(b) (1) Each former supervisory employee of the Department shall file with the Secretary, in such form and manner as the Secretary shall prescribe, not later than May 15 of the first and second calendar years following the first full year in which such person ceased to be an officer or employee of the Department, a report describing any employment with any energy concern during the period to which such report relates, including any employment as a consultant, agent, attorney, or otherwise, except that the requirements of this subsection shall not apply to any former supervisory employee who, at the time such employment with the Department ceases, has any contract, promise, or other agreement with respect to future employment with any energy concern, if (A) the former supervisory employee describes such agreement in any report filed within thirty days after the individual ceases to be an employee of the Department, and (B) the former supervisory employee amends the report by May 15 of either of the next two years during which he has accepted employment with another energy concern.

(2) Each report filed pursuant to paragraph (1) of this subsection shall contain the name and address of the person filing the report, the name and address of the energy concern with which he holds or will hold employment during any portion of the period covered by the report, a brief description of his responsibilities for the energy concern, the dates of his employment, and such other pertinent information as the Secretary may require.

[42 U.S.C. 7215]

PARTICIPATION PROHIBITIONS OF FORMER SUPERVISORY EMPLOYEES

Sec. 606. (a) Department proceedings in which former employer is substantially, directly, or materially involved. For a period of one year after terminating any employment with any energy concern, no supervisory employee shall knowingly participate in any Department proceeding in which his former employer is substantially, directly, or materially involved, other than in a rulemaking proceeding which has a substantial effect on numerous energy concerns.

(b) Department proceedings for which former employee had direct responsibility or in which former employee participated substantially or personally. For a period of one year after commencing service in the Department, no supervisory employee shall knowingly participate in any Department proceeding for which, within the previous five years, he had direct responsibility, or in which he participated substantially or personally, while in the employment of any energy concern.

(c) Waiver. Whenever the Secretary makes a written finding as to a particular supervisory employee that the application of a particular restriction or requirement imposed by subsection (a) or (b) in a particular circumstance would work an exceptional hardship upon such supervisory employee or would be contrary to the national interest, the Secretary may waive in writing such restriction or requirement as to such supervisory employee. Any waiver made by the Secretary of a restriction imposed under subsection (b) shall also be filed with any record of the Department proceeding as to which the waiver for purposes of participation is granted. No such waiver shall in any instance constitute a waiver of the requirements of section 207 of title 18, United States Code [18 U.S.C. 207].

[42 U.S.C. 7215]

PROCEDURES APPLICABLE TO REPORTS

Sec. 607. (a) Availability of reports to public; fee; time.

(1) Except as provided in this section, the Secretary shall make each report filed with him under section 603, 604, or 605 [42 U.S.C. 7213, 7214, or 7215] available to the public within thirty days after the receipt of such report, and shall provide a copy of any such report to any person upon written request.

(2) The Secretary may require any person receiving a copy of any report to pay a reasonable fee in any amount which the Secretary finds necessary to recover the cost of reproduction or mailing of such report, excluding any salary of any employee involved in such reproduction or mailing. The Secretary may furnish a copy of any such report without charge, or at a reduced charge, if he determines that waiver or reduction of the fee is in the public interest because furnishing the information primarily benefits the public.

(3) Any report received by the Secretary shall be held in his custody and made available to the public for a period of six years after receipt by the Secretary of such report. After such six-year period, the Secretary shall destroy any such report.

(b) Director of Office of Personnel Management audit of reports. The Civil Service Commission [Director of the Office of Personnel Management] shall, under such regulations as are prescribed by the Commission [Director of the Office of Personnel Management], conduct, on a random basis, a sufficient number of audits of the reports filed pursuant to sections 603, 604, and 605 [42 U.S.C. 7213, 7214, and 7215], as deemed necessary and appropriate in order to monitor the accuracy and completeness of such reports.

(c) Findings and waivers file; availability to public. The Secretary shall maintain a file containing all findings and waivers made by him pursuant to section 602(c), 603(c), 605(a), or 606(c) [42 U.S.C. 7212(c), 7213(c), 7215(a), or 7216(c)] and all such findings and waivers shall be available for public inspection and copying at all times during regular working hours in accordance with the procedures of this section.

[42 U.S.C. 7217]

SANCTIONS

Sec. 608. (a) Criminal penalty. Any individual who is subject to, and knowingly violates, section 603 [42 U.S.C. 7213] shall be fined not more than $2,500 or imprisoned not more than one year, or both.

(b) Civil penalty. Any individual who violates section 602, 603, 604, 605, or 606 [42 U.S.C. 7212, 7213, 7214, 7215, or 7216] shall be subject to a civil penalty, assessed by the Secretary in accordance with applicable law or by any district court of the United States, not to exceed $10,000 for each violation.

(c) Violations of postemployment prohibitions and reporting requirements considered in deciding outcome of Department proceedings. Notwithstanding any penalty imposed under subsection (a), any violation of section 605(a) [42 U.S.C. 7215(a)] shall be taken into consideration in deciding the outcome of any Department proceeding in connection with which the prohibited appearance, attendance, communication, or submission was made.

(d) Effect on operation of 18 U.S.C. 207 and 208. Nothing in this title [42 U.S.C. 7211 et seq.] shall be deemed to limit the operation of section 207 or section 208 of title 18, United States Code [18 U.S.C. 207 or 208]. Nor shall any waiver issued pursuant to section 602(c) [42 U.S.C. 7212(c)] constitute a waiver of the requirements of such provision.

[42 U.S.C. 7218]

PART B—PERSONNEL PROVISIONS

OFFICERS AND EMPLOYEES

Sec. 621. (a) Authority of Secretary to appoint and fix compensation. In the performance of his functions the Secretary is authorized to appoint and fix the compensation of such officers and employees, including attorneys, as may be necessary to carry out such functions. Except as otherwise provided in this section, such officers and employees shall be appointed in accordance with the civil service laws and their compensation fixed in accordance with title 5, United States Code [5 U.S.C. 1 et seq.].

(b) Appointment of scientific, engineering, etc., personnel without regard to civil service laws; compensation; termination of authority.

(1) Subject to the limitations provided in paragraph (2) and to the extent the Secretary deems such action necessary to the discharge of his functions, he may appoint not more than three hundred eleven of the scientific, engineering, professional, and administrative personnel of the department without regard to the civil service laws, and may fix the compensation of such personnel not in excess of the maximum rate payable for GS-18 of the General Schedule under section 5332 of title 5, United States Code [5 U.S.C. 5332 note].

(2) The Secretary's authority under this subsection to appoint an individual to such a position without regard to the civil service laws shall cease—

(A) when a person appointed, within four years after the effective date of this Act, to fill such position under paragraph (1) leaves such position, or

(B) on the day which is four years after such effective date, whichever is later.

(c) Placement of GS-16, GS-17, and GS-18 [5 U.S.C. 5332] positions without regard to 5 U.S.C. 3324; termination of authority.

(1) Subject to the provisions of chapter 51 of title 5, United States Code [5 U.S.C. 5101 et seq.], but notwithstanding the last two sentences of section 5108(a) of such title [5 U.S.C. 5108(a)], the Secretary may place at GS-16, GS-17, and GS-18 [5 U.S.C. 5337], not to exceed one hundred seventy-eight positions of the positions subject to the limitation of the first sentence of section 5108(a) of such title [5 U.S.C. 5108(a)].

(2) Appointments under this subsection may be made without regard to the provisions of section 3324 of title 5, United States Code [5 U.S.C. 3324], relating to the approval by the Civil Service Commission [Director of the Office of Personnel Management] of appointments under GS-16, GS-17, and GS-18 [5 U.S.C. 5332] if the individual placed in such position is an individual who is transferred in connection with a transfer of functions under this Act and who, immediately before the effective date of this Act, held a position and duties comparable to those of such position.

(3) The Secretary's authority under this subsection with respect to any position shall cease when the person first appointed to fill such position leaves such position.

(d) Appointment of additional scientific, engineering, etc., personnel without regard to civil service laws; compensation. In addition to the number of positions which may be placed at GS-16, GS-17, and GS-18 [5 U.S.C. 5332] under section 5108 of title 5, United States Code [5 U.S.C. 5108], under existing law, or under this Act and to the extent the Secretary deems such action necessary to the discharge of his functions, he may appoint not more than two hundred of the scientific, engineering, professional, and administrative personnel without regard to the civil service laws and may fix the compensation of such personnel not in excess of the

maximum rate payable for GS-18 of the General Schedule under section 5332 of title 5, United States Code [5 U.S.C. 5332 note].

(e) Determination of maximum aggregate number of positions. For the purposes of determining the maximum aggregate number of positions which may be placed at GS-16, GS-17, or GS-18 [5 U.S.C. 5332] under section 5108(a) of title 5, United States Code [5 U.S.C. 5108(a)], 63 percent of the positions established under subsections (b) and (c) shall be deemed GS-16 positions, 25 percent of such positions shall be deemed GS-17 positions, and 12 percent of such positions shall be deemed GS-18.

(f) All positions in the Department which the Secretary determines are devoted to intelligence and intelligence-related activities of the United States Government are excepted from the competitive service, and the individuals who occupy such positions as of the date of enactment of this act shall, while employed in such positions, be exempt from the competitive service.

[42 U.S.C. 7231]

SENIOR POSITIONS

Sec. 622. In addition to those positions created by title II of this Act [42 U.S.C. 7131 et seq.], there shall be within the Department fourteen additional officers in positions authorized by section 5316 of title 5, United States Code [5 U.S.C. 5316], who shall be appointed by the Secretary and who shall perform such functions as the Secretary shall prescribe from time to time.

[42 U.S.C. 7232]

EXPERTS AND CONSULTANTS

Sec. 623. The Secretary may obtain services as authorized by section 3109 of title 5, United States Code [5 U.S.C. 3109], at rates not to exceed the daily rate prescribed for grade GS-18 of the General Schedule under section 5332 of title 5, United States Code [5 U.S.C. 5332 note], for persons in Government service employed intermittently.

[42 U.S.C. 7233]

ADVISORY COMMITTEES

Sec. 624. (a) The Secretary is authorized to establish in accordance with the Federal Advisory Committee Act [5 U.S.C. Appx. I] such advisory committees as he may deem appropriate to assist in the performance of his functions. Members of such advisory committees, other than full-time employees of the Federal Government, while attending meetings of such committees or while otherwise serving at the request of the Secretary while serving away from their homes or regular places of business, may be allowed travel expenses, including per diem in lieu of subsistence, as authorized by section 5703 of title 5, United States Code [5 U.S.C. 5703], for individuals in the Government serving without pay.

(b) Section 17 of the Federal Energy Administration Act of 1974 [15 U.S.C. 776] shall be applicable to advisory committees chartered by the Secretary, or transferred to the Secretary or the Department under this Act, except that where an advisory committee advises the Secretary on matters pertaining to research and development, the Secretary may determine that such meeting shall be closed because it involves research and development matters and comes within the exemption of section 552b(c)(4) of title 5, United States Code [5 U.S.C. 552b(c)(4)].

[42 U.S.C. 7234]

ARMED SERVICES PERSONNEL

Sec. 625. (a) The Secretary is authorized to provide for participation of Armed Forces personnel in carrying out functions authorized to be performed, on the date of enactment of this Act [enacted Aug. 4, 1977], in the Energy Research and Development Administration and under chapter 641 of title 10, United States Code [10 U.S.C. 7421 et seq.]. Members of the Armed Forces may be detailed for service in the Department by the Secretary concerned (as such term is defined in section 101 of such title) [10 U.S.C. 101] pursuant to cooperative agreements with the Secretary.

(b) The detail of any personnel to the Department under this section shall in no way affect status, office, rank, or grade which officers or enlisted men may occupy or hold or any emolument, perquisite, right, privilege, or benefit incident to, or arising out of, such status, office, rank, or grade. A member so detailed shall not be

subject to direction or control by his armed force, or any officer thereof, directly or indirectly, with respect to the responsibilities exercised in the position to which detailed.
[42 U.S.C. 7235]

PART C—GENERAL ADMINISTRATIVE PROVISIONS

GENERAL AUTHORITY

Sec. 641. To the extent necessary or appropriate to perform any function transferred by this Act, the Secretary or any officer or employee of the Department may exercise, in carrying out the function so transferred, any authority or part thereof available by law, including appropriation Acts, to the official or agency from which such function was transferred.
[42 U.S.C. 7251]

DELEGATION

Sec. 642. Except as otherwise expressly prohibited by law, and except as otherwise provided in this Act, the Secretary may delegate any of his functions to such officers and employees of the Department as he may designate, and may authorize such successive redelegations of such functions within the Department as he may deem to be necessary or appropriate.
[42 U.S.C. 7252]

REORGANIZATION

Sec. 643. The Secretary is authorized to establish, alter, consolidate or discontinue such organizational units or components within the Department as he may deem to be necessary or appropriate. Such authority shall not extend to the abolition of organizational units or components established by this Act, or to the transfer of functions vested by this Act in any organizational unit or component.
[42 U.S.C. 7253]

RULES AND REGULATIONS

Sec. 644. The Secretary is authorized to prescribe such procedural and administrative rules and regulations as he may deem necessary or appropriate to administer and manage the functions now or hereafter vested in him.
[42 U.S.C. 7254]

SUBPOENA

Sec. 645. For the purpose of carrying out the provisions of this Act, the Secretary, or his duly authorized agent or agents, shall have the same powers and authorities as the Federal Trade Commission under section 9 of the Federal Trade Commission Act [15 U.S.C. 49] with respect to all functions vested in, or transferred or delegated to, the Secretary or such agents by this Act. For purposes of carrying out its responsibilities under the Natural Gas Policy Act of 1978, the Commission shall have the same powers and authority as the Secretary has under this section.
[42 U.S.C. 7255]

CONTRACTS, LEASES, ETC., WITH PUBLIC AGENCIES AND PRIVATE ORGANIZATIONS AND PERSONS

Sec. 646. (a) The Secretary is authorized to enter into and perform such contracts, leases, cooperative agreements, or other similar transactions with public agencies and private organizations and persons, and to make such payments (in lump sum or installments, and by way of advance or reimbursement) as he may deem to be necessary or appropriate to carry out functions now or hereafter vested in the Secretary.

(b) Notwithstanding any other provision of this title [42 U.S.C. 7211 et seq.], no authority to enter into contracts or to make payments under this title [42 U.S.C. 7211 et seq.] shall be effective except to such extent or in such amounts as are provided in advance in appropriation Acts.

[42 U.S.C. 7256]

ACQUISITION, CONSTRUCTION, ETC., OF LABORATORIES, RESEARCH AND TESTING SITES, ETC.

Sec. 647. The Secretary is authorized to acquire (by purchase, lease, condemnation, or otherwise), construct, improve, repair, operate, and maintain laboratories, research and testing sites and facilities, quarters and related accommodations for employees and dependents of employees of the Department, personal property (including patents), or any interest therein, as the Secretary deems necessary; and to provide by contract or otherwise for eating facilities and other necessary facilities for the health and welfare of employees of the Department at its installations and purchase and maintain equipment therefor.

[42 U.S.C. 7257]

FACILITIES CONSTRUCTION

Sec. 648. (a) Employees and dependents at remote locations. As necessary and when not otherwise available, the Secretary is authorized to provide for, construct, or maintain the following for employees and their dependents stationed at remote locations:

(1) Emergency medical services and supplies;

(2) Food and other subsistence supplies;

(3) Messing facilities;

(4) Audio-visual equipment, accessories, and supplies for recreation and training;

(5) Reimbursement for food, clothing, medicine, and other supplies furnished by such employees in emergencies for the temporary relief of distressed persons;

(6) Living and working quarters and facilities; and

(7) Transportation of schoolage dependents of employees to the nearest appropriate educational facilities.

(b) Medical treatment at reasonable prices. The furnishing of medical treatment under paragraph (1) of subsection (a) and the furnishing of services and supplies under paragraphs (2) and (3) of subsection (a) shall be at prices reflecting reasonable value as determined by the Secretary.

(c) Use of reimbursement proceeds. Proceeds from reimbursements under this section shall be deposited in the Treasury and may be withdrawn by the Secretary to pay directly the cost of such work or services, to repay or make advances to appropriations of funds which will initially bear all or a part of such cost, or to refund excess sums when necessary. Such payments may be credited to a working capital fund otherwise established by law, including the fund established pursuant to section 653 of this Act [42 U.S.C. 7263], and used under the law governing such fund, if the fund is available for use by the Department for performing the work or services for which payment is received.

[42 U.S.C. 7258]

USE OF FACILITIES

Sec. 649. (a) Facilities of United States and foreign governments. With their consent, the Secretary and the Federal Energy Regulatory Commission may, with or without reimbursement, use the research, equipment, and facilities of any agency or instrumentality of the United States or of any State, the District of Columbia, the Commonwealth of Puerto Rico, or any territory or possession of the United States, or of any political subdivision thereof, or of any foreign government, in carrying out any function now or hereafter vested in the Secretary or the Commission.

(b) Facilities under custody of Secretary. In carrying out his functions, the Secretary, under such terms, at such rates, and for such periods not exceeding five years, as he may deem to be in the public interest, is authorized to permit the use by public and private agencies, corporations, associations, or other organizations or by individuals of any real property, or any facility, structure, or other improvement thereon, under the custody of the Secretary for Department purposes. The Secretary may require permittees under this section to recondition and maintain, at their own expense, the real property, facilities, structures, and improvements involved to a satisfactory standard. This section shall not apply to excess property as defined in 3(e) of the Federal Property and Administrative Services Act of 1949 [40 U.S.C. 472(e)].

(c) Use of reimbursement proceeds. Proceeds from reimbursements under this section shall be deposited in the Treasury and may be withdrawn by the Secretary or the head of the agency or instrumentality of the United States involved, as the case may be, to pay directly the costs of the equipment, or facilities provided, to repay or make advances to appropriations or funds which do or will initially bear all or a part of such costs, or to refund excess sums when necessary, except that such proceeds may be credited to a working capital fund otherwise established by law, including the fund established pursuant to section 653 of this Act [42 U.S.C. 7263], and used under the law governing such fund, if the fund is available for use for providing the equipment or facilities involved.

[42 U.S.C. 7259]

FIELD OFFICES

Sec. 650. The Secretary is authorized to establish, alter, consolidate or discontinue and to maintain such State, regional, district, local or other field offices as he may deem to be necessary to carry out functions vested in him.

[42 U.S.C. 7260]

ACQUISITION OF COPYRIGHTS, PATENTS, ETC.

Sec. 651. The Secretary is authorized to acquire any of the following described rights if the property acquired thereby is for use by or for, or useful to, the Department:

(1) copyrights, patents, and applications for patents, designs, processes, and manufacturing data;

(2) licenses under copyrights, patents, and applications for patents; and

(3) releases, before suit is brought, for past infringement of patents or copyrights.

[42 U.S.C. 7261]

GIFTS, BEQUESTS, AND DEVISES

Sec. 652. The Secretary is authorized to accept, hold, administer, and utilize gifts, bequests, and devises of property, both real and personal, for the purpose of aiding or facilitating the work of the Department. Gifts, bequests, and devises of money and proceeds from sales of other property received as gifts, bequests, or devises shall be deposited in the Treasury and shall be disbursed upon the order of the Secretary. Property accepted pursuant to this section, and the proceeds thereof, shall be used as nearly as possible in accordance with the terms of the gift, bequest, or devise. For the purposes of Federal income, estate, and gift taxes, property accepted under this section shall be considered as a gift, bequest, or devise to the United States.

[42 U.S.C. 7262]

CAPITAL FUND

Sec. 653. The Secretary is authorized to establish a working capital fund, to be available without fiscal year limitation, for expenses necessary for the maintenance and operation of such common administrative services as he shall find to be desirable in the interests of economy and efficiency, including such services as a central supply service for stationery and other supplies and equipment for which adequate stocks may be maintained to meet in whole or in part the requirements of the Department and its agencies; central messenger, mail, telephone, and other communications services; office space, central services for document reproduction, and for graphics and visual aids; and a central library service. The capital of the fund shall consist of any appropriations made for the purpose of providing capital (which appropriations are hereby authorized) and the fair and reasonable value of such stocks of supplies, equipment, and other assets and inventories on order as the Secretary may transfer to the fund, less the related liabilities and unpaid obligations. Such funds shall be reimbursed in advance from available funds of agencies and offices in the Department, or from other sources, for supplies and services at rates which will approximate the expense of operation, including the accrual of annual leave and the depreciation of equipment. The fund shall also be credited with receipts from sale or exchange of property and receipts in payment for loss or damage to property owned by the fund. There shall be covered into the United States Treasury as miscellaneous receipts any surplus found in the fund (all assets, liabilities, and prior losses considered) above the amounts transferred or appropriated to establish and maintain said fund. There shall be transferred to the fund the stocks of supplies, equipment, other assets, liabilities, and unpaid obligations relating to the services which he determines will be performed through the fund.

Appropriations to the fund, in such amounts as may be necessary to provide additional working capital, are authorized.
[42 U.S.C. 7263]

SEAL OF DEPARTMENT

Sec. 654. The Secretary shall cause a seal of office to be made for the Department of such design as he shall approve and judicial notice shall be taken of such seal.
[42 U.S.C. 7264]

REGIONAL ENERGY ADVISORY BOARDS

Sec. 655. (a) Establishment; membership. The Governors of the various States may establish Regional Energy Advisory Boards for their regions with such membership as they may determine.
(b) Observers. Representatives of the Secretary, the Secretary of Commerce, the Secretary of the Interior, the Chairman of the Council on Environmental Quality, the Commandant of the Coast Guard and the Administrator of the Environmental Protection Agency shall be entitled to participate as observers in the deliberations of any Board established pursuant to subsection (a) of this section. The Federal Cochairman of the Appalachian Regional Commission or any regional commission under title V of the Public Works and Economic Development Act [42 U.S.C. 3181 et seq.] shall be entitled to participate as an observer in the deliberations of any such Board which contains one or more States which are members of such Commission.
(c) Recommendations of Board. Each Board established pursuant to subsection (a) may make such recommendations as it determines to be appropriate to programs of the Department having a direct effect on the region.
(d) Notice of reasons not to adopt recommendations. If any Regional Advisory Board makes specific recommendations pursuant to subsection (c), the Secretary shall, if such recommendations are not adopted in the implementation of the program, notify the Board in writing of his reasons for not adopting such recommendations.
[42 U.S.C. 7265]

DESIGNATION OF CONSERVATION OFFICERS

Sec. 656. The Secretary of Defense, the Secretary of Commerce, the Secretary of Housing and Urban Development, the Secretary of Transportation, the Secretary of Agriculture, the Secretary of the Interior, the United States Postal Service, and the Administrator of General Services shall each designate one Assistant Secretary or Assistant Administrator, as the case may be, as the principal conservation officer of such Department or of the Administration. Such designated principal conservation officer shall be principally responsible for planning and implementation of energy conservation programs by such Department or Administration and principally responsible for coordination with the Department of Energy with respect to energy matters. Each agency, Department or Administration required to designate a principal conservation officer pursuant to this section shall periodically inform the Secretary of the identity of such conservation officer, and the Secretary shall periodically publish a list identifying such officers.
[42 U.S.C. 7266]

ANNUAL REPORT

Sec. 657. The Secretary shall, as soon as practicable after the end of each fiscal year, commencing with the first complete fiscal year following the effective date of this Act, make a report to the President for submission to the Congress on the activities of the Department during the preceding fiscal year. Such report shall include a statement of the Secretary's goals, priorities, and plans for the Department, together with an assessment of the progress made toward the attainment of those goals, the effective and efficient management of the Department, and progress made in coordination of its functions with other departments and agencies of the Federal Government. In addition, such report shall include the information required by section 15 of the Federal Energy Administration Act of 1974 [15 U.S.C. 774], section 307 of the Energy Reorganization Act of 1974 [42 U.S.C. 5877], and section 15 of the Federal Nonnuclear Energy Research and Development Act of 1974 [42 U.S.C. 5914], and shall include:

(1) projected energy needs of the United States to meet the requirements of the general welfare of the people of the United States and the commercial and industrial life of the Nation, including a comprehensive summary of data pertaining to all fuel and energy needs of residents of the United States residing in—

(A) areas outside standard metropolitan statistical areas; and

(B) areas within such areas which are unincorporated or are specified by the Bureau of the Census, Department of Commerce, as rural areas;

(2) an estimate of (A) the domestic and foreign energy supply on which the United States will be expected to rely to meet such needs in an economic manner with due regard for the protection of the environment, the conservation of natural resources, and the implementation of foreign policy objectives, and (B) the quantities of energy expected to be provided by different sources (including petroleum, natural and synthetic gases, coal, uranium, hydroelectric, solar, and other means) and the expected means of obtaining such quantities;

(3) current and foreseeable trends in the price, quality, management, and utilization of energy resources and the effects of those trends on the social, environmental, economic, and other requirements of the Nation;

(4) a summary of research and development efforts funded by the Federal Government to develop new technologies, to forestall energy shortages, to reduce waste, to foster recycling, to encourage conservation practices, and to increase efficiency; and further such summary shall include a description of the activities the Department is performing in support of environmental, social, economic and institutional, biomedical, physical and safety research, development, demonstration, and monitoring activities necessary to guarantee that technological programs, funded by the Department, are undertaken in a manner consistent with and capable of maintaining or improving the quality of the environment and of mitigating any undesirable environmental and safety impacts;

(5) a review and appraisal of the adequacy and appropriateness of technologies, procedures, and practices (including competitive and regulatory practices) employed by Federal/State, and local governments and nongovernmental entities to achieve the purposes of this Act;

(6) a summary of cooperative and voluntary efforts that have been mobilized to promote conservation and recycling, together with plans for such efforts in the succeeding fiscal year, and recommendations for changes in laws and regulations needed to encourage more conservation and recycling by all segments of the Nation's populace;

(7) a summary of substantive measures taken by the Department to stimulate and encourage the development of new manpower resources through the Nation's colleges and universities and to involve these institutions in the execution of the Department's research and development programs; and

(8) to the extent practicable, a summary of activities in the United States by companies or persons which are foreign owned or controlled and which own or control United States energy sources and supplies, including the magnitude of annual foreign direct investment in the energy sector in the United States and exports of energy resources from the United States by foreign owned or controlled business entities or persons, and such other related matters as the Secretary may deem appropriate.

[42 U.S.C. 7267]

TRANSFER OF FUNDS

Sec. 659. The Secretary, when authorized in an appropriation Act, in any fiscal year, may transfer funds from one appropriation to another within the Department, except that no appropriation shall be either increased or decreased pursuant to this section by more than 5 per centum of the appropriation for such fiscal year.

[42 U.S.C. 7269]

AUTHORIZATION OF APPROPRIATIONS

Sec. 660. Appropriations to carry out the provisions of this Act shall be subject to annual authorization.

[42 U.S.C. 7270]

GUARDS FOR STRATEGIC PETROLEUM RESERVE FACILITIES

Sec. 661. Under guidelines prescribed by the Secretary and concurred with by the Attorney General, employees of the Department of Energy and employees of contractors and subcontractors (at any tier) of the Department of Energy, while discharging their official duties of protecting the Strategic Petroleum Reserve (established under part B of title I of the Energy Policy and Conservation Act) or its storage or related facilities or of protecting persons upon the Strategic Petroleum Reserve or its storage or related facilities, may—

(1) carry firearms, if designated by the Secretary and qualified for the use of firearms under the guidelines; and

(2) arrest without warrant any person for an offense against the United States—

(A) in the case of a felony, if the employee has reasonable grounds to believe that the person—

(i) has committed or is committing a felony; and

(ii) is in or is fleeing from the immediate area of the felony; and

(B) in the case of a felony or misdemeanor, if the violation is committed in the presence of the employee.

TRESPASS ON STRATEGIC PETROLEUM RESERVE FACILITIES

Sec. 662. (a) The Secretary may issue regulations relating to the entry upon or carrying, transporting, or otherwise introducing or causing to be introduced any dangerous weapon, explosive, or other dangerous instrument or material likely to produce substantial injury or damage to persons or property into or onto the Strategic Petroleum Reserve, its storage or related facilities, or real property subject to the jurisdiction, administration, or in the custody of the Secretary under part B of title I of the Energy Policy and Conservation Act [42 U.S.C. 6231-6247]. The Secretary shall post conspicuously, on the property subject to the regulations, notification that the property is subject to the regulations.

(b) Whoever willfully violates a regulation of the Secretary issued under subsection (a) shall be guilty of a misdemeanor and punished upon conviction by a fine of not more than $5,000, imprisonment for not more than one year, or both.

TITLE VII—TRANSITIONAL, SAVINGS, AND CONFORMING PROVISIONS

TRANSFER AND ALLOCATIONS OF APPROPRIATIONS AND PERSONNEL

Sec. 701. (a) Except as otherwise provided in this Act, the personnel employed in connection with, and the assets, liabilities, contracts, property, records, and unexpended balance of appropriations, authorizations, allocations, and other funds employed, held, used, arising from, available to or to be made available in connection with the functions transferred by this Act, subject to section 202 of the Budget and Accounting Procedure Act of 1950 [31 U.S.C. 581c], are hereby transferred to the Secretary for appropriate allocation. Unexpended funds transferred pursuant to this subsection shall only be used for the purposes for which the funds were originally authorized and appropriated.

(b) Positions expressly specified by statute or reorganization plan to carry out functions transferred by this Act, personnel occupying those positions on the effective date of this Act [see 42 U.S.C. 7341], and personnel authorized to receive compensation in such positions at the rate prescribed for offices and positions at level I, II, III, IV, or V of the executive schedule [42 U.S.C. 5312-5316] on the effective date of this Act, shall be subject to the provisions of section 703 of this Act [42 U.S.C. 7293].

[42 U.S.C. 7291]

EFFECT ON PERSONNEL

Sec. 702. (a) Full-time and part-time personnel holding permanent positions. Except as otherwise provided in this Act, the transfer pursuant to this title of full-time personnel (except special Government employees) and part-time personnel holding permanent positions pursuant to this title shall not cause any such employee to be separated or reduced in grade or compensation for one year after the date of enactment of this Act [enacted Aug. 4, 1977], except that full-time temporary personnel employed at the Energy Research Centers of the Energy Research and Development Administration upon the establishment of the Department who are determined by the Department to be performing continuing functions may at the employee's option be converted to permanent full-time status within one hundred and twenty days following their transfer to the Department. The employment levels of full-time permanent personnel authorized for the Department by other law or administrative action shall be increased by the number of employees who exercise the option to be so converted.

(b) Person who held position compensated in accordance with 5 U.S.C. 5301 et seq. Any person who, on the effective date of this Act, held a position compensated in accordance with the Executive Schedule prescribed in chapter 53 of title 5, United States Code [5 U.S.C. 5301 et seq.], and who, without a break in service, is appointed in the Department to a position having duties comparable to those performed immediately preceding his appointment shall continue to be compensated in his new position at not less than the rate provided for his previous position, for the duration of his service in the new position.

(c) Employees holding reemployment rights acquired under former 15 U.S.C. 786. Employees transferred to the Department holding reemployment rights acquired under section 28 of the Federal Energy Administration Act of 1974 or any other provision of law or regulation may exercise such rights only within one hundred twenty days from the effective date of this Act or within two years of acquiring such rights, whichever is later. Reemployment rights may only be exercised at the request of the employee.
[42 U.S.C. 7292]

AGENCY TERMINATIONS

Sec. 703. Except as otherwise provided in this Act, whenever all of the functions vested by law in any agency, commission, or other body, or any component thereof, have been terminated or transferred from that agency, commission, or other body, or component by this Act, the agency, commission, or other body, or component, shall terminate. If an agency, commission, or other body, or any component thereof, terminates pursuant to the preceding sentence, each position and office therein which was expressly authorized by law, or the incumbent of which was authorized to receive compensation at the rates prescribed for an office or position at level II, III, IV, or V of the Executive Schedule [5 U.S.C. 5313-5316], shall terminate.
[42 U.S.C. 7293]

INCIDENTAL TRANSFERS

Sec. 704. The Director of the Office of Management and Budget, in consultation with the Secretary and the Commission, is authorized and directed to make such determinations as may be necessary with regard to the transfer of functions which relate to or are utilized by an agency, commission or other body, or component thereof affected by this Act, to make such additional incidental dispositions of personnel, assets, liabilities, contracts, property, records, and unexpended balances of appropriations, authorizations, allocations, and other funds held, used, arising from, available to or to be made available in connection with the functions transferred by this Act, as he may deem necessary to accomplish the purposes of this Act.
[42 U.S.C. 7294]

SAVINGS PROVISIONS

Sec. 705. (a) Orders, determinations, rules, etc., in effect prior to the effective date of 42 U.S.C. 7101 et seq. All orders, determinations, rules, regulations, permits, contracts, certificates, licenses, and privileges—

(1) which have been issued, made, granted, or allowed to become effective by the President, any Federal department or agency or official thereof, or by a court of competent jurisdiction, in the performance of functions which are transferred under this Act to the Department or the Commission after the date of enactment of this Act [enacted Aug. 4, 1977], and

(2) which are in effect at the time this Act takes effect,

shall continue in effect according to their terms until modified, terminated, superseded, set aside, or revoked in accordance with law by the President, the Secretary, the Federal Energy Regulatory Commission, or other authorized officials, a court of competent jurisdiction, or by operation of law.

(b) Proceedings or applications for licenses, permits, etc., pending at the effective date of 42 U.S.C. 7101 et seq.; regulations.

(1) The provisions of this Act shall not affect any proceedings or any application for any license, permit, certificate, or financial assistance pending at the time this Act takes effect before any department, agency, commission, or component thereof, functions of which are transferred by this Act; but such proceedings and applications, to the extent that they relate to functions so transferred, shall be continued. Orders shall be issued in such proceedings, appeals shall be taken therefrom, and payments shall be made pursuant to such orders, as if this Act had not been enacted; and orders issued in any such proceedings shall continue in effect until modified, terminated, superseded, or revoked by a duly authorized official, by a court of competent jurisdiction, or by operation of law. Nothing in this subsection shall be deemed to prohibit the discontinuance or modification of any such proceeding under the same terms and conditions and to the same extent that such proceeding could have been discontinued or modified if this Act had not been enacted.

(2) The Secretary and the Commission are authorized to promulgate regulations providing for the orderly transfer of such proceedings to the Department or the Commission.

(c) Suits commenced prior to effective date of 42 U.S.C. 7101 et seq. Except as provided in subsection (e)—

(1) the provisions of this Act shall not affect suits commenced prior to the date this Act takes effect, and,

(2) in all such suits, proceedings shall be had, appeals taken, and judgments rendered in the same manner and effect as if this Act had not been enacted.

(d) Suits, actions, etc., commenced by or against any officer or agency or cause of action by or against any department or agency. No suit, action, or other proceeding commenced by or against any officer in his official capacity as an officer of any department or agency, functions of which are transferred by this Act, shall abate by reason of the enactment of this Act. No cause of action by or against any department or agency, functions of which are transferred by this Act, or by or against any officer thereof in his official capacity shall abate by reason of the enactment of this Act.

(e) Suits with officers, departments, or agencies as parties. If, before the date on which this Act takes effect, any department or agency, or officer thereof in his official capacity, is a party to a suit, and under this Act any function of such department, agency, or officer is transferred to the Secretary or any other official, then such suit shall be continued with the Secretary or other official, as the case may be, substituted.

[42 U.S.C. 7295]

SEPARABILITY OF PROVISIONS

Sec. 706. If any provision of this Act or the application thereof to any person or circumstance is held invalid, neither the remainder of this Act nor the application of such provision to other persons or circumstances shall be affected thereby.

[42 U.S.C. 7296]

CROSS REFERENCES

Sec. 707. With respect to any functions transferred by this Act and exercised after the effective date of this Act, reference in any other Federal law to any department, commission, or agency or any officer or office the functions of which are so transferred shall be deemed to refer to the Secretary, the Federal Energy Regulatory Commission, or other official or component of the Department in which this Act vests such functions.

[42 U.S.C. 7297]

PRESIDENTIAL AUTHORITY

Sec. 708. Except as provided in title IV [42 U.S.C. 7191 et seq.], nothing contained in this Act shall be construed to limit, curtail, abolish, or terminate any function of, or authority available to, the President which he had immediately before the effective date of this Act; or to limit, curtail, abolish, or terminate his authority to delegate, redelegate, or terminate any delegation of functions.

[42 U.S.C. 7298]

TRANSITION

Sec. 711. With the consent of the appropriate department or agency head concerned, the Secretary is authorized to utilize the services of such officers, employees, and other personnel of the departments and agencies from which functions have been transferred to the Secretary for such period of time as may reasonably be needed to facilitate the orderly transfer of functions under this Act.

[42 U.S.C. 7299]

ENVIRONMENTAL IMPACT STATEMENTS

Sec. 713. The transfer of functions under titles III and IV of this Act [42 U.S.C. 7151 et seq. and 7171 et seq.] shall not affect the validity of any draft environmental impact statement published before the effective date of this Act.

[42 U.S.C. 7301]

TITLE VIII—ENERGY PLANNING

NATIONAL ENERGY POLICY PLAN

Sec. 801. (a) Preparation by President and submission to Congress; formulation and review.

The President shall—

(1) prepare and submit to the Congress a proposed National Energy Policy Plan (hereinafter in this title [42 U.S.C. 7321 et seq.] referred to as a "proposed Plan") as provided in subsection (b);

(2) seek the active participation by regional, State, and local agencies and instrumentalities and the private sector through public hearings in cities and rural communities and other appropriate means to insure that the views and proposals of all segments of the economy are taken into account in the formulation and review of such proposed Plan;

(3) include within the proposed Plan a comprehensive summary of data pertaining to all fuel and energy needs of persons residing in—

(A) areas outside standard metropolitan statistical areas; and

(B) areas within standard metropolitan statistical areas which are unincorporated or are specified by the Bureau of the Census, Department of Commerce, as rural areas.

(b) Biennial transmittal to Congress; contents. Not later than April 1, 1979, and biennially thereafter, the President shall transmit to the Congress the proposed Plan. Such proposed Plan shall—

(1) consider and establish energy production, utilization, and conservation objectives, for periods of five and ten years, necessary to satisfy projected energy needs of the United States to meet the requirements of the general welfare of the people of the United States and the commercial and industrial life of the Nation, paying particular attention to the needs for full employment, price stability, energy security, economic growth, environmental protection, nuclear non-proliferation, special regional needs, and the efficient utilization of public and private resources;

(2) identify the strategies that should be followed and the resources that should be committed to achieve such objectives, forecasting the level of production and investment necessary in each of the significant energy supply sectors and the level of conservation and investment necessary in each consuming sector, and outlining the appropriate policies and actions of the Federal Government that will maximize the private production and investment necessary in each of the significant energy supply sectors consistent with applicable Federal, State, and local environmental laws, standards, and requirements; and

(3) recommend legislative and administrative actions necessary and desirable to achieve the objectives of such proposed Plan, including legislative recommendations with respect to taxes or tax incentives, Federal funding, regulatory actions, antitrust policy, foreign policy, and international trade.

(c) Submission of report to Congress; contents. The President shall submit to the Congress with the proposed Plan a report which shall include—

(1) whatever data and analysis are necessary to support the objectives, resource needs, and policy recommendations contained in such proposed Plan;

(2) an estimate of the domestic and foreign energy supplies on which the United States will be expected to rely to meet projected energy needs in an economic manner consistent with the need to protect the environment, conserve natural resources, and implement foreign policy objectives;

(3) an evaluation of current and foreseeable trends in the price, quality, management, and utilization of energy resources and the effects of those trends on the social, environmental, economic, and other requirements of the Nation;

(4) a summary of research and development efforts funded by the Federal Government to forestall energy shortages, to reduce waste, to foster recycling, to encourage conservation practices, and to otherwise protect environmental quality, including recommendations for developing technologies to accomplish such purposes; and

(5) a review and appraisal of the adequacy and appropriateness of technologies, procedures, and practices (including competitive and regulatory practices) employed by Federal, State, and local governments and nongovernmental entities to achieve the purposes of the Plan.

(d) Consultation with consumers; small businesses, etc. The President shall insure that consumers, small businesses, and a wide range of other interests, including those of individual citizens who have no financial interest in the energy industry, are consulted in the development of the Plan.

[42 U.S.C. 7321]

CONGRESSIONAL REVIEW

Sec. 802. (a) Each proposed Plan shall be referred to the appropriate committees in the Senate and the House of Representatives.

(b) Each such committee shall review the proposed Plan and, if it deems appropriate and necessary, report to the Senate or the House of Representatives legislation regarding such Plan which may contain such alternatives

to, modifications of, or additions to the proposed Plan submitted by the President as the committee deems appropriate.
[42 U.S.C. 7322]

TITLE IX—EFFECTIVE DATE AND INTERIM APPOINTMENTS

EFFECTIVE DATE

Sec. 901. The provisions of this Act shall take effect one hundred and twenty days after the Secretary first takes office, or on such earlier date as the President may prescribe and publish in the Federal Register, except that at any time after the date of enactment of this Act [enacted Aug. 4, 1977], (1) any of the officers provided for in title II and title IV of this Act [42 U.S.C. 7131 et seq. and 7191 et seq.] may be nominated and appointed, as provided in those titles, and (2) the Secretary and the Commission may promulgate regulations pursuant to section 705(b)(2) of this Act [42 U.S.C. 7295(b)(2)] at any time after the date of enactment of this Act [enacted Aug. 4, 1977]. Funds available to any department or agency (or any official or component thereof), functions of which are transferred to the Secretary or the Commission by this Act, may with the approval of the Director of the Office of Management and Budget, be used to pay the compensation and expenses of any officer appointed pursuant to this subsection until such time as funds for that purpose are otherwise available.
[42 U.S.C. 7341]

INTERIM APPOINTMENTS

Sec. 902. In the event that one or more officers required by this Act to be appointed by and with the advice and consent of the Senate shall not have entered upon office on the effective date of this Act, the President may designate any officer, whose appointment was required to be made, by and with the advice and consent of the Senate, and who was such an officer immediately prior to the effective date of the Act, to act in such office until the office is filled as provided in this Act. While so acting such persons shall receive compensation at the rates provided by this Act for the respective offices in which they act.
[42 U.S.C. 7342]

TITLE X—SUNSET PROVISIONS

SUBMISSION OF COMPREHENSIVE REVIEW

Sec. 1001. Not later than January 15, 1982, the President shall prepare and submit to the Congress a comprehensive review of each program of the Department. Each such review shall be made available to the committee or committees of the Senate and House of Representatives having jurisdiction with respect to the annual authorization of funds, pursuant to section 660 [42 U.S.C. 7270], for such programs for the fiscal year beginning October 1, 1982.
[42 U.S.C. 7351]

CONTENTS OF REVIEW

Sec. 1002. Each comprehensive review prepared for submission under section 1001 [42 U.S.C. 7351] shall include—

(1) the name of the component of the Department responsible for administering the program;

(2) an identification of the objectives intended for the program and the problem or need which the program was intended to address;

(3) an identification of any other programs having similar or potentially conflicting or duplicative objectives;

(4) an assessment of alternative methods of achieving the purposes of the program;

(5) a justification for the authorization of new budget authority, and an explanation of the manner in which it conforms to and integrates with other efforts;

(6) an assessment of the degree to which the original objectives of the program have been achieved, expressed in terms of the performance, impact, or accomplishments of the program and of the problem or need which it was intended to address, and employing the procedures or methods of analysis appropriate to the type or character of the program;

(7) a statement of the performance and accomplishments of the program in each of the previous four completed fiscal years and of the budgetary costs incurred in the operation of the program;

(8) a statement of the number and types of beneficiaries or persons served by the program;

(9) an assessment of the effect of the program on the national economy, including, but not limited to, the effects on competition, economic stability, employment, unemployment, productivity, and price inflation, including costs to consumers and to businesses;

(10) an assessment of the impact of the program on the Nation's health and safety;

(11) an assessment of the degree to which the overall administration of the program, as expressed in the rules, regulations, orders, standards, criteria, and decisions of the officers executing the program, are believed to meet the objectives of the Congress in establishing the program;

(12) a projection of the anticipated needs for accomplishing the objectives of the program, including an estimate if applicable of the date on which, and the conditions under which, the program may fulfill such objectives;

(13) an analysis of the services which could be provided and performance which could be achieved if the program were continued at a level less than, equal to, or greater than the existing level; and

(14) recommendations for necessary transitional requirements in the event that funding for such program is discontinued, including proposals for such executives or legislative action as may be necessary to prevent such discontinuation from being unduly disruptive.

[42 U.S.C. 7352]

URANIUM MILL TAILINGS RADIATION CONTROL ACT OF 1978[1]

An Act to authorize the Secretary of Energy to enter into cooperative agreements with certain States respecting residual radioactive material at existing sites, to provide for the regulation of uranium mill tailings under the Atomic Energy Act of 1954, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SHORT TITLE AND TABLE OF CONTENTS

Section 1. This Act may be cited as the "Uranium Mill Tailings Radiation Control Act of 1978".

Sec. 1. Short title and table of contents.
Sec. 2. Congressional findings and purposes.

TITLE I—REMEDIAL ACTION PROGRAM

Sec. 101. Definitions.
Sec. 102. Processing site designations.
Sec. 103. State cooperative agreements.
Sec. 104. Acquisition and disposition of land and materials.
Sec. 105. Indian tribe cooperative agreements.
Sec. 106. Acquisition of lands by Secretary; consultations with Governor; Consent of Governor; transfer from federal agecy to Secretary.
Sec. 107. Financial assistance.
Sec. 108. Remedial action and mineral recovery activities.
Sec. 109. Rules.
Sec. 110. Enforcement.
Sec. 111. Public participation; public hearings.
Sec. 112. Termination; authorization.
Sec. 113. Limitation.
Sec. 114. Reports to Congress.
Sec. 115. Active operations; liability for remedial action.

TITLE II—URANIUM MILL TAILINGS LICENSING AND REGULATIONS

Sec. 201. Definition.
Sec. 202. Custody of disposal site.
Sec. 203. Authority to establish certain requirements.
Sec. 204. Cooperation with States.
Sec. 205. Authorities of Commission respecting certain byproduct material.
Sec. 206. Authority of Environmental Protection Agency respecting certain byproduct material.
Sec. 207. Authorization of appropriations for grants.
Sec. 208. Effective date.
Sec. 209. Consolidation of licenses and procedures.

[1]This Act consists of Public Law 95-604 (92 Stat. 3021) enacted on Nov. 8, 1978, and subsequent amendments. The Act, except for amendments made to other law, appears in 42 U.S.C. 7901-7942. Bracketed notes are used at the end of each section for the convenience of the reader to indicate the United States Code citation.

TITLE III—STUDY AND DESIGNATION OF TWO MILL TAILINGS SITES IN NEW MEXICO

Sec. 301. Study of authority for regulation and control of residual radioactive materials at New Mexico sites for protection of public health, safety, and the environment; report to Congress and Secretary; basis for determination of inadequacy of authority; interim regulation pending completion of study..

Sec. 302. Designation by Secretary as processing sites for 40 USC 7911 et seq. purposes..

CONGRESSIONAL FINDINGS AND PURPOSES

Sec. 2. (a) The Congress finds that uranium mill tailings located at active and inactive mill operations may pose a potential and significant radiation health hazard to the public, and that the protection of the public health, safety, and welfare and the regulation of interstate commerce require that every reasonable effort be made to provide for the stabilization, disposal, and control in a safe and environmentally sound manner of such tailings in order to prevent or minimize radon diffusion into the environment and to prevent or minimize other environmental hazards from such tailings.

(b) The purposes of this Act are to provide—

(1) in cooperation with the interested States, Indian tribes, and the persons who own or control inactive mill tailings sites, a program of assessment and remedial action at such sites, including, where appropriate, the reprocessing of tailings to extract residual uranium and other mineral values where practicable, in order to stabilize and control such tailings in a safe and environmentally sound manner and to minimize or eliminate radiation health hazards to the public, and

(2) a program to regulate mill tailings during uranium or thorium ore processing at active mill operations and after termination of such operations in order to stabilize and control such tailings in a safe and environmentally sound manner and to minimize or eliminate radiation health hazards to the public.

[42 U.S.C. 7901]

TITLE I—REMEDIAL ACTION PROGRAM

DEFINITIONS

Sec. 101. For purposes of this title—

(1) The term "Secretary" means the Secretary of Energy.

(2) The term "Commission" means the Nuclear Regulatory Commission.

(3) The term "Administrator" means the Administrator of the Environmental Protection Agency.

(4) The term "Indian tribe" means any tribe, band, clan, group, pueblo, or community of Indians recognized as eligible for services provided by the Secretary of the Interior to Indians.

(5) The term "person" means any individual, association, partnership, corporation, firm, joint venture, trust, government entity, and any other entity, except that such term does not include any Indian or Indian tribe.

(6) The term "processing site" means—

(A) any site, including the mill, containing residual radioactive materials at which all or substantially all of the uranium was produced for sale to any Federal agency prior to January 1, 1971 under a contract with any Federal agency, except in the case of a site at or near Slick Rock, Colorado, unless—

(i) such site was owned or controlled as of January 1, 1978, or is thereafter owned or controlled, by any Federal agency, or

(ii) a license (issued by the Commission or its predecessor agency under the Atomic Energy Act of 1954 or by a State as permitted under section 274 of such Act [42 U.S.C. 2021]) for the production at such site of any uranium or thorium product derived from ores is in effect on January 1, 1978, or is issued or renewed after such date; and

(B) any other real property or improvement thereon which—

(i) is in the vicinity of such site, and

(ii) is determined by the Secretary, in consultation with the Commission, to be contaminated with residual radioactive materials derived from such site.

Any ownership or control of an area by a Federal agency which is acquired pursuant to a cooperative agreement under this title shall not be treated as ownership or control by such agency for purposes of subparagraph (A)(i). A license for the production of any uranium product from residual radioactive

materials shall not be treated as a license for production from ores within the meaning of subparagraph (A)(ii) if such production is in accordance with section 108(b).

(7) The term "residual radioactive material" means—

(A) waste (which the Secretary determines to be radioactive) in the form of tailings resulting from the processing of ores for the extraction of uranium and other valuable constituents of the ores; and

(B) other waste (which the Secretary determines to be radioactive) at a processing site which relate to such processing, including any residual stock of unprocessed ores or low-grade materials.

(8) The term "tailings" means the remaining portion of a metal-bearing ore after some or all of such metal, such as uranium, has been extracted.

(9) The term "Federal agency" includes any executive agency as defined in section 105 of title 5 of the United States Code [5 U.S.C. 105].

(10) The term "United States" means the 48 contiguous States and Alaska, Hawaii, Puerto Rico, the District of Columbia, and the territories and possessions of the United States.

[42 U.S.C. 7911]

PROCESSING SITE DESIGNATIONS

Sec. 102. (a) Specific and other site locations; remedial action; consultations; boundaries; Grand Junction, Colorado site restriction.

(1) As soon as practicable, but no later than one year after enactment of this Act [enacted Nov. 8, 1978], the Secretary shall designate processing sites at or near the following locations:

Salt Lake City, Utah
Green River, Utah
Mexican Hat, Utah
Durango, Colorado
Grand Junction, Colorado
Rifle, Colorado (two sites)
Gunnison, Colorado
Naturita, Colorado
Maybell, Colorado
Slick Rock, Colorado (two sites)
Shiprock, New Mexico
Ambrosia Lake, New Mexico
Riverton, Wyoming
Converse County, Wyoming
Lakeview, Oregon
Falls City, Texas
Tuba City, Arizona
Monument Valley, Arizona
Lowman, Idaho
Canonsburg, Pennsylvania

Subject to the provisions of this title, the Secretary shall complete remedial action at the above listed sites before his authority terminates under this title. The Secretary shall within one year of the date of enactment of this Act [enacted Nov. 8, 1978] also designate all other processing sites within the United States which he determines requires remedial action to carry out the purposes of this title. In making such designation, the Secretary shall consult with the Administrator, the Commission, and the affected States, and in the case of Indian lands, the appropriate Indian tribe and the Secretary of the Interior.

(2) As part of his designation under this subsection, the Secretary, in consultation with the Commission, shall determine the boundaries of each such site.

(3) No site or structure with respect to which remedial action is authorized under Public Law 92-314 in Grand Junction, Colorado, may be designated by the Secretary as a processing site under this section.

(b) Health hazard assessment; priorities for remedial action. Within one year from the date of the enactment of this Act [enacted Nov. 8, 1978], the Secretary shall assess the potential health hazard to the public from the residual radioactive materials at designated processing sites. Based upon such assessment, the Secretary

shall, within such one year period, establish priorities for carrying out remedial action at each such site. In establishing such priorities, the Secretary shall rely primarily on the advice of the Administrator.

(c) Notification. Within thirty days after making designations of processing sites and establishing the priorities for such sites under this section, the Secretary shall notify the Governor of each affected State, and, where appropriate, the Indian tribes and the Secretary of the Interior.

(d) Finality of determinations. The designations made, and priorities established, by the Secretary under this section shall be final and not be subject to judicial review.

(e) Certain real property or improved areas.

(1) The designation of processing sites within one year after enactment [enacted Nov. 8, 1978] under this section shall include, to the maximum extent practicable, the areas referred to in section 101(6)(B).

(2) Notwithstanding the one year limitation contained in this section, the Secretary may, after such one year period, include any area described in section 101(6)(B) [42 U.S.C. 7911(6)(B)] as part of a processing site designated under this section if he determines such inclusion to be appropriate to carry out the purposes of this title.

(3) The Secretary shall designate as a processing site within the meaning of section 101(6) [42 U.S.C. 7911(6)] any real property, or improvements thereon, in Edgemont, South Dakota, that—

(A) is in the vicinity of the Tennessee Valley Authority uranium mill site at Edgemont (but not including such site), and

(B) is determined by the Secretary to be contaminated with residual radioactive materials.

In making the designation under this paragraph, the Secretary shall consult with the Administrator, the Commission and the State of South Dakota. The provisions of this title shall apply to the site so designated in the same manner and to the same extent as to the sites designated under subsection (a) except that, in applying such provisions to such site, any reference in this title to the date of the enactment of this Act shall be treated as a reference to the date of the enactment of this paragraph [enacted Jan. 4, 1983] and in determining the State share under section 107 [42 U.S.C. 7917] of the costs of remedial action, there shall be credited to the State, expenditures made by the State prior to the date of the enactment of this paragraph [enacted Jan. 4, 1983] which the Secretary determines would have been made by the State or the United States in carrying out the requirements of this title.

[42 U.S.C. 7912]

STATE COOPERATIVE AGREEMENTS

Sec. 103. (a) Authority of Secretary; prompt commencement of preparations. After notifying a State of the designation referred to in section 102 of this title [42 U.S.C. 7912], the Secretary subject to section 113 [42 U.S.C. 7923], is authorized to enter into cooperative agreements with such State to perform remedial actions at each designated processing site in such State (other than a site located on Indian lands referred to in section 105 [42 U.S.C. 7915]). The Secretary shall, to the greatest extent practicable, enter into such agreements and carry out such remedial actions in accordance with the priorities established by him under section 102 [42 U.S.C. 7912]. The Secretary shall commence preparations for cooperative agreements with respect to each designated processing site as promptly as practicable following the designation of each site.

(b) Terms and conditions; limitation of Federal assistance. Each cooperative agreement under this section shall contain such terms and conditions as the Secretary deems appropriate and consistent with the purposes of this Act, including, but not limited to, a limitation on the use of Federal assistance to those costs which are directly required to complete the remedial action selected pursuant to section 108 [42 U.S.C. 7918].

(c) Written consent of record interest holder; waiver.

(1) Except where the State is required to acquire the processing site as provided in subsection (a) of section 104 [42 U.S.C. 7914], each cooperative agreement with a State under section 103 [this section] shall provide that the State shall obtain, in a form prescribed by the Secretary, written consent from any person holding any record interest in the designated processing site for the Secretary or any person designated by him to perform remedial action at such site.

(2) Such written consent shall include a waiver by each such person on behalf of himself, his heirs, successors, and assigns—

(A) releasing the United States of any liability or claim thereof by such person, his heirs, successors, and assigns concerning such remedial action, and

(B) holding the United States harmless against any claim by such person on behalf of himself, his heirs, successors, or assigns arising out of the performance of any such remedial action.

(d) Inspection entries; termination of right of entry. Each cooperative agreement under this section shall require the State to assure that the Secretary, the Commission, and the Administrator and their authorized representatives have a permanent right of entry at any time to inspect the processing site and the site provided pursuant to section 104(b)(1) [42 U.S.C. 7914(b)(1)] in furtherance of the provisions of this title and to carry out such agreement and enforce this Act and any rules prescribed under this Act. Such right of entry under this section or section 106 [42 U.S.C. 7916] into an area described in section 101(6)(B) [42 U.S.C. 7911(6)(B)] shall terminate on completion of the remedial action, as determined by the Secretary.

(e) Effective date. Each agreement under this section shall take effect only upon the concurrence of the Commission with the terms and conditions thereof.

(f) Reimbursement. The Secretary may, in any cooperative agreement entered into under this section or section 105 [42 U.S.C. 7915], provide for reimbursement of the actual costs, as determined by the Secretary, of any remedial action performed with respect to so much of a designated processing site as is described in section 101(6)(B) [42 U.S.C. 7911(6)(B)]. Such reimbursement shall be made only to a property owner of record at the time such remedial action was undertaken and only with respect to costs incurred by such property owner. No such reimbursement may be made unless—

(1) such remedial action was completed prior to enactment of this Act [enacted Nov. 8, 1978], and unless the application for such reimbursement was filed by such owner within one year after an agreement under this section or section 105 [42 U.S.C. 7915] is approved by the Secretary and the Commission, and

(2) the Secretary is satisfied that such action adequately achieves the purposes of this Act with respect to the site concerned and is consistent with the standards established by the Administrator pursuant to section 275(a) of the Atomic Energy Act of 1954 [42 U.S.C. 2022(a)].

[42 U.S.C. 7913]

ACQUISITION AND DISPOSITION OF LANDS AND MATERIALS

Sec. 104. (a) State acquisition; windfall profits prevention. Each cooperative agreement under section 103 [42 U.S.C. 7913] shall require the State, where determined appropriate by the Secretary with the concurrence of the Commission, to acquire any designated processing site, including where appropriate any interest therein. In determining whether to require the State to acquire a designated processing site or interest therein, consideration shall be given to the prevention of windfall profits.

(b) Disposition and stabilization site for residual radioactive materials; Federal site available.

(1) If the Secretary with the concurrence of the Commission determines that removal of residual radioactive material from a processing site is appropriate, the cooperative agreement shall provide that the State shall acquire land (including, where appropriate, any interest therein) to be used as a site for the permanent disposition and stabilization of such residual radioactive materials in a safe and environmentally sound manner.

(2) Acquisition by the State shall not be required under this subsection if a site located on land controlled by the Secretary or made available by the Secretary of the Interior pursuant to section 106(a)(2) [42 U.S.C. 7916(a)(2)] is designated by the Secretary, with the concurrence of the Commission, for such disposition and stabilization.

(c) Boundary limitations. No State shall be required under subsection (a) or (b) to acquire any real property or improvement outside the boundaries of—

(1) that portion of the processing site which is described in section 101(6)(A) [42 U.S.C. 7911(6)(A)], and

(2) the site used for disposition of the residual radioactive materials.

(d) Purchasers of sites; notification; rules and regulations. In the case of each processing site designated under this title other than a site designated on Indian land, the State shall take such action as may be necessary, and pursuant to regulations of the Secretary under this subsection, to assure that any person who purchases such a processing site after the removal of radioactive materials from such site shall be notified in an appropriate manner prior to such purchase, of the nature and extent of residual radioactive materials removed from the site, including notice of the date when such action took place, and the condition of such site after such action. If the State is the owner of such site, the State shall so notify any prospective purchaser before entering into a contract, option, or other arrangement to sell or otherwise dispose of such site. The Secretary shall issue appropriate rules and regulations to require notice in the local land records of the residual radioactive materials which were located at any processing site and notice of the nature and extent

of residual radioactive materials removed from the site, including notice of the date when such action took place.

(e) State disposition; terms and conditions; fair market value; offer of sale to prior owner.

(1) The terms and conditions of any cooperative agreement with a State under section 103 [42 U.S.C. 7913] shall provide that in the case of any lands or interests therein acquired by the State pursuant to subsection (a), the State, with the concurrence of the Secretary and the Commission, may—

(A) sell such lands and interests,

(B) permanently retain such land and interests in lands (or donate such lands and interests therein to another governmental entity within such State) for permanent use by such State or entity solely for park, recreational, or other public purposes, or

(C) transfer such lands and interests to the United States as provided in subsection (f).

No lands may be sold under subparagraph (A) without the consent of the Secretary and the Commission. No site may be sold under subparagraph (A) or retained under subparagraph (B) if such site is used for the disposition of residual radioactive materials.

(2) Before offering for sale any lands and interests therein which comprise a processing site, the State shall offer to sell such lands and interests at their fair market value to the person from whom the State acquired them.

(f) Transfer of title to Secretary; payment from funds for administrative and legal costs; custody of property; compliance with health and environmental standards for uranium mill tailings; transfer of title restriction.

(1) Each agreement under section 103 [42 U.S.C. 7913] shall provide that title to—

(A) the residual radioactive materials subject to the agreement, and

(B) any lands and interests therein which have been acquired by the State, under subsection (a) or (b), for the disposition of such materials,

shall be transferred by the State to the Secretary when the Secretary (with the concurrence of the Commission) determines that remedial action is completed in accordance with the requirements imposed pursuant to this title. No payment shall be made in connection with the transfer of such property from funds appropriated for purposes of this Act other than payments for any administrative and legal costs incurred in carrying out such transfer.

(2) Custody of any property transferred to the United States under this subsection shall be assumed by the Secretary or such Federal agency as the President may designate. Notwithstanding any other provision of law, upon completion of the remedial action program authorized by this title, such property and minerals shall be maintained pursuant to a license issued by the Commission in such manner as will protect the public health, safety, and the environment. The Commission may, pursuant to such license or by rule or order, require the Secretary or other Federal agency having custody of such property and minerals to undertake such monitoring, maintenance, and emergency measures necessary to protect public health and safety and other actions as the Commission deems necessary to comply with the standards of section 275(a) of the Atomic Energy Act of 1954 [42 U.S.C. 2022(a)]. The Secretary or such other Federal agency is authorized to carry out maintenance, monitoring and emergency measures under this subsection, but shall take no other action pursuant to such license, rule or order with respect to such property and minerals unless expressly authorized by Congress after the date of enactment of this Act [enacted Nov. 8, 1978]. The United States shall not transfer title to property or interest therein acquired under this subsection to any person or State, except as provided in subsection (h).

(g) Reimbursement; fair market value; deposits in the Treasury. Each agreement under section 103 [42 U.S.C. 7913] which permits any sale described in subsection (e)(1)(A) shall provide for the prompt reimbursement to the Secretary from the proceeds of such sale. Such reimbursement shall be in an amount equal to the lesser of—

(1) that portion of the fair market value of the lands or interests therein which bears the same ratio to such fair market value as the Federal share of the costs of acquisition by the State to such lands or interests therein bears to the total cost of such acquisition, or

(2) the total amount paid by the Secretary with respect to such acquisition.

The fair market value of such lands or interest shall be determined by the Secretary as of the date of the sale by the State. Any amounts received by the Secretary under this title shall be deposited in the Treasury of the United States as miscellaneous receipts.

(h) Subsurface mineral rights; sale, lease, or other disposition; restoration costs for disturbance of residual radioactive materials. No provision of any agreement under section 103 [42 U.S.C. 7913] shall prohibit the

Secretary of the Interior, with the concurrence of the Secretary of Energy and the Commission, from disposing of any subsurface mineral rights by sale or lease (in accordance with laws of the United States applicable to the sale, lease, or other disposal of such rights) which are associated with land on which residual radioactive materials are disposed and which are transferred to the United States as required under this section if the Secretary of the Interior takes such action as the Commission deems necessary pursuant to a license issued by the Commission to assure that the residual radioactive materials will not be disturbed by reason of any activity carried on following such disposition. If any such materials are disturbed by any such activity, the Secretary of the Interior shall insure, prior to the disposition of the minerals, that such materials will be restored to a safe and environmentally sound condition as determined by the Commission, and that the costs of such restoration will be borne by the person acquiring such rights from the Secretary of the Interior or from his successor or assign.

[42 U.S.C. 7914]

INDIAN TRIBE COOPERATIVE AGREEMENTS

Sec. 105. (a) Authority of Secretary; priorities for remedial action; use of Indian personnel; terms and conditions. After notifying the Indian tribe of the designation pursuant to section 102 of this title [42 U.S.C. 7912], the Secretary, in consultation with the Secretary of the Interior, is authorized to enter into a cooperative agreement, subject to section 113 [42 U.S.C. 7923], with any Indian tribe to perform remedial action at a designated processing site located on land of such Indian tribe. The Secretary shall, to the greatest extent practicable, enter into such agreements and carry out such remedial actions in accordance with the priorities established by him under section 102 [42 U.S.C. 7912]. In performing any remedial action under this section and in carrying out any continued monitoring or maintenance respecting residual radioactive materials associated with any site subject to a cooperative agreement under this section, the Secretary shall make full use of any qualified members of Indian tribes resident in the vicinity of any such site. Each such agreement shall contain such terms and conditions as the Secretary deems appropriate and consistent with the purposes of this Act. Such terms and conditions shall require the following:

(1) The Indian tribe and any person holding any interest in such land shall execute a waiver (A) releasing the United States of any liability or claim thereof by such tribe or person concerning such remedial action and (B) holding the United States harmless against any claim arising out of the performance of any such remedial action.

(2) The remedial action shall be selected and performed in accordance with section 108 [42 U.S.C. 7918] by the Secretary or such person as he may designate.

(3) The Secretary, the Commission, and the Administrator and their authorized representatives shall have a permanent right of entry at any time to inspect such processing site in furtherance of the provisions of this title, to carry out such agreement, and to enforce any rules described under this Act. Each agreement under this section shall take effect only upon concurrence of the Commission with the terms and conditions thereof.

(b) Disposition and stabilization sites for residual radioactive materials; transfer to Secretary of Interior. When the Secretary with the concurrence of the Commission determines removal of residual radioactive materials from a processing site on lands described in subsection (a) to be appropriate, he shall provide, consistent with other applicable provisions of law, a site or sites for the permanent disposition and stabilization in a safe and environmentally sound manner of such residual radioactive materials. Such materials shall be transferred to the Secretary (without payment therefor by the Secretary) and permanently retained and maintained by the Secretary under the conditions established in a license issued by the Commission, subject to section 104(f)(2) and (h) [42 U.S.C. 7914(f)(2), (h)].

[42 U.S.C. 7915]

ACQUISITION OF LAND BY SECRETARY; CONSULTATIONS WITH GOVERNOR; CONSENT OF GOVERNOR; TRANSFER FROM FEDERAL AGENCY TO SECRETARY

Sec. 106. Where necessary or appropriate in order to consolidate in a safe and environmentally sound manner the location of residual radioactive materials which are removed from processing sites under cooperative agreements under this title, or where otherwise necessary for the permanent disposition and stabilization of such materials in such manner—

(1) the Secretary may acquire land and interests in land for such purposes by purchase, donation, or under any other authority of law or

(2) the Secretary of the Interior may transfer permanently to the Secretary to carry out the purposes of this Act, public lands under the jurisdiction of the Bureau of Land Management in the vicinity of processing sites in the following counties:

(A) Apache County in the State of Arizona;

(B) Mesa, Gunnison, Moffat, Montrose, Garfield, and San Miguel Counties in the State of Colorado;

(C) Boise County in the State of Idaho;

(D) Billings and Bowman Counties in the State of North Dakota;

(E) Grand and San Juan Counties in the State of Utah;

(F) Converse and Fremont Counties in the State of Wyoming; and

(G) Any other county in the vicinity of a processing site, if no site in the county in which a processing site is located is suitable.

Any permanent transfer of lands under the jurisdiction of the Bureau of Land Management by the Secretary of the Interior to the Secretary shall not take place until the Secretary complies with the requirements of the National Environmental Policy Act (42 U.S.C. 4321 et seq.) with respect to the selection of a site for the permanent disposition and stabilization of residual radioactive materials. Section 204 of the Federal Land Policy and Management Act (43 U.S.C. 1714) shall not apply to this transfer of jurisdiction. Prior to acquisition of land under paragraph (1) or (2) of this subsection in any State, the Secretary shall consult with the Governor of such State. No lands may be acquired under such paragraph (1) or (2) in any State in which there is no (1) processing site designated under this title or (2) active uranium mill operation, unless the Secretary has obtained the consent of the Governor of such State. No lands controlled by any Federal agency may be transferred to the Secretary to carry out the purposes of this Act without the concurrence of the chief administrative officer of such agency.

[42 U.S.C. 7916]

FINANCIAL ASSISTANCE

Sec. 107. (a) Federal and non-Federal funds; administrative costs. In the case of any designated processing site for which an agreement is executed with any State for remedial action at such site, the Secretary shall pay 90 per centum of the actual cost of such remedial action, including the actual costs of acquiring such site (and any interest therein) or any disposition site (and any interest therein) pursuant to section 103 of this title [42 U.S.C. 7913], and the State shall pay the remainder of such costs from non-Federal funds. The Secretary shall not pay the administrative costs incurred by any State to develop, prepare, and carry out any cooperative agreement executed with such State under this title, except the proportionate share of the administrative costs associated with the acquisition of lands and interests therein acquired by the State pursuant to this title.

(b) Indian land processing sites. In the case of any designated processing site located on Indian lands, the Secretary shall pay the entire cost of such remedial action.

[42 U.S.C. 7917]

REMEDIAL ACTION AND MINERAL RECOVERY ACTIVITIES

Sec. 108. (a) General standards for remedial action; Federal performance and State participation; use of technology; promulgation of standards.

(1) The Secretary or such person as he may designate shall select and perform remedial actions at designated processing sites and disposal sites in accordance with the general standards prescribed by the Administrator pursuant to section 275 a. of the Atomic Energy Act of 1954. The State shall participate fully in the selection and performance of a remedial action for which it pays part of the cost. Such remedial action shall be selected and performed with the concurrence of the Commission and in consultation, as appropriate with the Indian tribe and the Secretary of the Interior.

(2) The Secretary shall use technology in performing such remedial action as will insure compliance with the general standards promulgated by the Administrator under section 275 a. of the Atomic Energy Act of 1954 [42 U.S.C. 2022(a)] and will assure the safe and environmentally sound stabilization of residual radioactive materials, consistent with existing law.

(3) Notwithstanding paragraphs (1) and (2) of this subsection, after October 31, 1982, if the Administrator has not promulgated standards under section 275 a. of the Atomic Energy Act of 1954 [42 U.S.C. 2022(a)] in final form by such date, remedial action taken by the Secretary under this title shall comply with the standards proposed by the Administrator under such section 275 a. [42 U.S.C. 2022(a)] until such time as the Administrator promulgates the standards in final form.

(b) Mineral concentration evaluation; terms and conditions for mineral recovery; payment of Federal and State share of net profits recovery costs; licenses. Prior to undertaking any remedial action at a designated site pursuant to this title, the Secretary shall request expressions of interest from private parties regarding the remilling of the residual radioactive materials at the site and, upon receipt of any expression of interest, the Secretary shall evaluate among other things the mineral concentration of the residual radioactive materials at each designated processing site to determine whether, as a part of any remedial action program, recovery of such minerals is practicable. The Secretary, with the concurrence of the Commission, may permit the recovery of such minerals, under such terms and conditions as he may prescribe to carry out the purposes of this title. No such recovery shall be permitted unless such recovery is consistent with remedial action. Any person permitted by the Secretary to recover such mineral shall pay to the Secretary a share of the net profits derived from such recovery, as determined by the Secretary. Such share shall not exceed the total amount paid by the Secretary for carrying out remedial action at such designated site. After payment of such share to the United States under this subsection, such person shall pay to the State in which the residual radioactive materials are located a share of the net profits derived from such recovery, as determined by the Secretary. The person recovering such minerals shall bear all costs of such recovery. Any person carrying out mineral recovery activities under this paragraph shall be required to obtain any necessary license under the Atomic Energy Act of 1954 or under State law as permitted under section 274 of such Act [42 U.S.C. 2021].

[42 U.S.C. 7918]

RULES

Sec. 109. The Secretary may prescribe such rules consistent with the purposes of this Act as he deems appropriate pursuant to title V of the Department of Energy Organization Act [42 U.S.C. 7191 et seq.].

[42 U.S.C. 7919]

ENFORCEMENT

Sec. 110. (a) Civil penalty; appellate review; action to recover civil penalty; sovereign immunity; equitable remedies.

(1) Any person who violates any provision of this title or any cooperative agreement entered into pursuant to this title or any rule prescribed under this Act concerning any designated processing site, disposition site, or remedial action shall be subject to an assessment by the Secretary of a civil penalty of not more than $1,000 per day per violation. Such assessment shall be made by order after notice and an opportunity for a public hearing, pursuant to section 554 of title 5, United States Code [5 U.S.C. 554].

(2) Any person against whom a penalty is assessed under this section may, within sixty calendar days after the date of the order of the Secretary assessing such penalty, institute an action in the United States court of appeals for the appropriate judicial circuit for judicial review of such order in accordance with chapter 7 of title 5, United States Code [5 U.S.C. 701 et seq.]. The court shall have jurisdiction to enter a judgment affirming, modifying, or setting aside in whole or in part, the order of the Secretary, or the court may remand the proceeding to the Secretary for such further action as the court may direct.

(3) If any person fails to pay an assessment of a civil penalty after it has become a final and unappealable order, the Secretary shall institute an action to recover the amount of such penalty in any appropriate district court of the United States. In such action, the validity and appropriateness of such final assessment order or judgment shall not be subject to review. Section 402(d) of the Department of Energy Organization Act [42 U.S.C. 7172(d)] shall not apply with respect to the functions of the Secretary under this section.

(4) No civil penalty may be assessed against the United States or any State or political subdivision of a State or any official or employee of the foregoing.

(5) Nothing in this section shall prevent the Secretary from enforcing any provision of this title or any cooperative agreement or any such rule by injunction or other equitable remedy.

(b) Atomic energy licensing requirements. Subsection (a) shall not apply to any licensing requirement under the Atomic Energy Act of 1954. Such licensing requirements shall be enforced by the Commission as provided in such Act.

[42 U.S.C. 7920]

PUBLIC PARTICIPATION; PUBLIC HEARINGS

Sec. 111. In carrying out the provisions of this title, including the designation of processing sites, establishing priorities for such sites, the selection of remedial actions, and the execution of cooperative agreements, the Secretary, the Administrator, and the Commission shall encourage public participation and, where appropriate, the Secretary shall hold public hearings relative to such matters in the States where processing sites and disposal sites are located.

[42 U.S.C. 7921]

TERMINATION OF AUTHORITY OF SECRETARY; EXTENSION OF AUTHORITY; ANNUAL DEPARTMENT OF ENERGY AUTHORIZATIONS; APPROPRIATIONS AVAILABLE FOR EXPENDITURE

Sec. 112. (a) The authority of the Secretary to perform remedial action under this title shall terminate on September 30, 1994, except that the authority of the Secretary to perform groundwater restoration activities under this title is without limitation.

(b) The amounts authorized to be appropriated to carry out the purposes of this title by the Secretary, the Administrator, the Commission, and the Secretary of the Interior shall not exceed such amounts as are established in annual authorization Acts for fiscal year 1979 and each fiscal year thereafter applicable to the Department of Energy. Any sums appropriated for the purposes of this title shall be available until expended.

[42 U.S.C. 7922]

LIMITATION OF CONTRACTUAL AUTHORITY

Sec. 113. The authority under this title to enter into contracts or other obligations requiring the United States to make outlays may be exercised only to the extent provided in advance in annual authorization and appropriation Acts.

[42 U.S.C. 7923]

REPORTS TO CONGRESS

Sec. 114. (a) Information; consultations; separate official views; partial report concerning uranium mill tailings provisions. Beginning on January 1, 1980, and each year thereafter until January 1, 1986, the Secretary shall submit a report to the Congress with respect to the status of the actions required to be taken by the Secretary, the Commission, the Secretary of the Interior, the Administrator, and the States and Indian tribes under this Act and any amendments to other laws made by this Act. Each report shall—

(1) include data on the actual and estimated costs of the program authorized by this title;

(2) describe the extent of participation by the States and Indian tribes in this program;

(3) evaluate the effectiveness of remedial actions, and describe any problems associated with the performance of such actions; and

(4) contain such other information as may be appropriate.

Such report shall be prepared in consultation with the Commission, the Secretary of the Interior, and the Administrator and shall contain their separate views, comments, and recommendations, if any. The Commission shall submit to the Secretary and Congress such portion of the report under this subsection as relates to the authorities of the Commission under title II of this Act.

(b) Identification of sites; Federal agency jurisdiction; contents; duplication prohibition; use and cooperation respecting other Federal agency information. Not later than July 1, 1979, the Secretary shall provide a report to the Congress which identifies all sites located on public or acquired lands of the United States containing residual radioactive materials and other raidoactive [radioactive] waste (other than waste resulting from the production of electric energy) and specifies which Federal agency has jurisdiction over such sites. The report shall include the identity of property and other structures in the vicinity of such site that are contaminated or may be contaminated by such materials and the actions planned or taken to remove such materials. The report shall describe in what manner such sites are adequately stabilized and otherwise controlled to prevent radon diffusion from such sites into the environment and other environmental harm. If any site is not so stabilized or controlled, the report shall describe the remedial actions planned for such site and the time frame for performing such actions. In preparing the reports under this section, the Secretary shall avoid duplication of previous or ongoing studies and shall utilize all information available from other departments and agencies of the United States respecting the subject matter of such report. Such agencies shall cooperate with the Secretary in the preparation of such report and furnish such information as available to them and necessary for such report.

(c) Uranium mine wastes hazards elimination program. Not later than January 1, 1980, the Administrator, in consultation with the Commission, shall provide a report to the Congress which identifies the location and potential health, safety, and environmental hazards of uranium mine wastes together with recommendations, if any, for a program to eliminate these hazards.

(d) Reports to Congressional committees. Copies of the reports required by this section to be submitted to the Congress shall be separately submitted to the Committees on Interior and Insular Affairs and on Interstate and Foreign Commerce of the House of Representatives and the Committee on Energy and Natural Resources of the Senate.

(e) Documentation of information; public availability; trade secrets and other disclosure exempt information. The Commission, in cooperation with the Secretary, shall ensure that any relevant information, other than trade secrets and other proprietary information otherwise exempted from mandatory disclosure under any other provision of law, obtained from the conduct of each of the remedial actions authorized by this title and the subsequent perpetual care of those residual radioactive materials is documented systematically, and made publicly available conveniently for use.

[42 U.S.C. 7924]

ACTIVE OPERATIONS; LIABILITY FOR REMEDIAL ACTION

Sec. 115. (a) No amount may be expended under this title with respect to any site licensed by the Commission under the Atomic Energy Act of 1954 or by a State as permitted under section 274 of such Act [42 U.S.C. 2021] at which production of any uranium product from ores (other than from residual radioactive materials) takes place.

(b) In the case of each processing site designated under this title, the Attorney General shall conduct a study to determine the identity and legal responsibility which any person (other than the United States, a State, or Indian tribe) who owned or operated or controlled (as determined by the Attorney General) such site before the date of the enactment of this Act [enacted Nov. 8, 1978] may have under any law or rule of law for reclamation or other remedial action with respect to such site. The Attorney General shall publish the results of such study, and provide copies thereof to the Congress, as promptly as practicable following the date of the enactment of this Act [enacted Nov. 8, 1978]. The Attorney General, based on such study, shall, to the extent he deems it appropriate and in the public interest, take such action under any provision of law in effect when uranium was produced at such site to require payment by such person of all or any part of the costs incurred by the United States for such remedial action for which he determines such person is liable.

[42 U.S.C. 7925]

TITLE II—URANIUM MILL TAILINGS LICENSING AND REGULATIONS

DEFINITION

Sec. 201. [Amends section 11 e. of the Atomic Energy Act of 1954.]

CUSTODY OF DISPOSAL SITE

Sec. 202. (a) [Amends chapter 8 of the Atomic Energy Act of 1954 by adding a new section 83.]

(b) This section shall be effective three years after the enactment of this Act.

(c) [Amends table of contents for chapter 8 of the Atomic Energy Act of 1954 by inserting a new item after the item relating to section 82.]

AUTHORITY TO ESTABLISH CERTAIN REQUIREMENTS

Sec. 203. [Amends section 161 of the Atomic Energy Act of 1954, which appears in this compilation, by adding a new subsection x.]

COOPERATION WITH STATES

Sec. 204. (a) [Amends section 274 b. of the Atomic Energy Act of 1954.]

(b) [Amends section 274 d. (2) of the Atomic Energy Act of 1954.]

(c) [Amends section 274 n. of the Atomic Energy Act of 1954.

(d) [Amends section 274 j. of the Atomic Energy Act of 1954.]

(e) (1) [Amends section 274 of the Atomic Energy Act of 1954, by adding a new subsection o.]

(2) The provisions of the amendment made by paragraph (1) of this subsection (which adds a new subsection o. to section 274 of the Atomic Energy Act of 1954) shall apply only to the maximum extent practicable during the three-year period beginning on the date of the enactment of this Act.

(f) [Amends section 274 c. of the Atomic Energy Act of 1954.]

(g) Nothing in any amendment made by this section shall preclude any State from exercising any other authority as permitted under the Atomic Energy Act of 1954 respecting any byproduct material, as defined in section 11 e. (2) of the Atomic Energy Act of 1954.

(h) (1) During the three-year period beginning on the date of the enactment of this Act, notwithstanding any other provision of this title, any State may exercise any authority under State law (including authority exercised pursuant to an agreement entered into pursuant to section 274 of the Atomic Energy Act of 1954) respecting (A) byproduct material, as defined in section 11 e. (2) of the Atomic Energy Act of 1954, or (B) any activity which results in the production of byproduct material as so defined, in the same manner and to the same extent as permitted before the date of the enactment of this Act, except that such State authority shall be exercised in a manner which, to the extent practicable, is consistent with the requirements of section 274 o. of the Atomic Energy Act of 1954 (as added by section 204(e) of this Act). The Commission shall have the authority to ensure that such section 274 o. is implemented by any such State to the extent practicable during the three-year period beginning on the date of the enactment of this Act. Nothing in this section shall be construed to preclude the Commission or the Administrator of the Environmental Protection Agency from taking such action under section 275 of the Atomic Energy Act of 1954 as may be necessary to implement title I of this Act.

(2) An agreement entered into with any State as permitted under section 274 of the Atomic Energy Act of 1954 with respect to byproduct material as defined in section 11 e. (2) of such Act, may be entered into at any time after the date of the enactment of this Act but no such agreement may take effect before the date three years after the date of the enactment of this Act.

(3) Notwithstanding any other provision of this title, where a State assumes or has assumed, pursuant to an agreement entered into under section 274 b. of the Atomic Energy Act of 1954, authority over any activity which results in the production of byproduct material, as defined in section 11 e. (2) of such Act, the Commission shall not, until the end of the three-year period beginning on the date of the enactment of this Act, have licensing authority over such byproduct material produced in any activity covered by such agreement, unless the agreement is terminated, suspended, or amended to provide for such Federal licensing. If, at the end of such three-year period, a State has not entered into such an agreement with respect to byproduct material, as defined in section 11 e. (2) of the Atomic Energy Act of 1954, the Commission shall have authority over such byproduct material: *Provided, however,* That, in the case of a State which has exercised any authority under State law pursuant to an agreement entered into under section 274 of the Atomic Energy Act of 1954, the State authority over such byproduct material may be terminated, and the Commission authority over such material may be exercised, only after compliance by the Commission with the same procedures as are applicable in the case of termination of agreements under section 274 j. of the Atomic Energy Act of 1954.

AUTHORITIES OF COMMISSION RESPECTING CERTAIN BYPRODUCT MATERIAL

Sec. 205. (a) [Amends chapter 8 of the Atomic Energy Act of 1954, by adding a new section 84.]

(b) [Amends the first sentence of section 81 of the Atomic Energy Act of 1954.]

(c) [Amends the table of contents for such chapter 8 by inserting a new item after the item relating to section 83.]

AUTHORITY OF ENVIRONMENTAL PROTECTION AGENCY RESPECTING CERTAIN BYPRODUCT MATERIAL

Sec. 206. [Amends chapter 19 of the Atomic Energy Act of 1954, by adding a new section 275.]

AUTHORIZATION OF APPROPRIATION FOR GRANTS

Sec. 207. There is hereby authorized to be appropriated for fiscal year 1980 to the Nuclear Regulatory Commission not to exceed $500,000 to be used for making grants to States which have entered into agreements with the Commission under section 274 of the Atomic Energy Act of 1954, to aid in the development of State regulatory programs under such section which implement the provisions of this Act.

EFFECTIVE DATE

Sec. 208. Except as otherwise provided in this title the amendments made by this title shall take effect on the date of the enactment of this Act.

CONSOLIDATION OF LICENSES AND PROCEDURES

Sec. 209. The Nuclear Regulatory Commission shall consolidate, to the maximum extent practicable, licenses and licensing procedures under amendments made by this title with licenses and licensing procedures under other authorities contained in the Atomic Energy Act of 1954.

TITLE III—STUDY AND DESIGNATION OF TWO MILL TAILINGS SITES IN NEW MEXICO

STUDY OF AUTHORITY FOR REGULATION AND CONTROL OF RESIDUAL RADIOACTIVE MATERIALS AT NEW MEXICO SITES FOR PROTECTION OF PUBLIC HEALTH, SAFETY, AND THE ENVIRONMENT; REPORT TO CONGRESS AND SECRETARY; BASIS FOR DETERMINATION OF INADEQUACY OF AUTHORITY; INTERIM REGULATION PENDING COMPLETION OF STUDY

Sec. 301. The Commission, in consultation with the Attorney General and the Attorney General of the State of New Mexico, shall conduct a study to determine the extent and adequacy of the authority of the Commission and the State of New Mexico to require, under the Atomic Energy Act of 1954 (as amended by title II of this Act) or under State authority as permitted under section 274 of such Act [42 U.S.C. 2021] or under other provision of law, the owners of the following active uranium mill sites to undertake appropriate action to regulate and control all residual radioactive materials at such sites to protect public health, safety, and the environment: the former Homestake-New Mexico Partners site near Milan, New Mexico, and the Anaconda carbonate process tailings site near Bluewater, New Mexico. Such study shall be completed and a report thereof submitted to the Congress and to the Secretary within one year after enactment of this Act [enacted Nov. 8, 1978], together with such recommendations as may be appropriate. If the Commission determines that such authority is not adequate to regulate and control such materials at such sites in the manner provided in the first sentence of this section, the Commission shall include in the report a statement of the basis for such determination. Nothing in this Act shall be construed to prevent or delay action by a State as permitted under section 274 of the Atomic Energy Act of 1954 [42 U.S.C. 2021] or under any other provision of law or by the Commission to regulate such residual radioactive materials at such sites prior to completion of such study.

[42 U.S.C. 7941]

DESIGNATION BY SECRETARY AS PROCESSING SITES FOR 42 U.S.C. 7911 ET SEQ. PURPOSES

Sec. 302. (a) New Mexico cooperative agreement respecting certain residual radioactive materials; submission to Congressional committees. Within ninety days from the date of his receipt of the report and recommendations submitted by the Commission under section 301 [42 U.S.C. 7941], notwithstanding the limitations contained in section 101(6)(A) [42 U.S.C. 7911(6)(A)] and in section 115(a) [42 U.S.C. 7925(a)], if the Commission determines, based on such study, that such sites cannot be regulated and controlled by the State or the Commission in the manner described in section 301 [42 U.S.C. 7941], the Secretary may designate either or both of the sites referred to in section 301 [42 U.S.C. 7941] as a processing site for purposes of title I [42 U.S.C. 7911 et seq.]. Following such designation, the Secretary may enter into cooperative agreements with New Mexico to perform remedial action pursuant to such title concerning only the residual radioactive materials at such site resulting from uranium produced for sale to a Federal agency prior to January 1, 1971, under contract with such agency. Any such designation shall be submitted by the Secretary, together with his estimate of the cost of carrying out such remedial action at the designated site, to the Committee on Interior and Insular Affairs and the Committee on Interstate and Foreign Commerce of the House of Representatives[1] and to the Committee on Energy and Natural Resources of the Senate.

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[1] The name of the Committee on Interstate and Foreign Commerce of the House of Representatives was changed to Committee on Energy and Commerce immediately prior to noon on Jan. 3, 1981, by House Resolution 549, Ninety-sixth Congress, Mar. 25, 1980.

(b) Effective date.

(1)[2] No designation under subsection (a) shall take effect before the expiration of one hundred and twenty calendar days (not including any day in which either House of Congress is not in session because of an adjournment of more than three calendar days to a day certain or an adjournment sine die) after receipt by such Committees of such designation.

(c) 42 U.S.C. 7911 et seq. provisions applicable. Except as otherwise specifically provided in subsection (a), any remedial action under title I [42 U.S.C. 7911 et seq.] with respect to any sites designated under this title [42 U.S.C. 7941 et seq.] shall be subject to the provisions of title I [42 U.S.C. 7911 et seq.] (including the authorization of appropriations referred to in section 112(b) [42 U.S.C. 7922(b)]).

[42 U.S.C. 7942]

[2] Subsection enacted with only one paragraph.

NUCLEAR WASTE POLICY ACT OF 1982[1]

An Act to provide for the development of repositories for the disposal of high-level radioactive waste and spent nuclear fuel, to establish a program of research, development, and demonstration regarding the disposal of high-level radioactive waste and spent nuclear fuel, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SHORT TITLE AND TABLE OF CONTENTS

Section 1. This Act may be cited as the "Nuclear Waste Policy Act of 1982".

Sec. 1. Short title and table of contents.
Sec. 2. Definitions.
Sec. 3. Separability.
Sec. 4. Territories and possessions.
Sec. 5. Ocean disposal.
Sec. 6. Limitation on spending authority.
Sec. 7. Protection of classified national security information.
Sec. 8. Applicability.
Sec. 9. Applicability to transportation laws.

TITLE I—DISPOSAL AND STORAGE OF HIGH-LEVEL RADIOACTIVE WASTE, SPENT NUCLEAR FUEL, AND LOW-LEVEL RADIOACTIVE WASTE

Sec. 101. State and affected Indian tribe participation in development of proposed repositories for defense waste.

SUBTITLE A—REPOSITORIES FOR DISPOSAL OF HIGH-LEVEL RADIOACTIVE WASTE AND SPENT NUCLEAR FUEL

Sec. 111. Findings and purposes.
Sec. 112. Recommendation of candidate sites for site characterization.
Sec. 113. Site characterization.
Sec. 114. Site approval and construction authorization.
Sec. 115. Review of repository site selection.
Sec. 116. Participation of States.
Sec. 117. Consultation with States and affected Indian tribes.
Sec. 118. Participation of Indian tribes.
Sec. 119. Judicial review of agency actions.
Sec. 120. Expedited authorizations.
Sec. 121. Certain standards and criteria.
Sec. 122. Disposal of spent nuclear fuel.
Sec. 123. Title of material.
Sec. 124. Consideration of effect of acquisition of water rights.
Sec. 125. Termination of certain provisions.

SUBTITLE B—INTERIM STORAGE PROGRAM

Sec. 131. Findings and purposes.

[1] This Act consists of the Act of Jan. 7, 1983 (Public Law 97-425; 96 Stat. 2201), as amended by P. L. 100-203 (December 22, 1987). The Act is generally classified to 42 U.S.C. 10101 and following. Bracketed notes at the end of each section indicate the United States Code citation for the reader's convenience.

Sec. 132. Available capacity for interim storage of spent nuclear fuel.
Sec. 133. Interim at-reactor storage.
Sec. 134. Licensing of facility expansions and transshipments.
Sec. 135. Storage of spent nuclear fuel.
Sec. 136. Interim Storage Fund.
Sec. 137. Transportation.

SUBTITLE C—MONITORED RETRIEVABLE STORAGE

Sec. 141. Monitored retrievable storage.
Sec. 142. Authorization of monitored retrievable storage.
Sec. 143. Monitored Retrievable Storage Commission.
Sec. 144. Survey.
Sec. 145. Site selection.
Sec. 146. Notice of disapproval.
Sec. 147. Benefits agreement.
Sec. 148. Construction authorization.
Sec. 149. Financial assistance.

SUBTITLE D—LOW-LEVEL RADIOACTIVE WASTE

Sec. 151. Financial arrangements for low-level radioactive site closure.

SUBTITLE E—REDIRECTION OF THE NUCLEAR WASTE PROGRAM

Sec. 160. Selection of Yucca Mountain site.
Sec. 161. Siting a second repository.

SUBTITLE F—BENEFITS

Sec. 170. Benefits agreements.
Sec. 171. Content of agreements.
Sec. 172. Review panel.
Sec. 173. Termination.

SUBTITLE G—OTHER BENEFITS

Sec. 174. Consideration in siting facilities.
Sec. 175. Report.

SUBTITLE H—TRANSPORTATION

Sec. 180. Transportation.
Sec. 181. Transportation of plutonium by aircraft through United States airspace.

TITLE II—RESEARCH, DEVELOPMENT, AND DEMONSTRATION REGARDING DISPOSAL OF HIGH-LEVEL RADIOACTIVE WASTE AND SPENT NUCLEAR FUEL

Sec. 211. Purpose.
Sec. 212. Applicability.
Sec. 213. Identification of sites.
Sec. 214. Siting research and related activities.
Sec. 215. Test and evaluation facility siting review and reports.
Sec. 216. Federal agency actions.
Sec. 217. Research and development on disposal of high-level radioactive waste.
Sec. 218. Research and development on spent nuclear fuel.
Sec. 219. Payments to States and Indian tribes.
Sec. 220. Study of research and development needs for monitored retrievable storage proposal.
Sec. 221. Judicial review.
Sec. 222. Research on alternatives for the permanent disposal of high-level radioactive waste.
Sec. 223. Technical assistance to non-nuclear weapon states in the field of spent fuel storage and disposal.
Sec. 224. Subseabed disposal.

Sec. 225. Dry cask storage.

TITLE III—OTHER PROVISIONS RELATING TO RADIOACTIVE WASTE

Sec. 301. Mission plan.
Sec. 302. Nuclear Waste Fund.
Sec. 303. Alternate means of financing.
Sec. 304. Office of Civilian Radioactive Waste Management.
Sec. 305. Location of test and evaluation facility.
Sec. 306. Nuclear Regulatory Commission training authorization.

TITLE IV—NUCLEAR WASTE NEGOTIATOR

Sec. 401. Definition.
Sec. 402. The Office of Nuclear Waste Negotiator.
Sec. 403. Duties of the Negotiator.
Sec. 404. Environmental assessment of sites.
Sec. 405. Site characterization; licensing.
Sec. 406. Monitored retrievable storage.
Sec. 407. Environmental impact statement.
Sec. 408. Administrative powers of the Negotiator.
Sec. 409. Cooperation of other departments and agencies.
Sec. 410. Termination of the office.
Sec. 411. Authorization of appropriations.

TITLE V—NUCLEAR WASTE TECHNICAL REVIEW BOARD

Sec. 501. Definitions.
Sec. 502. Nuclear Waste Technical Review Board
Sec. 503. Functions
Sec. 504. Investigatory powers.
Sec. 505. Compensation of members.
Sec. 506. Staff.
Sec. 507. Support services.
Sec. 508. Report.
Sec. 509. Authorization of appropriations.
Sec. 510. Termination of the Board.

DEFINITIONS

Sec. 2. For purposes of this Act [42 U.S.C. 10101 et seq.]:

(1) The term "Administrator" means the Administrator of the Environmental Protection Agency.

(2) The term "affected Indian tribe" means any Indian tribe—

(A) within whose reservation boundaries a monitored retrievable storage facility, test and evaluation facility, or a repository for high-level radioactive waste or spent fuel is proposed to be located;

(B) whose federally defined possessory or usage rights to other lands outside of the reservation's boundaries arising out of congressionally ratified treaties may be substantially and adversely affected by the locating of such a facility: *Provided*, That the Secretary of the Interior finds, upon the petition of the appropriate governmental officials of the tribe, that such effects are both substantial and adverse to the tribe.

(3) The term "atomic energy defense activity" means any activity of the Secretary performed in whole or in part in carrying out any of the following functions:

(A) naval reactors development;

(B) weapons activities including defense inertial confinement fusion;

(C) verification and control technology;

(D) defense nuclear materials production;

(E) defense nuclear waste and materials by-products management;

(F) defense nuclear materials security and safeguards and security investigations; and

(G) defense research and development.

(4) The term "candidate site" means an area, within a geologic and hydrologic system, that is recommended by the Secretary under section 112 [42 U.S.C. 10132] for site characterization, approved by the President under section 112 [42 U.S.C. 10133] for site characterization, or undergoing site characterization under section 113 [42 U.S.C. 10133].

(5) The term "civilian nuclear activity" means any atomic energy activity other than an atomic energy defense activity.

(6) The term "civilian nuclear power reactor" means a civilian nuclear powerplant required to be licensed under section 103 or 104 b. of the Atomic Energy Act of 1954 [42 U.S.C. 2133, 2134(b)].

(7) The term "Commission" means the Nuclear Regulatory Commission.

(8) The term "Department" means the Department of Energy.

(9) The term "disposal" means the emplacement in a repository of high-level radioactive waste, spent nuclear fuel, or other highly radioactive material with no foreseeable intent of recovery, whether or not such emplacement permits the recovery of such waste.

(10) The terms "disposal package" and "package" mean the primary container that holds, and is in contact with, solidified high-level radioactive waste, spent nuclear fuel, or other radioactive materials, and any overpacks that are emplaced at a repository.

(11) The term "engineered barriers" means manmade components of a disposal system designed to prevent the release of radionuclides into the geologic medium involved. Such term includes the high-level radioactive waste form, high-level radioactive waste canisters, and other materials placed over and around such canisters.

(12) The term "high-level radioactive waste" means—

(A) the highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations; and

(B) other highly radioactive material that the Commission, consistent with existing law, determines by rule requires permanent isolation.

(13) The term "Federal agency" means any Executive agency, as defined in section 105 of title 5, United States Code [5 U.S.C. 105].

(14) The term "Governor" means the chief executive officer of a State.

(15) The term "Indian tribe" means any Indian tribe, band, nation, or other organized group or community of Indians recognized as eligible for the services provided to Indians by the Secretary of the Interior because of their status as Indians, including any Alaska Native village, as defined in section 3(c) of the Alaska Native Claims Settlement Act) [43 U.S.C. 1602(c)].

(16) The term "low-level radioactive waste" means radioactive material that—

(A) is not high-level radioactive waste, spent nuclear fuel, transuranic waste, or by-product material as defined in section 11e(2)of the Atomic Energy Act of 1954 [42 U.S.C. 2014(e)(2)]; and

(B) the Commission, consistent with existing law, classifies as low-level radioactive waste.

(17) The term "Office" means the Office of Civilian Radioactive Waste Management established in section 304 [42 U.S.C. 10224].

(18) The term "repository" means any system licensed by the Commission that is intended to be used for, or may be used for, the pennanent deep geologic disposal of high-level radioactive waste and spent nuclear fuel, whether or not such system is designed to permit the recovery, for a limited period during initial operation, of any materials placed in such system. Such term includes both surface and subsurface areas at which high-level radioactive waste and spent nuclear fuel handling activities are conducted.

(19) The term "reservation" means—

(A) any Indian reservation or dependent Indian community referred to in clause (a) or (b) of section 1151 of title 18, United States Code [18 U.S.C. 1151]; or

(B) any land selected by an Alaska Native village or regional corporation under the provisions of the Alaska Native Claims Settlement Act (43 U.S.C. 1601 et seq.).

(20) The term "Secretary" means the Secretary of Energy.

(21) The term "site characterization" means—

(A) siting research activities with respect to a test and evaluation facility at a candidate site; and

(B) activities, whether in the laboratory or in the field, undertaken to establish the geologic condition and the ranges of the parameters of a candidate site relevant to the location of a repository, including

borings, surface excavations, excavations of exploratory shafts, limited subsurface lateral excavations and borings, and in situ testing needed to evaluate the suitability of a candidate site for the location of a repository, but not including preliminary borings and geophysical testing needed to assess whether site characterization should be undertaken.

(22) The term "siting research" means activities, including borings, surface excavations, shaft excavations, subsurface lateral excavations and borings, and in situ testing, to determine the suitability of a site for a test and evaluation facility.

(23) The term "spent nuclear fuel" means fuel that has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated by reprocessing.

(24) The term "State" means each of the several States, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Northern Mariana Islands, the Trust Territory of the Pacific Islands, and any other territory or possession of the United States.

(25) The term "storage" means retention of high-level radioactive waste, spent nuclear fuel, or transuranic waste with the intent to recover such waste or fuel for subsequent use, processing, or disposal.

(26) The term "Storage Fund" means the Interim Storage Fund established in section 136(c).

(27) The term "test and evaluation facility" means an at-depth, prototypic, underground cavity with subsurface lateral excavations extending from a central shaft that is used for research and development purposes, including the development of data and experience for the safe handling and disposal of solidified high-level radioactive waste, transuranic waste, or spent nuclear fuel.

(28) The term "unit of general local government" means any borough, city, county, parish, town, township, village, or other general purpose political subdivision of a State.

(29) The term "Waste Fund" means the Nuclear Waste Fund established in section 302(c) [42 U.S.C. 10222].

(30) The term "Yucca Mountain site" means the candidate site in the State of Nevada recommended by the Secretary to the President under section 112(b)(1)(B) [42 U.S.C. 10132(b)(1)(B)] on May 27, 1986.

(31) The term "affected unit of local government" means the unit of local government with jurisdiction over the site of a repository or a monitored retrievable storage facility. Such term may, at the discretion of the Secretary, include units of local government that are contiguous with such unit.

(32) The term "Negotiator" means the Nuclear Waste Negotiator.

(33) As used in title IV, the term "Office" means the Office of the Nuclear Waste Negotiator established under title IV of this Act.

(34) The term "monitored retrievable storage facility" means the storage facility described in section 141(b)(1) [42 U.S.C. 10161(b)(1)].

[42 U.S.C. 10101]

SEPARABILITY

Sec. 3. If any provision of this Act [42 U.S.C. 10101 et seq.], or the application of such provision to any person or circumstances, is held invalid, the remainder of this Act [42 U.S.C. 10101 et seq.], or the application of such provision to persons or circumstances other than those as to which it is held invalid, shall not be affected thereby.

[42 U.S.C. 10102]

TERRITORIES AND POSSESSIONS

Sec. 4. Nothing in this Act [42 U.S.C. 10101 et seq.] shall be deemed to repeal, modify, or amend the provisions of section 605 of the Act of March 12, 1980 (48 U.S.C. 1491).[1]

[42 U.S.C. 10103]

OCEAN DISPOSAL

Sec. 5. Nothing in this Act [42 U.S.C. 10101 et seq.] shall be deemed to affect the Marine Protection, Research, and Sanctuaries Act of 1972 [33 U.S.C. 1401 et seq.].

[42 U.S.C. 10104]

LIMITATION ON SPENDING AUTHORITY

Sec. 6. The authority under this Act [42 U.S.C. 10101 et seq.] to incur indebtedness, or enter into contracts, obligating amounts to be expended by the Federal Government shall be effective for any fiscal year only to such extent or in such amounts as are provided in advance by appropriation Acts.
[42 U.S.C. 10105]

PROTECTION OF CLASSIFIED NATIONAL SECURITY INFORMATION

Sec. 7. Nothing in this Act [42 U.S.C. 10101 et seq.] shall require the release or disclosure to any person or to the Commission of any classified national security information.
[42 U.S.C. 10106]

APPLICABILITY

Sec. 8. (a) Atomic energy defense activities. Subject to the provisions of subsection (c), the provisions of this Act [42 U.S.C. 10101 et seq.] shall not apply with respect to any atomic energy defense activity or to any facility used in connection with any such activity.

(b) Evaluation by President.

(1) Not later than 2 years after the date of the enactment of this Act [enacted Jan. 7, 1983], the President shall evaluate the use of disposal capacity at one or more repositories to be developed under subtitle A of title I [42 U.S.C. 10131 et seq.] for the disposal of high-level radioactive waste resulting from atomic energy defense activities. Such evaluation shall take into consideration factors relating to cost efficiency, health and safety, regulation, transportation, public acceptability, and national security.

(2) Unless the President finds, after conducting the evaluation required in paragraph (1), that the development of a repository for the disposal of high-level radioactive waste resulting from atomic energy defense activities only is required, taking into account all of the factors described in such subsection, the Secretary shall proceed promptly with arrangement for the use of one or more of the repositories to be developed under subtitle A of title I [42 U.S.C. 10131 et seq.] for the disposal of such waste. Such arrangements shall include the allocation of costs of developing, constructing, and operating this repository or repositories. The costs resulting from permanent disposal of high-level radioactive waste from atomic energy defense activities shall be paid by the Federal Government, into the special account established under section 302 [42 U.S.C. 10222].

(3) Any repository for the disposal of high-level radioactive waste resulting from atomic energy defense activities only shall (A) be subject to licensing under section 202 of the Energy Reorganization Act of 1973 [42 U.S.C. 5842]; and (B) comply with all requirements of the Commission for the siting, development, construction, and operation of a repository.

(c) Applicability to certain repositories. The provisions of this Act [42 U.S.C. 10101 et seq.] shall apply with respect to any repository not used exclusively for the disposal of high-level radioactive waste or spent nuclear fuel resulting from atomic energy defense activities, research and development activities of the Secretary, or both.
[42 U.S.C. 10107]

APPLICABILITY TO TRANSPORTATION LAWS

Sec. 9. Nothing in this Act [42 U.S.C. 10101 et seq.] shall be construed to affect Federal, State, or local laws pertaining to the transportation of spent nuclear fuel or high-level radioactive waste.
[42 U.S.C. 10108]

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[1] The text of section 605 is as follows:

"Sec. 605. (a) Prior to the granting of any license, permit, or other authorization or permission by any agency or instrumentality of the United States to any person for the transportation of spent nuclear fuel or high-level radioactive waste for interim long-term, or permanent storage to or for the storage of such fuel or waste on any territory or possession of the United States, the Secretary of the Interior is directed to transmit to the Congress a detailed report on the proposed transportation or storage plan, and no such license, permit, or other authorization or permission may be granted nor may any such transportation or storage occur unless the proposed transportation or storage plan has been specifically authorized by Act of Congress: *Provided*. That the provisions of this section shall not apply to the cleanup and rehabilitation of Bikini and Enewetak Atolls.

"(b) For the purpose of this section the words 'territory or possession' include the Trust Territory of the Pacific Islands and any area not within the boundaries of the several States over which the United States claims or exercises sovereignty."

TITLE I—DISPOSAL AND STORAGE OF HIGH-LEVEL RADIOACTIVE WASTE, SPENT NUCLEAR FUEL, AND LOW-LEVEL RADIOACTIVE WASTE

STATE AND AFFECTED INDIAN TRIBE PARTICIPATION IN DEVELOPMENT OF PROPOSED REPOSITORIES FOR DEFENSE WASTE

Sec. 101. (a) Notification to States and affected Indian tribes. Notwithstanding the provisions of section 8 [42 U.S.C. 10107], upon any decision by the Secretary or the President to develop a repository for the disposal of high-level radioactive waste or spent nuclear fuel resulting exclusively from atomic energy defense activities, research and development activities of the Secretary, or both, and before proceeding with any site-specific investigations with respect to such repository, the Secretary shall notify the Governor and legislature of the State in which such repository is proposed to be located, or the governing body of the affected Indian tribe on whose reservation such repository is proposed to be located, as the case may be, of such decision.

(b) Participation of States and affected Indian tribes. Following the receipt of any notification under subsection (a), the State or Indian tribe involved shall be entitled, with respect to the proposed repository involved, to rights of participation and consultation identical to those provided in sections 115 through 118 [42 U.S.C. 10135-10138], except that any financial assistance authorized to be provided to such State or affected Indian tribe under section 116(c) or 118(b) [42 U.S.C. 10136(c), 10138(b)] shall be made from amounts appropriated to the Secretary for purposes of carrying out this section.

[42 U.S.C. 10121]

SUBTITLE A—REPOSITORIES FOR DISPOSAL OF HIGH-LEVEL RADIOACTIVE WASTE AND SPENT NUCLEAR FUEL

FINDINGS AND PURPOSES

Sec. 111. (a) Findings. The Congress finds that—

(1) radioactive waste creates potential risks and requires safe and environmentally acceptable methods of disposal;

(2) a national problem has been created by the accumulation of (A) spent nuclear fuel from nuclear reactors; and (B) radioactive waste from (i) reprocessing of spent nuclear fuel; (ii) activities related to medical research, diagnosis, and treatment; and (iii) other sources;

(3) Federal efforts during the past 30 years to devise a permanent solution to the problems of civilian radioactive waste disposal have not been adequate;

(4) while the Federal Government has the responsibility to provide for the permanent disposal of high-level radioactive waste and such spent nuclear fuel as may be disposed of in order to protect the public health and safety and the environment, the costs of such disposal should be the responsibility of the generators and owners of such waste and spent fuel;

(5) the generators and owners of high-level radioactive waste and spent nuclear fuel have the primary responsibility to provide for, and the responsibility to pay the costs of, the interim storage of such waste and spent fuel until such waste and spent fuel is accepted by the Secretary of Energy in accordance with the provisions of this Act [42 U.S.C. 10101 et seq.];

(6) State and public participation in the planning and development of repositories is essential in order to promote public confidence in the safety of disposal of such waste and spent fuel; and

(7) high-level radioactive waste and spent nuclear fuel have become major subjects of public concern, and appropriate precautions must be taken to ensure that such waste and spent fuel do not adversely affect the public health and safety and the environment for this or future generations.

(b) Purposes. The purposes of this subtitle [42 U.S.C. 10131 et seq.] are—

(1) to establish a schedule for the siting, construction, and operation of repositories that will provide a reasonable assurance that the public and the environment will be adequately protected from the hazards posed by high-level radioactive waste and such spent nuclear fuel as may be disposed of in a repository;

(2) to establish the Federal responsibility, and a definite Federal policy, for the disposal of such waste and spent fuel;

(3) to define the relationship between the Federal Government and the State governments with respect to the disposal of such waste and spent fuel; and

(4) to establish a Nuclear Waste Fund, composed of payments made by the generators and owners of such waste and spent fuel, that will ensure that the costs of carrying out activities relating to the disposal

of such waste and spent fuel will be borne by the persons responsible for generating such waste and spent fuel.

[42 U.S.C. 10131]

RECOMMENDATION OF CANDIDATE SITES FOR SITE CHARACTERIZATION

Sec. 112. (a) Guidelines. Not later than 180 days after the date of the enactment of this Act [enacted Jan. 7, 1983], the Secretary, following consultation with the Council on Environmental Quality, the Administrator of the Environmental Protection Agency, the Director of the Geological Survey, and interested Governors, and the concurrence of the Commission shall issue general guidelines for the recommendation of sites for repositories. Such guidelines shall specify detailed geologic considerations that shall be primary criteria for the selection of sites in various geologic media. Such guidelines shall specify factors that qualify or disqualify any site from development as a repository, including factors pertaining to the location of valuable natural resources, hydrology, geophysics, seismic activity, and atomic energy defense activities, proximity to water supplies, proximity to water supplies, proximity to populations, the effect upon the rights of users of water, and proximity to components of the National Park System, the National Wildlife Refuge System, the National Wild and Scenic Rivers System, the National Wilderness Preservation System, or National Forest Lands. Such guidelines shall take into consideration the proximity to sites where high-level radioactive waste and spent nuclear fuel is generated or temporarily stored and the transportation and safety factors involved in moving such waste to a repository. Such guidelines shall specify population factors that will disqualify any site from development as a repository if any surface facility of such repository would be located (1) in a highly populated area; or (2) adjacent to an area 1 mile by 1 mile having a population of not less than 1,000 individuals. Such guidelines also shall require the Secretary to consider the cost and impact of transporting to the repository site the solidified high-level radioactive waste and spent fuel to be disposed of in the repository and the advantages of regional distribution in the siting of repositories. Such guidelines shall require the Secretary to consider the various geologic media in which sites for repositories may be located and, to the extent practicable, to recommend sites in different geologic media. The Secretary shall use guidelines established under this subsection in considering candidate sites for recommendation under subsection (b). The Secretary may revise such guidelines from time to time, consistent with the provisions of this subsection.

(b) Recommendation by Secretary to the President.

(1)(A) Following the issuance of guidelines under subsection (a) and consultation with the Governors of affected States, the Secretary shall nominate at least 5 sites that he determines suitable for site characterization for selection of the first repository site.

(B) Subsequent to such nomination, the Secretary shall recommend to the President 3 of the nominated sites not later than January 1, 1985 for characterization as candidate sites.

(C) Such recommendations under subparagraph (B) shall be consistent with the provisions of section 305 [42 U.S.C. 10225].

(D) Each nomination of a site under this subsection shall be accompanied by an environmental assessment, which shall include a detailed statement of the basis for such recommendation and of the probable impacts of the site characterization activities planned for such site, and a discussion of alternative activities relating to site characterization that may be undertaken to avoid such impacts. Such environmental assessment shall include—

(i) an evaluation by the Secretary as to whether such site is suitable for site characterization under the guidelines established under subsection (a);

(ii) an evaluation by the Secretary as to whether such site is suitable for development as a repository under each such guideline that does not require site characterization as a prerequisite for application of such guideline;

(iii) an evaluation by the Secretary of the effects of the site characterization activities at such site on the public health and safety and the environment;

(iv) a reasonable comparative evaluation by the Secretary of such site with other sites and locations that have been considered;

(v) a description of the decision process by which such site was recommended; and

(vi) an assessment of the regional and local impacts of locating the proposed repository at such site.

(E) The issuance of any environmental assessment under this paragraph shall be considered to be a final agency action subject to judicial review in accordance with the provisions of chapter 7 of title 5, United States Code [5 U.S.C. 701 et seq.], and section 119 [42 U.S.C. 10139]. Such judicial review shall be limited to the sufficiency of such environmental assessment with respect to the items described in clauses (i) through (vi) of subparagraph (E).

(F) Each environmental assessment prepared under this paragraph shall be made available to the public.

(G) Before nominating a site, the Secretary shall notify the Governor and legislature of the State in which such site is located, or the governing body of the affected Indian tribe where such site is located, as the case may be, of such nomination and the basis for such nomination.

(2) Before nominating any site the Secretary shall hold public hearings in the vicinity of such site to inform the residents of the area in which such site is located of the proposed nomination of such site and to receive their comments. At such hearings, the Secretary shall also solicit and receive any recommendations of such residents with respect to issues that should be addressed in the environmental assessment described in paragraph (1) and the site characterization plan described in section 113(b)(1) [42 U.S.C. 10133(b)(1)].

(3) In evaluating the sites nominated under this section prior to any decision to recommend a site as a candidate site, the Secretary shall use available geophysical, geologic, geochemical and hydrologic, and other information and shall not conduct any preliminary borings or excavations at a site unless (i) such preliminary boring or excavation activities were in progress upon the date of enactment of this Act [enacted Jan. 7, 1983] or (ii) the Secretary certifies that such available information from other sources, in the absence of preliminary borings or excavations, will not be adequate to satisfy applicable requirements of this Act [42 U.S.C. 10101 et seq.] or any other law: *Provided,* That preliminary borings or excavations under this section shall not exceed a diameter of 6 inches.

(c) Presidential review of recommended candidate sites.

(1) The President shall review each candidate site recommendation made by the Secretary under subsection (b). Not later than 60 days after the submission by the Secretary of a recommendation of a candidate site, the President, in his discretion, may either approve or disapprove such candidate site, and shall transmit any such decision to the Secretary and to either the Governor and legislature of the State in which such candidate site is located, or the governing body of the affected Indian tribe where such candidate site is located, as the case may be. If, during such 60-day period, the President fails to approve or disapprove such candidate site, or fails to invoke his authority under paragraph (2) to delay his decision, such candidate site shall be considered to be approved, and the Secretary shall notify such Governor and legislature, or governing body of the affected Indian tribe, of the approval of such candidate site by reason of the inaction of the President.

(2) The President may delay for not more than 6 months his decision under paragraph (1) to approve or disapprove a candidate site, upon determining that the information provided with the recommendation of the Secretary is insufficient to permit a decision within the 60-day period referred to in paragraph (1). The President may invoke his authority under this paragraph by submitting written notice to the Congress, within such 60-day period, of his intent to invoke such authority. If the President invokes such authority, but fails to approve or disapprove the candidate site involved by the end of such 6-month period, such candidate site shall be considered to be approved, and the Secretary shall notify such Governor and legislature, or governing body of the affected Indian tribe, of the approval of such candidate site by reason of the inaction of the President.

(d) Preliminary activities. Except as otherwise provided in this section, each activity of the President or the Secretary under this section shall be considered to be a preliminary decisionmaking activity. No such activity shall require the preparation of an environmental impact statement under section 102(2)(C) of the National Environmental Policy Act of 1969) [42 U.S.C. 4332(2)(C)], or to require any environmental review under subparagraph (E) or (F) of section 102(2) of such Act [42 U.S.C. 4332(2)(E), (F)].

(e) [Redesignated]

(f) [Deleted]

[42 U.S.C. 10132]

SITE CHARACTERIZATION

Sec. 113. (a) In general. The Secretary shall carry out, in accordance with the provisions of this section, appropriate site characterization activities at the Yucca Mountain site. The Secretary shall consider fully the comments received under subsection (b)(2) and section 112(b)(2) [42 U.S.C. 10132(b)(2)] and shall, to the maximum extent practicable and in consultation with the Governor of the State of Nevada, conduct site characterization activities in a manner that minimizes any significant adverse environmental impacts identified in such comments or in the environmental assessment submitted under section 112(b)(1).

(b) Commission and States.

(1) Before proceeding to sink shafts at the Yucca Mountain site, the Secretary shall submit for such candidate site to the Commission and to the Governor or legislature of the State of Nevada, for their review and comment—

(A) a general plan for site characterization activities to be conducted at such candidate site, which plan shall include—

(i) a description of such candidate site;

(ii) a description of such site characterization activities, including the following: the extent of planned excavations, plans for any onsite testing with radioactive or nonradioactive material, plans for any investigation activities that may affect the capability of such candidate site to isolate high-level radioactive waste and spent nuclear fuel, and plans to control any adverse, safety-related impacts from such site characterization activities;

(iii) plans for the decontamination and decommissioning of such candidate site, and for the mitigation of any significant adverse environmental impacts caused by site characterization activities if it is determined unsuitable for application for a construction authorization for a repository;

(iv) criteria to be used to determine the suitability of such candidate site for the location of a repository, developed pursuant to section 112(a) [42 U.S.C. 10132(a)]; and

(v) any other information required by the Commission;

(B) a description of the possible form or packaging for the high-level radioactive waste and spent nuclear fuel to be emplaced in such repository, a description, to the extent practicable, of the relationship between such waste form or packaging and the geologic medium of such site, and a description of the activities being conducted by the Secretary with respect to such possible waste form or packaging or such relationship; and

(C) a conceptual repository design that takes into account likely site-specific requirements.

(2) Before proceeding to sink shafts at the Yucca Mountain site, the Secretary shall (A) make available to the public the site characterization plan described in paragraph (1); and (B) hold public hearings in the vicinity of such candidate site to inform the residents of the area in which such candidate site is located of such plan, and to receive their comments.

(3) During the conduct of site characterization activities at the Yucca Mountain site, the Secretary shall report not less than once every 6 months to the Commission and to the Governor and legislature of the State of Nevada, on the nature and extent of such activities and the information developed from such activities.

(c) Restrictions.

(1) The Secretary may conduct at the Yucca Mountain site only such site characterization activities as the Secretary considers necessary to provide the data required for evaluation of the suitability of such site for an application to be submitted to the Commission for a construction authorization for a repository at such site, and for compliance with the National Environmental Policy Act of 1969 [42 U.S.C. 4321 et seq.].

(2) In conducting site characterization activities—

(A) the Secretary may not use any radioactive material at a site unless the Commission concurs that such use is necessary to provide data for the preparation of the required environmental reports and an application for a construction authorization for a repository at such site; and

(B) if any radioactive material is used at a site—

(i) the Secretary shall use the minimum quantity necessary to determine the suitability of such site for a repository, but in no event more than the curie equivalent of 10 metric tons of spent nuclear fuel; and

(ii) such radioactive material shall be fully retrievable.

(3) If the Secretary at any time determines the Yucca Mountain site to be unsuitable for development as a repository, the Secretary shall—

(A) terminate all site characterization activities at such site;

(B) notify the Congress, the Governor and legislature of Nevada of such termination and the reasons for such termination;

(C) remove any high-level radioactive waste, spent nuclear fuel, or other radioactive materials at or in such site as promptly as practicable;

(D) take reasonable and necessary steps to reclaim the site and to mitigate any significant adverse environmental impacts caused by site characterization activities at such site;

(E) suspend all future benefits payments under subtitle F [42 U.S.C. 10173 et seq.] with respect to such site; and

(F) report to Congress not later than 6 months after such determination the Secretary's recommendations for further action to assure the safe, permanent disposal of spent nuclear fuel and high-level radioactive waste, including the need for new legislative authority.

(4) [Deleted]

(d) Preliminary activities. Each activity of the Secretary under this section that is in compliance with the provisions of subsection (c) shall be considered a preliminary decisionmaking activity. No such activity shall require the preparation of an environmental impact statement under section 102(2)(C) of the National Environmental Policy Act of 1969 [42 U.S.C. 4332(2)(C)], or require any environmental review under subparagraph (E) or (F) of section 102(2) of such Act [42 U.S.C. 4332(2)(E), (F)].

[42 U.S.C. 10133]

SITE APPROVAL AND CONSTRUCTION AUTHORIZATION

Sec. 114. (a) Hearings and Presidential recommendation.

(1) The Secretary shall hold public hearings in the vicinity of the Yucca Mountain site, for the purposes of informing the residents of the area of such consideration and receiving their comments regarding the possible recommendation of such site. If, upon completion of such hearings and completion of site characterization activities at the Yucca Mountain site, under section 113 [42 U.S.C. 10133], the Secretary decides to recommend approval of such site to the President, the Secretary shall notify the Governor and legislature of the State of Nevada of such decision. No sooner than the expiration of the 30-day period following such notification, the Secretary shall submit to the President a recommendation that the President approve such site for the development of a repository. Any such recommendation by the Secretary shall be based on the record of information developed by the Secretary under section 113 [42 U.S.C. 10133] and this section, including the information described in subparagraph (A) through subparagraph (G). Together with any recommendation of a site under this paragraph, the Secretary shall make available to the public, and submit to the President, a comprehensive statement of the basis of such recommendation, including the following:

(A) a description of the proposed repository, including preliminary engineering specifications for the facility;

(B) a description of the waste form or packaging proposed for use at such repository, and an explanation of the relationship between such waste form or packaging and the geologic medium of such site;

(C) a discussion of data, obtained in site characterization activities, relating to the safety of such site;

(D) a final environmental impact statement prepared for the Yucca Mountain site pursuant to subsection (f) and the National Environmental Policy Act of 1969 [42 U.S.C. 4321 et seq.], together with comments made concerning such environmental impact statement by the Secretary of the Interior, the Council on Environmental Quality, the Administrator, and the Commission, except that the Secretary shall not be required in any such environmental impact statement to consider the need for a repository, the alternatives to geological disposal, or alternative sites to the Yucca Mountain site;

(E) preliminary comments of the Commission concerning the extent to which the at-depth site characterization analysis and the waste form proposal for such site seem to be sufficient for inclusion in any application to be submitted by the Secretary for licensing of such site as a repository;

(F) the views and comments of the Governor and legislature of any State, or the governing body of any affected Indian tribe, as determined by the Secretary, together with the response of the Secretary to such views;

(G) such other information as the Secretary considers appropriate; and

(H) any impact report submitted under section 116(c)(2)(B) [42 U.S.C. 10136(c)(2)(B)] by the State of Nevada.

(2)(A) If, after recommendation by the Secretary, the President considers the Yucca Mountain site qualified for application for a construction authorization for a repository, the President shall submit a recommendation of such site to Congress.

(B) The President shall submit with such recommendation a copy of the statement for such site prepared by the Secretary under paragraph (1).

(3)(A) The President may not recommend the approval of the Yucca Mountain site unless the Secretary has recommended to the President under paragraph (1) approval of such site and has submitted to the President a statement for such site as required under such paragraph.

(B) No recommendation of a site by the President under this subsection shall require the preparation of an environmental impact statement under section 102(2)(C) of the National Environmental Policy Act of 1969 [42 U.S.C. 4332(2)(C)], or to require any environmental review under subparagraph (E) or (F) of section 102(2) of such Act [42 U.S.C. 4332(2)(E), (F)].

(b) Submission of application. If the President recommends to the Congress the Yucca Mountain site under subsection (a) and the site designation is permitted to take effect under section 115 [42 U.S.C. 10135], the Secretary shall submit to the Commission an application for a construction authorization for a repository at such site not later than 90 days after the date on which the recommendation of the site designation is effective under such section and shall provide to the Governor and legislature of the State of Nevada a copy of such application.

(c) Status report on application. Not later than 1 year after the date on which an application for a construction authorization is submitted under subsection (b), and annually thereafter until the date on which such authorization is granted, the Commission shall submit a report to the Congress describing the proceedings undertaken through the date of such report with regard to such application, including a description of—

(1) any major unresolved safety issues, and the explanation of the Secretary with respect to design and operation plans for resolving such issues;

(2) any matters of contention regarding such application; and

(3) any Commission actions regarding the granting or denial of such authorization.

(d) Commission action. The Commission shall consider an application for a construction authorization for all or part of a repository in accordance with the laws applicable to such applications, except that the Commission shall issue a final decision approving or disapproving the issuance of a construction authorization not later than the expiration of 3 years after the date of the submission of such application, except that the Commission may extend such deadline by not more than 12 months if, not less than 30 days before such deadline, the Commission complies with the reporting requirements established in subsection (e)(2). The Commission decision approving the first such application shall prohibit the emplacement in the first repository of a quantity of spent fuel containing in excess of 70,000 metric tons of heavy metal or a quantity of solidified high-level radioactive waste resulting from the reprocessing of such a quantity of spent fuel until such time as a second repository is in operation. In the event that a monitored retrievable storage facility, approved pursuant to subtitle C of this Act, shall be located, or is planned to be located, within 50 miles of the first repository, then the Commission decision approving the first such application shall prohibit the emplacement of a quantity of spent fuel containing in excess of 70,000 metric tons of heavy metal or a quantity of solidified high-level radioactive waste resulting from the reprocessing of spent fuel in both the repository and monitored retrievable storage facility until such time as a second repository is in operation.

(e) Project decision schedule.

(1) The Secretary shall prepare and update, as appropriate, in cooperation with all affected Federal agencies, a project decision schedule that portrays the optimum way to attain the operation of the repository within the time periods specified in this subtitle. Such schedule shall include a description of objectives and a sequence of deadlines for all Federal agencies required to take action, including an identification of the activities in which a delay in the start, or completion, of such activities will cause a delay in beginning repository operation.

(2) Any Federal agency that determines that it cannot comply with any deadline in the project decision schedule, or fails to so comply, shall submit to the Secretary and to the Congress a written report explaining the reason for its failure or expected failure to meet such deadline, the reason why such agency could not reach an agreement with the Secretary, the estimated time for completion of the activity or activities involved, the associated effect on its other deadlines in the project decision schedule, and any recommendations it may have or actions it intends to take regarding any improvements in its operation or organization, or changes to its statutory directives or authority, so that it will be able to mitigate the delay involved. The Secretary, within 30 days after receiving any such report, shall file with the Congress his response to such report, including the reasons why the Secretary could not amend the project decision schedule to accommodate the Federal agency involved.

(f) Environmental impact statement.

(1) Any recommendation made by the Secretary under this section shall be considered a major Federal action significantly affecting the quality of the human environment for purposes of the National Environmental Policy Act of 1969 [42 U.S.C. 4321 et seq.]. A final environmental impact statement prepared by the Secretary under such Act shall accompany any recommendation to the President to approve a site for a repository.

(2) With respect to the requirements imposed by the National Environmental Policy Act of 1969 [42 U.S.C. 4321 et seq.], compliance with the procedures and requirements of this Act shall be deemed adequate consideration of the need for a repository, the time of the initial availability of a repository, and all alternatives to the isolation of high-level radioactive waste and spent nuclear fuel in a repository.

(3) For purposes of complying with the requirements of the National Environmental Policy Act of 1969 [42 U.S.C. 4321 et seq.] and this section, the Secretary need not consider alternate sites to the Yucca Mountain site for the repository to be developed under this subtitle.

(4) Any environmental impact statement prepared in connection with a repository proposed to be constructed by the Secretary under this subtitle shall, to the extent practicable, be adopted by the Commission in connection with the issuance by the Commission of a construction authorization and license for such repository. To the extent such statement is adopted by the Commission, such adoption shall be deemed to also satisfy the responsibilities of the Commission under the National Environmental Policy Act of 1969 [42 U.S.C. 4321 et seq.] and no further consideration shall be required, except that nothing in this subsection shall affect any independent responsibilities of the Commission to protect the public health and safety under the Atomic Energy Act of 1954 [42 U.S.C. 2011 et seq.].

(5) Nothing in this Act shall be construed to amend or otherwise detract from the licensing requirements of the Nuclear Regulatory Commission established in title II of the Energy Reorganization Act of 1974 [42 U.S.C. 5841 et seq.].

(6) In any such statement prepared with respect to the repository to be constructed under this subtitle, the Nuclear Regulatory Commission need not consider the need for a repository, the time of initial availability of a repository, alternate sites to the Yucca Mountain site, or nongeologic alternatives to such site.

[42 U.S.C. 10134]

REVIEW OF REPOSITORY SITE SELECTION

Sec. 115. (a) Definition. For purposes of this section, the term "resolution of repository siting approval" means a joint resolution of the Congress, the matter after the resolving clause of which is as follows: "That there hereby is approved the site at —— for a repository, with respect to which a notice of disapproval was submitted by —— on ——". The first blank space in such resolution shall be filled with the name of the geographic location of the proposed site of the repository to which such resolution pertains; the second blank space in such resolution shall be filled with the designation of the State Governor and legislature or Indian tribe governing body submitting the notice of disapproval to which such resolution pertains; and the last blank space in such resolution shall be filled with the date of such submission.

(b) State or Indian tribe petitions. The designation of a site as suitable for application for a construction authorization for a repository shall be effective at the end of the 60-day period beginning on the date that the President recommends such site to the Congress under section 114 [42 U.S.C. 10134], unless the Governor and legislature of the State in which such site is located, or the governing body of an Indian tribe on whose reservation such site is located, as the case may be, has submitted to the Congress a notice of

disapproval under section 116 or 118 [42 U.S.C. 10136, 10138]. If any such notice of disapproval has been submitted, the designation of such site shall not be effective except as provided under subsection (c).

(c) Congressional review of petitions. If any notice of disapproval of a repository site designation has been submitted to the Congress under section 116 or 118 [42 U.S.C. 10136, 10138] after a recommendation for approval of such site is made by the President under section 114 [42 U.S.C. 10134], such site shall be disapproved unless, during the first period of 90 calendar days of continuous session of the Congress after the date of the receipt by the Congress of such notice of disapproval, the Congress passes a resolution of repository siting approval in accordance with this subsection approving such site, and such resolution thereafter becomes law.

(d) Procedures applicable to the Senate.

(1) The provisions of this subsection are enacted by the Congress—

(A) as an exercise of the rulemaking power of the Senate, and as such they are deemed a part of the rules of the Senate, but applicable only with respect to the procedure to be followed in the Senate in the case of resolutions of repository siting approval, and such provisions supersede other rules of the Senate only to the extent that they are inconsistent with such other rules; and

(B) with full recognition of the constitutional right of the Senate to change the rules (so far as relating to the procedure of the Senate) at any time, in the same manner and to the same extent as in the case of any other rule of the Senate.

(2)(A) Not later than the first day of session following the day on which any notice of disapproval of a repository site selection is submitted to the Congress under section 116 or 118 [42 U.S.C. 10136, 10138], a resolution of repository siting approval shall be introduced (by request) in the Senate by the chairman of the committee to which such notice of disapproval is referred, or by a Member or Members of the Senate designated by such chairman.

(B) Upon introduction, a resolution of repository siting approval shall be referred to the appropriate committee or committees of the Senate by the President of the Senate, and all such resolutions with respect to the same repository site shall be referred to the same committee or committees. Upon the expiration of 60 calendar days of continuous session after the introduction of the first resolution of repository siting approval with respect to any site, each committee to which such resolution was referred shall make its recommendations to the Senate.

(3) If any committee to which is referred a resolution of siting approval introduced under paragraph (2)(A), or, in the absence of such a resolution, any other resolution of siting approval introduced with respect to the site involved, has not reported such resolution at the end of 60 days of continuous session of Congress after introduction of such resolution, such committee shall be deemed to be discharged from further consideration of such resolution, and such resolution shall be placed on the appropriate calendar of the Senate.

(4)(A) When each committee to which a resolution of siting approval has been referred has reported, or has been deemed to be discharged from further consideration of, a resolution described in paragraph (3), it shall at any time thereafter be in order (even though a previous motion to the same effect has been disagreed to) for any Member of the Senate to move to proceed to the consideration of such resolution. Such motion shall be highly privileged and shall not be debatable. Such motion shall not be subject to amendment, to a motion to postpone, or to a motion to proceed to the consideration of other business. A motion to reconsider the vote by which such motion is agreed to or disagreed to shall not be in order. If a motion to proceed to the consideration of such resolution is agreed to, such resolution shall remain the unfinished business of the Senate until disposed of.

(B) Debate on a resolution of siting approval, and on all debatable motions and appeals in connection with such resolution, shall be limited to not more than 10 hours, which shall be divided equally between Members favoring and Members opposing such resolution. A motion further to limit debate shall be in order and shall not be debatable. Such motion shall not be subject to amendment, to a motion to postpone, or to a motion to proceed to the consideration of other business, and a motion to recommit such resolution shall not be in order. A motion to reconsider the vote by which such resolution is agreed to or disagreed to shall not be in order.

(C) Immediately following the conclusion of the debate on a resolution of siting approval, and a single quorum call at the conclusion of such debate if requested in accordance with the rules of the Senate, the vote on final approval of such resolution shall occur.

(D) Appeals from the decisions of the Chair relating to the application of the rules of the Senate to the procedure relating to a resolution of siting approval shall be decided without debate.

(5) If the Senate receives from the House a resolution of repository siting approval with respect to any site, then the following procedure shall apply:

(A) The resolution of the House with respect to such site shall not be referred to a committee.

(B) With respect to the resolution of the Senate with respect to such site—

(i) the procedure with respect to that or other resolutions of the Senate with respect to such site shall be the same as if no resolution from the House with respect to such site had been received; but

(ii) on any vote on final passage of a resolution of the Senate with respect to such site, a resolution from the House with respect to such site where the text is identical shall be automatically substituted for the resolution of the Senate.

(e) Procedures applicable to the House of Representatives.

(1) The provisions of this subsection are enacted by the Congress—

(A) as an exercise of the rulemaking power of the House of Representatives, and as such they are deemed a part of the rules of the House, but applicable only with respect to the procedure to be followed in the House in the case of resolutions of repository siting approval, and such provisions supersede other rules of the House only to the extent that they are inconsistent with such other rules; and

(B) with full recognition of the constitutional right of the House to change the rules (so far as relating to the procedure of the House) at any time, in the same manner and to the same extent as in the case of any other rule of the House.

(2) Resolutions of repository siting approval shall upon introduction, be immediately referred by the Speaker of the House to the appropriate committee or committees of the House. Any such resolution received from the Senate shall be held at the Speaker's table.

(3) Upon the expiration of 60 days of continuous session after the introduction of the first resolution of repository siting approval with respect to any site, each committee to which such resolution was referred shall be discharged from further consideration of such resolution, and such resolution shall be referred to the appropriate calendar, unless such resolution or an identical resolution was previously reported by each committee to which it was referred.

(4) It shall be in order for the Speaker to recognize a Member favoring a resolution to call up a resolution of repository siting approval after it has been on the appropriate calendar for 5 legislative days. When any such resolution is called up, the House shall proceed to its immediate consideration and the Speaker shall recognize the Member calling up such resolution and a Member opposed to such resolution for 2 hours of debate in the House, to be equally divided and controlled by such Members. When such time has expired, the previous question shall be considered as ordered on the resolution to adoption without intervening motion. No amendment to any such resolution shall be in order, nor shall it be in order to move to reconsider the vote by which such resolution is agreed to or disagreed to.

(5) If the House receives from the Senate a resolution of repository siting approval with respect to any site, then the following procedure shall apply:

(A) The resolution of the Senate with respect to such site shall not be referred to a committee.

(B) With respect to the resolution of the House with respect to such site—

(i) the procedure with respect to that or other resolutions of the House with respect to such site shall be the same as if no resolution from the Senate with respect to such site had been received; but

(ii) on any vote on final passage of a resolution of the House with respect to such site, a resolution from the Senate with respect to such site where the text is identical shall be automatically substituted for the resolution of the House.

(f) Computation of days. For purposes of this section—

(1) continuity of session of Congress is broken only by an adjournment sine die; and

(2) the days on which either House is not in session because of an adjournment of more than 3 days to a day certain are excluded in the computation of the 90-day period referred to in subsection (c) and the 60-day period referred to in subsections (d) and (e).

(g) Information provided to Congress. In considering any notice of disapproval submitted to the Congress under section 116 or 118 [42 U.S.C. 10136, 10138], the Congress may obtain any comments of the

Commission with respect to such notice of disapproval. The provision of such comments by the Commission shall not be construed as binding the Commission with respect to any licensing or authorization action concerning the repository involved.

[42 U.S.C. 10135]

PARTICIPATION OF STATES

Sec. 116. (a) Notification of States and affected tribes. The Secretary shall identify the States with one or more potentially acceptable sites for a repository within 90 days after the date of enactment of this Act [enacted Jan. 7, 1983]. Within 90 days of such identification, the Secretary shall notify the Governor, the State legislature, and the tribal council of any affected Indian tribe in any State of the potentially acceptable sites within such State. For the purposes of this title [42 U.S.C. 10121 et seq.], the term "potentially acceptable site" means any site at which, after geologic studies and field mapping but before detailed geologic data gathering, the Department undertakes preliminary drilling and geophysical testing for the definition of site location.

(b) State participation in repository siting decisions.

(1) Unless otherwise provided by State law, the Governor orlegislature of each State shall have authority to submit a notice of disapproval to the Congress under paragraph (2). In any case in which State law provides for submission of any such notice of disapproval by any other person or entity, any reference in this subtitle [42 U.S.C. 10131 et seq.] to the Governor or legislature of such State shall be considered to refer instead to such other person or entity.

(2) Upon the submission by the President to the Congress of a recommendation of a site for a repository, the Governor or legislature of the State in which such site is located may disapprove the site designation and submit to the Congress a notice of disapproval. Such Governor or legislature may submit such a notice of disapproval to the Congress not later than the 60 days after the date that the President recommends such site to the Congress under section 114 [42 U.S.C. 10134]. A notice of disapproval shall be considered to be submitted to the Congress on the date of the transmittal of such notice of disapproval to the Speaker of the House and the President pro tempore of the Senate. Such notice of disapproval shall be accompanied by a statement of reasons explaining why such Governor or legislature disapproved the recommended repository site involved.

(3) The authority of the Governor or legislature of each State under this subsection shall not be applicable with respect to any site located on a reservation.

(c) Financial Assistance.

(1)(A) The Secretary shall make grants to the State of Nevada and any affected unit of local government for the purpose of participating in activities required by this section and section 117 [42 U.S.C. 10137] or authorized by written agreement entered into pursuant to section 117(c) [42 U.S.C. 10137(c)]. Any salary or travel expense that would ordinarily be incurred by such State or affected unit of local government, may not be considered eligible for funding under this paragraph.

(B) The Secretary shall make grants to the State of Nevada and any affected unit of local government for purposes of enabling such State or affected unit of local government—

(i) to review activities taken under this subtitle with respect to the Yucca Mountain site for purposes of determining any potential economic, social, public health and safety, and environmental impacts of a repository on such State, or affected unit of local government and its residents;

(ii) to develop a request for impact assistance under paragraph (2);

(iii) to engage in any monitoring, testing, or evaluation activities with respect to site characterization programs with regard to such site;

(iv) to provide information to Nevada residents regarding any activities of such State, the Secretary, or the Commission with respect to such site; and

(v) to request information from, and make comments and recommendations to, the Secretary regarding any activities taken under this subtitle with respect to such site.

(C) Any salary or travel expense that would ordinarily be incurred by the State of Nevada or any affected unit of local government may not be considered eligible for funding under this paragraph.

(2)(A)(i) The Secretary shall provide financial and technical assistance to the State of Nevada, and any affected unit of local government requesting such assistance.

(ii) Such assistance shall be designed to mitigate the impact on such State or affected unit of local government of the development of such repository and the characterization of such site.

(iii) Such assistance to such State or affected unit of local government of such State shall commence upon the initiation of site characterization activities.

(B) The State of Nevada and any affected unit of local government may request assistance under this subsection by preparing and submitting to the Secretary a report on the economic, social, public health and safety, and environmental impacts that are likely to result from site characterization activities at the Yucca Mountain site. Such report shall be submitted to the Secretary after the Secretary has submitted to the State a general plan for site characterization activities under section 113(b) [42 U.S.C. 10133(b)].

(C) As soon as practicable after the Secretary has submitted such site characterization plan, the Secretary shall seek to enter into a binding agreement with the State of Nevada setting forth—

(i) the amount of assistance to be provided under this subsection to such State or affected unit of local government; and

(ii) the procedures to be followed in providing such assistance.

(3)(A) In addition to financial assistance provided under paragraphs (1) and (2), the Secretary shall grant to the State of Nevada and any affected unit of local government an amount each fiscal year equal to the amount such State or affected unit of local government, respectively, would receive if authorized to tax site characterization activities at such site, and the development and operation of such repository, as such State or affected unit of local government taxes the non-Federal real property and industrial activities occurring within such State or affected unit of local government.

(B) Such grants shall continue until such time as all such activities, development, and operation are terminated at such site.

(4)(A) The State of Nevada or any affected unit of local government may not receive any grant under paragraph (1) after the expiration of the 1-year period following—

(i) the date on which the Secretary notifies the Governor and legislature of the State of Nevada of the termination of site characterization activities at the site in such State;

(ii) the date on which the Yucca Mountain site is disapproved under section 115 [42 U.S.C. 10135]; or

(iii) the date on which the Commission disapproves an application for a construction authorization for a repository at such site; whichever occurs first.

(B) The State of Nevada or any affected unit of local government may not receive any further assistance under paragraph (2) with respect to a site if repository construction activities or site characterization activities at such site are terminated by the Secretary or if such activities are permanently enjoined by any court.

(C) At the end of the 2-year period beginning on the effective date of any license to receive and possess for a repository in a State, no Federal funds, shall be made available to such State or affected unit of local government under paragraph (1) or (2), except for—

(i) such funds as may be necessary to support activities related to any other repository located in, or proposed to be located in, such State, and for which a license to receive and possess has not been in effect for more than 1 year;

(ii) such funds as may be necessary to support State activities pursuant to agreements or contracts for impact assistance entered into, under paragraph (2), by such State with the Secretary during such 2-year period; and

(iii) such funds as may be provided under an agreement entered into under title IV.

(5) Financial assistance authorized in this subsection shall be made out of amounts held in the Waste Fund.

(6) No State, other than the State of Nevada, may receive financial assistance under this subsection after the date of the enactment of the Nuclear Waste Policy Amendments Act of 1987 [enacted Dec. 22, 1987].

(d) Additional notification and consultation. Whenever the Secretary is required under any provision of this Act [42 U.S.C. 10101 et seq.] to notify or consult with the governing body of an affected Indian tribe where a site is located, the Secretary shall also notify or consult with, as the case may be, the Governor of the State in which such reservation is located.

[42 U.S.C. 10136]

CONSULTATION WITH STATES AND AFFECTED INDIAN TRIBES

Sec. 117. (a) Provision of information.

(1) The Secretary, the Commission, and other agencies involved in the construction, operation, or regulation of any aspect of a repository in a State shall provide to the Governor and legislature of such State, and to the governing body of any affected Indian tribe, timely and complete information regarding determinations or plans made with respect to the site characterization siting, development, design, licensing, construction, operation, regulation, or decommissioning of such repository.

(2) Upon written request for such information by the Governor or legislature of such State, or by the governing body of any affected Indian tribe, as the case may be, the Secretary shall provide a written response to such request within 30 days of the receipt of such request. Such response shall provide the information requested or, in the alternative, the reasons why the information cannot be so provided. If the Secretary fails to so respond within such 30 days, the Governor or legislature of such State, or the governing body of any affected Indian tribe, as the case may be, may transmit a formal written objection to such failure to respond to the President. If the President or Secretary fails to respond to such written request within 30 days of the receipt by the President of such formal written objection, the Secretary shall immediately suspend all activities in such State authorized by this subtitle [42 U.S.C. 10131 et seq.], and shall not renew such activities until the Governor or legislature of such State, or the governing body of any affected Indian tribe, as the case may be, has received the written response to such written request required by this subsection.

(b) Consultation and cooperation. In performing any study of an area within a State for the purpose of determining the suitability of such area for a repository pursuant to section 112(c) [42 U.S.C. 10132(c)], and in subsequently developing and loading any repository within such State, the Secretary shall consult and cooperate with the Governor and legislature of such State and the governing body of any affected Indian tribe in an effort to resolve the concerns of such State and any affected Indian tribe regarding the public health and safety, environmental, and economic impacts of any such repository. In carrying out his duties under this subtitle [42 U.S.C. 10131 et seq.], the Secretary shall take such concerns into account to the maximum extent feasible and as specified in written agreements entered into under subsection (c).

(c) Written agreement. Not later than 60 days after (1) the approval of a site for site characterization for such a repository under section 112(c) [42 U.S.C. 10132(c)], or (2) the written request of the State or Indian tribe in any affected State notified under section 116(a) [42 U.S.C. 10136(a)] to the Secretary, whichever first occurs, the Secretary shall seek to enter into a binding written agreement, and shall begin negotiations, with such State and, where appropriate, to enter into a separate binding agreement with the governing body of any affected Indian tribe, setting forth (but not limited to) the procedures under which the requirements of subsections (a) and (b), and the provisions of such written agreement, shall be carried out. Any such written agreement shall not affect the authority of the Commission under existing law. Each such written agreement shall, to the maximum extent feasible, be completed not later than 6 months after such notification. If such written agreement is not completed within such period, the Secretary shall report to the Congress in writing within 30 days on the status of negotiations to develop such agreement and the reasons why such agreement has not been completed. Prior to submission of such report to the Congress, the Secretary shall transmit such report to the Governor of such State or the governing body of such affected Indian tribe, as the case may be, for their review and comments. Such comments shall be included in such report prior to submission to the Congress. Such written agreement shall specify procedures—

(1) by which such State or governing body of an affected Indian tribe, as the case may be, may study, determine, comment on, and make recommendations with regard to the possible public health and safety, environmental, social, and economic impacts of any such repository;

(2) by which the Secretary shall consider and respond to comments and recommendations made by such State or governing body of an affected Indian tribe, including the period in which the Secretary shall so respond;

(3) by which the Secretary and such State or governing body of an affected Indian tribe may review or modify the agreement periodically;

(4) by which such State or governing body of an affected Indian tribe is to submit an impact report and request for impact assistance under section 116(c) [42 U.S.C. 10136(b)] or section 118(b) [42 U.S.C. 10138(b)], as the case may be;

(5) by which the Secretary shall assist such State, and the units of general local government in the vicinity of the repository site, in resolving the offsite concerns of such State and units of general local

government, including, but not limited to, questions of State liability arising from accidents, necessary road upgrading and access to the site, ongoing emergency preparedness and emergency response, monitoring of transportation of high-level radioactive waste and spent nuclear fuel through such State, conduct of baseline health studies of inhabitants in neighboring communities near the repository site and reasonable periodic monitoring thereafter, and monitoring of the repository site upon any decommissioning and decontamination;

(6) by which the Secretary shall consult and cooperate with such State on a regular, ongoing basis and provide for an orderly process and timely schedule for State review and evaluation, including identification in the agreement of key events, milestones, and decision points in the activities of the Secretary at the potential repository site;

(7) by which the Secretary shall notify such State prior to the transportation of any high-level radioactive waste and spent nuclear fuel into such State for disposal at the repository site;

(8) by which such State may conduct reasonable independent monitoring and testing of activities on the repository site, except that such monitoring and testing shall not unreasonably interfere with or delay onsite activities;

(9) for sharing, in accordance with applicable law, of all technical and licensing information, the utilization of available expertise, the facilitating of permit procedures, joint project review, and the formulation of joint surveillance and monitoring arrangements to carry out applicable Federal and State laws;

(10) for public notification of the procedures specified under the preceding paragraphs; and

(11) for resolving objections of a State and affected Indian tribes at any stage of the planning, siting, development, construction, operation, or closure of such a facility within such State through negotiation, arbitration, or other appropriate mechanisms.

(d) On-site representative. The Secretary shall offer to any State, Indian tribe or unit of local government within whose jurisdiction a site for a repository or monitored retrievable storage facility is located under this title an opportunity to designate a representative to conduct on-site oversight activities at such site. Reasonable expenses of such representatives shall be paid out of the Waste Fund.

[42 U.S.C. 10137]

PARTICIPATION OF INDIAN TRIBES

Sec. 118. (a) Participation of Indian tribes in repository siting decisions. Upon the submission by the President to the Congress of a recommendation of a site for a repository located on the reservation of an affected Indian tribe, the governing body of such Indian tribe may disapprove the site designation and submit to the Congress a notice of disapproval. The governing body of such Indian tribe may submit such a notice of disapproval to the Congress not later than the 60 days after the date that the President recommends such site to the Congress under section 114 [42 U.S.C. 10134]. A notice of disapproval shall be considered to be submitted to the Congress on the date of the transmittal of such notice of disapproval to the Speaker of the House and the President pro tempore of the Senate. Such notice of disapproval shall be accompanied by a statement of reasons explaining why the governing body of such Indian tribe disapproved the recommended repository site involved.

(b) Financial assistance.

(1) The Secretary shall make grants to each affected tribe notified under section 116(a) [42 U.S.C. 10136(a)] for the purpose of participating in activities required by section 117 [42 U.S.C. 10137] or authorized by written agreement entered into pursuant to section 117(c) [42 U.S.C. 10137(c)]. Any salary or travel expense that would ordinarily be incurred by such tribe, may not be considered eligible for funding under this paragraph.

(2)(A) The Secretary shall make grants to each affected Indian tribe where a candidate site for a repository is approved under section 112(c) [42 U.S.C. 10132(c)]. Such grants may be made to each such Indian tribe only for purposes of enabling such Indian tribe—

(i) to review activities taken under this subtitle [42 U.S.C. 10131 et seq.] with respect to such site for purposes of determining any potential economic, social, public health and safety, and environmental impacts of such repository on the reservation and its residents;

(ii) to develop a request for impact assistance under paragraph (2);

(iii) to engage in any monitoring, testing, or evaluation activities with respect to site characterization programs with regard to such site;

(iv) to provide information to the residents of its reservation regarding any activities of such Indian tribe, the Secretary, or the Commission with respect to such site; and

(v) to request information from, and make comments and recommendations to, the Secretary regarding any activities taken under this subtitle [42 U.S.C. 10131 et seq.] with respect to such site.

(B) The amount of funds provided to any affected Indian tribe under this paragraph in any fiscal year may not exceed 100 percent of the costs incurred by such Indian tribe with respect to the activities described in clauses (i) through (v) of subparagraph (A). Any salary or travel expense that would ordinarily be incurred by such Indian tribe may not be considered eligible for funding under this paragraph.

(3)(A) The Secretary shall provide financial and technical assistance to any affected Indian tribe requesting such assistance and where there is a site with respect to which the Commission has authorized construction of a repository. Such assistance shall be designed to mitigate the impact on such Indian tribe of the development of such repository. Such assistance to such Indian tribe shall commence within 6 months following the granting by the Commission of a construction authorization for such repository and following the initiation of construction activities at such site.

(B) Any affected Indian tribe desiring assistance under this paragraph shall prepare and submit to the Secretary a report on any economic, social, public health and safety, and environmental impacts that are likely as a result of the development of a repository at a site on the reservation of such Indian tribe. Such report shall be submitted to the Secretary following the completion of site characterization activities at such site and before the recommendation of such site to the President by the Secretary for application for a construction authorization for a repository. As soon as practicable following the granting of a construction authorization for such repository, the Secretary shall seek to enter into a binding agreement with the Indian tribe involved setting forth the amount of assistance to be provided to such Indian tribe under this paragraph and the procedures to be followed in providing such assistance.

(4) The Secretary shall grant to each affected Indian tribe where a site for a repository is approved under section 112(c) [42 U.S.C. 10132(c)] an amount each fiscal year equal to the amount such Indian tribe would receive were it authorized to tax site characterization activities at such site, and the development and operation of such repository, as such Indian tribe taxes the other commercial activities occurring on such reservation. Such grants shall continue until such time as all such activities, development, and operation are terminated at such site.

(5)(A) An affected Indian tribe may not receive any grant under paragraph (1) after the expiration of the 1-year period following—

(i) the date on which the Secretary notifies such Indian tribe of the termination of site characterization activities at the candidate site involved on the reservation of such Indian tribe;

(ii) the date on which such site is disapproved under section 115 [42 U.S.C. 10135];

(iii) the date on which the Commission disapproves an application for a construction authorization for a repository at such site; or

(iv) the date of the enactment of the Nuclear Waste Policy Amendments Act of 1987 [enacted Dec. 22, 1987];

whichever occurs first, unless there is another candidate site on the reservation of such Indian tribe that is approved under section 112(c) [42 U.S.C. 10132(c)] and with respect to which the actions described in clauses (i), (ii), and (iii) have not been taken.

(B) An affected Indian tribe may not receive any further assistance under paragraph (2)[1] with respect to a site if repository construction activities at such site are terminated by the Secretary or if such activities are permanently enjoined by any court.

(C) At the end of the 2-year period beginning on the effective date of any license to receive and possess for a repository at a site on the reservation of an affected Indian tribe, no Federal funds shall be made available under paragraph (1) or (2)[2] to such Indian tribe, except for—

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[1] So in original. Reference probably should be to paragraph (3).

[2] So in original. Reference probably should be to paragraph (1), (2), or (3).

(i) such funds as may be necessary to support activities of such Indian tribe related to any other repository where a license to receive and possess has not been in effect for more than 1 year; and

(ii) such funds as may be necessary to support activities of such Indian tribe pursuant to agreements or contracts for impact assistance entered into, under paragraph (2), by such Indian tribe with the Secretary during such 2-year period.

(6) Financial assistance authorized in this subsection shall be made out of amounts held in the Nuclear Waste Fund established in section 302 [42 U.S.C. 10222].

[42 U.S.C. 10138]

JUDICIAL REVIEW OF AGENCY ACTIONS

Sec. 119. (a) Jurisdiction of United States Courts of Appeals.

(1) Except for review in the Supreme Court of the United States, the United States courts of appeals shall have original and exclusive jurisdiction over any civil action—

(A) for review of any final decision or action of the Secretary, the President, or the Commission under this subtitle [42 U.S.C. 10131 et seq.];

(B) alleging the failure of the Secretary, the President, or the Commission to make any decision, or take any action, required under this subtitle [42 U.S.C. 10131 et seq.];

(C) challenging the constitutionality of any decision made, or action taken, under any provision of this subtitle [42 U.S.C. 10131 et seq.];

(D) for review of any environmental impact statement prepared pursuant to the National Environmental Policy Act of 1969 [42 U.S.C. 4321 et seq.] with respect to any action under this subtitle [42 U.S.C. 10131 et seq.], or as required under section 135(c)(1) [42 U.S.C. 10155(c)(1)], or alleging a failure to prepare such statement with respect to any such action;

(E) for review of any environmental assessment prepared under section 112(b)(1) or 135(c)(2) [42 U.S.C. 10132(b)(1), 10155(c)(2)]; or

(F) for review of any research and development activity under title II [42 U.S.C. 10191 et seq.]

(2) The venue of any proceeding under this section shall be in the judicial circuit in which the petitioner involved resides or has its principal office, or in the United States Court of Appeals for the District of Columbia.

(b)Seadline for commencing action. A civil action for judicial review described under subsection (a)(1) may be brought not later than the 180th day after the date of the decision or action or failure to act involved, as the case may be, except that if a party shows that he did not know of the decision or action complained of (or of the failure to act), and that a reasonable person acting under the circumstances would not have known, such party may bring a civil action not later than the 180th day after the date such party acquired actual or constructive knowledge of such decision, action, or failure to act.

[42 U.S.C. 10139]

EXPEDITED AUTHORIZATIONS

Sec. 120. (a) Issuance of authorizations.

(1) To the extent that the taking of any action related to the site characterization of a site or the construction or initial operation of a repository under this subtitle [42 U.S.C. 10131 et seq.] requires a certificate, right-of-way, permit, lease, or other authorization from a Federal agency or officer, such agency or officer shall issue or grant any such authorization at the earliest practicable date, to the extent permitted by the applicable provisions of law administered by such agency or officer. All actions of a Federal agency or officer with respect to consideration of applications or requests for the issuance or grant of any such authorization shall be expedited, and any such application or request shall take precedence over any similar applications or requests not related to such repositories.

(2) The provisions of paragraph (1) shall not apply to any certificate, right-of-way, permit, lease, or other authorization issued or granted by, or requested from, the Commission.

(b) Terms of authorizations. Any authorization issued or granted pursuant to subsection (a) shall include such terms and conditions as may be required by law, and may include terms and conditions permitted by law.

[42 U.S.C. 10140]

CERTAIN STANDARDS AND CRITERIA

Sec. 121. (a) Environmental Protection Agency standards. Not later than 1 year after the date of the enactment of this Act [enacted Jan. 7, 1983], the Administrator, pursuant to authority under other provisions of law, shall, by rule, promulgate generally applicable standards for protection of the general environment from offsite releases from radioactive material in repositories.

(b) Commission requirements and criteria.

(1)(A) Not later than January 1, 1984, the Commission, pursuant to authority under other provisions of law, shall, by rule, promulgate technical requirements and criteria that it will apply, under the Atomic Energy Act of 1954 [42 U.S.C. 2011 et seq.] and the Energy Reorganization Act of 1974 [42 U.S.C. 5801 et seq.], in approving or disapproving—

(i) applications for authorization to construct repositories;

(ii) applications for licenses to receive and possess spent nuclear fuel and high-level radioactive waste in such repositories; and

(iii) applications for authorization for closure and decommissioning of such repositories.

(B) Such criteria shall provide for the use of a system of multiple barriers in the design of the repository and shall include such restrictions on the retrievability of the solidified high-level radioactive waste and spent fuel emplaced in the repository as the Commission deems appropriate.

(C) Such requirements and criteria shall not be inconsistent with any comparable standards promulgated by the Administrator under subsection (a).

(2) For purposes of this Act [42 U.S.C. 10101 et seq.], nothing in this section shall be construed to prohibit the Commission from promulgating requirements and criteria under paragraph (1) before the Administrator promulgates standards under subsection (a). If the Administrator promulgates standards under subsection (a) after requirements and criteria are promulgated by the Commission under paragraph (1), such requirements and criteria shall be revised by the Commission if necessary to comply with paragraph (1)(C).

(c) Environmental impact statement. The promulgation of standards or criteria in accordance with the provisions of this section shall not require the preparation of an environmental impact statement under section 102(2)(C) of the National Environmental Policy Act of 1969 [42 U.S.C. 4332(2)(C)], or to require any environmental review under subparagraph (E) or (F) of section 102(2) of such Act [42 U.S.C. 4332(2)(E), (F)].

[42 U.S.C. 10141]

DISPOSAL OF SPENT NUCLEAR FUEL

Sec. 122. Notwithstanding any other provision of this subtitle [42 U.S.C. 10131 et seq.], any repository constructed on a site approved under this subtitle [42 U.S.C. 10131 et seq.] shall be designed and constructed to permit the retrieval of any spent nuclear fuel placed in such repository, during an appropriate period of operation of the facility, for any reason pertaining to the public health and safety, or the environment, or for the purpose of permitting the recovery of the economically valuable contents of such spent fuel. The Secretary shall specify the appropriate period of retrievability with respect to any repository at the time of design of such repository, and such aspect of such repository shall be subject to approval or disapproval by the Commission as part of the construction authorization process under subsections (b) through (d) of section 114 [42 U.S.C. 10134(b)-(d)].

[42 U.S.C. 10142]

TITLE TO MATERIAL

Sec. 123. Delivery, and acceptance by the Secretary, of any high-level radioactive waste or spent nuclear fuel for a repository constructed under this subtitle [42 U.S.C. 10131 et seq.] shall constitute a transfer to the Secretary of title to such waste or spent fuel.

[42 U.S.C. 10143]

CONSIDERATION OF EFFECT OF ACQUISITION OF WATER RIGHTS

Sec. 124. The Secretary shall give full consideration to whether the development, construction, and operation of a repository may require any purchase or other acquisition of water rights that will have a significant adverse effect on the present or future development of the area in which such repository is located. The Secretary shall mitigate any such adverse effects to the maximum extent practicable.

[42 U.S.C. 10144]

TERMINATION OF CERTAIN PROVISIONS

Sec. 125. Sections 119 and 120 [42 U.S.C. 10139, 10140] shall cease to have effect at such time as a repository developed under this subtitle [42 U.S.C. 10131 et seq.] is licensed to receive and possess high-level radioactive waste and spent nuclear fuel.

[42 U.S.C. 10145]

SUBTITLE B—INTERIM STORAGE PROGRAM

FINDINGS AND PURPOSES

Sec. 131. (a) Findings. The Congress finds that—

(1) the persons owning and operating civilian nuclear power reactors have the primary responsibility for providing interim storage of spent nuclear fuel from such reactors, by maximizing, to the extent practical, the effective use of existing storage facilities at the site of each civilian nuclear power reactor, and by adding new onsite storage capacity in a timely manner where practical;

(2) the Federal Government has the responsibility to encourage and expedite the effective use of existing storage facilities and the addition of needed new storage capacity at the site of each civilian nuclear power reactor; and

(3) the Federal Government has the responsibility to provide, in accordance with the provisions of this subtitle, not more than 1,900 metric tons of capacity for interim storage of spent nuclear fuel for civilian nuclear power reactors that cannot reasonably provide adequate storage capacity at the sites of such reactors when needed to assure the continued, orderly operation of such reactors.

(b) Purposes. The purposes of this subtitle [42 U.S.C. 10151 et seq.] are—

(1) to provide for the utilization of available spent nuclear fuel pools at the site of each civilian nuclear power reactor to the extent practical and the addition of new spent nuclear fuel storage capacity where practical at the site of such reactor; and

(2) to provide, in accordance with the provisions of this subtitle [42 U.S.C. 10151 et seq.], for the establishment of a federally owned and operated system for the interim storage of spent nuclear fuel at one or more facilities owned by the Federal Government with not more than 1,900 metric tons of capacity to prevent disruptions in the orderly operation of any civilian nuclear power reactor that cannot reasonably provide adequate spent nuclear fuel storage capacity at the site of such reactor when needed.

[42 U.S.C. 10151]

AVAILABLE CAPACITY FOR INTERIM STORAGE OF SPENT NUCLEAR FUEL

Sec. 132. The Secretary, the Commission, and other authorized Federal officials shall each take such actions as such official considers necessary to encourage and expedite the effective use of available storage, and necessary additional storage, at the site of each civilian nuclear power reactor consistent with—

(1) the protection of the public health and safety, and the environment;

(2) economic considerations;

(3) continued operation of such reactor;

(4) any applicable provisions of law; and

(5) the views of the population surrounding such reactor.

[42 U.S.C. 10152]

INTERIM AT- REACTOR STORAGE

Sec. 133. The Commission shall, by rule, establish procedures for the licensing of any technology approved by the Commission under section 219(a) or use at the site of any civilian nuclear power reactor. The establishment of such procedures shall not preclude the licensing, under any applicable procedures or rules of the Commission in effect prior to such establishment, of any technology for the storage of civilian spent nuclear fuel at the site of any civilian nuclear power reactor.

[42 U.S.C. 10153]

LICENSING OF FACILITY EXPANSIONS AND TRANSSHIPMENTS

Sec. 134. (a) Oral argument. In any Commission hearing under section 189 of the Atomic Energy Act of 1954 [42 U.S.C. 2239] on an application for a license, or for an amendment to an existing license, filed after the date of the enactment of this Act [enacted Jan. 7, 1983], to expand the spent nuclear fuel storage capacity at the site of a civilian nuclear power reactor, through the use of high-density fuel storage racks,

fuel rod compaction, the transshipment of spent nuclear fuel to another civilian nuclear power reactor within the same utility system, the construction of additional spent nuclear fuel pool capacity or dry storage capacity, or by other means, the Commission shall, at the request of any party, provide an opportunity for oral argument with respect to any matter which the Commission determines to be in controversy among the parties. The oral argument shall be preceded by such discovery procedures as the rules of the Commission shall provide. The Commission shall require each party, including the Commission staff, to submit in written form, at the time of the oral argument, a summary of the facts, data, and arguments upon which such party proposes to rely that are known at such time to such party. Only facts and data in the form of sworn testimony or written submission may be relied upon by the parties during oral argument. Of the materials that may be submitted by the parties during oral argument, the Commission shall only consider those facts and data that are submitted in the form of sworn testimony or written submission.

(b) Adjudicatory hearing.

(1) At the conclusion of any oral argument under subsection (a), the Commission shall designate any disputed question of fact, together with any remaining questions of law, for resolution in an adjudicatory hearing only if it determines that—

(A) there is a genuine and substantial dispute of fact which can only be resolved with sufficient accuracy by the introduction of evidence in an adjudicatory hearing; and

(B) the decision of the Commission is likely to depend in whole or in part on the resolution of such dispute.

(2) In making a determination under this subsection, the Commission—

(A) shall designate in writing the specific facts that are in genuine and substantial dispute, the reason why the decision of the agency is likely to depend on the resolution of such facts, and the reason why an adjudicatory hearing is likely to resolve the dispute; and

(B) shall not consider—

(i) any issue relating to the design, construction, or operation of any civilian nuclear power reactor already licensed to operate at such site, or any civilian nuclear power reactor for which a construction permit has been granted at such site, unless the Commission determines that any such issue substantially affects the design, construction, or operation of the facility or activity for which such license application, authorization, or amendment is being considered; or

(ii) any siting or design issue fully considered and decided by the Commission in connection with the issuance of a construction permit or operating license for a civilian nuclear power reactor at such site, unless (I) such issue results from any revision of siting or design criteria by the Commission following such decision; and (II) the Commission determines that such issue substantially affects the design, construction, or operation of the facility or activity for which such license application, authorization, or amendment is being considered.

(3) The provisions of paragraph (2)(B) shall apply only with respect to licenses, authorizations, or amendments to licenses or authorizations, applied for under the Atomic Energy Act of 1954 [42 U.S.C. 2011 et seq.] before December 31, 2005.

(4) The provisions of this section shall not apply to the first application for a license or license amendment received by the Commission to expand onsite spent fuel storage capacity by the use of a new technology not previously approved for use at any nuclear powerplant by the Commission.

(c) Judicial review. No court shall hold unlawful or set aside a decision of the Commission in any proceeding described in subsection (a) because of a failure by the Commission to use a particular procedure pursuant to this section unless—

(1) an objection to the procedure used was presented to the Commission in a timely fashion or there are extraordinary circumstances that excuse the failure to present a timely objection; and

(2) the court finds that such failure has precluded a fair consideration and informed resolution of a significant issue of the proceeding taken as a whole.

[42 U.S.C. 10154]

STORAGE OF SPENT NUCLEAR FUEL

Sec. 135. (a) Storage capacity.

(1) Subject to section 8 [42 U.S.C. 10107], the Secretary shall provide, in accordance with paragraph (5), not more than 1,900 metric tons of capacity for the storage of spent nuclear fuel from civilian nuclear

power reactors. Such storage capacity shall be provided through any one or more of the following methods, used in any combination determined by the Secretary to be appropriate:

(A) use of available capacity at one or more facilities owned by the Federal Government on the date of the enactment of this Act [enacted Jan. 7, 1983], including the modification and expansion of any such facilities, if the Commission determines that such use will adequately protect the public health and safety, except that such use shall not—

(i) render such facilities subject to licensing under the Atomic Energy Act of 1954 [42 U.S.C. 2011 et seq.] or the Energy Reorganization Act of 1974 [42 U.S.C. 5801 et seq.]; or

(ii) except as provided in subsection (c) require the preparation of an environmental impact statement under section 102(2)(C) of the National Environmental Policy Act of 1969 [42 U.S.C. 4332(2)(C)], if such facility is already being used, or has previously been used, for such storage or for any similar purpose;

(B) acquisition of any modular or mobile spent nuclear fuel storage equipment, including spent nuclear fuel storage casks, and provision of such equipment, to any person generating or holding title to spent nuclear fuel, at the site of any civilian nuclear power reactor operated by such person or at any site owned by the Federal Government on the date of enactment of this Act [enacted Jan. 7, 1983];

(C) construction of storage capacity at any site of a civilian nuclear power reactor.

(2) Storage capacity authorized by paragraph (1) shall not be provided at any Federal or non-Federal site within which there is a candidate site for a repository. The restriction in the preceding sentence shall only apply until such time as the Secretary decides that such candidate site is no longer a candidate site under consideration for development as a repository.

(3) In selecting methods of providing storage capacity under paragraph (1), the Secretary shall consider the timeliness of the availability of each such method and shall seek to minimize the transportation of spent nuclear fuel, the public health and safety impacts, and the costs of providing such storage capacity.

(4) In providing storage capacity through any method described in paragraph (1), the Secretary shall comply with any applicable requirements for licensing or authorization of such method, except as provided in paragraph (1)(A)(i).

(5) The Secretary shall ensure that storage capacity is made available under paragraph (1) when needed, as determined on the basis of the storage needs specified in contracts entered into under section 136(a) [42 U.S.C. 10156(a)], and shall accept upon request any spent nuclear fuel as covered under such contracts.

(6) For purposes of paragraph (1)(A), the term "facility" means any building or structure.

(b) Contracts.

(1) Subject to the capacity limitation established in subsections (a)(1) and (d) the Secretary shall offer to enter into, and may enter into, contracts under section 136(a) [42 U.S.C. 10156(a)] with any person generating or owning spent nuclear fuel for purposes of providing storage capacity for such spent fuel under this section only if the Commission determines that—

(A) adequate storage capacity to ensure the continued orderly operation of the civilian nuclear power reactor at which such spent nuclear fuel is generated cannot reasonably be provided by the person owning and operating such reactor at such site, or at the site of any other civilian nuclear power reactor operated by such person, and such capacity cannot be made available in a timely manner through any method described in subparagraph (B); and

(B) such person is diligently pursuing licensed alternatives to the use of Federal storage capacity for the storage of spent nuclear fuel expected to be generated by such person in the future, including—

(i) expansion of storage facilities at the site of any civilian nuclear power reactor operated by such person;

(ii) construction of new or additional storage facilities at the site of any civilian nuclear power reactor operated by such person;

(iii) acquisition of modular or mobile spent nuclear fuel storage equipment, including spent nuclear fuel storage casks, for use at the site of any civilian nuclear power reactor operated by such person; and

(iv) transshipment to another civilian nuclear power reactor owned by such person.

(2) In making the determination described in paragraph (1)(A), the Commission shall ensure maintenance of a full core reserve storage capability at the site of the civilian nuclear power reactor involved unless the Commission determines that maintenance of such capability is not necessary for the continued orderly operation of such reactor.

(3) The Commission shall complete the determinations required in paragraph (1) with respect to any request for storage capacity not later than 6 months after receipt of such request by the Commission.

(c) Environmental review.

(1) The provision of 300 or more metric tons of storage capacity at any one Federal site under subsection (a)(1)(A) shall be considered to be a major Federal action requiring preparation of an environmental impact statement under section 102(2)(C) of the National Environmental Policy Act of 1969 [42 U.S.C. 4332(2)(C)].

(2)(A) The Secretary shall prepare, and make available to the public, an environmental assessment of the probable impacts of any provision of less than 300 metric tons of storage capacity at any one Federal site under subsection (a)(1)(A) that requires the modification or expansion of any facility at the site, and a discussion of alternative activities that may be undertaken to avoid such impacts. Such environmental assessment shall include—

(i) an estimate of the amount of storage capacity to be made available at such site;

(ii) an evaluation as to whether the facilities to be used at such site are suitable for the provision of such storage capacity;

(iii) a description of activities planned by the Secretary with respect to the modification or expansion of the facilities to be used at such site;

(iv) an evaluation of the effects of the provision of such storage capacity at such site on the public health and safety, and the environment;

(v) a reasonable comparative evaluation of current information with respect to such site and facilities and other sites and facilities available for the provision of such storage capacity;

(vi) a description of any other sites and facilities that have been considered by the Secretary for the provision of such storage capacity; and

(vii) an assessment of the regional and local impacts of providing such storage capacity at such site, including the impacts on transportation.

(B) The issuance of any environmental assessment under this paragraph shall be considered to be a final agency action subject to judicial review in accordance with the provisions of chapter 7 of title 5, United States Code [5 U.S.C. 701 et seq.]. Such judicial review shall be limited to the sufficiency of such assessment with respect to the items described in clauses (i) through (vii) of subparagraph (A).

(3) Judicial review of any environmental impact statement or environmental assessment prepared pursuant to this subsection shall be conducted in accordance with the provisions of section 119 [42 U.S.C. 10139].

(d) Review of sites and State participation.

(1) In carrying out the provisions of this subtitle [42 U.S.C. 10151 et seq.] with regard to any interim storage of spent fuel from civilian nuclear power reactors which the Secretary is authorized by section 135 [this section] to provide, the Secretary shall, as soon as practicable, notify, in writing, the Governor and the State legislature of any State and the Tribal Council of any affected Indian tribe in such State in which is located a potentially acceptable site or facility for such interim storage of spent fuel of his intention to investigate that site or facility.

(2) During the course of investigation of such site or facility, the Secretary shall keep the Governor, State legislature, and affected Tribal Council currently informed of the progress of the work, and results of the investigation. At the time of selection by the Secretary of any site or existing facility, but prior to undertaking any site-specific work or alterations, the Secretary shall promptly notify the Governor, the legislature, and any affected Tribal Council in writing of such selection, and subject to the provisions of paragraph (6) of this subsection, shall promptly enter into negotiations with such State and affected Tribal Council to establish a cooperative agreement under which such State and Council shall have the right to participate in a process of consultation and cooperation, based on public health and safety and environmental concerns, in all stages of the planning, development, modification, expansion, operation, and closure of storage capacity at a site or facility within such State for the interim storage of spent fuel from civilian nuclear power reactors. Public participation in the negotiation of such an agreement shall

be provided for and encouraged by the Secretary, the State, and the affected Tribal Council. The Secretary, in cooperation with the States and Indian tribes, shall develop and publish minimum guidelines for public participation in such negotiations, but the adequacy of such guidelines or any failure to comply with such guidelines shall not be a basis for judicial review.

(3) The cooperative agreement shall include, but need not be limited to, the sharing in accordance with applicable law of all technical and licensing information, the utilization of available expertise, the facilitating of permitting procedures, joint project review, and the formulation of joint surveillance and monitoring arrangements to carry out applicable Federal and State laws. The cooperative agreement also shall include a detailed plan or schedule of milestones, decision points and opportunities for State or eligible Tribal Council review and objection. Such cooperative agreement shall provide procedures for negotiating and resolving objections of the State and affected Tribal Council in any stage of planning, development, modification, expansion, operation, or closure of storage capacity at a site or facility within such State. The terms of any cooperative agreement shall not affect the authority of the Nuclear Regulatory Commission under existing law.

(4) For the purpose of this subsection, "process of consultation and cooperation" means a methodology by which the Secretary (A) keeps the State and eligible Tribal Council fully and currently informed about the aspects of the project related to any potential impact on the public health and safety and environment; (B) solicits, receives, and evaluates concerns and objections of such State and Council with regard to such aspects of the project on an ongoing basis; and (C) works diligently and cooperatively to resolve, through arbitration or other appropriate mechanisms, such concerns and objections. The process of consultation and cooperation shall not include the grant of a right to any State or Tribal Council to exercise an absolute veto of any aspect of the planning, development, modification, expansion, or operation of the project.

(5) The Secretary and the State and affected Tribal Council shall seek to conclude the agreement required by paragraph (2) as soon as practicable, but not later than 180 days following the date of notification of the selection under paragraph (2). The Secretary shall periodically report to the Congress thereafter on the status of the agreements approved under paragraph (3). Any report to the Congress on the status of negotiations of such agreement by the Secretary shall be accompanied by comments solicited by the Secretary from the State and eligible Tribal Council.

(6)(A) Upon deciding to provide an aggregate of 300 or more metric tons of storage capacity under subsection (a)(1) at any one site, the Secretary shall notify the Governor and legislature of the State where such site is located, or the governing body of the Indian tribe in whose reservation such site is located, as the case may be, of such decision. During the 60-day period following receipt of notification by the Secretary of his decision to provide an aggregate of 300 or more metric tons of storage capacity at any one site, the Governor or legislature of the State in which such site is located, or the governing body of the affected Indian tribe where such site is located, as the case may be, may disapprove the provision of 300 or more metric tons of storage capacity at the site involved and submit to the Congress a notice of such disapproval. A notice of disapproval shall be considered to be submitted to the Congress on the date of the transmittal of such notice of disapproval to the Speaker of the House and the President pro tempore of the Senate. Such notice of disapproval shall be accompanied by a statement of reasons explaining why the provision of such storage capacity at such site was disapproved by such Governor or legislature or the governing body of such Indian tribe.

(B) Unless otherwise provided by State law, the Governor or legislature of each State shall have authority to submit a notice of disapproval to the Congress under subparagraph (A). In any case in which State law provides for submission of any such notice of disapproval by any other person or entity, any reference in this subtitle to the Governor or legislature of such State shall be considered to refer instead to such other person or entity.

(C) The authority of the Governor and legislature of each State under this paragraph shall not be applicable with respect to any site located on a reservation.

(D) If any notice of disapproval is submitted to the Congress under subparagraph (A), the proposed provision of 300 or more metric tons of storage capacity at the site involved shall be disapproved unless, during the first period of 90 calendar days of continuous session of the Congress following the date of the receipt by the Congress of such notice of disapproval, the Congress passes a resolution approving such proposed provision of storage capacity in accordance with the procedures estab-

lished in this paragraph and subsections (d) through (f) of section 115 [42 U.S.C. 10135(d)-(f)] and such resolution thereafter becomes law. For purposes of this paragraph, the term "resolution" means a joint resolution of either House of the Congress, the matter after the resolving clause of which is as follows: "That there hereby is approved the provision of 300 or more metric tons of spent nuclear fuel storage capacity at the site located at ——, with respect to which a notice of disapproval was submitted by —— on ——.". The first blank space in such resolution shall be filled with the geographic location of the site involved; the second blank space in such resolution shall be filled with the designation of the State Governor and[1] legislature or affected Indian tribe governing body submitting the notice of disapproval involved; and the last blank space in such resolution shall be filled with the date of submission of such notice of disapproval.

(E) For purposes of the consideration of any resolution described in subparagraph (D), each reference in subsections (d) and (e) of section 115 [42 U.S.C. 10135(d)-(f)] to a resolution of repository siting approval shall be considered to refer to the resolution described in such subparagraph.

(7) As used in this section, the term "affected Tribal Council" means the governing body of any Indian tribe within whose reservation boundaries there is located a potentially acceptable site for interim storage capacity of spent nuclear fuel from civilian nuclear power reactors, or within whose boundaries a site for such capacity is selected by the Secretary, or whose federally defined possessory or usage rights to other lands outside of the reservation's boundaries arising out of congressionally ratified treaties, as determined by the Secretary of the Interior pursuant to a petition filed with him by the appropriate governmental officials of such tribe, may be substantially and adversely affected by the establishment of any such storage capacity.

(e) Limitations. Any spent nuclear fuel stored under this section shall be removed from the storage site or facility involved as soon as practicable, but in any event not later than 3 years following the date on which a repository or monitored retrievable storage facility developed under this Act [42 U.S.C. 10101 et seq.] is available for disposal of such spent nuclear fuel.

(f) Report. The Secretary shall annually prepare and submit to the Congress a report on any plans of the Secretary for providing storage capacity under this section. Such report shall include a description of the specific manner of providing such storage selected by the Secretary, if any. The Secretary shall prepare and submit the first such report not later than 1 year after the date of the enactment of this Act [enacted Jan. 7, 1982].

(g) Criteria for determining adequacy of available storage capacity. Not later than 90 days after the date of the enactment of this Act [enacted Jan. 7, 1983], the Commission pursuant to section 553 of the Administrative Procedures Act,[2] shall propose, by rule, procedures and criteria for making the determination required by subsection (b) that a person owning and operating a civilian nuclear power reactor cannot reasonably provide adequate spent nuclear fuel storage capacity at the civilian nuclear power reactor site when needed to ensure the continued orderly operation of such reactor. Such criteria shall ensure the maintenance of a full core reserve storage capability at the site of such reactor unless the Commission determines that maintenance of such capability is not necessary for the continued orderly operation of such reactor. Such criteria shall identify the feasibility of reasonably providing such adequate spent nuclear fuel storage capacity, taking into account economic, technical, regulatory, and public health and safety factors, through the use of high-density fuel storage racks, fuel rod compaction, transshipment of spent nuclear fuel to another civilian nuclear power reactor within the same utility system, construction of additional spent nuclear fuel pool capacity, or such other technologies as may be approved by the Commission.

(h) Application. Notwithstanding any other provision of law, nothing in this Act [42 U.S.C. 10101 et seq.] shall be construed to encourage, authorize, or require the private or Federal use, purchase, lease, or other acquisition of any storage facility located away from the site of any civilian nuclear power reactor and not owned by the Federal Government on the date of the enactment of this Act [enacted Jan. 7, 1983].

(i) Coordination with research and development program. To the extent available, and consistent with the provisions of this section, the Secretary shall provide spent nuclear fuel for the research and development

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[1] So in original.

[2] So in original. Reference probably should be to section 553 of title 5, United States Code.

program authorized in section 217 from spent nuclear fuel received by the Secretary for storage under this section. Such spent nuclear fuel shall not be subject to the provisions of subsection (e).

[42 U.S.C. 10155]

INTERIM STORAGE FUND

Sec. 136. (a) Contracts.

(1) During the period following the date of the enactment of this Act [enacted Jan. 7, 1983], but not later than January 1, 1990, the Secretary is authorized to enter into contracts with persons who generate or own spent nuclear fuel resulting from civilian nuclear activities for the storage of such spent nuclear fuel in any storage capacity provided under this subtitle: *Provided, however,* That the Secretary shall not enter into contracts for spent nuclear fuel in amounts in excess of the available storage capacity specified in section 135(a) [42 U.S.C. 10155(a)]. Those contracts shall provide that the Federal Government will (1) take title at the civilian nuclear power reactor site, to such amounts of spent nuclear fuel from the civilian nuclear power reactor as the Commission determines cannot be stored onsite, (2) transport the spent nuclear fuel to a federally owned and operated interim away-from-reactor storage facility, and (3) store such fuel in the facility pending further processing, storage, or disposal. Each such contract shall (A) provide for payment to the Secretary of fees determined in accordance with the provisions of this section; and (B) specify the amount of storage capacity to be provided for the person involved.

(2) The Secretary shall undertake a study and, not later than 180 days after the date of the enactment of this Act [enacted Jan. 7, 1983], submit to the Congress a report, establishing payment charges that shall be calculated on an annual basis, commencing on or before January 1, 1984. Such payment charges and the calculation thereof shall be published in the Federal Register, and shall become effective not less than 30 days after publication. Each payment charge published in the Federal Register under this paragraph shall remain effective for a period of 12 months from the effective date as the charge for the cost of the interim storage of any spent nuclear fuel. The report of the Secretary shall specify the method and manner of collection (including the rates and manner of payment) and any legislative recommendations determined by the Secretary to be appropriate.

(3) Fees for storage under this subtitle [42 U.S.C. 10151 et seq.] shall be established on a nondiscriminatory basis. The fees to be paid by each person entering into a contract with the Secretary under this subsection shall be based upon an estimate of the pro rata costs of storage and related activities under this subtitle [42 U.S.C. 10151 et seq.] with respect to such person, including the acquisition, construction, operation, and maintenance of any facilities under this subtitle [42 U.S.C. 10151 et seq.].

(4) The Secretary shall establish in writing criteria setting forth the terms and conditions under which such storage services shall be made available.

(5) Except as provided in section 137 [42 U.S.C. 10157], nothing in this or any other Act requires the Secretary, in carrying out the responsibilities of this section, to obtain a license or permit to possess or own spent nuclear fuel.

(b) Limitation. No spent nuclear fuel generated or owned by any department of the United States referred to in section 101 or 102 of title 5, United States Code [5 U.S.C. 101, 102], may be stored by the Secretary in any storage capacity provided under this subtitle [42 U.S.C. 10151 et seq.] unless such department transfers to the Secretary, for deposit in the Interim Storage Fund, amounts equivalent to the fees that would be paid to the Secretary under the contracts referred to in this section if such spent nuclear fuel were generated by any other person.

(c) Establishment of Interim Storage Fund. There hereby is established in the Treasury of the United States a separate fund, to be known as the Interim Storage Fund. The Storage Fund shall consist of—

(1) all receipts, proceeds, and recoveries realized by the Secretary under subsections (a), (b), and (e),[1] which shall be deposited in the Storage Fund immediately upon their realization;

(2) any appropriations made by the Congress to the Storage Fund; and

[1] So in original. Reference should be to subsections (a), (b), and (f).

(3) any unexpended balances available on the date of the enactment of this Act [enacted Jan. 7, 1983] for functions or activities necessary or incident to the interim storage of civilian spent nuclear fuel, which shall automatically be transferred to the Storage Fund on such date.

(d) Use of Storage Fund. The Secretary may make expenditures from the Storage Fund, subject to subsection (e), for any purpose necessary or appropriate to the conduct of the functions and activities of the Secretary, or the provision or anticipated provision of services, under this subtitle [42 U.S.C. 10151 et seq.], including—

(1) the identification, development, licensing, construction, operation, decommissioning, and post-decommissioning maintenance and monitoring of any interim storage facility provided under this subtitle [42 U.S.C. 10151 et seq.];

(2) the administrative cost of the interim storage program;

(3) the costs associated with acquisition, design, modification, replacement, operation, and construction of facilities at an interim storage site, consistent with the restrictions in section 135 [42 U.S.C. 10155];

(4) the cost of transportation of spent nuclear fuel; and

(5) impact assistance as described in subsection (e).

(e) Impact assistance.

(1) Beginning the first fiscal year which commences after the date of the enactment of this Act [enacted Jan. 7, 1983], the Secretary shall make annual impact assistance payments to a State or appropriate unit of local government, or both, in order to mitigate social or economic impacts occasioned by the establishment and subsequent operation of any interim storage capacity within the jurisdictional boundaries of such government or governments and authorized under this subtitle [42 U.S.C. 10151 et seq.]: *Provided, however,* That such impact assistance payments shall not exceed (A) ten per centum of the costs incurred in paragraphs (1) and (2), or (B) $15 per kilogram of spent fuel, whichever is less;

(2) Payments made available to States and units of local government pursuant to this section shall be—

(A) allocated in a fair and equitable manner with a priority to those States or units of local government suffering the most severe impacts; and

(B) utilized by States or units of local governments only for (i) planning, (ii) construction and maintenance of public services, (iii) provision of public services related to the providing of such interim storage authorized under this title [42 U.S.C. 10121 et seq.], and (iv) compensation for loss of taxable property equivalent to that if the storage had been provided under private ownership.

(3) Such payments shall be subject to such terms and conditions as the Secretary determines necessary to ensure that the purposes of this subsection shall be achieved. The Secretary shall issue such regulations as may be necessary to carry out the provisions of this subsection.

(4) Payments under this subsection shall be made available solely from the fees determined under subsection (a).

(5) The Secretary is authorized to consult with States and appropriate units of local government in advance of commencement establishment of storage capacity authorized under this subtitle [42 U.S.C. 10151 et seq.] in an effort to determine the level of the payment such government would be eligible to receive pursuant to this subsection.

(6) As used in this subsection, the term "unit of local government" means a county, parish, township, municipality, and shall include a borough existing in the State of Alaska on the date of the enactment of this subsection [enacted Jan. 7, 1983], and any other unit of government below the State level which is a unit of general government as determined by the Secretary.

(f) Administration of Storage Fund.

(1) The Secretary of the Treasury shall hold the Storage Fund and, after consultation with the Secretary, annually report to the Congress on the financial condition and operations of the Storage Fund during the preceding fiscal year.

(2) The Secretary shall submit the budget of the Storage Fund to the Office of Management and Budget triennially along with the budget of the Department of Energy submitted at such time in accordance with chapter 11 of title 31, United States Code [31 U.S.C. 1101 et seq.]. The budget of the Storage Fund shall consist of estimates made by the Secretary of expenditures from the Storage Fund and other

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[2] So in original. Reference probably should be to subsection (f).

relevant financial matters for the succeeding 3 fiscal years, and shall be included in the Budget of the United States Government. The Secretary may make expenditures from the Storage Fund, subject to appropriations which shall remain available until expended. Appropriations shall be subject to triennial authorization.

(3) If the Secretary determines that the Storage Fund contains at any time amounts in excess of current needs, the Secretary may request the Secretary of the Treasury to invest such amounts, or any portion of such amounts as the Secretary determines to be appropriate, in obligations of the United States—

(A) having maturities determined by the Secretary of the Treasury to be appropriate to the needs of the Storage Fund; and

(B) bearing interest at rates determined to be appropriate by the Secretary of the Treasury, taking into consideration the current average market yield on outstanding marketable obligations of the United States with remaining periods to maturity comparable to the maturities of such investments, except that the interest rate on such investments shall not exceed the average interest rate applicable to existing borrowings.

(4) Receipts, proceeds, and recoveries realized by the Secretary under this section, and expenditures of amounts from the Storage Fund, shall be exempt from annual apportionment under the provisions of subchapter II of chapter 15 of title 31, United States Code [31 U.S.C. 1511 et seq.].

(5) If at any time the moneys available in the Storage Fund are insufficient to enable the Secretary to discharge his responsibilities under this subtitle [31 U.S.C. 10151 et seq.], the Secretary shall issue to the Secretary of the Treasury obligations in such forms and denominations, bearing such maturities, and subject to such terms and conditions as may be agreed to by the Secretary and the Secretary of the Treasury. The total of such obligations shall not exceed amounts provided in appropriation Acts. Redemption of such obligations shall be made by the Secretary from moneys available in the Storage Fund. Such obligations shall bear interest at a rate determined by the Secretary of the Treasury, which shall be not less than a rate determined by taking into consideration the average market yield on outstanding marketable obligations of the United States of comparable maturities during the month preceding the issuance of the obligations under this paragraph. The Secretary of the Treasury shall purchase any issued obligations, and for such purpose the Secretary of the Treasury is authorized to use as a public debt transaction the proceeds from the sale of any securities issued under chapter 31 of title 31, United States Code [31 U.S.C. 3101 et seq.], and the purposes for which securities may be issued under such Act are extended to include any purchase of such obligations. The Secretary of the Treasury may at any time sell any of the obligations acquired by him under this paragraph. All redemptions, purchases, and sales by the Secretary of the Treasury of obligations under this paragraph shall be treated as public debt transactions of the United States.

(6) Any appropriations made available to the Storage Fund for any purpose described in subsection (d) shall be repaid into the general fund of the Treasury, together with interest from the date of availability of the appropriations until the date of repayment. Such interest shall be paid on the cumulative amount of appropriations available to the Storage Fund, less the average undisbursed cash balance in the Storage Fund account during the fiscal year involved. The rate of such interest shall be determined by the Secretary of the Treasury taking into consideration the average market yield during the month preceding each fiscal year on outstanding marketable obligations of the United States of comparable maturity. Interest payments may be deferred with the approval of the Secretary of the Treasury, but any interest payments so deferred shall themselves bear interest.

[42 U.S.C. 10156]

TRANSPORTATION

Sec. 137. (a)

(1) Transportation of spent nuclear fuel under section 136(a) [42 U.S.C. 10136(a)] shall be subject to licensing and regulation by the Commission and by the Secretary of Transportation as provided for transportation of commercial spent nuclear fuel under existing law.

(2) The Secretary, in providing for the transportation of spent nuclear fuel under this Act [42 U.S.C. 10101 et seq.], shall utilize by contract private industry to the fullest extent possible in each aspect of such transportation. The Secretary shall use direct Federal services for such transportation only upon a determination of the Secretary of Transportation, in consultation with the Secretary, that private industry is unable or unwilling to provide such transportation services at reasonable cost.

[42 U.S.C. 10157]

SUBTITLE C—MONITORED RETRIEVABLE STORAGE

MONITORED RETRIEVABLE STORAGE

Sec. 141. (a) Findings. The Congress finds that—

(1) long-term storage of high-level radioactive waste or spent nuclear fuel in monitored retrievable storage facilities is an option for providing safe and reliable management of such waste or spent fuel;

(2) the executive branch and the Congress should proceed as expeditiously as possible to consider fully a proposal for construction of one or more monitored retrievable storage facilities to provide such long-term storage;

(3) the Federal Government has the responsibility to ensure that site-specific designs for such facilities are available as provided in this section;

(4) the generators and owners of the high-level radioactive waste and spent nuclear fuel to be stored in such facilities have the responsibility to pay the costs of the long-term storage of such waste and spent fuel; and

(5) disposal of high-level radioactive waste and spent nuclear fuel in a repository developed under this Act [42 U.S.C. 10101 et seq.] should proceed regardless of any construction of a monitored retrievable storage facility pursuant to this section.

(b) Submission of proposal by Secretary.

(1) On or before June 1, 1985, the Secretary shall complete a detailed study of the need for and feasibility of, and shall submit to the Congress a proposal for, the construction of one or more monitored retrievable storage facilities for high-level radioactive waste and spent nuclear fuel. Each such facility shall be designed—

(A) to accommodate spent nuclear fuel and high-level radioactive waste resulting from civilian nuclear activities;

(B) to permit continuous monitoring, management, and maintenance of such spent fuel and waste for the foreseeable future;

(C) to provide for the ready retrieval of such spent fuel and waste for further processing or disposal; and

(D) to safely store such spent fuel and waste as long as may be necessary by maintaining such facility through appropriate means, including any required replacement of such facility.

(2) Such proposal shall include—

(A) the establishment of a Federal program for the siting, development, construction, and operation of facilities capable of safely storing high-level radioactive waste and spent nuclear fuel, which facilities are to be licensed by the Commission;

(B) a plan for the funding of the construction and operation of such facilities, which plan shall provide that the costs of such activities shall be borne by the generators and owners of the high-level radioactive waste and spent nuclear fuel to be stored in such facilities;

(C) site-specific designs, specifications, and cost estimates sufficient to (i) solicit bids for the construction of the first such facility; (ii) support congressional authorization of the construction of such facility; and (iii) enable completion and operation of such facility as soon as practicable following congressional authorization of such facility; and

(D) a plan for integrating facilities constructed pursuant to this section with other storage and disposal facilities authorized in this Act [42 U.S.C. 10101 et seq.].

(3) In formulating such proposal, the Secretary shall consult with the Commission and the Administrator, and shall submit their comments on such proposal to the Congress at the time such proposal is submitted.

(4) The proposal shall include, for the first such facility, at least 3 alternative sites and at least 5 alternative combinations of such proposed sites and facility designs consistent with the criteria of paragraph (b)(1).[1] The Secretary shall recommend the combination among the alternatives that the Secretary deems preferable. The environmental assessment under subsection (c) shall include a full

[1] So in original. Reference probably should be to paragraph (1).

analysis of the relative advantages and disadvantages of all 5 such alternative combinations of proposed sites and proposed facility designs.

(c) Environmental impact statements.

(1) Preparation and submission to the Congress of the proposal required in this section shall not require the preparation of an environmental impact statement under section 102(2)(C) of the National Environmental Policy Act of 1969 [42 U.S.C. 4332(2)(C)]. The Secretary shall prepare, in accordance with regulations issued by the Secretary implementing such Act [42 U.S.C. 4321 et seq.], an environmental assessment with respect to such proposal. Such environmental assessment shall be based upon available information regarding alternative technologies for the storage of spent nuclear fuel and high-level radioactive waste. The Secretary shall submit such environmental assessment to the Congress at the time such proposal is submitted.

(2) If the Congress by law, after review of the proposal submitted by the Secretary under subsection (b), specifically authorizes construction of a monitored retrievable storage facility, the requirements of the National Environmental Policy Act of 1969 [42 U.S.C. 4321 et seq.] shall apply with respect to construction of such facility, except that any environmental impact statement prepared with respect to such facility shall not be required to consider the need for such facility or any alternative to the design criteria for such facility set forth in subsection (b)(1).

(d) Licensing. Any facility authorized pursuant to this section shall be subject to licensing under section 202(3) of the Energy Reorganization Act of 1974 [42 U.S.C. 5842(3)]. In reviewing the application filed by the Secretary for licensing of the first such facility, the Commission may not consider the need for such facility or any alternative to the design criteria for such facility set forth in subsection (b)(1).

(e) Clarification. Nothing in this section limits the consideration of alternative facility designs consistent with the criteria of paragraph (b)(1) in any environmental impact statement, or in any licensing procedure of the Commission, with respect to any monitored, retrievable facility authorized pursuant to this section.

(f) Impact assistance.

(1) Upon receipt by the Secretary of congressional authorization to construct a facility described in subsection (b), the Secretary shall commence making annual impact aid payments to appropriate units of general local government in order to mitigate any social or economic impacts resulting from the construction and subsequent operation of any such facility within the jurisdictional boundaries of any such unit.

(2) Payments made available to units of general local government under this subsection shall be—

(A) allocated in a fair and equitable manner, with priority given to units of general local government determined by the Secretary to be most severely affected; and

(B) utilized by units of general local government only for planning, construction, maintenance, and provision of public services related to the siting of such facility.

(3) Such payments shall be subject to such terms and conditions as the Secretary determines are necessary to ensure achievement of the purposes of this subsection. The Secretary shall issue such regulations as may be necessary to carry out the provisions of this subsection.

(4) Such payments shall be made available entirely from funds held in the Nuclear Waste Fund established in section 302(c) [42 U.S.C. 10222(c)] and shall be available only to the extent provided in advance in appropriation Acts.

(5) The Secretary may consult with appropriate units of general local government in advance of commencement of construction of any such facility in an effort to determine the level of payments each such unit is eligible to receive under this subsection.

(g) Limitation. No monitored retrievable storage facility developed pursuant to this section may be constructed in any State in which there is located any site approved for site characterization under section 112 [42 U.S.C. 10132]. The restriction in the preceding sentence shall only apply until such time as the Secretary decides that such candidate site is no longer a candidate site under consideration for development as a repository. Such restriction shall continue to apply to any site selected for construction as a repository.

(h) Participation of States and Indian tribes. Any facility authorized pursuant to this section shall be subject to the provisions of sections 115, 116(a), 116(b), 116(d), 117, and 118 [42 U.S.C. 10135, 10136(a), (b), (d), 10137, 10138]. For purposes of carrying out the provisions of this subsection, any reference in sections 115 through 118 [42 U.S.C. 10135-10138] to a repository shall be considered to refer to a monitored retrievable storage facility.

[42 U.S.C. 10161]

AUTHORIZATION OF MONITORED RETRIEVABLE STORAGE

Sec. 142. (a) Nullification of Oak Ridge siting proposal. The proposal of the Secretary (EC-1022, 100th Congress) to locate a monitored retrievable storage facility at a site on the Clinch River in the Roane County portion of Oak Ridge, Tennessee, with alternative sites on the Oak Ridge Reservation of the Department of Energy and on the former site of a proposed nuclear powerplant in Hartsville, Tennessee, is annulled and revoked. In carrying out the provisions of sections 144 and 145 [42 U.S.C. 10164, 10165], the Secretary shall make no presumption or preference to such sites by reason of their previous selection.

(b) Authorization. The Secretary is authorized to site, construct, and operate one monitored retrievable storage facility subject to the conditions described in sections 143 through 149 [42 U.S.C. 10163-10169].

[42 U.S.C. 10162]

MONITORED RETRIEVABLE STORAGE COMMISSION

Sec. 143. (a) Establishment.

(1)(A) There is established a Monitored Retrievable Storage Review Commission (hereinafter in this section referred to as the "MRS Commission"), that shall consist of 3 members who shall be appointed by and serve at the pleasure of the President pro tempore of the Senate and the Speaker of the House of Representatives.

(B) Members of the MRS Commission shall be appointed not later than 30 days after the date of the enactment of the Nuclear Waste Policy Amendments Act of 1987 [enacted Dec. 22, 1987] from among persons who as a result of training, experience and attainments are exceptionally well qualified to evaluate the need for a monitored retrievable storage facility as a part of the Nation's nuclear waste management system.

(C) The MRS Commission shall prepare a report on the need for a monitored retrievable storage facility as a part of a national nuclear waste management system that achieves the purposes of this Act. In preparing the report under this subparagraph, the MRS Commission shall—

(i) review the status and adequacy of the Secretary's evaluation of the systems advantages and disadvantages of bringing such a facility into the national nuclear waste disposal system;

(ii) obtain comment and available data on monitored retrievable storage from affected parties, including States containing potentially acceptable sites;

(iii) evaluate the utility of a monitored retrievable storage facility from a technical perspective; and

(iv) make a recommendation to Congress as to whether such a facility should be included in the national nuclear waste management system in order to achieve the purposes of this Act, including meeting needs for packaging and handling of spent nuclear fuel, improving the flexibility of the repository development schedule, and providing temporary storage of spent nuclear fuel accepted for disposal.

(2) In preparing the report and making its recommendation under paragraph (1) the MRS Commission shall compare such a facility to the alternative of at-reactor storage of spent nuclear fuel prior to disposal of such fuel in a repository under this Act. Such comparison shall take into consideration the impact on—

(A) repository design and construction;

(B) waste package design, fabrication and standardization;

(C) waste preparation;

(D) waste transportation systems;

(E) the reliability of the national system for the disposal of radioactive waste;

(F) the ability of the Secretary to fulfill contractual commitments of the Department under this Act to accept spent nuclear fuel for disposal; and

(G) economic factors, including the impact on the costs likely to be imposed on ratepayers of the Nation's electric utilities for temporary at-reactor storage of spent nuclear fuel prior to final disposal in a repository, as well as the costs likely to be imposed on ratepayers of the Nation's electric utilities in building and operating such a facility.

(3) The report under this subsection, together with the recommendation of the MRS Commission, shall be transmitted to Congress on November 1, 1989.

(4)(A)(i) Each member of the MRS Commission shall be paid at the rate provided for level III of the

Executive Schedule for each day (including travel time) such member is engaged in the work of the MRS Commission, and shall receive travel expenses, including per diem in lieu of subsistence in the same manner as is permitted under sections 5702 and 5703 of title 5, United States Code.

(ii) The MRS Commission may appoint and fix compensation, not to exceed the rate of basic pay payable for GS-18 of the General Schedule, for such staff as may be necessary to carry out its functions.

(B)(i) The MRS Commission may hold hearings, sit and act at such times and places, take such testimony and receive such evidence as the MRS Commission considers appropriate. Any member of the MRS Commission may administer oaths or affirmations to witnesses appearing before the MRS Commission.

(ii) The MRS Commission may request any Executive agency, including the Department, to furnish such assistance or information, including records, data, files, or documents, as the Commission considers necessary to carry out its functions. Unless prohibited by law, such agency shall promptly furnish such assistance or information.

(iii) To the extent permitted by law, the Administrator of the General Services Administration shall, upon request of the MRS Commission, provide the MRS Commission with necessary administrative services, facilities, and support on a reimbursable basis.

(iv) The MRS Commission may procure temporary and intermittent services from experts and consultants to the same extent as is authorized by section 3109(b) of title 5, United States Code, at rates and under such rules as the MRS Commission considers reasonable.

(C) The MRS Commission shall cease to exist 60 days after the submission to Congress of the report required under this subsection.

[42 U.S.C. 10163]

SURVEY

Sec. 144. After the MRS Commission submits its report to the Congress under section 143, the Secretary may conduct a survey and evaluation of potentially suitable sites for a monitored retrievable storage facility. In conducting such survey and evaluation, the Secretary shall consider the extent to which siting a monitored retrievable storage facility at each site surveyed would—

(1) enhance the reliability and flexibility of the system for the disposal of spent nuclear fuel and high-level radioactive waste established under this Act;

(2) minimize the impacts of transportation and handling of such fuel and waste;

(3) provide for public confidence in the ability of such system to safely dispose of the fuel and waste;

(4) impose minimal adverse effects on the local community and the local environment;

(5) provide a high probability that the facility will meet applicable environmental, health, and safety requirements in a timely fashion;

(6) provide such other benefits to the system for the disposal of spent nuclear fuel and high-level radioactive waste as the Secretary deems appropriate; and

(7) unduly burden a State in which significant volumes of high-level radioactive waste resulting from atomic energy defense activities are stored.

[42 U.S.C. 10164]

SITE SELECTION

Sec. 145. (a) In general. The Secretary may select the site evaluated under section 144 [42 U.S.C. 10164] that the Secretary determines on the basis of available information to be the most suitable for a monitored retrievable storage facility that is an integral part of the system for the disposal of spent nuclear fuel and high-level radioactive waste established under this Act.

(b) Limitation. The Secretary may not select a site under subsection (a) until the Secretary recommends to the President the approval of a site for development as a repository under section 114(a) [42 U.S.C. 10164(a)].

(c) Site specific activities. The Secretary may conduct such site specific activities at each site surveyed under section 144 [42 U.S.C. 10164] as he determines may be necessary to support an application to the Commission for a license to construct a monitored retrievable storage facility at such site.

(d) Environmental assessment. Site specific activities and selection of a site under this section shall not require the preparation of an environmental impact statement under section 102(2)(C) of the National

Environmental Policy Act of 1969 [42 U.S.C. 4332(2)(C)]. The Secretary shall prepare an environmental assessment with respect to such selection in accordance with regulations issued by the Secretary implementing such Act. Such environmental assessment shall be based upon available information regarding alternative technologies for the storage of spent nuclear fuel and high-level radioactive waste. The Secretary shall submit such environmental assessment to the Congress at the time such site is selected.

(e) Notification before selection.

(1) At least 6 months before selecting a site under subsection (a), the Secretary shall notify the Governor and legislature of the State in which such site is located, or the governing body of the affected Indian tribe where such site is located, as the case may be, of such potential selection and the basis for such selection.

(2) Before selecting any site under subsection (a), the Secretary shall hold at least one public hearing in the vicinity of such site to solicit any recommendations of interested parties with respect to issues raised by the selection of such site.

(f) Notification of selection. The Secretary shall promptly notify Congress and the appropriate State or Indian tribe of the selection under subsection (a).

(g) Limitation. No monitored retrievable storage facility authorized pursuant to section 142(b) [42 U.S.C. 10162(b)] may be constructed in the State of Nevada.

[42 U.S.C. 10165]

NOTICE OF DISAPPROVAL

Sec. 146. (a) In general. The selection of a site under section 145 [42 U.S.C. 10165] shall be effective at the end of the period of 60 calendar days beginning on the date of notification under such subsection, unless the governing body of the Indian tribe on whose reservation such site is located, or, if the site is not on a reservation, the Governor and the legislature of the State in which the site is located, has submitted to Congress a notice of disapproval with respect to such site. If any such notice of disapproval has been submitted under this subsection, the selection of the site under section 145 [42 U.S.C. 10165] shall not be effective except as provided under section 115(c) [42 U.S.C. 10135(c)].

(b) References. For purposes of carrying out the provisions of this subsection, references in section 115(c) [42 U.S.C. 10135(c)] to a repository shall be considered to refer to a monitored retrievable storage facility and references to a notice of disapproval of a repository site designation under section 116(b) or 118(a) [42 U.S.C. 10136(b) or 10138(a)] shall be considered to refer to a notice of disapproval under this section.

[42 U.S.C. 10166]

BENEFITS AGREEMENT

Sec. 147. Once selection of a site for a monitored retrievable storage facility is made by the Secretary under section 145 [42 U.S.C. 10165], the Indian tribe on whose reservation the site is located, or, in the case that the site is not located on a reservation, the State in which the site is located, shall be eligible to enter into a benefits agreement with the Secretary under section 170 [42 U.S.C. 10173].

[42 U.S.C. 10167]

CONSTRUCTION AUTHORIZATION

Sec. 148. (a) Environmental impact statement.

(1) Once the selection of a site is effective under section 146 [42 U.S.C. 10166], the requirements of the National Environmental Policy Act of 1969 [42 U.S.C. 4321 et seq.] shall apply with respect to construction of a monitored retrievable storage facility, except that any environmental impact statement prepared with respect to such facility shall not be required to consider the need for such facility or any alternative to the design criteria for such facility set forth in section 141(b)(1) [42 U.S.C. 10161(b)(1)].

(2) Nothing in this section shall be construed to limit the consideration of alternative facility designs consistent with the criteria described in section 141(b)(1) [42 U.S.C. 10161(b)(1)] in any environmental impact statement, or in any licensing procedure of the Commission, with respect to any monitored retrievable storage facility authorized under section 142(b) [42 U.S.C. 10162(b)].

(b) Application for construction license. Once the selection of a site for a monitored retrievable storage facility is effective under section 146 [42 U.S.C. 10166], the Secretary may submit an application to the Commission for a license to construct such a facility as part of an integrated nuclear waste management system and in accordance with the provisions of this section and applicable agreements under this Act affecting such facility.

(c) Licensing. Any monitored retrievable storage facility authorized pursuant to section 142(b) [42 U.S.C. 10162(b)] shall be subject to licensing under section 202(3) of the Energy Reorganization Act of 1974 [42 U.S.C. 5842(3)]. In reviewing the application filed by the Secretary for licensing of such facility, the Commission may not consider the need for such facility or any alternative to the design criteria for such facility set forth in section 141(b)(1) [42 U.S.C. 10161(b)(1)].

(d) Licensing conditions. Any license issued by the Commission for a monitored retrievable storage facility under this section shall provide that—

(1) construction of such facility may not begin until the Commission has issued a license for the construction of a repository under section 115(d) [42 U.S.C. 10135(d)];

(2) construction of such facility or acceptance of spent nuclear fuel or high-level radioactive waste shall be prohibited during such time as the repository license is revoked by the Commission or construction of the repository ceases;

(3) the quantity of spent nuclear fuel or high-level radioactive waste at the site of such facility at any one time may not exceed 10,000 metric tons of heavy metal until a repository under this Act first accepts spent nuclear fuel or solidified high-level radioactive waste; and

(4) the quantity of spent nuclear fuel or high-level radioactive waste at the site of such facility at any one time may not exceed 15,000 metric tons of heavy metal.

[42 U.S.C. 10168]

FINANCIAL ASSISTANCE

Sec. 149. The provisions of section 116(c) or 118(b) [42 U.S.C. 10136(c) or 10138(b)] with respect to grants, technical assistance, and other financial assistance shall apply to the State, to affected Indian tribes and to affected units of local government in the case of a monitored retrievable storage facility in the same manner as for a repository.

[42 U.S.C. 10169]

SUBTITLE D—LOW-LEVEL RADIOACTIVE WASTE

FINANCIAL ARRANGEMENTS FOR LOW-LEVEL RADIOACTIVE WASTE SITE CLOSURE

Sec. 151. (a) Financial arrangements.

(1) The Commission shall establish by rule, regulation, or order, after public notice, and in accordance with section 181 of the Atomic Energy Act of 1954 [42 U.S.C. 2231 et seq.], such standards and instructions as the Commission may deem necessary or desirable to ensure in the case of each license for the disposal of low-level radioactive waste that an adequate bond, surety, or other financial arrangement (as determined by the Commission) will be provided by a licensee to permit completion of all requirements established by the Commission for the decontamination, decommissioning, site closure, and reclamation of sites, structures, and equipment used in conjunction with such low-level radioactive waste. Such financial arrangements shall be provided and approved by the Commission, or, in the case of sites within the boundaries of any agreement State under section 274 of the Atomic Energy Act of 1954 [42 U.S.C. 2021], by the appropriate State or State entity, prior to issuance of licenses for low-level radioactive waste disposal or, in the case of licenses in effect on the date of the enactment of this Act [enacted Jan. 7, 1982] prior to termination of such licenses.

(2) If the Commission determines that any long-term maintenance or monitoring, or both, will be necessary at a site described in paragraph (1), the Commission shall ensure before termination of the license involved that the licensee has made available such bonding, surety, or other financial arrangements as may be necessary to ensure that any necessary long-term maintenance or monitoring needed for such site will be carried out by the person having title and custody for such site following license termination.

(b) Title and custody.

(1) The Secretary shall have authority to assume title and custody of low-level radioactive waste and the land on which such waste is disposed of, upon request of the owner of such waste and land and following termination of the license issued by the Commission for such disposal, if the Commission determines that—

(A) the requirements of the Commission for site closure, decommissioning, and decontamination have been met by the licensee involved and that such licensee is in compliance with the provisions of subsection (a);

(B) such title and custody will be transferred to the Secretary without cost to the Federal Government; and

(C) Federal ownership and management of such site is necessary or desirable in order to protect the public health and safety, and the environment.

(2) If the Secretary assumes title and custody of any such waste and land under this subsection, the Secretary shall maintain such waste and land in a manner that will protect the public health and safety, and the environment.

(c) Special sites. If the low-level radioactive waste involved is the result of a licensed activity to recover zirconium, hafnium, and rare earths from source material, the Secretary, upon request of the owner of the site involved, shall assume title and custody of such waste and the land on which it is disposed when such site has been decontaminated and stabilized in accordance with the requirements established by the Commission and when such owner has made adequate financial arrangements approved by the Commission for the long-term maintenance and monitoring of such site.

[42 U.S.C. 10171]

SUBTITLE E—REDIRECTION OF THE NUCLEAR WASTE PROGRAM

SELECTION OF YUCCA MOUNTAIN SITE

Sec. 160. (a) In general.

(1) The Secretary shall provide for an orderly phase-out of site specific activities at all candidate sites other than the Yucca Mountain site.

(2) The Secretary shall terminate all site specific activities (other than reclamation activities) at all candidate sites, other than the Yucca Mountain site, within 90 days after the date of enactment of the Nuclear Waste Policy Amendments Act of 1987 [enacted Dec. 22, 1987].

(b) Effective on the date of the enactment of the Nuclear Waste Policy Amendments Act of 1987 [enacted Dec. 22, 1987], the State of Nevada shall be eligible to enter into a benefits agreement with the Secretary under section 170 [42 U.S.C. 10173].

[42 U.S.C. 10172]

SITING A SECOND REPOSITORY

Sec. 161. (a) Congressional action required. The Secretary may not conduct site-specific activities with respect to a second repository unless Congress has specifically authorized and appropriated funds for such activities.

(b) Report. The Secretary shall report to the President and to Congress on or after January 1, 2007, but not later than January 1, 2010, on the need for a second repository.

(c) Termination of granite research. Not later than 6 months after the date of the enactment of the Nuclear Waste Policy Amendments Act of 1987 [enacted Dec. 22, 1987], the Secretary shall phase out in an orderly manner funding for all research programs in existence on such date of enactment [enacted Dec. 22, 1987] designed to evaluate the suitability of crystalline rock as a potential repository host medium.

(d) Additional siting criteria. In the event that the Secretary at any time after such date of enactment [enacted Dec. 22, 1987] considers any sites in crystalline rock for characterization or selection as a repository, the Secretary shall consider (as a supplement to the siting guidelines under section 112) such potentially disqualifying factors as—

(1) seasonal increases in population;

(2) proximity to public drinking water supplies, including those of metropolitan areas; and

(3) the impact that characterization or siting decisions would have on lands owned or placed in trust by the United States for Indian tribes.

[42 U.S.C. 10172a]

SUBTITLE F—BENEFITS

BENEFITS AGREEMENTS

Sec. 170. (a) In general.

(1) The Secretary may enter into a benefits agreement with the State of Nevada concerning a repository or with a State or an Indian tribe concerning a monitored retrievable storage facility for the acceptance of high-level radioactive waste or spent nuclear fuel in that State or on the reservation of that tribe, as appropriate.

(2) The State or Indian tribe may enter into such an agreement only if the State Attorney General or the appropriate governing authority of the Indian tribe or the Secretary of the Interior, in the absence of an appropriate governing authority, as appropriate, certifies to the satisfaction of the Secretary that the laws of the State or Indian tribe provide adequate authority for that entity to enter into the benefits agreement.

(3) Any benefits agreement with a State under this section shall be negotiated in consultation with affected units of local government in such State.

(4) Benefits and payments under this subtitle may be made available only in accordance with a benefits agreement under this section.

(b) Amendment. A benefits agreement entered into under subsection (a) may be amended only by the mutual consent of the parties to the agreement and terminated only in accordance with section 173 [42 U.S.C. 10173c].

(c) Agreement with Nevada. The Secretary shall offer to enter into a benefits agreement with the Governor of Nevada. Any benefits agreement with a State under this subsection shall be negotiated in consultation with any affected units of local government in such State.

(d) Monitored retrievable storage. The Secretary shall offer to enter into a benefits agreement relating to a monitored retrievable storage facility with the governing body of the Indian tribe on whose reservation the site for such facility is located, or, if the site is not located on a reservation, with the Governor of the State in which the site is located and in consultation with affected units of local government in such State.

(e) Limitation. Only one benefits agreement for a repository and only one benefits agreement for a monitored retrievable storage facility may be in effect at any one time.

(f) Judicial review. Decisions of the Secretary under this section are not subject to judicial review.

[42 U.S.C. 10173]

CONTENT OF AGREEMENTS

Sec. 171. (a) In general.

(1) In addition to the benefits to which a State, an affected unit of local government or Indian tribe is entitled under title I, the Secretary shall make payments to a State or Indian tribe that is a party to a benefits agreement under section 170 [42 U.S.C. 10173] in accordance with the following schedule:

BENEFITS SCHEDULE
(amounts in $ millions)

Event	MRS	Repository
(A) Annual payments prior to first spent fuel receipt:	5	10
(B) Upon first spent fuel receipt:	10	20
(C) Annual payments after first spent fuel receipt until closure of the facility:	10	20

(2) For purposes of this section, the term—

(A) "MRS" means a monitored retrievable storage facility,

(B) "spent fuel" means high-level radioactive waste or spent nuclear fuel, and

(C) "first spent fuel receipt" does not include receipt of spent fuel or high-level radioactive waste for purposes of testing or operational demonstration.

(3) Annual payments prior to first spent fuel receipt under paragraph (1)(A) shall be made on the date of execution of the benefits agreement and thereafter on the anniversary date of such execution. Annual payments after the first spent fuel receipt until closure of the facility under paragraph (1)(C) shall be made on the anniversary date of such first spent fuel receipt.

(4) If the first spent fuel payment under paragraph (1)(B) is made within six months after the last annual payment prior to the receipt of spent fuel under paragraph (1)(A), such first spent fuel payment under

paragraph (1)(B) shall be reduced by an amount equal to one-twelfth of such annual payment under paragraph (1)(A) for each full month less than six that has not elapsed since the last annual payment under paragraph (1)(A).

(5) Notwithstanding paragraph (1), (2), or (3), no payment under this section may be made before January 1, 1989, and any payment due under this title before January 1, 1989, shall be made on or after such date.

(6) Except as provided in paragraph (7), the Secretary may not restrict the purposes for which the payments under this section may be used.

(7)(A) Any State receiving a payment under this section shall transfer an amount equal to not less than one-third of the amount of such payment to affected units of local government of such State.

(B) A plan for this transfer and appropriate allocation of such portion among such governments shall be included in the benefits agreement under section 170 covering such payments.

(C) In the event of a dispute concerning such plan, the Secretary shall resolve such dispute, consistent with this Act and applicable State law.

(b) Contents. A benefits agreement under section 170 [42 U.S.C. 10173] shall provide that—

(1) a Review Panel be established in accordance with section 172 [42 U.S.C. 10173b];

(2) the State or Indian tribe that is party to such agreement waive its rights under title I to disapprove the recommendation of a site for a repository;

(3) the parties to the agreement shall share with one another information relevant to the licensing process for the repository or monitored retrievable storage facility, as it becomes available;

(4) the State or Indian tribe that is party to such agreement participate in the design of the repository or monitored retrievable storage facility and in the preparation of documents required under law or regulation governing the effects of the facility on the public health and safety; and

(5) the State or Indian tribe waive its rights, if any, to impact assistance under sections 116(c)(1)(B)(ii), 116(c)(2), 118(b)(2)(A)(ii), and 118(b)(3) [42 U.S.C. 10136(c)(1)(B)(ii), (c)(2), 10138(b)(2)(A)(ii), (b)(3)].

(c) The Secretary shall make payments to the States or affected Indian tribes under a benefits agreement under this section from the Waste Fund. The signature of the Secretary on a valid benefits agreement under section 170 [42 U.S.C. 10173] shall constitute a commitment by the United States to make payments in accordance with such agreement.

[42 U.S.C. 10173a]

REVIEW PANEL

Sec. 172. (a) In general. The Review Panel required to be established by section 171(b)(1) of this Act shall consist of a Chairman selected by the Secretary in consultation with the Governor of the State or governing body of the Indian tribe, as appropriate, that is party to such agreement and 6 other members as follows:

(1) 2 members selected by the Governor of such State or governing body of such Indian tribe;

(2) 2 members selected by units of local government affected by the repository or monitored retrievable storage facility;

(3) 1 member to represent persons making payments into the Waste Fund, to be selected by the Secretary; and

(4) 1 member to represent other public interests, to be selected by the Secretary.

(b) Terms.

(1) The members of the Review Panel shall serve for terms of 4 years each.

(2) Members of the Review Panel who are not full-time employees of the Federal Government, shall receive a per diem compensation for each day spent conducting work of the Review Panel, including their necessary travel or other expenses while engaged in the work of the Review Panel.

(3) Expenses of the Panel shall be paid by the Secretary from the Waste Fund.

(c) Duties. The Review Panel shall—

(1) advise the Secretary on matters relating to the proposed repository or monitored retrievable storage facility, including issues relating to design, construction, operation, and decommissioning of the facility;

(2) evaluate performance of the repository or monitored retrievable storage facility, as it considers appropriate;

(3) recommend corrective actions to the Secretary;

(4) assist in the presentation of State or affected Indian tribe and local perspectives to the Secretary; and

(5) participate in the planning for and the review of preoperational data on environmental, demographic, and socioeconomic conditions of the site and the local community.

(d) Information. The Secretary shall promptly make available promptly any information in the Secretary's possession requested by the Panel or its Chairman.

(e) Federal Advisory Committee Act. The requirements of the Federal Advisory Committee Act [5 U.S.C. Appx.] shall not apply to a Review Panel established under this title.

[42 U.S.C. 10173b]

TERMINATION

Sec. 173. (a) In general. The Secretary may terminate a benefits agreement under this title if—

(1) the site under consideration is disqualified for its failure to comply with guidelines and technical requirements established by the Secretary in accordance with this Act; or

(2) the Secretary determines that the Commission cannot license the facility within a reasonable time.

(b) Termination by State or Indian tribe. A State or Indian tribe may terminate a benefits agreement under this title only if the Secretary disqualifies the site under consideration for its failure to comply with technical requirements established by the Secretary in accordance with this Act or the Secretary determines that the Commission cannot license the facility within a reasonable time.

(c) Decisions of the Secretary. Decisions of the Secretary under this section shall be in writing, shall be available to Congress and the public, and are not subject to judicial review.

[42 U.S.C. 10173c]

SUBTITLE G—OTHER BENEFITS

CONSIDERATION IN SITING FACILITIES

Sec. 174. The Secretary, in siting Federal research projects, shall give special consideration to proposals from States where a repository is located.

[42 U.S.C. 10174]

REPORT

Sec. 175. (a) In general. Within one year of the date of the enactment of the Nuclear Waste Policy Amendments Act of 1987 [enacted Dec. 22, 1987], the Secretary shall report to Congress on the potential impacts of locating a repository at the Yucca Mountain site, including the recommendations of the Secretary for mitigation of such impacts and a statement of which impacts should be dealt with by the Federal Government, which should be dealt with by the State with State resources, including the benefits payments under section 171 [42 U.S.C. 10173a], and which should be a joint Federal-State responsibility. The report under this subsection shall include the analysis of the Secretary of the authorities available to mitigate these impacts and the appropriate sources of funds for such mitigation.

(b) Impacts to be considered. Potential impacts to be addressed in the report under this subsection (a) shall include impacts on—

(1) education, including facilities and personnel for elementary and secondary schools, community colleges, vocational and technical schools and universities;

(2) public health, including the facilities and personnel for treatment and distribution of water, the treatment of sewage, the control of pests and the disposal of solid waste;

(3) law enforcement, including facilities and personnel for the courts, police and sheriff's departments, district attorneys and public defenders and prisons;

(4) fire protection, including personnel, the construction of fire stations, and the acquisition of equipment;

(5) medical care, including emergency services and hospitals;

(6) cultural and recreational needs, including facilities and personnel for libraries and museums and the acquisition and expansion of parks;

(7) distribution of public lands to allow for the timely expansion of existing, or creation of new, communities and the construction of necessary residential and commercial facilities;

(8) vocational training and employment services;

(9) social services, including public assistance programs, vocational and physical rehabilitation programs, mental health services, and programs relating to the abuse of alcohol and controlled substances;
(10) transportation, including any roads, terminals, airports, bridges, or railways associated with the facility and the repair and maintenance of roads, terminals, airports, bridges, or railways damaged as a result of the construction, operation, and closure of the facility;
(11) equipment and training for State and local personnel in the management of accidents involving high-level radioactive waste;
(12) availability of energy;
(13) tourism and economic development, including the potential loss of revenue and future economic growth; and
(14) other needs of the State and local governments that would not have arisen but for the characterization of the site and the construction, operation, and eventual closure of the repository facility.
[42 U.S.C. 10174a]

SUBTITLE H—TRANSPORTATION

TRANSPORTATION

Sec. 180. (a) No spent nuclear fuel or high-level radioactive waste may be transported by or for the Secretary under subtitle A or under subtitle C except in packages that have been certified for such purpose by the Commission.
(b) The Secretary shall abide by regulations of the Commission regarding advance notification of State and local governments prior to transportation of spent nuclear fuel or high-level radioactive waste under subtitle A or under subtitle C.
(c) The Secretary shall provide technical assistance and funds to States for training for public safety officials of appropriate units of local government and Indian tribes through whose jurisdiction the Secretary plans to transport spent nuclear fuel or high-level radioactive waste under subtitle A or under subtitle C. Training shall cover procedures required for safe routine transportation of these materials, as well as procedures for dealing with emergency response situations. The Waste Fund shall be the source of funds for work carried out under this subsection.
[42 U.S.C. 10175]

TRANSPORTATION OF PLUTONIUM BY AIRCRAFT THROUGH UNITED STATES AIRSPACE

Sec. 181. (a) In general. Notwithstanding any other provision of law, no form of plutonium may be transported by aircraft through the airspace of the United States from a foreign nation to a foreign nation unless the Nuclear Regulatory Commission has certified to Congress that the container in which such plutonium is transported is safe, as determined in accordance with subsection (b), the second undesignated paragraph under section 201 of Public Law 94-79 [89 Stat. 413; 42 U.S.C. 5841 note], and all other applicable laws.
(b) Responsibilities of the Nuclear Regulatory Commission—
(1) Determination of safety. The Nuclear Regulatory Commission shall determine whether the container referred to in subsection (a) is safe for use in the transportation of plutonium by aircraft and transmit to Congress a certification for the purposes of such subsection in the case of each container determined to be safe.
(2) Testing. In order to make a determination with respect to a container under paragraph (1), the Nuclear Regulatory Commission shall—
(A) require an actual drop test from maximum cruising altitude of a full-scale sample of such container loaded with test materials; and
(B) require an actual crash test of a cargo aircraft fully loaded with full-scale samples of such container loaded with test material unless the Commission determines, after consultation with an independent scientific review panel, that the stresses on the container produced by other tests used in developing the container exceed the stresses which would occur during a worst case plutonium air shipment accident.
(3) Limitation. The Nuclear Regulatory Commission may not certify under this section that a container is safe for use in the transportation of plutonium by aircraft if the container ruptured or released its contents during testing conducted in accordance with paragraph (2).

(4) Evaluation. The Nuclear Regulatory Commission shall evaluate the container certification required by title II of the Energy Reorganization Act of 1974 [42 U.S.C. 5841 et seq.] and subsection (a) in accordance with the National Environmental Policy Act of 1969 [83 Stat. 852; 42 U.S.C. 4321 et seq.] and all other applicable law.

(c) Content of certification. A certification referred to in subsection (a) with respect to a container shall include—

(1) the determination of the Nuclear Regulatory commission as to the safety of such container;

(2) a statement that the requirements of subsection (b)(2) were satisfied in the testing of such container; and

(3) a statement that the container did not rupture or release its contents into the environment during testing.

(d) Design of testing procedures. The tests required by subsection (b) shall be designed by the Nuclear Regulatory Commission to replicate actual worst case transportation conditions to the maximum extent practicable. In designing such tests, the Commission shall provide for public notice of the proposed test procedures, provide a reasonable opportunity for public comment on such procedures, and consider such comments, if any.

(e) Testing results: reports and public disclosure. The Nuclear Regulatory Commission shall transmit to Congress a report on the results of each test conducted under this section and shall make such results available to the public.

(f) Alternative routes and means of transportation. With respect to any shipments of plutonium from a foreign nation to a foreign nation which are subject to United States consent rights contained in an Agreement for Peaceful Nuclear Cooperation, the President is authorized to make every effort to pursue and conclude arrangements for alternative routes and means of transportation, including sea shipment. All such arrangements shall be subject to stringent physical security conditions, and other conditions designed to protect the public health and safety, and provisions of this section, and all other applicable laws.

(g) Inapplicability to medical devices. Subsections (a) through (e) shall not apply with respect to plutonium in any form contained in a medical device designed for individual human application.

(h) Inapplicability to military uses. Subsections (a) through (e) shall not apply to plutonium in the form of nuclear weapons nor to other shipments of plutonium determined by the Department of Energy to be directly connected with the United States national security or defense programs.

(i) Inapplicability to previously certified containers. This section shall not apply to any containers for the shipment of plutonium previously certified as safe by the Nuclear Regulatory Commission under Public Law 94-79 [89 Stat. 413; 42 U.S.C. 5841 note].

(j) Payment of costs. All costs incurred by the Nuclear Regulatory Commission associated with the testing program required by this section, and administrative costs related thereto, shall be reimbursed to the Nuclear Regulatory Commission by any foreign country receiving plutonium shipped through United States airspace in containers specified by the Commission.

TITLE II—RESEARCH, DEVELOPMENT, AND DEMONSTRATION REGARDING DISPOSAL OF HIGH-LEVEL RADIOACTIVE WASTE AND SPENT NUCLEAR FUEL

PURPOSE

Sec. 211. It is the purpose of this title [42 U.S.C. 10191 et seq.]—

(1) to provide direction to the Secretary with respect to the disposal of high-level radioactive waste and spent nuclear fuel;

(2) to authorize the Secretary, pursuant to this title [42 U.S.C. 10191 et seq.]—

(A) to provide for the construction, operation, and maintenance of a deep geologic test and evaluation facility; and

(B) to provide for a focused and integrated high-level radioactive waste and spent nuclear fuel research and development program, including the development of a test and evaluation facility to carry out research and provide an integrated demonstration of the technology for deep geologic disposal of high-level radioactive waste, and the development of the facilities to demonstrate dry storage of spent nuclear fuel; and

(3) to provide for an improved cooperative role between the Federal Government and States, affected Indian tribes, and units of general local government in the siting of a test and evaluation facility.

[42 U.S.C. 10191]

APPLICABILITY

Sec. 212. The provisions of this title [42 U.S.C. 10191 et seq.] are subject to section 8 [42 U.S.C. 10107] and shall not apply to facilities that are used for the disposal of high-level radioactive waste, low-level radioactive waste, transuranic waste, or spent nuclear fuel resulting from atomic energy defense activities.
[42 U.S.C. 10192]

IDENTIFICATION OF SITES

Sec. 213. (a) Guidelines. Not later than 6 months after the date of the enactment of this Act [enacted Jan. 7, 1983] and notwithstanding the failure of other agencies to promulgate standards pursuant to applicable law, the Secretary, in consultation with the Commission, the Director of the Geological Survey, the Administrator, the Council on Environmental Quality, and such other Federal agencies as the Secretary considers appropriate, is authorized to issue, pursuant to section 553 of title 5, United States Code [5 U.S.C. 553], general guidelines for the selection of a site for a test and evaluation facility. Under such guidelines the Secretary shall specify factors that qualify or disqualify a site for development as a test and evaluation facility, including factors pertaining to the location of valuable natural resources, hydrogeophysics, seismic activity, and atomic energy defense activities, proximity to water supplies, proximity to populations, the effect upon the rights of users of water, and proximity to components of the National Park System, the National Wildlife Refuge System, the National Wild and Scenic Rivers System, the National Wilderness Preservation System, or National Forest Lands. Such guidelines shall require the Secretary to consider the various geologic media in which the site for a test and evaluation facility may be located and, to the extent practicable, to identify sites in different geologic media. The Secretary shall use guidelines established under this subsection in considering and selecting sites under this title [42 U.S.C. 10191 et seq.].

(b) Site identification by the Secretary.

(1) Not later than 1 year after the date of the enactment of this Act [enacted Jan. 7, 1983], and following promulgation of guidelines under subsection (a), the Secretary is authorized to identify 3 or more sites, at least 2 of which shall be in different geologic media in the continental United States, and at least 1 of which shall be in media other than salt. Subject to Commission requirements, the Secretary shall give preference to sites for the test and evaluation facility in media possessing geochemical characteristics that retard aqueous transport of radionuclides. In order to provide a greater possible protection of public health and safety as operating experience is gained at the test and evaluation facility, and with the exception of the primary areas under review by the Secretary on the date of the enactment of this Act [enacted Jan. 7, 1983] for the location of a test and evaluation facility or repository, all sites identified under this subsection shall be more than 15 statute miles from towns having a population of greater than 1,000 persons as determined by the most recent census unless such sites contain high-level radioactive waste prior to identification under this title [42 U.S.C. 10191 et seq.]. Each identification of a site shall be supported by an environmental assessment, which shall include a detailed statement of the basis for such identification and of the probable impacts of the siting research activities planned for such site, and a discussion of alternative activities relating to siting research that may be undertaken to avoid such impacts. Such environmental assessment shall include—

(A) an evaluation by the Secretary as to whether such site is suitable for siting research under the guidelines established under subsection (a);

(B) an evaluation by the Secretary of the effects of the siting research activities at such site on the public health and safety and the environment;

(C) a reasonable comparative evaluation by the Secretary of such site with other sites and locations that have been considered;

(D) a description of the decision process by which such site was recommended; and

(E) an assessment of the regional and local impacts of locating the proposed test and evaluation facility at such site.

(2) When the Secretary identifies a site, the Secretary shall as soon as possible notify the Governor of the State in which such site is located, or the governing body of the affected Indian tribe where such site is located, of such identification and the basis of such identification. Additional sites for the location of the test and evaluation facility authorized in section 302(d) [42 U.S.C. 10222(d)] may be identified after such 1 year period, following the same procedure as if such sites had been identified within such period.
[42 U.S.C. 10193]

SITING RESEARCH AND RELATED ACTIVITIES

Sec. 214. (a) In general. Not later than 30 months after the date on which the Secretary completes the identification of sites under section 213 [42 U.S.C. 10193], the Secretary is authorized to complete sufficient evaluation of 3 sites to select a site for expanded siting research activities and for other activities under section 218 [42 U.S.C. 10198].[1] The Secretary is authorized to conduct such preconstruction activities relative to such site selection for the test and evaluation facility as he deems appropriate. Additional sites for the location of the test and evaluation facility authorized in section 302(d) [42 U.S.C. 10222(d)] may be evaluated after such 30-month period, following the same procedures as if such sites were to be evaluated within such period.

(b) Public meetings and environmental assessment. Not later than 6 months after the date on which the Secretary completes the identification of sites under section 213 [42 U.S.C. 10193], and before beginning siting research activities, the Secretary shall hold at least 1 public meeting in the vicinity of each site to inform the residents of the area of the activities to be conducted at such site and to receive their views.

(c) Restrictions. Except as provided in section 218 [42 U.S.C. 10198][1] with respect to a test and evaluation facility, in conducting siting research activities pursuant to subsection (a)—

(1) the Secretary shall use the minimum quantity of high-level radioactive waste or other radioactive materials, if any, necessary to achieve the test or research objectives;

(2) the Secretary shall ensure that any radioactive material used or placed on a site shall be fully retrievable; and

(3) upon termination of siting research activities at a site for any reason, the Secretary shall remove any radioactive material at or in the site as promptly as practicable.

(d) Title to material. The Secretary may take title, in the name of the Federal Government, to the high-level radioactive waste, spent nuclear fuel, or other radioactive material emplaced in a test and evaluation facility. If the Secretary takes title to any such material, the Secretary shall enter into the appropriate financial arrangements described in subsection (a) or (b) of section 302 [42 U.S.C. 10222(a), (b)] for the disposal of such material.

[42 U.S.C. 10194]

TEST AND EVALUATION FACILITY SITING REVIEW AND REPORTS

Sec. 215. (a) Consultation and cooperation. The Governor of a State, or the governing body of an affected Indian tribe, notified of a site identification under section 213 [42 U.S.C. 10193] shall have the right to participate in a process of consultation and cooperation as soon as the site involved has been identified pursuant to such section and throughout the life of the test and evaluation facility. For purposes of this section, the term "process of consultation and cooperation" means a methodology—

(1) by which the Secretary—

(A) keeps the Governor or governing body involved fully and currently informed about any potential economic or public health and safety impacts in all stages of the siting, development, construction, and operation of a test and evaluation facility;

(B) solicits, receives, and evaluates concerns and objections of such Governor or governing body with regard to such test and evaluation facility on an ongoing basis; and

(C) works diligently and cooperatively to resolve such concerns and objections; and

(2) by which the State or affected Indian tribe involved can exercise reasonable independent monitoring and testing of onsite activities related to all stages of the siting, development, construction and operation of the test and evaluation facility, except that any such monitoring and testing shall not unreasonably interfere with onsite activities.

(b) Written agreements. The Secretary shall enter into written agreements with the Governor of the State in which an identified site is located or with the governing body of any affected Indian tribe where an identified site is located in order to expedite the consultation and cooperation process. Any such written agreement shall specify—

[1] So in original. Reference probably should be to section 217.

(1) procedures by which such Governor or governing body may study, determine, comment on, and make recommendations with regard to the possible health, safety, and economic impacts of the test and evaluation facility;

(2) procedures by which the Secretary shall consider and respond to comments and recommendations made by such Governor or governing body, including the period in which the Secretary shall so respond;

(3) the documents the Department is to submit to such Governor or governing body, the timing for such submissions, the timing for such Governor or governing body to identify public health and safety concerns and the process to be followed to try to eliminate those concerns;

(4) procedures by which the Secretary and either such Governor or governing body may review or modify the agreement periodically; and

(5) procedures for public notification of the procedures specified under subparagraphs (A) through (D).

(c) Limitation. Except as specifically provided in this section, nothing in this title [42 U.S.C. 10195 et seq.] is intended to grant any State or affected Indian tribe any authority with respect to the siting, development, or loading of the test and evaluation facility.

[42 U.S.C. 10195]

FEDERAL AGENCY ACTIONS

Sec. 216. (a) Cooperation and coordination. Federal agencies shall assist the Secretary by cooperating and coordinating with the Secretary in the preparation of any necessary reports under this title and the mission plan under section 301 [42 U.S.C. 10221].

(b) Environmental review.

(1) No action of the Secretary or any other Federal agency required by this title or [42 U.S.C. 10191 et seq.] section 301 [42 U.S.C. 10221] with respect to a test and evaluation facility to be taken prior to the initiation of onsite construction of a test and evaluation facility shall require the preparation of an environmental impact statement under section 102(2)(C) of the Environmental Policy Act of 1969 [42 U.S.C. 4332(2)(C)], or to require the preparation of environmental reports, except as otherwise specifically provided for in this title [42 U.S.C. 10191 et seq.].

(2) The Secretary and the heads of all other Federal agencies shall, to the maximum extent possible, avoid duplication of efforts in the preparation of reports under the National Environmental Policy Act of 1969 [42 U.S.C. 4321 et seq.].

[42 U.S.C. 10196]

RESEARCH AND DEVELOPMENT ON DISPOSAL OF HIGH-LEVEL RADIOACTIVE WASTE

Sec. 217. (a) Purpose. Not later than 64 months after the date of the enactment of this Act [enacted Jan. 7, 1983], the Secretary is authorized to, to the extent practicable, begin at a site evaluated under section 214 [42 U.S.C. 10194], as part of and as an extension of siting research activities of such site under such section [42 U.S.C. 10194], the mining and construction of a test and evaluation facility. Prior to the mining and construction of such facility, the Secretary shall prepare an environmental assessment. The purpose of such facility shall be—

(1) to supplement and focus the repository site characterization process;

(2) to provide the conditions under which known technological components can be integrated to demonstrate a functioning repository-like system;

(3) to provide a means of identifying, evaluating, and resolving potential repository licensing issues that could not be resolved during the siting research program conducted under section 212 [42 U.S.C. 10192];[1]

(4) to validate, under actual conditions, the scientific models used in the design of a repository;

(5) to refine the design and engineering of repository components and systems and to confirm the predicted behavior of such components and systems;

(6) to supplement the siting data, the generic and specific geological characteristics developed under section 214 [42 U.S.C. 10194] relating to isolating disposal materials in the physical environment of a repository;

[1] So in original. Reference probably should be to section 214.

(7) to evaluate the design concepts for packaging, handling, and emplacement of high-level radioactive waste and spent nuclear fuel at the design rate; and

(8) to establish operating capability without exposing workers to excessive radiation.

(b) Design. The Secretary shall design each test and evaluation facility—

(1) to be capable of receiving not more than 100 full-sized canisters of solidified high-level radioactive waste (which canisters shall not exceed an aggregate weight of 100 metric tons), except that spent nuclear fuel may be used instead of such waste if such waste cannot be obtained under reasonable conditions;

(2) to permit full retrieval of solidified high-level radioactive waste, or other radioactive material used by the Secretary for testing, upon completion of the technology demonstration activities; and

(3) based upon the principle that the high-level radioactive waste, spent nuclear fuel, or other radioactive material involved shall be isolated from the biosphere in such a way that the initial isolation is provided by engineered barriers functioning as a system with the geologic environment.

(c) Operation.

(1) Not later than 88 months after the date of the enactment of this Act [enacted Jan. 7, 1983], the Secretary shall begin an in situ testing program at the test and evaluation facility in accordance with the mission plan developed under section 301 [42 U.S.C. 10221], for purposes of—

(A) conducting in situ tests of bore hole sealing, geologic media fracture sealing, and room closure to establish the techniques and performance for isolation of high-level radioactive waste, spent nuclear fuel, or other radioactive materials from the biosphere;

(B) conducting in situ tests with radioactive sources and materials to evaluate and improve reliable models for radionuclide migration, absorption, and containment within the engineered barriers and geologic media involved, if the Secretary finds there is reasonable assurance that such radioactive sources and materials will not threaten the use of such site as a repository;

(C) conducting in situ tests to evaluate and improve models for ground water or brine flow through fractured geologic media;

(D) conducting in situ tests under conditions representing the real time and the accelerated time behavior of the engineered barriers within the geologic environment involved;

(E) conducting in situ tests to evaluate the effects of heat and pressure on the geologic media involved, on the hydrology of the surrounding area, and on the integrity of the disposal packages;

(F) conducting in situ tests under both normal and abnormal repository conditions to establish safe design limits for disposal packages and to determine the effects of the gross release of radionuclides into surroundings, and the effects of various credible failure modes, including—

(i) seismic events leading to the coupling of aquifers through the test and evaluation facility;

(ii) thermal pulses significantly greater than the maximum calculated; and

(iii) human intrusion creating a direct pathway to the biosphere; and

(G) conducting such other research and development activities as the Secretary considers appropriate, including such activities necessary to obtain the use of high-level radioactive waste, spent nuclear fuel, or other radioactive materials (such as any highly radioactive material from the Three Mile Island nuclear powerplant or from the West Valley Demonstration Project) for test and evaluation purposes, if such other activities are reasonably necessary to support the repository program and if there is reasonable assurance that the radioactive sources involved will not threaten the use of such site as a repository.

(2) The in situ testing authorized in this subsection shall be designed to ensure that the suitability of the site involved for licensing by the Commission as a repository will not be adversely affected.

(d) Use of existing Department facilities. During the conducting of siting research activities under section 214 [42 U.S.C. 10194] and for such period thereafter as the Secretary considers appropriate, the Secretary shall use Department facilities owned by the Federal Government on the date of the enactment of this Act [enacted Jan. 7, 1983] for the conducting of generically applicable tests regarding packaging, handling, and emplacement technology for solidified high-level radioactive waste and spent nuclear fuel from civilian nuclear activities.

(e) Engineered barriers. The system of engineered barriers and selected geology used in a test and evaluation facility shall have a design life at least as long as that which the Commission requires by regulations issued under this Act [42 U.S.C. 10101 et seq.], or under the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.), for repositories.

(f) Role of Commission.

(1)(A) Not later than 1 year after the date of the enactment of this Act [enacted Jan. 7, 1983], the Secretary and the Commission shall reach a written understanding establishing the procedures for review, consultation, and coordination in the planning, construction, and operation of the test and evaluation facility under this section. Such understanding shall establish a schedule, consistent with the deadlines set forth in this subtitle, for submission by the Secretary of, and review by the Commission of and necessary action on—

(i) the mission plan prepared under section 301 [42 U.S.C. 10221]; and

(ii) such reports and other information as the Commission may reasonably require to evaluate any health and safety impacts of the test and evaluation facility.

(B) Such understanding shall also establish the conditions under which the Commission may have access to the test and evaluation facility for the purpose of assessing any public health and safety concerns that it may have. No shafts may be excavated for the test and evaluation until the Secretary and the Commission enter into such understanding.

(2) Subject to section 305 [42 U.S.C. 10225], the test and evaluation facility, and the facilities authorized in section 217 [this section], shall be constructed and operated as research, development, and demonstration facilities, and shall not be subject to licensing under section 202 of the Energy Reorganization Act of 1974 [42 U.S.C. 5842].

(3)(A) The Commission shall carry out a continuing analysis of the activities undertaken under this section to evaluate the adequacy of the consideration of public health and safety issues.

(B) The Commission shall report to the President, the Secretary, and the Congress as the Commission considers appropriate with respect to the conduct of activities under this section.

(g) Environmental review. The Secretary shall prepare an environmental impact statement under section 102(2)(C) of the National Environmental Policy Act of 1969) [42 U.S.C. 4332(2)(C)] prior to conducting tests with radioactive materials at the test and evaluation facility. Such environmental impact statement shall incorporate, to the extent practicable, the environmental assessment prepared under section 217(a) [subsec. (a) of this section]. Nothing in this subsection may be construed to limit siting research activities conducted under section 214 [42 U.S.C. 10194]. This subsection shall apply only to activities performed exclusively for a test and evaluation facility.

(h) Limitations.

(1) If the test and evaluation facility is not located at the site of a repository, the Secretary shall obtain the concurrence of the Commission with respect to the decontamination and decommissioning of such facility.

(2) If the test and evaluation facility is not located at a candidate site or repository site, the Secretary shall conduct only the portion of the in situ testing program required in subsection (c) determined by the Secretary to be useful in carrying out the purposes of this Act [42 U.S.C. 10101 et seq.].

(3) The operation of the test and evaluation facility shall terminate not later than—

(A) 5 years after the date on which the initial repository begins operation; or

(B) at such time as the Secretary determines that the continued operation of a test and evaluation facility is not necessary for research, development, and demonstration purposes;

whichever occurs sooner.

(4) Notwithstanding any other provisions of this subsection, as soon as practicable following any determination by the Secretary, with the concurrence of the Commission, that the test and evaluation facility is unsuitable for continued operation, the Secretary shall take such actions as are necessary to remove from such site any radioactive material placed on such site as a result of testing and evaluation activities conducted under this section. Such requirement may be waived if the Secretary, with the concurrence of the Commission, finds that short-term testing and evaluation activities using radioactive material will not endanger the public health and safety.

[42 U.S.C. 10197]

RESEARCH AND DEVELOPMENT ON SPENT NUCLEAR FUEL

Sec. 218. (a) Demonstration and cooperative programs. The Secretary shall establish a demonstration program, in cooperation with the private sector, for the dry storage of spent nuclear fuel at civilian nuclear power reactor sites, with the objective of establishing one or more technologies that the Commission may, by rule, approve for use at the sites of civilian nuclear power reactors without, to the maximum extent

practicable, the need for additional site-specific approvals by the Commission. Not later than 1 year after the date of the enactment of this Act [enacted Jan. 7, 1983], the Secretary shall select at least 1, but not more than 3, sites evaluated under section 214 [42 U.S.C. 10194] at such power reactors. In selecting such site or sites, the Secretary shall give preference to civilian nuclear power reactors that will soon have a shortage of interim storage capacity for spent nuclear fuel. Subject to reaching agreement as provided in subsection (b), the Secretary shall undertake activities to assist such power reactors with demonstration projects at such sites, which may use one of the following types of alternate storage technologies; spent nuclear fuel storage casks, caissons, or silos. The Secretary shall also undertake a cooperative program with civilian nuclear power reactors to encourage the development of the technology for spent nuclear fuel rod consolidation in existing power reactor water storage basins.

(b) Cooperative agreements. To carry out the programs described in subsection (a), the Secretary shall enter into a cooperative agreement with each utility involved that specifies, at a minimum, that—

(1) such utility shall select the alternate storage technique to be used, make the land and spent nuclear fuel available for the dry storage demonstration, submit and provide site-specific documentation for a license application to the Commission, obtain a license relating to the facility involved, construct such facility, operate such facility after licensing, pay the costs required to construct such facility, and pay all costs associated with the operation and maintenance of such facility;

(2) the Secretary shall provide, on a cost-sharing basis, consultative and technical assistance, including design support and generic licensing documentation, to assist such utility in obtaining the construction authorization and appropriate license from the Commission; and

(3) the Secretary shall provide generic research and development of alternative spent nuclear fuel storage techniques to enhance utility-provided, at-reactor storage capabilities, if authorized in any other provision of this Act [42 U.S.C. 10101 et seq.] or in any other provision of law.

(c) Dry storage research and development.

(1) The consultative and technical assistance referred to in subsection (b)(2) may include, but shall not be limited to, the establishment of a research and development program for the dry storage of not more than 300 metric tons of spent nuclear fuel at facilities owned by the Federal Government on the date of the enactment of this Act [enacted Jan. 7, 1983]. The purpose of such program shall be to collect necessary data to assist the utilities involved in the licensing process.

(2) To the extent available, and consistent with the provisions of section 135 [42 U.S.C. 10155], the Secretary shall provide spent nuclear fuel for the research and development program authorized in this subsection from spent nuclear fuel received by the Secretary for storage under section 135 [42 U.S.C. 10155]. Such spent nuclear fuel shall not be subject to the provisions of section 135(e) [42 U.S.C. 10155(e)].

(d) Funding. The total contribution from the Secretary from Federal funds and the use of Federal facilities or services shall not exceed 25 percent of the total costs of the demonstration program authorized in subsection (a), as estimated by the Secretary. All remaining costs of such program shall be paid by the utilities involved or shall be provided by the Secretary from the Interim Storage Fund established in section 136 [42 U.S.C. 10156].

(e) Relation to spent nuclear fuel storage program. The spent nuclear fuel storage program authorized in section 135 [42 U.S.C. 10155] shall not be construed to authorize the use of research development or demonstration facilities owned by the Department unless—

(1) a period of 30 calendar days (not including any day in which either House of Congress is not in session because of adjournment of more than 3 calendar days to a day certain) has passed after the Secretary has transmitted to the Committee on Science and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate a written report containing a full and complete statement concerning (A) the facility involved; (B) any necessary modifications; (C) the cost thereof; and (D) the impact on the authorized research and development program; or

(2) each such committee, before the expiration of such period, has transmitted to the Secretary a written notice to the effect that such committee has no objection to the proposed use of such facility.

[42 U.S.C. 10198]

PAYMENTS TO STATES AND INDIAN TRIBES

Sec. 219. (a) Payments. Subject to subsection (b), the Secretary shall make payments to each State or affected Indian tribe that has entered into an agreement pursuant to section 215 [42 U.S.C. 10195]. The

Secretary shall pay an amount equal to 100 percent of the expenses incurred by such State or Indian tribe in engaging in any monitoring, testing, evaluation, or other consultation and cooperation activity under section 215 [42 U.S.C. 10195] with respect to any site. The amount paid by the Secretary under this paragraph shall not exceed $3,000,000 per year from the date on which the site involved was identified to the date on which the decontamination and decommission of the facility is complete pursuant to section 217(h) [42 U.S.C. 10197(h)]. Any such payment may only be made to a State in which a potential site for a test and evaluation facility has been identified under section 213 [42 U.S.C. 10193], or to an affected Indian tribe where the potential site has been identified under such section [42 U.S.C. 10193].

(b) Limitation. The Secretary shall make any payment to a State under subsection (a) only if such State agrees to provide, to each unit of general local government within the jurisdictional boundaries of which the potential site or effectively selected site involved is located, at least one-tenth of the payments made by the Secretary to such State under such subsection. A State or affected Indian tribe receiving any payment under subsection (a) shall otherwise have discretion to use such payment for whatever purpose it deems necessary, including the State or tribal activities pursuant to agreements entered into in accordance with section 215 [42 U.S.C. 10195]. Annual payments shall be prorated on a 365-day basis to the specified dates.

[42 U.S.C. 10199]

STUDY OF RESEARCH AND DEVELOPMENT NEEDS FOR MONITORED RETRIEVABLE STORAGE PROPOSAL

Sec. 220. Not later than 6 months after the date of the enactment of this Act [enacted Jan. 7, 1983], the Secretary shall submit to the Congress a report describing the research and development activities the Secretary considers necessary to develop the proposal required in section 141(b) [42 U.S.C. 10161(b)] with respect to a monitored retrievable storage facility.

[42 U.S.C. 10200]

JUDICIAL REVIEW

Sec. 221. Judicial review of research and development activities under this title [42 U.S.C. 10191 et seq.] shall be in accordance with the provisions of section 119 [42 U.S.C. 10139].

[42 U.S.C. 10201]

RESEARCH ON ALTERNATIVES FOR THE PERMANENT DISPOSAL OF HIGH-LEVEL RADIOACTIVE WASTE

Sec.222. The Secretary shall continue and accelerate a program of research, development, and investigation of alternative means and technologies for the permanent disposal of high-level radioactive waste from civilian nuclear activities and Federal research and development activities except that funding shall be made from amounts appropriated to the Secretary for purposes of carrying out this section. Such program shall include examination of various waste disposal options.

[42 U.S.C. 10202]

TECHNICAL ASSISTANCE TO NON-NUCLEAR WEAPON STATES IN THE FIELD OF SPENT FUEL STORAGE AND DISPOSAL

Sec. 223. (a) It shall be the policy of the United States to cooperate with and provide technical assistance to non-nuclear weapon states in the field of spent fuel storage and disposal.

(b) (1) Within 90 days of enactment of this Act [enacted Jan. 7, 1983], the Secretary and the Commission shall publish a joint notice in the Federal Register stating that the United States is prepared to cooperate with and provide technical assistance to non-nuclear weapon states in the fields of at-reactor spent fuel storage; away-from-reactor spent fuel storage; monitored, retrievable spent fuel storage; geologic disposal of spent fuel; and the health, safety, and environmental regulation of such activities. The notice shall summarize the resources that can be made available for international cooperation and assistance in these fields through existing programs of the Department and the Commission, including the availability of: (i) data from past or ongoing research and development projects; (ii) consultations with expert Department or Commission personnel or contractors; and (iii) liaison with private business entities and organizations working in these fields.

(2) The joint notice described in the preceding subparagraph shall be updated and reissued annually for 5 succeeding years.

(c) Following publication of the annual joint notice referred to in subsection (b), the Secretary of State shall inform the governments of non-nuclear weapon states and, as feasible, the organizations operating nuclear powerplants in such states, that the United States is prepared to cooperate with and provide technical

assistance to non-nuclear weapon states in the fields of spent fuel storage and disposal, as set forth in the joint notice. The Secretary of State shall also solicit expressions of interest from non-nuclear weapon state governments and non-nuclear weapon state nuclear power reactor operators concerning their participation in expanded United States cooperation and technical assistance programs in these fields. The Secretary of State shall transmit any such expressions of interest to the Department and the Commission.

(d) With his budget presentation materials for the Department and the Commission for fiscal years 1984 through 1989, the President shall include funding requests for an expanded program of cooperation and technical assistance with non-nuclear weapon states in the fields of spent fuel storage and disposal as appropriate in light of expressions of interest in such cooperation and assistance on the part of non-nuclear weapon state governments and non-nuclear weapon state nuclear power reactor operators.

(e) For the purposes of this subsection,[1] the term "non-nuclear weapon state" shall have the same meaning as that set forth in article IX of the Treaty on the Non-Proliferation of Nuclear Weapons [(21 U.S.C. 438)] [unclassified].

(f) Nothing in this subsection shall authorize the Department or the Commission to take any action not authorized under existing law.

[42 U.S.C. 10203]

SUBSEABED DISPOSAL

Sec. 224. (a) Study. Within 270 days after the date of the enactment of the Nuclear Waste Policy Amendments Act of 1987 [enacted Dec. 22, 1987], the Secretary shall report to Congress on subseabed disposal of spent nuclear fuel and high-level radioactive waste. The report under this subsection shall include—

(1) an assessment of the current state of knowledge of subseabed disposal as an alternative technology for disposal of spent nuclear fuel and high-level radioactive waste;

(2) an estimate of the costs of subseabed disposal;

(3) an analysis of institutional factors associated with subseabed disposal, including international aspects of a decision of the United States to proceed with subseabed disposal as an option for nuclear waste management;

(4) a full discussion of the environmental and public health and safety aspects of subseabed disposal;

(5) recommendations on alternative ways to structure an effort in research, development, and demonstration with respect to subseabed disposal; and

(6) the recommendations of the Secretary with respect to research, development and demonstration in subseabed disposal of spent nuclear fuel and high-level radioactive waste.

(b) Office of subseabed disposal research.

(1) There is hereby established an Office of Subseabed Disposal Research within the Office of Energy Research of the Department of Energy. The Office shall be headed by the Director, who shall be a member of the Senior Executive Service appointed by the Director of the Office of Energy Research, and compensated at a rate determined by applicable law.

(2) The Director of the Office of Subseabed Disposal Research shall be responsible for carrying out research, development, and demonstration activities on all aspects of subseabed disposal of high-level radioactive waste and spent nuclear fuel, subject to the general supervision of the Secretary. The Director of the Office shall be directly responsible to the Director of the Office of Energy Research, and the first such Director shall be appointed within 30 days of the date of enactment of the Nuclear Waste Policy Amendments Act of 1987 [enacted Dec. 22, 1987].

(3) In carrying out his responsibilities under this Act, the Secretary may make grants to, or enter into contracts with, the Subseabed Consortium described in subsection (d) of this section, and other persons.

(4)(A) Within 60 days of the date of enactment of the Nuclear Waste Policy Amendments Act of 1987 [enacted Dec. 22, 1987], the Secretary shall establish a university-based Subseabed Consortium involving leading oceanographic universities and institutions, national laboratories, and other organizations to investigate the technical and institutional feasibility of subseabed disposal.

[1] So in original. Reference probably should be to this section.

(B) The Subseabed Consortium shall develop a research plan and budget to achieve the following objectives by 1995:

(i) demonstrate the capacity to identify and characterize potential subseabed disposal sites;

(ii) develop conceptual designs for a subseabed disposal system, including estimated costs and institutional requirements; and

(iii) identify and assess the potential impacts of subseabed disposal on the human and marine environment.

(C) In 1990, and again in 1995, the Subseabed Consortium shall report to Congress on the progress being made in achieving the objectives of paragraph (2).

(5) The Director of the Office of Subseabed Disposal Research shall annually prepare and submit a report to the Congress on the activities and expenditures of the Office.

[42 U.S.C. 10204]

DRY CASK STORAGE[1]

Sec. 225. (a) Study. During the period between the date of the enactment of the Nuclear Waste Policy Amendments Act of 1987 and October 1, 1988, the Secretary of Energy (hereinafter in this section referred to as the "Secretary") shall conduct a study and evaluation of the use of dry cask storage technology at the sites of civilian nuclear power reactors for the temporary storage of spent nuclear fuel until such time as a permanent geologic repository has been constructed and licensed by the Nuclear Regulatory Commission (hereinafter in this section referred to as the "Commission") and is capable of receiving spent nuclear fuel. The Secretary shall report to Congress on the study under this paragraph by October 1, 1988.

(b)Contents of study. In conducting the study under paragraph (1) the Secretary shall—

(1) consider the costs of dry cask storage technology, the extent to which dry cask storage on the site of civilian nuclear power reactors will affect human health and the environment, the extent to which the storage on the sites of civilian nuclear power reactors affects the costs and risk of transporting spent nuclear fuel to a central facility such as a monitored retrievable storage facility, and any other factors the Secretary considers appropriate;

(2) consider the extent to which amounts in the Nuclear Waste Fund established in section 302(c) of the Nuclear Waste Policy Act of 1982 [42 U.S.C. 10222(c)] can be used, and should be used, to provide funds to construct, operate, maintain and safeguard spent nuclear fuel in dry cask storage at the sites for civilian nuclear power reactors;

(3) consult with the Commission and include the views of the Commission in the report under paragraph (1); and

(4) solicit the views of State and local governments and the public.

TITLE III—OTHER PROVISIONS RELATING TO RADIOACTIVE WASTE

MISSION PLAN

Sec. 301. (a) Contents of mission plan. The Secretary shall prepare a comprehensive report, to be known as the mission plan, which shall provide an informational basis sufficient to permit informed decisions to be made in carrying out the repository program and the research, development, and demonstration programs required under this Act [42 U.S.C. 10101 et seq.]. The mission plan shall include—

(1) an identification of the primary scientific, engineering, and technical information, including any necessary demonstration of engineering or systems integration, with respect to the siting and construction of a test and evaluation facility and repositories;

(2) an identification of any information described in paragraph (1) that is not available because of any unresolved scientific, engineering, or technical questions, or undemonstrated engineering or systems integration, a schedule including specific major milestones for the research, development, and technology demonstration program required under this Act [42 U.S.C. 10101 et seq.] and any additional activities to be undertaken to provide such information, a schedule for the activities necessary to achieve important programmatic milestones, and an estimate of the costs required to carry out such research, development, and demonstration programs;

[1] So in original.

(3) an evaluation of financial, political, legal, or institutional problems that may impede the implementation of this Act [42 U.S.C. 10101 et seq.], the plans of the Secretary to resolve such problems, and recommendations for any necessary legislation to resolve such problems;

(4) any comments of the Secretary with respect to the purpose and program of the test and evaluation facility;

(5) a discussion of the significant results of research and development programs conducted and the implications for each of the different geologic media under consideration for the siting of repositories, and, on the basis of such information, a comparison of the advantages and disadvantages associated with the use of such media for repository sites;

(6) the guidelines issued under section 112(a) [42 U.S.C. 10132(a)];

(7) a description of known sites at which site characterization activities should be undertaken, a description of such siting characterization activities, including the extent of planned excavations, plans for onsite testing with radioactive or nonradioactive material, plans for any investigations activities which may affect the capability of any such site to isolate high-level radioactive waste or spent nuclear fuel, plans to control any adverse, safety-related impacts from such site characterization activities, and plans for the decontamination and decommissioning of such site if it is determined unsuitable for licensing as a repository;

(8) an identification of the process for solidifying high-level radioactive waste or packaging spent nuclear fuel, including a summary and analysis of the data to support the selection of the solidification process and packaging techniques, an analysis of the requirements for the number of solidification packaging facilities needed, a description of the state of the art for the materials proposed to be used in packaging such waste or spent fuel and the availability of such materials including impacts on strategic supplies and any requirements for new or reactivated facilities to produce any such materials needed, and a description of a plan, and the schedule for implementing such plan, for an aggressive research and development program to provide when needed a high-integrity disposal package at a reasonable price;

(9) an estimate of (A) the total repository capacity required to safely accommodate the disposal of all high-level radioactive waste and spent nuclear fuel expected to be generated through December 31, 2020, in the event that no commercial reprocessing of spent nuclear fuel occurs, as well as the repository capacity that will be required if such reprocessing does occur; (B) the number and type of repositories required to be constructed to provide such disposal capacity; (C) a schedule for the construction of such repositories; and (D) an estimate of the period during which each repository listed in such schedule will be accepting high-level radioactive waste or spent nuclear fuel for disposal;

(10) an estimate, on an annual basis, of the costs required (A) to construct and operate the repositories anticipated to be needed under paragraph (9) based on each of the assumptions referred to in such paragraph; (B) to construct and operate a test and evaluation facility, or any other facilities, other than repositories described in subparagraph (A), determined to be necessary; and (C) to carry out any other activities under this Act [42 U.S.C. 10101 et seq.]; and

(11) an identification of the possible adverse economic and other impacts to the State or Indian tribe involved that may arise from the development of a test and evaluation facility or repository at a site.

(b) Submission of mission plan.

(1) Not later than 15 months after the date of the enactment of this Act [enacted Jan. 7, 1983.], the Secretary shall submit a draft mission plan to the States, the affected Indian tribes, the Commission, and other Government agencies as the Secretary deems appropriate for their comments.

(2) In preparing any comments on the mission plan, such agencies shall specify with precision any objections that they may have. Upon submission of the mission plan to such agencies, the Secretary shall publish a notice in the Federal Register of the submission of the mission plan and of its availability for public inspection, and, upon receipt of any comments of such agencies respecting the mission plan, the Secretary shall publish a notice in the Federal Register of the receipt of comments and of the availability of the comments for public inspection. If the Secretary does not revise the mission plan to meet objections specified in such comments, the Secretary shall publish in the Federal Register a detailed statement for not so revising the mission plan.

(3) The Secretary, after reviewing any other comments made by such agencies and revising the mission plan to the extent that the Secretary may consider to be appropriate, shall submit the mission plan to the appropriate committees of the Congress not later than 17 months after the date of the enactment of

this Act [enacted Jan. 7, 1983.]. The mission plan shall be used by the Secretary at the end of the first period of 30 calendar days (not including any day on which either House of Congress is not in session because of adjournment of more than 3 calendar days to a day certain) following receipt of the mission plan by the Congress.

[42 U.S.C. 10221]

NUCLEAR WASTE FUND

Sec. 302. (a) Contracts.

(1) In the performance of his functions under this Act [42 U.S.C. 10101 et seq.], the Secretary is authorized to enter into contracts with any person who generates or holds title to high-level radioactive waste, or spent nuclear fuel, of domestic origin for the acceptance of title, subsequent transportation, and disposal of such waste or spent fuel. Such contracts shall provide for payment to the Secretary of fees pursuant to paragraphs (2) and (3) sufficient to offset expenditures described in subsection (d).

(2) For electricity generated by a civilian nuclear power reactor and sold on or after the date 90 days after the date of enactment of this Act [enacted Jan. 7, 1983], the fee under paragraph (1) shall be equal to 1.0 mil per kilowatt-hour.

(3) For spent nuclear fuel, or solidified high-level radioactive waste derived from spent nuclear fuel, which fuel was used to generate electricity in a civilian nuclear power reactor prior to the application of the fee under paragraph (2) to such reactor, the Secretary shall, not later than 90 days after the date of enactment of this Act [enacted Jan. 7, 1983], establish a 1 time fee per kilogram of heavy metal in spent nuclear fuel, or in solidified high-level radioactive waste. Such fee shall be in an amount equivalent to an average charge of 1.0 mil per kilowatt-hour for electricity generated by such spent nuclear fuel, or such solidified high-level waste derived therefrom, to be collected from any person delivering such spent nuclear fuel or high-level waste, pursuant to section 123 [42 U.S.C. 10143], to the Federal Government. Such fee shall be paid to the Treasury of the United States and shall be deposited in the separate fund established by subsection (c) 126(b).[1] In paying such a fee, the person delivering spent fuel, or solidified high-level radioactive wastes derived therefrom, to the Federal Government shall have no further financial obligation to the Federal Government for the long-term storage and permanent disposal of such spent fuel, or the solidified high-level radioactive waste derived therefrom.

(4) Not later than 180 days after the date of enactment of this Act [enacted Jan. 7, 1983], the Secretary shall establish procedures for the collection and payment of the fees established by paragraph (2) and paragraph (3). The Secretary shall annually review the amount of the fees established by paragraphs (2) and (3) above to evaluate whether collection of the fee will provide sufficient revenues to offset the costs as defined in subsection (d) herein. In the event the Secretary determines that either insufficient or excess revenues are being collected, in order to recover the costs incurred by the Federal Government that are specified in subsection (d), the Secretary shall propose an adjustment to the fee to ensure full cost recovery. The Secretary shall immediately transmit this proposal for such an adjustment to Congress. The adjusted fee proposed by the Secretary shall be effective after a period of 90 days of continuous session have elapsed following the receipt of such transmittal unless during such 90-day period either House of Congress adopts a resolution disapproving the Secretary's proposed adjustment in accordance with the procedures set forth for congressional review of an energy action under section 551 of the Energy Policy and Conservation Act [42 U.S.C. 6421].

(5) Contracts entered into under this section shall provide that—

(A) following commencement of operation of a repository, the Secretary shall take title to the high-level radioactive waste or spent nuclear fuel involved as expeditiously as practicable upon the request of the generator or owner of such waste or spent fuel; and

(B) in return for the payment of fees established by this section, the Secretary, beginning not later than January 31, 1998, will dispose of the high-level radioactive waste or spent nuclear fuel involved as provided in this subtitle.[2]

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[1] So in original. Reference to 126(b) probably should be omitted.

[2] So in original. Reference probably should be to this section and subtitle A of title I.

(6) The Secretary shall establish in writing criteria setting forth the terms and conditions under which such disposal services shall be made available.

(b) Advance contracting requirement.

(1)(A) The Commission shall not issue or renew a license to any person to use a utilization or production facility under the authority of section 103 or 104 of the Atomic Energy Act of 1954 (42 U.S.C. 2133, 2134) unless—

(i) such person has entered into a contract with the Secretary under this section; or

(ii) the Secretary affirms in writing that such person is actively and in good faith negotiating with the Secretary for a contract under this section.

(B) The Commission, as it deems necessary or appropriate, may require as a precondition to the issuance or renewal of a license under section 103 or 104 of the Atomic Energy Act of 1954 [42 U.S.C. 2133, 2134] that the applicant for such license shall have entered into an agreement with the Secretary for the disposal of high-level radioactive waste and spent nuclear fuel that may result from the use of such license.

(2) Except as provided in paragraph (1), no spent nuclear fuel or high-level radioactive waste generated or owned by any person (other than a department of the United States referred to in section 101 or 102 of title 5, United States Code [5 U.S.C. 101, 102]) may be disposed of by the Secretary in any repository constructed under this Act [42 U.S.C. 10101 et seq.] unless the generator or owner of such spent fuel or waste has entered into a contract with the Secretary under this section by not later than—

(A) June 30, 1983; or

(B) the date on which such generator or owner commences generation of, or takes title to, such spent fuel or waste;

whichever occurs later.

(3) The rights and duties of a party to a contract entered into under this section may be assignable with transfer of title to the spent nuclear fuel or high-level radioactive waste involved.

(4) No high-level radioactive waste or spent nuclear fuel generated or owned by any department of the United States referred to in section 101 or 102 of title 5, United States Code [5 U.S.C. 101, 102], may be disposed of by the Secretary in any repository constructed under this Act [42 U.S.C. 10101 et seq.] unless such department transfers to the Secretary, for deposit in the Nuclear Waste Fund, amounts equivalent to the fees that would be paid to the Secretary under the contracts referred to in this section if such waste or spent fuel were generated by any other person.

(c) Establishment of Nuclear Waste Fund. There hereby is established in the Treasury of the United States a separate fund, to be known as the Nuclear Waste Fund. The Waste Fund shall consist of—

(1) all receipts, proceeds, and recoveries realized by the Secretary under subsections (a), (b), and (e), which shall be deposited in the Waste Fund immediately upon their realization;

(2) any appropriations made by the Congress to the Waste Fund; and

(3) any unexpended balances available on the date of the enactment of this Act [enacted Jan. 7, 1983] for functions or activities necessary or incident to the disposal of civilian high-level radioactive waste or civilian spent nuclear fuel, which shall automatically be transferred to the Waste Fund on such date.

(d) Use of Waste Fund. The Secretary may make expenditures from the Waste Fund, subject to subsection (e), only for purposes of radioactive waste disposal activities under titles I and II [42 U.S.C. 10121 et seq., 10191 et seq.], including—

(1) the identification, development, licensing, construction, operation, decommissioning, and post-decommissioning maintenance and monitoring of any repository, monitored retrievable storage facility, or test and evaluation facility constructed under this Act [42 U.S.C. 10101 et seq.];

(2) the conducting of nongeneric research, development, and demonstration activities under this Act [42 U.S.C. 10101 et seq.];

(3) the administrative cost of the radioactive waste disposal program;

(4) any costs that may be incurred by the Secretary in connection with the transportation, treating, or packaging of spent nuclear fuel or high-level radioactive waste to be disposed of in a repository, to be stored in a monitored retrievable storage site, or to be used in a test and evaluation facility;

(5) the costs associated with acquisition, design, modification, replacement, operation, and construction of facilities at a repository site, a monitored retrievable storage site, or a test and evaluation facility site and necessary or incident to such repository, monitored retrievable storage facility, or test and evaluation facility; and

(6) the provision of assistance to States, units of general local government, and Indian tribes under sections 116, 118, and 219 [42 U.S.C. 10136, 10138, 10199].[1]

No amount may be expended by the Secretary under this subtitle for the construction or expansion of any facility unless such construction or expansion is expressly authorized by this or subsequent legislation. The Secretary hereby is authorized to construct one repository and one test and evaluation facility.

(e) Administration of Waste Fund.

(1) The Secretary of the Treasury shall hold the Waste Fund and, after consultation with the Secretary, annually report to the Congress on the financial condition and operations of the Waste Fund during the preceding fiscal year.

(2) The Secretary shall submit the budget of the Waste Fund to the Office of Management and Budget triennially along with the budget of the Department of Energy submitted at such time in accordance with chapter 11 of title 31, United States Code [31 U.S.C. 1101 et seq.]. The budget of the Waste Fund shall consist of the estimates made by the Secretary of expenditures from the Waste Fund and other relevant financial matters for the succeeding 3 fiscal years, and shall be included in the Budget of the United States Government. The Secretary may make expenditures from the Waste Fund, subject to appropriations which shall remain available until expended. Appropriations shall be subject to triennial authorization.

(3) If the Secretary determines that the Waste Fund contains at any time amounts in excess of current needs, the Secretary may request the Secretary of the Treasury to invest such amounts, or any portion of such amounts as the Secretary determines to be appropriate, in obligations of the United States—

(A) having maturities determined by the Secretary of the Treasury to be appropriate to the needs of the Waste Fund; and

(B) bearing interest at rates determined to be appropriate by the Secretary of the Treasury, taking into consideration the current average market yield on outstanding marketable obligations of the United States with remaining periods to maturity comparable to the maturities of such investments, except that the interest rate on such investments shall not exceed the average interest rate applicable to existing borrowings.

(4) Receipts, proceeds, and recoveries realized by the Secretary under this section, and expenditures of amounts from the Waste Fund, shall be exempt from annual apportionment under the provisions of subchapter II of chapter 15 of title 31, United States Code [31 U.S.C. 1511 et seq.].

(5) If at any time the moneys available in the Waste Fund are insufficient to enable the Secretary to discharge his responsibilities under this subtitle, the Secretary shall issue to the Secretary of the Treasury obligations in such forms and denominations, bearing such maturities, and subject to such terms and conditions as may be agreed to by the Secretary and the Secretary of the Treasury. The total of such obligations shall not exceed amounts provided in appropriation Acts. Redemption of such obligations shall be made by the Secretary from moneys available in the Waste Fund. Such obligations shall bear interest at a rate determined by the Secretary of the Treasury, which shall be not less than a rate determined by taking into consideration the average market yield on outstanding marketable obligations of the United States of comparable maturities during the month preceding the issuance of the obligations under this paragraph. The Secretary of the Treasury shall purchase any issued obligations, and for such purpose the Secretary of the Treasury is authorized to use as a public debt transaction the proceeds from the sale of any securities issued under chapter 31 of title 31, United States Code [31 U.S.C. 3101 et seq.], and the purposes for which securities may be issued under such Act are extended to include any purchase of such obligations. The Secretary of the Treasury may at any time sell any of the obligations acquired by him under this paragraph. All redemptions, purchases, and sales by the Secretary of the Treasury of obligations under this paragraph shall be treated as public debt transactions of the United States.

(6) Any appropriations made available to the Waste Fund for any purpose described in subsection (d) shall be repaid into the general fund of the Treasury, together with interest from the date of availability of the appropriations until the date of repayment. Such interest shall be paid on the cumulative amount of appropriations available to the Waste Fund, less the average undisbursed cash balance in the Waste

[1] So in original. Reference probably should be to sections 116, 118, 141, and 219.

Fund account during the fiscal year involved. The rate of such interest shall be determined by the Secretary of the Treasury taking into consideration the average market yield during the month preceding each fiscal year on outstanding marketable obligations of the United States of comparable maturity. Interest payments may be deferred with the approval of the Secretary of the Treasury, but any interest payments so deferred shall themselves bear interest.

[42 U.S.C. 10222]

ALTERNATIVE MEANS OF FINANCING

Sec. 303. The Secretary shall undertake a study with respect to alternative approaches to managing the construction and operation of all civilian radioactive waste management facilities, including the feasibility of establishing a private corporation for such purposes. In conducting such study, the Secretary shall consult with the Director of the Office of Management and Budget, the Chairman of the Commission, and such other Federal agency representatives as may be appropriate. Such study shall be completed, and a report containing the results of such study shall be submitted to the Congress, within 1 year after the date of the enactment of this Act [enacted Jan. 7, 1983].

[42 U.S.C. 10223]

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT

Sec. 304. (a) Establishment. There hereby is established within the Department of Energy an Office of Civilian Radioactive Waste Management. The Office shall be headed by a Director, who shall be appointed by the President, by and with the advice and consent of the Senate, and who shall be compensated at the rate payable for level IV of the Executive Schedule under section 5315 of title 5, United States Code [5 U.S.C. 5315].

(b) Functions of Director. The Director of the Office shall be responsible for carrying out the functions of the Secretary under this Act [42 U.S.C. 10101 et seq.], subject to the general supervision of the Secretary. The Director of the Office shall be directly responsible to the Secretary.

(c) Annual report to Congress. The Director of the Office shall annually prepare and submit to the Congress a comprehensive report on the activities and expenditures of the Office.

(d) Annual audit by Comptroller General. The Comptroller General of the United States shall annually make an audit of the Office, in accordance with such regulations as the Comptroller General may prescribe. The Comptroller General shall have access to such books, records, accounts, and other materials of the Office as the Comptroller General determines to be necessary for the preparation of such audit. The Comptroller General shall submit to the Congress a report on the results of each audit conducted under this section.

[42 U.S.C. 10224]

LOCATION OF TEST AND EVALUATION FACILITY

Sec. 305. (a) Report to Congress. Not later than 1 year after the date of the enactment of this Act [enacted Jan. 7, 1983], the Secretary shall transmit to the Congress a report setting forth whether the Secretary plans to locate the test and evaluation facility at the site of a repository.

(b) Procedures.

(1) If the test and evaluation facility is to be located at any candidate site or repository site (A) site selection and development of such facility shall be conducted in accordance with the procedures and requirements established in title I [42 U.S.C. 10121 et seq.] with respect to the site selection and development of repositories; and (B) the Secretary may not commence construction of any surface facility for such test and evaluation facility prior to issuance by the Commission of a construction authorization for a repository at the site involved.

(2) No test and evaluation facility may be converted into a repository unless site selection and development of such facility was conducted in accordance with the procedures and requirements established in title I [42 U.S.C. 10121 et seq.] with respect to the site selection and development of repositories.

(3) The Secretary may not commence construction of a test and evaluation facility at a candidate site or site recommended as the location for a repository prior to the date on which the designation of such site is effective under section 115 [42 U.S.C. 10135].

[42 U.S.C. 10225]

NUCLEAR REGULATORY COMMISSION TRAINING AUTHORIZATION

Sec. 306. The Nuclear Regulatory Commission is authorized and directed to promulgate regulations, or other appropriate Commission regulatory guidance, for the training and qualifications of civilian nuclear powerplant operators, supervisors, technicians and other appropriate operating personnel. Such regulations or guidance shall establish simulator training requirements for applicants for civilian nuclear powerplant operator licenses and for operator requalification programs; requirements governing NRC[1] administration of requalification examinations; requirements for operating tests at civilian nuclear powerplant simulators, and instructional requirements for civilian nuclear powerplant licensee personnel training programs. Such regulations or other regulatory guidance shall be promulgated by the Commission within the 12-month period following enactment of this Act [enacted Jan. 7, 1983], and the Commission within the 12-month period following enactment of this Act [enacted Jan. 7, 1983] shall submit a report to Congress setting forth the actions the Commission has taken with respect to fulfilling its obligations under this section.

[42 U.S.C. 10226]

TITLE IV—NUCLEAR WASTE NEGOTIATOR

DEFINITION

Sec. 401. For purposes of this title, the term "State" means each of the several States, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Northern Mariana Islands, the Trust Territory of the Pacific Islands, any other territory or possession of the United States, and the Republic of the Marshall Islands.

[42 U.S.C. 10241]

THE OFFICE OF THE NUCLEAR WASTE NEGOTIATOR

Sec. 402. (a) Establishment. There is established the Office of the Nuclear Waste Negotiator that shall be an independent establishment in the executive branch.

(b) The Nuclear Waste Negotiator.

(1) The Office shall be headed by a Nuclear Waste Negotiator who shall be appointed by the President, by and with the advice and consent of the Senate. The Negotiator shall hold office at the pleasure of the President, and shall be compensated at the rate provided for level III of the Executive Schedule in section 5314 of title 5, United States Code.

(2) The Negotiator shall attempt to find a State or Indian tribe willing to host a repository or monitored retrievable storage facility at a technically qualified site on reasonable terms and shall negotiate with any State or Indian tribe which expresses an interest in hosting a repository or monitored retrievable storage facility.

[42 U.S.C. 10242]

DUTIES OF THE NEGOTIATOR

Sec. 403. (a) Negotiations with potential hosts.

(1) The Negotiator shall—

(A) seek to enter into negotiations on behalf of the United States, with—

(i) the Governor of any State in which a potential site is located; and

(ii) the governing body of any Indian tribe on whose reservation a potential site is located; and

(B) attempt to reach a proposed agreement between the United States and any such State or Indian tribe specifying the terms and conditions under which such State or tribe would agree to host a repository or monitored retrievable storage facility within such State or reservation.

(2) In any case in which State law authorizes any person or entity other than the Governor to negotiate a proposed agreement under this section on behalf of the State, any reference in this title to the Governor shall be considered to refer instead to such other person or entity.

(b) Consultation with affected States, subdivisions of States, and tribes. In addition to entering into negotiations under subsection (a), the Negotiator shall consult with any State, affected unit of local government, or any Indian tribe that the Negotiator determines may be affected by the siting of a repository

[1] So in original. Probably should be "Commission".

or monitored retrievable storage facility and may include in any proposed agreement such terms and conditions relating to the interest of such States, affected units of local government, or Indian tribes as the Negotiator determines to be reasonable and appropriate.

(c) Consultation with other Federal agencies. The Negotiator may solicit and consider the comments of the Secretary, the Nuclear Regulatory Commission, or any other Federal agency on the suitability of any potential site for site characterization. Nothing in this subsection shall be construed to require the Secretary, the Nuclear Regulatory Commission, or any other Federal agency to make a finding that any such site is suitable for site characterization.

(d) Proposed agreement.

(1) The Negotiator shall submit to the Congress any proposed agreement between the United States and a State or Indian tribe negotiated under subsection (a) and an environmental assessment prepared under section 404(a) [42 U.S.C. 10244(a)] for the site concerned.

(2) Any such proposed agreement shall contain such terms and conditions (including such financial and institutional arrangements) as the Negotiator and the host State or Indian tribe determine to be reasonable and appropriate and shall contain such provisions as are necessary to preserve any right to participation or compensation of such State, affected unit of local government, or Indian tribe under sections 116(c), 117, and 118(b) [42 U.S.C. 10136(c), 10137, 10138(b)].

(3)(A) No proposed agreement entered into under this section shall have legal effect unless enacted into Federal law.

(B) A State or Indian tribe shall enter into an agreement under this section in accordance with the laws of such State or tribe. Nothing in this section may be construed to prohibit the disapproval of a proposed agreement between a State and the United States under this section by a referendum or an act of the legislature of such State.

(4) Notwithstanding any proposed agreement under this section, the Secretary may construct a repository or monitored retrievable storage facility at a site agreed to under this title only if authorized by the Nuclear Regulatory Commission in accordance with the Atomic Energy Act of 1954 [42 U.S.C. 2012 et seq.], title II of the Energy Reorganization Act of 1982 [42 U.S.C. 5841 et seq.] and any other law applicable to authorization of such construction.

[42 U.S.C. 10243]

ENVIRONMENTAL ASSESSMENT OF SITES

Sec. 404. (a) In general. Upon the request of the Negotiator, the Secretary shall prepare an environmental assessment of any site that is the subject of negotiations under section 403(a) [42 U.S.C. 10243(a)].

(b) Contents.

(1) Each environmental assessment prepared for a repository site shall include a detailed statement of the probable impacts of characterizing such site and the construction and operation of a repository at such site.

(2) Each environmental assessment prepared for a monitored retrievable storage facility site shall include a detailed statement of the probable impacts of construction and operation of such a facility at such site.

(c) Judicial review. The issuance of an environmental assessment under subsection (a) shall be considered to be a final agency action subject to judicial review in accordance with the provisions of chapter 7 of title 5, United States Code, and section 119 [5 U.S.C. 701 et seq.; 42 U.S.C. 10139].

(d) Public hearings.

(1) In preparing an environmental assessment for any repository or monitored retrievable storage facility site, the Secretary shall hold public hearings in the vicinity of such site to inform the residents of the area in which such site is located that such site is being considered and to receive their comments.

(2) At such hearings, the Secretary shall solicit and receive any recommendations of such residents with respect to issues that should be addressed in the environmental assessment required under subsection (a) and the site characterization plan described in section 113(b)(1) [42 U.S.C. 10133(b)(1)].

(e) Public availability. Each environmental assessment prepared under subsection (a) shall be made available to the public.

(f) Evaluation of sites.

(1) In preparing an environmental assessment under subsection (a), the Secretary shall use available geophysical, geologic, geochemical and hydrologic, and other information and shall not conduct any preliminary borings or excavations at any site that is the subject of such assessment unless—

(A) such preliminary boring or excavation activities were in progress on or before the date of the enactment of the Nuclear Waste Policy Amendments Act of 1987 [enacted Dec. 22, 1987]; or

(B) the Secretary certifies that, in the absence of preliminary borings or excavations, adequate information will not be available to satisfy the requirements of this Act or any other law.

(2) No preliminary boring or excavation conducted under this section shall exceed a diameter of 40 inches.

[42 U.S.C. 10244]

SITE CHARACTERIZATION; LICENSING

Sec. 405. (a) Site characterization. Upon enactment of legislation to implement an agreement to site a repository negotiated under section 403(a) [42 U.S.C. 10243(a)], the Secretary shall conduct appropriate site characterization activities for the site that is the subject of such agreement subject to the conditions and terms of such agreement. Any such site characterization activities shall be conducted in accordance with section 113 [42 U.S.C. 10133], except that references in such section to the Yucca Mountain site and the State of Nevada shall be deemed to refer to the site that is the subject of the agreement and the State or Indian tribe entering into the agreement.

(b) Licensing.

(1) Upon the completion of site characterization activities carried out under subsection (a), the Secretary shall submit to the Nuclear Regulatory Commission an application for construction authorization for a repository at such site.

(2) The Nuclear Regulatory Commission shall consider an application for a construction authorization for a repository or monitored retrievable storage facility in accordance with the laws applicable to such applications, except that the Nuclear Regulatory Commission shall issue a final decision approving or disapproving the issuance of a construction authorization not later than 3 years after the date of the submission of such application.

[42 U.S.C. 10245]

MONITORED RETRIEVABLE STORAGE

Sec. 406. (a) Construction and operation. Upon enactment of legislation to implement an agreement negotiated under section 403(a) [42 U.S.C. 10243(a)] to site a monitored retrievable storage facility, the Secretary shall construct and operate such facility as part of an integrated nuclear waste management system in accordance with the terms and conditions of such agreement.

(b) Financial assistance. The Secretary may make grants to any State, Indian tribe, or affected unit of local government to assess the feasibility of siting a monitored retrievable storage facility under this section at a site under the jurisdiction of such State, tribe, or affected unit of local government.

[42 U.S.C. 10246]

ENVIRONMENTAL IMPACT STATEMENT

Sec. 407. (a) In general. Issuance of a construction authorization for a repository or monitored retrievable storage facility under section 405(b) shall be considered a major Federal action significantly affecting the quality of the human environment for purposes of the National Environmental Policy Act of 1969 [42 U.S.C. 4321 et seq.].

(b) Preparation. A final environmental impact statement shall be prepared by the Secretary under such Act [42 U.S.C. 4321 et seq.] and shall accompany any application to the Nuclear Regulatory Commission for a construction authorization.

(c) Adoption.

(1) Any such environmental impact statement shall, to the extent practicable, be adopted by the Nuclear Regulatory Commission, in accordance with section 1506.3 of title 40, Code of Federal Regulations, in connection with the issuance by the Nuclear Regulatory Commission of a construction authorization and license for such repository or monitored retrievable storage facility.

(2)(A) In any such statement prepared with respect to a repository to be constructed under this title

at the Yucca Mountain site, the Nuclear Regulatory Commission need not consider the need for a repository, the time of initial availability of a repository, alternate sites to the Yucca Mountain site, or nongeologic alternatives to such site.

(B) In any such statement prepared with respect to a repository to be constructed under this title at a site other than the Yucca Mountain site, the Nuclear Regulatory Commission need not consider the need for a repository, the time of initial availability of a repository, or nongeologic alternatives to such site but shall consider the Yucca Mountain site as an alternate to such site in the preparation of such statement.

[42 U.S.C. 10247]

ADMINISTRATIVE POWERS OF THE NEGOTIATOR

Sec. 408. In carrying out his functions under this title, the Negotiator may—

(1) appoint such officers and employees as he determines to be necessary and prescribe their duties;

(2) obtain services as authorized by section 3109 of title 5, United States Code, at rates not to exceed the rate prescribed for grade GS-18 of the General Schedule by section 5332 of title 5, United States Code;

(3) promulgate such rules and regulations as may be necessary to carry out such functions;

(4) utilize the services, personnel, and facilities of other Federal agencies (subject to the consent of the head of any such agency);

(5) for purposes of performing administrative functions under this title, and to the extent funds are appropriated, enter into and perform such contracts, leases, cooperative agreements, or other transactions as may be necessary and on such terms as the Negotiator determines to be appropriate, with any agency or instrumentality of the United States, or with any public or private person or entity;

(6) accept voluntary and uncompensated services, notwithstanding the provisions of section 1342 of title 31, United States Code;

(7) adopt an official seal, which shall be judicially noticed;

(8) use the United States mails in the same manner and under the same conditions as other departments and agencies of the United States;

(9) hold such hearings as are necessary to determine the views of interested parties and the general public; and

(10) appoint advisory committees under the Federal Advisory Committee Act (5 U.S.C. App.).

[42 U.S.C. 10248]

COOPERATION OF OTHER DEPARTMENTS AND AGENCIES

Sec. 409. Each department, agency, and instrumentality of the United States, including any independent agency, may furnish the Negotiator such information as he determines to be necessary to carry out his functions under this title.

[42 U.S.C. 10249]

TERMINATION OF THE OFFICE

Sec. 410. The Office shall cease to exist not later than 30 days after the date 5 years after the date of the enactment of the Nuclear Waste Policy Amendments Act of 1987 [enacted Dec. 22, 1987].

[42 U.S.C. 10250]

AUTHORIZATION OF APPROPRIATIONS

Sec. 411. Notwithstanding subsection (d) of section 302 [42 U.S.C. 10222(d)], and subject to subsection (e) of such section [42 U.S.C. 10222(e)], there are authorized to be appropriated for expenditures from amounts in the Waste Fund established in subsection (c) of such section [42 U.S.C. 10222(c)], such sums as may be necessary to carry out the provisions of this title.

[42 U.S.C. 10251]

TITLE V—NUCLEAR WASTE TECHNICAL REVIEW BOARD

DEFINITIONS

Sec. 501. As used in this title:

(1) The term "Chairman" means the Chairman of the Nuclear Waste Technical Review Board.

(2) The term "Board" means the Nuclear Waste Technical Review Board established under section 502 [42 U.S.C. 10262].

[42 U.S.C. 10261]

NUCLEAR WASTE TECHNICAL REVIEW BOARD

Sec. 502. (a) Establishment. There is established a Nuclear Waste Technical Review Board that shall be an independent establishment within the executive branch.

(b) Members.

(1) The Board shall consist of 11 members who shall be appointed by the President not later than 90 days after the date of the enactment of the Nuclear Waste Policy Amendments Act of 1987 [enacted Dec. 22, 1987] from among persons nominated by the National Academy of Sciences in accordance with paragraph (3).

(2) The President shall designate a member of the Board to serve as chairman.

(3)(A) The National Academy of Sciences shall, not later than 90 days after the date of the enactment of the Nuclear Waste Policy Amendments Act of 1987 [enacted Dec. 22, 1987], nominate not less than 22 persons for appointment to the Board from among persons who meet the qualifications described in subparagraph (C).

(B) The National Academy of Sciences shall nominate not less than 2 persons to fill any vacancy on the Board from among persons who meet the qualifications described in subparagraph (C).

(C)(i) Each person nominated for appointment to the Board shall be—

(I) eminent in a field of science or engineering, including environmental sciences; and

(II) selected solely on the basis of established records of distinguished service.

(ii) The membership of the Board shall be representative of the broad range of scientific and engineering disciplines related to activities under this title.

(iii) No person shall be nominated for appointment to the Board who is an employee of—

(I) the Department of Energy;

(II) a national laboratory under contract with the Department of Energy; or

(III) an entity performing high-level radioactive waste or spent nuclear fuel activities under contract with the Department of Energy.

(4) Any vacancy on the Board shall be filled by the nomination and appointment process described in paragraphs (1) and (3).

(5) Members of the Board shall be appointed for terms of 4 years, each such term to commence 120 days after the date of enactment of the Nuclear Waste Policy Amendments Act of 1987 [enacted Dec. 22, 1987], except that of the 11 members first appointed to the Board, 5 shall serve for 2 years and 6 shall serve for 4 years, to be designated by the President at the time of appointment.

[42 U.S.C. 10262]

FUNCTIONS

Sec. 503. The Board shall evaluate the technical and scientific validity of activities undertaken by the Secretary after the date of the enactment of the Nuclear Waste Policy Amendments Act of 1987 [enacted Dec. 22, 1987], including—

(1) site characterization activities; and

(2) activities relating to the packaging or transportation of high-level radioactive waste or spent nuclear fuel.

[42 U.S.C. 10263]

INVESTIGATORY POWERS

Sec. 504. (a) Hearings. Upon request of the Chairman or a majority of the members of the Board, the Board may hold such hearings, sit and act at such times and places, take such testimony, and receive such evidence, as the Board considers appropriate. Any member of the Board may administer oaths or affirmations to witnesses appearing before the Board.

(b) Production of documents.

(1) Upon the request of the Chairman or a majority of the members of the Board, and subject to existing law, the Secretary (or any contractor of the Secretary) shall provide the Board with such records, files, papers, data, or information as may be necessary to respond to any inquiry of the Board under this title.

(2) Subject to existing law, information obtainable under paragraph (1) shall not be limited to final work products of the Secretary, but shall include drafts of such products and documentation of work in progress.

[42 U.S.C. 10264]

COMPENSATION OF MEMBERS

Sec. 505. (a) In general. Each member of the Board shall be paid at the rate of pay payable for level III of the Executive Schedule for each day (including travel time) such member is engaged in the work of the Board.

(b) Travel expenses. Each member of the Board may receive travel expenses, including per diem in lieu of subsistence, in the same manner as is permitted under sections 5702 and 5703 of title 5, United States Code.

[42 U.S.C. 10265]

STAFF

Sec. 506. (a) Clerical staff.

(1) Subject to paragraph (2), the Chairman may appoint and fix the compensation of such clerical staff as may be necessary to discharge the responsibilities of the Board.

(2) Clerical staff shall be appointed subject to the provisions of title 5, United States Code, governing appointments in the competitive service, and shall be paid in accordance with the provisions of chapter 51 and subchapter III of chapter 53 of such title [5 U.S.C. 5301 et seq., 5331 et seq.] relating to classification and General Schedule pay rates.

(b) Professional staff.

(1) Subject to paragraphs (2) and (3), the Chairman may appoint and fix the compensation of such professional staff as may be necessary to discharge the responsibilities of the Board.

(2) Not more than 10 professional staff members may be appointed under this subsection.

(3) Professional staff members may be appointed without regard to the provisions of title 5, United States Code, governing appointments in the competitive service, and may be paid without regard to the provisions of chapter 51 and subchapter III of chapter 53 of such title [5 U.S.C. 5301 et seq., 5331 et seq.] relating to classification and General Schedule pay rates, except that no individual so appointed may receive pay in excess of the annual rate of basic pay payable for GS-18 of the General Schedule.

[42 U.S.C. 10266]

SUPPORT SERVICES

Sec. 507. (a) General services. To the extent permitted by law and requested by the Chairman, the Administrator of General Services shall provide the Board with necessary administrative services, facilities, and support on a reimbursable basis.

(b) Accounting, research, and technology assessment services. The Comptroller General, the Librarian of Congress, and the Director of the Office of Technology Assessment shall, to the extent permitted by law and subject to the availability of funds, provide the Board with such facilities, support, funds and services, including staff, as may be necessary for the effective performance of the functions of the Board.

(c) Additional support. Upon the request of the Chairman, the Board may secure directly from the head of any department or agency of the United States information necessary to enable it to carry out this title.

(d) Mails. The Board may use the United States mails in the same manner and under the same conditions as other departments and agencies of the United States.

(e) Experts and consultants. Subject to such rules as may be prescribed by the Board, the Chairman may procure temporary and intermittent services under section 3109(b) of title 5 of the United States Code, but at rates for individuals not to exceed the daily equivalent of the maximum annual rate of basic pay payable for GS-18 of the General Schedule.

[42 U.S.C. 10267]

REPORT

Sec. 508. The Board shall report not less than 2 times per year to Congress and the Secretary its findings, conclusions, and recommendations. The first such report shall be submitted not later than 12 months after the date of the enactment of the Nuclear Waste Policy Amendments Act of 1987 [enacted Dec. 22, 1987].

[42 U.S.C. 10268]

AUTHORIZATION OF APPROPRIATIONS

Sec. 509. Notwithstanding subsection (d) of section 302 [42 U.S.C. 10222(d)], and subject to subsection (e) of such section [42 U.S.C. 10222(e)], there are authorized to be appropriated for expenditures from amounts in the Waste Fund established in subsection (c) of such section [42 U.S.C. 10222(c)] such sums as may be necessary to carry out the provisions of this title.
[42 U.S.C. 10269]

TERMINATION OF THE BOARD

Sec. 510. The Board shall cease to exist not later than 1 year after the date on which the Secretary begins disposal of high-level radioactive waste or spent nuclear fuel in a repository.
[42 U.S.C. 10270]

SECTION 3—IMPLEMENTING REGULATIONS

SECTION 3. IMPLEMENTING REGULATIONS AND OTHER GUIDANCE

The Atomic Energy Act of 1954, as amended, is implemented through regulations*, guidelines, and internal orders of DOE, NRC, and EPA. While certain NRC requirements may not be applicable to DOE, they are included in this section because (1)DOE has adopted the technical standards, (2) DOE has referenced the regulation in a particular DOE order, or (3) the material has informational significance. Other NRC regulations that have peripheral applicability to DOE activities are listed below, but their full text is not included in this Reference Book. For example, several regulations concerning licensing [e.g., 10 *Code of Federal Regulations* (*CFR*) 30, 40, and 50] do not apply to DOE facilities or activities unless they are identified in Section 202 of the Energy Reorganization Act of 1974.

For easy cross-reference Table 3-1 lists nuclear energy related statutes and their implementing regulations included in this Reference Book.

NRC REGULATIONS

***10 *CFR* 20 STANDARDS FOR PROTECTION AGAINST RADIATION**

- General Provisions
- Permissible Doses, Levels and Concentrations
- Precautionary Procedures
- Waste Disposal
- Records, Reports, and Notification
- Exceptions and Additional Requirements
- Enforcement
- Appendix A - Protection Factors for Respirators
- Appendix B - Concentrations in Air and Water Above Natural Background
- Appendix C - Quantities of Licensed Material Requiring Labeling

* Regulations marked with an asterisk are included in this Reference Book.

- Appendix D - U.S. Nuclear Regulatory Commission Regional Offices
- Subparts A through O

On May 21, 1991 (56 *FR* 23360), the NRC issued a final rule revising 10 *CFR* 20 by adding Subparts A through O. Although adherence to these regulations is not mandatory until January 1, 1993, earlier compliance is encouraged. The revisions:

- update 10 *CFR* 20 to incorporate advances in science and new concepts of radiation protection methodology and philosophy;
- implement pending federal radiation guidance on occupational radiation protection;
- implement the principal current dose-limiting recommendations of the ICRP;
- incorporate the ICRP "effective dose equivalent" concept;
- update the limits on airborne radionuclide intakes, effluent releases, and doses from inhaled or ingested radionuclides using up-to-date metabolic models and dose factors; and
- require that licensees have programs for keeping radiation exposures "as low as reasonably achievable" (ALARA).

Further discussion of the May 21, 1991, final rule may be found at the end of this section of the Reference Book.

The regulations in 10 CFR 20 contain provisions involving radiation dose standards for individuals in restricted and nonrestricted areas, radioactivity in effluents, and information on basic physical parameters of radiation. The rules also set a NRC policy to make every reasonable effort to maintain radiation exposures and releases of radioactive materials in effluents to unrestricted areas to ALARA levels. This part applies to DOE due to NRC's licensing function over any DOE high-level waste geologic repositories (10 *CFR* 60). This part contains many definitions generally applicable to radiation protection. Important definitions include:

ALARA—means "as low as is reasonably achievable" taking into account the state of technology, the economics of improvements in relation to benefits to the public health and safety, and societal and socioeconomic considerations, and in relation to the

utilization of nuclear energy in the public interest [10 *CFR* 20.1(c)].

It should be noted that DOE has issued interim guidance regarding its use of ALARA entitled *DOE Guidance on the Procedures in Applying ALARA Process for Compliance with DOE 5400.5* (March 1991). A copy of this guidance may be found in Section 4 of this Reference Book.

Dose—as used in this part, is the quantity of radiation absorbed, per unit of mass, by the body or by any portion of the body. When the regulations in this part specify a dose during a period of time, the dose means the total quantity of radiation absorbed, per unit of mass, by the body or any portion of the body during such period of time.

rad—as used in this part, is a measure of the dose of any ionizing radiation to body tissues in terms of the energy absorbed per unit mass of the tissue. One rad is the dose corresponding to the absorption of 100 ergs per gram of tissue.

rem—as used in this part, is a measure of the dose of any ionizing radiation to body tissues in terms of its estimated biological effect relative to a dose of one roentgen (r) of X-rays.

curie—3.7×10^{10} disintegrations per second.

10 *CFR* 21 REPORTING OF DEFECTS AND NONCOMPLIANCE

10 *CFR* 30 RULES OF GENERAL APPLICABILITY TO DOMESTIC LICENSING OF BYPRODUCT MATERIAL

- General Provisions
- Exemptions
- Licenses
- Records, Inspections, Tests, and Reports
- Enforcement
- Schedules

*10 *CFR* 39 **LICENSES AND RADIATION SAFETY REQUIREMENTS FOR WELL LOGGING**

- General Provisions
- Specific Licensing Requirements
- Equipment
- Radiation Safety Requirements
- Security, Records, Notifications
- Exemptions
- Enforcement

Well logging uses instruments lowered into a drilled hole to obtain information on underground rock formations (e.g., type of rock, porosity, density, and hydro-carbon content) to locate oil, gas, coal, and other mineral deposits. These regulations specify radiation safety and license requirements for the use of licensed radioactive materials in well logging. The regulations consolidate radiation safety requirements for well logging into one part, establishes clearly-stated and specific radiation safety requirements, and promotes the adoption of uniform radiation safety requirements among the NRC and Agreement States.

10 *CFR* 40 **DOMESTIC LICENSING OF SOURCE MATERIAL**

- General Provisions
- Exemptions
- License Applications
- Licenses
- Transfer of Source Material
- Records, Reports, and Inspections
- Enforcement

These regulations involve the operation of commercial uranium mills and disposition of their wastes. Appendix A of 10 *CFR* 40 contains siting criteria. An EPA regulation (40 *CFR* 192, Standards for Remedial Actions at Inactive Uranium Processing Sites) has specific applicability to DOE remedial actions under the Uranium Mill Tailings Radiation Control Act of 1978 and is included in this Reference Book.

10 *CFR* 50 DOMESTIC LICENSING OF PRODUCTION AND UTILIZATION FACILITIES

- General Provisions
- Requirement of License, Exceptions
- Classification and Description of Licenses
- Applications for Licenses, Form, Contents, Ineligibility of Certain Applicants
- Standards for Licenses and Construction Permits
- Issuance, Limitations, and Conditions of Licenses and Construction Permits
- Inspections, Records, Reports, Notification
- US/IAEA Safeguards Agreement
- Transfers of Licenses - Creditors Rights - Surrender of License
- Amendment of License or Construction Permit at Request of Holder
- Revocation, Suspension, Modification, Amendment of Licenses and Construction Permits, Emergency Operations by the Commission
- Backfitting
- Enforcement

These regulations contain NRC rules for licensing nuclear power plants. This part does not apply to DOE facilities because they are not licensed.

10 *CFR* 51 ENVIRONMENTAL PROTECTION REGULATIONS FOR DOMESTIC LICENSING AND RELATED REGULATORY FUNCTIONS

This part includes NRC National Environmental Policy Act (NEPA) regulations.

*10 *CFR* 53 CRITERIA AND PROCEDURES FOR DETERMINING ADEQUACY OF AVAILABLE SPENT NUCLEAR FUEL STORAGE CAPACITY

- General Provisions
- Request for a Commission Determination
- Issuance of a Commission Determination

These regulations establish procedures and criteria for determining whether a person owning or operating a civilian nuclear power reactor can reasonably provide adequate spent nuclear fuel storage capacity.

***10 *CFR* 60 DISPOSAL OF HIGH-LEVEL RADIOACTIVE WASTES IN GEOLOGIC REPOSITORIES**

- General Provisions
- Licenses
- Participation by State Governments and Affected Indian Tribes
- Records, Reports, Tests, and Inspection
- Technical Criteria
- Performance Confirmation Program
- Quality Assurance
- Training and Certification of Personnel
- Emergency Planning Criteria (Reserved)

These regulations are NRC rules governing the licensing of DOE to receive and possess source, special nuclear, and byproduct material at a geologic repository operations area.

***10 *CFR* 61 LICENSING REQUIREMENTS FOR LAND DISPOSAL OF RADIOACTIVE WASTE**

- General Provisions
- Licenses
- Performance Objectives
- Technical Requirements for Land Disposal Facilities
- Financial Assurances
- Participation by State Governments and Indian Tribes
- Records, Reports, Tests, and Inspections

These regulations contain NRC rules for licensing the shallow land burial of radioactive waste by persons who are not licensees. Licensees dispose of their waste pursuant to 10 *CFR* 20. While NRC may not regulate DOE under this Part, 10 *CFR* 61 has applicability to DOE if DOE takes title to land used as a shallow

land burial site. Such a circumstance may arise under Title I, Subtitle D of the Nuclear Waste Policy Act.

***10 *CFR* 71 PACKAGING AND TRANSPORTATION OF RADIOACTIVE MATERIAL**

- General Provisions
- Exemptions
- General Licenses
- Application for Package Approval
- Package Approval Standards
- Package and Special Form Tests
- Operating Controls and Procedures
- Quality Assurance
- Appendix A - Determination of A_1 and A_2

This part establishes requirements for packaging, preparation for shipment, and transportation of licensed material. It also sets procedures and standards for NRC approval of packaging and shipping procedures for fissile material and for a quantity of other licensed material in excess of a quantity determined by a method described in Appendix A of this part.

10 *CFR* 72 LICENSING REQUIREMENTS FOR THE STORAGE OF SPENT FUEL IN AN INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI)

- General Provisions
- License Application, Form, and Contents
- Issuance and Conditions of Licenses
- Records, Reports, Inspection, and Enforcement
- Siting Evaluation Factors
- General Design Criteria
- Quality Assurance
- Physical Protection
- Training and Certification of ISFSI Personnel

These regulations license independent spent fuel storage installations at a commercial reactor site. Facilities on DOE property are not intended to be licensed under this section.

*10 *CFR* 100 REACTOR SITE CRITERIA

- Site Evaluation Criteria
- Appendix A - Seismic and Geologic Siting Criteria for Nuclear Power Plants

The purpose of this part is to describe criteria which guide the NRC in its evaluation of the suitability of proposed sites for stationary power and testing reactors subject to 10 *CFR* 50. These regulations are not applicable to the non-licensed DOE facilities. The regulations are included in this Reference Book for informational purposes.

10 *CFR* 150 EXEMPTIONS AND CONTINUED REGULATORY AUTHORITY IN AGREEMENT STATES AND IN OFF-SHORE WATERS UNDER SECTION 274

- General Provisions
- Continued Commission Regulatory Authority in Offshore Waters
- Exemptions in Agreement States
- Continued Commission Regulatory Authorization in Agreement States
- Reciprocity
- Enforcement

*10 *CFR* 762 URANIUM ENRICHMENT SERVICES CRITERIA

This part sets forth the terms and conditions under which DOE will provide uranium enrichment services to civilian customers. In particular, the revised criteria establish DOE's approach concerning prices and cost recovery.

*10 *CFR* 960 GENERAL GUIDELINES FOR THE RECOMMENDATION OF SITES FOR NUCLEAR WASTE REPOSITORIES

- General Provisions
- Implementation Guidelines
- Postclosure Guidelines
- Preclosure Guidelines
- NRC and EPA Requirements for Postclosure Repository Performance

- NRC and EPA Requirements for Preclosure Repository Performance
- Application of the System and Technical Guidelines During the Siting Process
- Types of Information for the Nomination of Sites as Suitable for Characterization

These guidelines were developed for use by the Secretary of Energy in evaluating the suitability of sites for the development of repositories.

***10 *CFR* 961 STANDARD CONTRACT FOR DISPOSAL OF SPENT NUCLEAR FUEL AND/OR HIGH-LEVEL RADIOACTIVE WASTE**

This part establishes the contractual terms and conditions under which DOE will make available nuclear waste disposal services to the owners and generators of spent nuclear fuel and high-level radioactive waste.

***10 *CFR* 962 BYPRODUCT MATERIAL**

The purpose of this part is to clarify the meaning of the term "byproduct material" for use only in determining DOE's obligations under the Resource Conservation and Recovery Act (RCRA) with regard to radioactive waste substances owned or produced by DOE pursuant to the exercise of its responsibilities under the AEA.

EPA REGULATIONS

***40 *CFR* 61, SUBPART H NATIONAL EMISSION STANDARD FOR EMISSIONS OF RADIONUCLIDE OTHER THAN RADON FROM DEPARTMENT OF ENERGY (DOE) FACILITIES**

The provisions of this subpart apply to all facilities that are owned or operated by DOE, except those regulated under 40 *CFR* Parts 190, 191, or 192.

*40 *CFR* 190 ENVIRONMENTAL RADIATION PROTECTION STANDARDS FOR NUCLEAR POWER OPERATIONS

- General Provisions
- Environmental Standards for the Uranium Fuel Cycle

These regulations set standards for the annual dose equivalent to members of the public at the boundaries of nuclear facilities. The rules also establish a limit on the total quantity of radioactive materials entering the general environment from the nuclear fuel cycle.

*40 *CFR* 191 ENVIRONMENTAL RADIATION PROTECTION STANDARDS FOR MANAGEMENT AND DISPOSAL OF SPENT NUCLEAR FUEL, HIGH-LEVEL AND TRANSURANIC RADIOACTIVE WASTES

- Environmental Standards for Management and Storage
- Environmental Standards for Disposal

This part establishes environmental standards for the management and disposal of spent nuclear fuel and high-level and transuranic radioactive wastes. The standards apply to management and disposal of such materials generated by activities regulated by the NRC and to disposal of similar materials generated by atomic energy defense activities under the jurisdiction of DOE.

*40 *CFR* 192 HEALTH AND ENVIRONMENTAL PROTECTION STANDARDS FOR URANIUM AND THORIUM MILL TAILINGS

This part is divided into five subparts. Subparts A, B, and C apply to regulations established under the Uranium Mill Tailings Radiation Control Act of 1978. Subpart A involves control of residual radioactive material at designated processing or depository sites, Subpart B applies to land and buildings that are part of any processing site designated by the Secretary of Energy, and Subpart C provides guidance for implementation and criteria for applying supplemental standards. Subparts D and E set standards for management of uranium and thorium byproduct materials pursuant to Section 84 of the Atomic Energy Act of 1954, as amended.

RECENT FINAL RULES

Rules of Practice for the Licensing of High-Level Radioactive Waste at a Geologic Repository

The NRC issued a final rule on February 26, 1991 [56 *FR* 7787, Notice of Proposed Rulemaking (NPRM): September 26, 1989] amending its regulations at 10 *CFR* 2 concerning the Rules of Practice for licensing a geologic repository for the disposal of high-level radioactive waste. The rule modified Subpart J which establishes basic procedures for the HLW licensing process including the use of the Licensing Support System (LSS) in the proceeding. The modifications streamline the licensing process in order to enhance the Commission's ability to comply with the NWPA. Section 114(d) of the NWPA requires a decision by NRC on the issuance of the construction authorization for the repository within three years after submission of DOE's license application. Nevertheless, NRC makes it clear that such a deadline will not lessen its commitment to conduct a thorough technical and safety review of DOE's application.

The rule made several important revisions to procedures for the HLW licensing. First, the rule amended the standards for submitting initial contentions to require the petitioner to supply information showing the existence of a genuine dispute with the applicant on a material issue of law or fact. Second, the rule clarified that both the periodic evaluations of, and the written report on, DOE's compliance with the LSS requirements will be circulated to the potential parties (i.e., those with access to the LSS) for comment. Third, the rule established a model hearing schedule which would be mandatory but has some flexibility for the Presiding Officer to handle special circumstances.

In addition to the revisions to the HLW proceedings, NRC also discussed proposed issues related to the management of the hearing that will be established in the Notice of Hearing for the HLW proceeding. This rule became effective on March 28, 1991.

Standards for Protection Against Radiation

Under the Atomic Energy Act, the NRC issued a final rule on May 21, 1991 (56 *FR* 23360, NPRM: January 9, 1986), to revise its standards in 10 *CFR* part 20 for protection against ionizing radiation for activities licensed by the NRC. The Commission amended the regulations to reflect updated scientific knowledge on radiation and changes in radiation protection philosophy. In issuing the rule the NRC added new terms and revised several definitions to reduce the potential for confusion in applying the regulation. In addition, the NRC will retain the "special" units (i.e., the curie, rad, and rem) for measuring radiation dose because licensees are familiar with them. While the NRC is not requiring the use of the International System of Units or SI units (i.e., becquerels, grays, and sieverts), it does not rule out the possibility of eventually requiring the use of such units only.

The final rule requires NRC licensees to establish a radiation protection program with measures to keep radiation doses and intakes ALARA. While use of the ALARA concept is not new, the rule now makes it a requirement for NRC licensees. Compliance with ALARA will be judged by determining whether the licensee actually tracks and, if needed, reduces exposures. NRC emphasized that the scope of a radiation protection program should be equal in extent to the size of a facility and its potential hazards.

To further enhance workers' protection from radiation, the NRC has lowered the occupational dose limit to 5 rems per year. Radiation doses to workers in excess of the annual limit may be authorized under planned special exposures if specific conditions are met. Radiation exposures to individual members of the public from NRC-licensed activities are to be kept at a dose limit of 0.1 rem per year. However, under certain conditions and with the NRC's approval, an existing facility may temporarily operate at the former 0.5 rem per year dose limit for exposures to the general public.

The Commission also has revised requirements in part 20 for surveys and monitoring, posting and labeling, reporting and recordkeeping, and waste disposal.

In addition to revising part 20, the final rule amends several other parts of the NRC's Chapter I regulations to update citations to part 20. A new requirement is included in part 19 to inform all workers at least annually of their radiation dose whether or not the data are requested. The rule became effective on June 20, 1991, although licensees have until January 1, 1994 to implement it. Until then, applicants seeking new licenses and those with existing licenses may comply with either the new provisions of part 20 in sections 20.1001-20.2401 or with the earlier provisions of part 20 in sections 20.1-20.601. On January 9, 1992 (57 *FR* 937), the NRC issued a draft regulatory guide entitled "Guidance on Complying with New Part 20 Requirements" to assist in implementing the revised part 20 regulations.

FINAL NRC REGULATORY CHANGES

Table 3-2 summarizes final changes to the NRC's regulatory program that became effective between December 1, 1990 and September 1, 1992. *Federal Register* citations are provided in the table for more detailed information.

TABLE 3-1. NUCLEAR ENERGY RELATED STATUTES AND THEIR IMPLEMENTING REGULATIONS INCLUDED IN THIS REFERENCE BOOK

STATUTE	PART OF CFR	TITLE
Atomic Energy Act	10 CFR 20	Standards for Protection against Radiation
	10 CFR 39	Licenses and Radiation Safety Requirements for Well Logging
	10 CFR 60	Disposal of High-Level Radioactive Wastes in Geologic Repositories
	10 CFR 61	Licensing Requirements for Land Disposal of Radioactive Waste
	10 CFR 71	Packaging and Transportation of Radioactive Material
	10 CFR 100	Reactor Site Criteria
	10 CFR 762	Uranium Enrichment Services Criteria
	10 CFR 960	General Guidelines for the Recommendation of Sites for Nuclear Waste Repositories
	10 CFR 962	Byproduct Material
	40 CFR 61 (Subpart H)	National Emission Standard for Radionuclide Emissions from Department of Energy (DOE) Facilities
	40 CFR 190	Environmental Radiation Protection Standards for Nuclear Power Operations
	40 CFR 191	Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes
	40 CFR 192	Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings
Energy Reorganization Act	10 CFR 20	Standards for Protection against Radiation
	10 CFR 960	General Guidelines for the Recommendation of Sites for Nuclear Waste Repositories
	10 CFR 962	Byproduct Material
Department of Energy Reorganization Act	10 CFR 960	General Guidelines for the Recommendation of Sites for Nuclear Waste Repositories
	10 CFR 962	Byproduct Material

TABLE 3-1. NUCLEAR ENERGY RELATED STATUTES AND THEIR IMPLEMENTING REGULATIONS INCLUDED IN THIS REFERENCE BOOK (Continued)

STATUTE	PART OF CFR	TITLE
Uranium Mill Tailings Radiation Control Act	40 CFR 192	Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings
Nuclear Waste Policy Act	10 CFR 53	Criteria and Procedures for Determining Adequacy of Available Spent Nuclear Fuel Storage Capacity
	10 CFR 60	Disposal of High-Level Radioactive Wastes in Geologic Repositories
	10 CFR 960	General Guidelines for the Recommendation of Sites for Nuclear Waste Repositories
	10 CFR 961	Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Wastes
	10 CFR 962	Byproduct Material
	40 CFR 191	Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Waste

TABLE 3-2. SUMMARY OF RECENT FINAL CHANGES TO AEA REGULATORY PROGRAM

SUBJECT Affected CFR Citations(s)	STATUS[a] DATE (FR citation)	DESCRIPTIVE SUMMARY	EFFECTIVE DATE
Nuclear Plant License Renewal 10 CFR 2	ANPRM 53 FR 32919 8/29/88 NPRM 55 FR 29043 7/17/90 NOA 56 FR 64817 12/12/91 Final rule 56 FR 64943 12/13/91	NRC established the requirements that an applicant for renewal of a nuclear power plant operating license must meet and the information that must be submitted for the NRC License Renewal.	1/13/92
Notification of Incidents 10 CFR 20 10 CFR 30 10 CFR 40 10 CFR 70	NPRM 55 FR 19890 5/14/90 Final Rule 56 FR 40757 8/16/91 Correction 56 FR 64980 12/13/91	NRC revised licensee reporting requirements for notifications of incidents related to radiation safety to ensure that significant occurrences at material licensee facilities are promptly reported to NRC.	10/15/91
Criteria and Procedures for Reporting of Defects 10 CFR 21 10 CFR 50	NPRM 53 FR 44594 11/4/88 Notice 56 FR 27546 6/14/91 Final rule 56 FR 36081 7/31/91	NRC amended its regulations on the reporting of safety defects applicable to NRC licensees and non-licensees who construct facilities for or supply components to NRC-licensed facilities or activities. The amendments eliminate duplicative reporting of defects, clarify the criteria for reporting defects, and establish uniform time periods for reporting and uniform requirements for the content of the reports.	10/29/91

[a] ANPRM = Advanced Notice of Proposed Rulemaking, NPRM = Notice of Proposed Rulemaking, NOA = Notice of Availability

TABLE 3-2. SUMMARY OF RECENT FINAL CHANGES TO AEA REGULATORY PROGRAM (Continued)

SUBJECT Affected CFR Citations(s)	STATUS[a] DATE (FR citation)	DESCRIPTIVE SUMMARY	EFFECTIVE DATE
Criteria and Procedures for Determining Eligibility for Access to Classified Matter or Significant Quantities of Special Nuclear Material 10 CFR 710	NPRM 54 FR 5376 2/2/89 Final rule 56 FR 10068 3/8/91	DOE issued a rule dealing with criteria and procedures determining eligibility for access to classified matter or significant quantities of special nuclear material. This action establishes a Q(R) access authorization for individuals applying for or currently holding a position identified as a Personnel Security Assurance Program (PSAP) position.	4/8/91
Maintenance Programs for Nuclear Power Plants 10 CFR 2 10 CFR 50	NPRM 53 FR 47822 11/28/88 NOA 54 FR 33988 8/17/89 Policy statement: modification 54 FR 50610 12/8/89 Revised policy statement 54 FR 50611 12/8/89 Final rule 56 FR 31306 7/10/91	NRC amended its regulations to require commercial nuclear power plant licensees to monitor the effectiveness of maintenance activities for safety significant plant equipment in order to minimize the likelihood of failures and events caused by the lack of effective maintenance.	7/10/91
Pressurized Thermal Shock Rule 10 CFR 50	NPRM 54 FR 52946 12/26/89 Notice 55 FR 71 1/2/90 Final rule 56 FR 22300 5/15/91	NRC revised the pressurized thermal shock (PTS) rule of 1985 to make the procedure used to calculate the amount of radiation embrittlement that a reactor vessel receives consistent with that given in Revision 2 of Regulatory Guide 1.99. The PTS rule establishes a screening criterion to limit the amount of embrittlement.	6/14/91

[a] ANPRM = Advanced Notice of Proposed Rulemaking, NPRM = Notice of Proposed Rulemaking, NOA = Notice of Availability

TABLE 3-2. SUMMARY OF RECENT FINAL CHANGES TO AEA REGULATORY PROGRAM (Continued)

SUBJECT Affected CFR Citations(s)	STATUS[a] DATE (FR citation)	DESCRIPTIVE SUMMARY	EFFECTIVE DATE
Emergency Response Data System 10 CFR 50	NPRM 55 FR 41095 10/9/90 Final rule 56 FR 40178 8/13/91	NRC issued a final rule requiring licensees to participate in the Emergency Response Data System (ERDS) program and to set a definite schedule for its implementation. The ERDS is a direct electronic data link between computer data systems used by licensees and the NRC Operations Center.	9/12/91
Zero-Release Low-Level Radioactive Waste Disposal Facility - Sierra Club Petition 10 CFR 61	Petition for rulemaking 55 FR 13797 4/12/90 Receipt of amendment 55 FR 23206 6/7/90 Denial of petition 56 FR 34035 7/25/91	NRC denied a petition for rulemaking submitted by the Sierra Club of North Carolina. The petition requested that NRC amend its regulations to permit the licensing of a zero-release low-level radioactive waste disposal facility within the saturated zone. The petition is denied for the following reasons: (1) the design of a zero-release engineered facility for extremely long time periods is beyond the current level of demonstrated technology known to the NRC staff and (2) the existing rule allows for saturated zone disposal under a specific hydrologic condition. However, the effort to develop regulations for enhanced engineered saturated zone disposal, under a broad range of hydrologic conditions, would be significant and the NRC is not aware of interest in this type of disposal by state authorities.	
Material Control and Accounting Requirements for Uranium Enrichment Plants 10 CFR 2 10 CFR 40 10 CFR 70 10 CFR 74	NPRM 55 FR 51726 12/17/90 NOA 56 FR 7884 2/26/91 Final Rule 56 FR 55991 10/31/91	NRC established performance-based material control and accounting requirements for special nuclear material of low strategic significance at uranium enrichment plants, including requirements to detect and prevent enrichment above a specified maximum.	12/2/91

[a] ANPRM = Advanced Notice of Proposed Rulemaking, NPRM = Notice of Proposed Rulemaking, NOA = Notice of Availability

TABLE 3-2. SUMMARY OF RECENT FINAL CHANGES TO AEA REGULATORY PROGRAM (Continued)

SUBJECT Affected CFR Citations(s)	STATUS[a] DATE (FR citation)	DESCRIPTIVE SUMMARY	EFFECTIVE DATE
Uranium Enrichment Regulations 10 CFR 2 10 CFR 40 10 CFR 50-51 10 CFR 70 10 CFR 75 10 CFR 110 10 CFR 140 10 CFR 150 10 CFR 170	NPRM 56 FR 46739 9/16/91 Final rule 57 FR 18388 4/30/92	NRC amended its regulations concerning the licensing of uranium enrichment facilities to reflect amendments to the Atomic Energy Act. Uranium enrichment facilities will be licensed subject to provisions of the Act pertaining to source material and special nuclear materials rather than under provisions pertaining to a production facility.	6/1/92
Agreement State Radiation Control Programs	Policy statement 52 FR 21132 6/4/87 Proposed policy revision 55 FR 10851 3/32/90 Final policy statement 57 FR 22495 5/28/92	NRC revised its general statement of policy, "Guidelines for NRC Review of Agreement State Radiation Control Programs," to incorporate changes to the regulation of LLW disposal in permanent facilities.	5/28/92

10 CFR 20

PART 20—STANDARDS FOR PROTECTION AGAINST RADIATION

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20.2 Scope.
20.3 Definitions.
20.4 Units of radiation dose.
20.5 Units of radioactivity.
20.6 Interpretations.
20.7 Communications.
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Permissible Doses, Levels and Concentrations

20.101 Radiation dose standards for individuals in restricted areas.
20.102 Determination of prior dose.
20.103 Exposure of individuals to concentrations of radioactive materials in air in restricted areas.
20.104 Exposure of minors.
20.105 Permissible levels of radiation in unrestricted areas.
20.106 Radioactivity in effluents to unrestricted areas.
20.107 Medical diagnosis and therapy.
20.108 Orders requiring furnishing of bio-assay services.

Precautionary Procedures

20.201 Surveys.
20.202 Personnel monitoring.
20.203 Caution signs, labels, signals and controls.
20.204 Same: Exceptions.
20.205 Procedures for picking up, receiving, and opening packages.
20.206 Instruction of personnel.
20.207 Storage and control of licensed materials in unrestricted areas.

Waste Disposal

20.301 General requirement.
20.302 Method for obtaining approval of proposed disposal procedures.
20.303 Disposal by release into sanitary sewerage systems.
20.305 Treatment or disposal by incineration.
20.306 Disposal of specific wastes.
20.311 Transfer for disposal and manifests.

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20.401 Records of surveys, radiation monitoring, and disposal.
20.402 Reports of theft or loss of licensed material.
20.403 Notifications of incidents.
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20.501 Applications for exemptions.
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Appendix C to §§20.1-20.601—Quantities of Licensed Material Requiring Labeling
Appendix D to §§20.1-20.601—U. S. Nuclear Regulatory Commission Regional Offices

Regulations Mandatory as of January 1, 1993 With Earlier Compliance Encouraged

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20.1002 Scope.
20.1003 Definitions.
20.1004 Units of radiation dose.
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20.1006 Interpretations.
20.1007 Communications.
20.1008 Implementation.
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20.1201 Occupational dose limits for adults.
20.1202 Compliance with requirements for summation of external and internal doses.
20.1203 Determination of external dose from airborne radioactive material.
20.1204 Determination of internal exposure.
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20.1206 Planned special exposures.
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Subpart D—Radiation Dose Limits for Individual Members of the Public

20.1301 Dose limits for individual members of the public.
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Subpart F—Surveys and Monitoring

20.1501 General.
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20.1601 Control of access to high radiation areas.
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20.1701 Use of process or other engineering controls.
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20.1801 Security of stored material.
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20.1901 Caution signs.
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Subpart K—Waste Disposal

20.2001 General requirements.
20.2002 Method for obtaining approval of proposed disposal procedures.
20.2003 Disposal by release into sanitary sewerage.
20.2004 Treatment or disposal by incineration.
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Subpart L—Records

20.2101 General provisions.
20.2102 Records of radiation protection programs.
20.2103 Records of surveys.
20.2104 Determination of prior occupational dose.
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20.2202 Notification of incidents.
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20.2301 Applications for exemptions.
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Subpart O—Enforcement

20.2401 Violations.

Authority: §§ 53, 63, 65, 81, 103, 104, 161, 182, 186, 68 Stat. 930, 933, 935, 936, 937, 948, 953, 955, as amended (42 U.S.C. 2073, 2093, 2095, 2111, 2133, 2134, 2201, 2232, 2236), secs. 201, as amended, 202, 206, 88 Stat. 1242, as amended, 1244, 1246 (U.S.C. 5841, 5842, 5846).

Section 20.408 also issued under secs. 135, 141, Pub. L. 97-425, 96 Stat. 2232, 2241 (42 U.S.C. 10155, 10161).

For the purposes of sec. 233, 68 Stat. 958, as amended (42 U.S.C. 2273); §§ 20.101, 20.102, 20.103 (a), (b), and (f), 20.104 (a) and (b), 20.105(b), 20.106(a), 20.201, 20.202(a), 20.205, 20.207, 20.301, 20.303, 20.304, 20.305, 20.1102, 20.1201-20.1204, 20.1206, 20.1207, 20.1208, 20.1301, 20.1302, 20.1501, 20.1502, 20.1601 (a) and (d), 20.1602, 20.1603, 20.1701, 20.1704, 20.1801, 20.1802, 20.1901(a), 20.1902, 20.1904, 20.1906, 20.2001, 20.2002, 20.2003, 20.2004, 20.2005 (b) and (c), 20.2006, 20.2101-20.2110, 20.2201- 20.2206, and 20.2301 are issued under sec. 161b, 68 Stat. 948, as amended (42 U.S.C. 2201(b)); § 20.2106(d) is issued under the Privacy Act of 1974, Pub. L. 93-579, 5 U.S.C. 552a; and §§ 20.102, 20.103(e), 20.401- 20.407, 20.408(b), 20.409, 20.1102(a) (2) and (4), 20.1204(c), 20.1206 (g) and (h), 20.1904(c)(4), 20.1905 (c) and (d), 20.2005(c), 20.2006(b)-(d), 20.2101-20.2103, 20.2104(b)-(d), 20.2105-20.2108, and 20.2201-20.2207 are issued under sec. 161(o), 68 Stat. 950, as amended (42 U.S.C. 2201(o)).

Source: 25 FR 10914, Nov. 17, 1960, unless otherwise noted.

Editorial Note: For nomenclature changes to this part, see 40 FR 8783, Mar. 3, 1975; 45 FR 14200, Mar. 5, 1980.

General Provisions

§20.1 Purpose.

(a) The regulations in this part establish standards for protection against radiation hazards arising out of activities under licenses issued by the Nuclear Regulatory Commission and are issued pursuant to the Atomic Energy Act of 1954, as amended, and the Energy Reorganization Act of 1974.

(b) The use of radioactive material or other sources of radiation not licensed by the Commission is not subject to the regulations in this part. However, it is the purpose of the regulations in this part to control the possession, use, and transfer of licensed material by any licensee in such a manner that the total dose to an individual (including exposures to licensed and unlicensed radioactive material and to other unlicensed sources of radiation, whether in the possession of the licensee or any other person, but not including exposures to radiation from natural background sources or medical diagnosis and therapy) does not exceed the standards of radiation protection prescribed in the regulations in this part.

(c) In accordance with recommendations of the Federal Radiation Council, approved by the President, persons engaged in activities under licenses issued by the Nuclear Regulatory Commission pursuant to the Atomic Energy Act of 1954, as amended, and the Energy Reorganization Act of 1974 should, in addition to complying with the requirements set forth in this part, make every reasonable effort to maintain radiation exposures, and releases of radioactive materials in effluents to unrestricted areas, as low as is reasonably achievable. The term "as low as is reasonably achievable" means as low as is reasonably achievable taking into account the state of technology, and the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to the utilization of atomic energy in the public interest.

[25 FR 10914, Nov. 17, 1960, as amended at 40 FR 8783, Mar. 3, 1975; 40 FR 58847, Dec. 19, 1975; 44 FR 32352, June 6, 1979]

§20.2 Scope.

The regulations in this part apply to all persons who receive, possess, use, or transfer material licensed pursuant to the regulations in Parts 30 through 35, 39, 40, 60, 61, 70, or 72 of this chapter, including persons licensed to operate a production or utilization facility pursuant to Part 50 of this chapter.

[46 FR 58282, Dec. 1, 1981, as amended at 47 FR 57479, Dec. 27, 1982; 52 FR 8240, Mar. 17, 1987]

§20.3 Definitions.

(a) As used in this part:

(1) "Act" means the Atomic Energy Act of 1954 (68 Stat. 919) including any amendments thereto;

(2) "Airborne radioactive material" means any radioactive material dispersed in the air in the form of dusts, fumes, mists, vapors, or gases;

(3) "Byproduct material" means any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material;

(4) "Calendar quarter" means not less than 12 consecutive weeks nor more than 14 consecutive weeks. The first calendar quarter of each year shall begin in January and subsequent calendar quarters shall be such that no day is included in more than one calendar quarter or omitted from inclusion within a calendar quarter. No licensee shall change the method observed by him of determining calendar quarters except at the beginning of a calendar year.

(5) "Commission" means the Nuclear Regulatory Commission or its duly authorized representatives;

(6) "Government agency" means any executive department, commission, independent establishment, corporation, wholly or partly owned by the United States of America which is an instrumentality of the United States, or any board, bureau, division, service, office, officer, authority, administration, or other establishment in the executive branch of the Government;

(7) "Individual" means any human being;

(8) "Licensed material" means source material, special nuclear material, or by-product material received, possessed, used, or transferred under a general or specific license issued by the Commission pursuant to the regulations in this chapter;

(9) "License" means a license issued under the regulations in Parts 30 through 35, 39, 40, 60, 61, 70, or Part 72 of this chapter. "Licensee" means the holder of such license;

(10) "Occupational dose" includes exposure of an individual to radiation (i) in a restricted area; or (ii) in the course of employment in which the individual's duties involve exposure to radiation, provided, that "occupational dose" shall not be deemed to include any exposure of an individual

to radiation for the purpose of medical diagnosis or medical therapy of such individual.

(11) "Person" means:

(i) Any individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, Government agency other than the Commission or the Department (except that the Department shall be considered a person within the meaning of the regulations in this part to the extent that its facilities and activities are subject to the licensing and related regulatory authority of the Commission pursuant to section 202 of the Energy Reorganization Act of 1974 (88 Stat. 1244)), any State, any foreign government or nation or any political subdivision of any such government or nation, or other entity; and (ii) any legal successor, representative, agent, or agency of the foregoing.

(12) "Radiation" means any or all of the following: alpha rays, beta rays, gamma rays, X-rays, neutrons, high-speed electrons, high-speed protons, and other atomic particles; but not sound or radio waves, or visible, infrared, or ultraviolet light;

(13) "Radioactive material" includes any such material whether or not subject to licensing control by the Commission;

(14) "Restricted area" means any area access to which is controlled by the licensee for purposes of protection of individuals from exposure to radiation and radioactive materials. "Restricted area" shall not include any areas used as residential quarters, although a separate room or rooms in a residential building may be set apart as a restricted area;

(15) "Source material" means:

(i) Uranium or thorium, or any combination thereof, in any physical or chemical form; or

(ii) ores which contain by weight one-twentieth of one percent (0.05%) or more of (a) uranium, (b) thorium or (c) any combination thereof. Source material does not include special nuclear material.

(16) "Special nuclear material" means:

(i) Plutonium, uranium 233, uranium enriched in the isotope 233 or in the isotope 235, and any other material which the Commission, pursuant to the provisions of section 51 of the act, determines to be special nuclear material, but does not include source material; or (ii) any material artificially enriched by any of the foregoing but does not include source material;

(17) "Unrestricted area" means any area access to which is not controlled by the licensee for purposes of protection of individuals from exposure to radiation and radioactive materials, and any area used for residential quarters.

(18) "Department" means the Department of Energy established by the Department of Energy Organization Act (Pub. L. 95-91, 91 Stat. 565, 42 U.S.C. 7101 et seq.) to the extent that the Department, or its duly authorized representatives, exercises functions formerly vested in the U.S. Atomic Energy Commission, its Chairman, members, officers and components and transferred to the U.S. Energy Research and Development Administration and to the Administrator thereof pursuant to sections 104 (b), (c) and (d) of the Energy Reorganization Act of 1974 (Pub. L. 93-438, 88 Stat. 1233 at 1237, 42 U.S.C. 5814) and retransferred to the Secretary of Energy pursuant to section 301(a) of the Department of Energy Organization Act (Pub. L. 95-91, 91 Stat. 565 at 577-578, 42 U.S.C. 7151).

(19) "Termination" means the end of employment with the licensee or, in the case of individuals not employed by the licensee, the end of a work assignment in the licensee's restricted areas in a given calendar quarter, without expectation or specific scheduling of reentry into the licensee's restricted areas during the remainder of that calendar quarter.

(20) "Dosimetry processor" means an individual or an organization that processes and evaluates personnel monitoring equipment in order to determine the radiation dose delivered to the equipment.

(b) Definitions of certain other words and phrases as used in this part are set forth in other sections, including:

(1) "Airborne radioactivity area" defined in §20.203;

(2) "Radiation area" and "high radiation area" defined in §20.202;

(3) "Personnel monitoring equipment" defined in §20.202;

(4) "Survey" defined in §20.201;

(5) Units of measurement of dose (rad. rem) defined in §20.4;

(6) Units of measurement of radioactivity defined in §20.5.

[25 FR 10914, Nov. 17, 1960, as amended at 25 FR 13953, Dec. 30, 1960; 27 FR 5905, June 22, 1962; 38 FR 22467, Aug. 21, 1973; 40 FR 8783, Mar. 3, 1975; 40 FR 42558, Sept. 15, 1975; 44 FR 32352, June 6, 1979; 45 FR 14200, Mar. 5, 1980; 46 FR 58282, Dec. 1, 1981; 47 FR 57479, Dec. 27, 1982; 52 FR 4604, Feb. 13, 1987; 52 FR 8240, Mar. 17, 1987]

§20.4 Units of radiation dose.

(a) "Dose," as used in this part, is the quantity of radiation absorbed, per unit of mass, by the body or by any portion of the body. When the regulations in this part specify a dose during a period of time, the dose means the total quantity of radiation absorbed, per unit of mass, by the body or by any portion of the body during such period of time. Several different units of dose are in current use. Definitions of units as used in this part are set forth in paragraphs (b) and (c) of this section.

(b) The rad, as used in this part, is a measure of the dose of any ionizing radiation to body tissues in terms of the energy absorbed per unit mass of the tissue. One rad is the dose corresponding to the absorption of 100 ergs per gram of tissue. (One millirad (mrad)=0.001 rad.)

(c) The rem, as used in this part, is a measure of the dose of any ionizing radiation to body tissues in terms of its estimated biological effect relative to a dose of one roentgen (r) of X-rays. (One millirem (mrem)=0.001 rem.) The relation of the rem to other dose units depends upon the biological effect under consideration and upon the conditions of irradiation. For the purpose of the regulations in this part, any of the following is considered to be equivalent to a dose of one rem:

(1) A dose of 1 r due to X— or gamma radiation;

(2) A dose of 1 rad due to X—, gamma, or beta radiation;

(3) A dose of 0.1 rad due to neutrons or high energy protons;

(4) A dose of 0.05 rad due to particles heavier than protons and with sufficient energy to reach the lens of the eye; If it is more convenient to measure the neutron flux, or equivalent, than to determine the neutron dose in rads, as provided in paragraph (c)(3) of this section, one rem of neutron radiation may, for purposes of the regulations in this part, be assumed to be equivalent to 14 million neutrons per square centimeter incident upon the body; or, if there exists sufficient information to estimate with reasonable accuracy the approximate distribution in energy of the neutrons, the incident number of neutrons per square centimeter equivalent to one rem may be estimated from the following table:

NEUTRON FLUX DOSE EQUIVALENTS

Neutron energy (Mev)	Number of neutrons per square centimeter equivalent to a dose of 1 rem (neutrons/cm^2)	Average flux to deliver 100 millirem in 40 hours (neutrons/cm^2 sec.)
Thermal	970×10^6	670
0.0001	720×10^6	500
0.005	820×10^6	570
0.02	400×10^6	280
0.1	120×10^6	80
0.5	43×10^6	30
1.0	26×10^6	18
2.5	29×10^6	20
5.0	26×10^6	16
7.5	24×10^6	17
10	24×10^6	17
10 to 30	14×10^6	10

(d) For determining exposures to X or gamma rays up to 3 Mev, the dose limits specified in §§20.101 to 20.104, inclusive, may be assumed to be equivalent to the "air dose". For the purpose of this part "air dose" means that the dose is measured by a properly calibrated appropriate instrument in air at or near the body surface in the region of highest dosage rate.

§20.5 Units of radioactivity.

(a) Radioactivity is commonly, and for purposes of the regulations in this part shall be, measured in terms of disintegrations per unit time or in curies. One curie=3.7×10^{10} disintegrations per second (dps)=2.2×10^{12} disintegrations per

minute (dpm). Commonly used submultiples of the curie are the millicurie and the microcurie:

(1) One millicurie (mCi) 1=0.001 curie (Ci) 1=3.7 × 10^7 dps.

(2) One microcurie (μCi) 1=0.000001 curie=3.7× 10^4 dps.

[25 FR 10914, Nov. 17, 1960, as amended at 38 FR 29314, Oct. 24, 1973; 39 FR 23990, June 28, 1974; 40 FR 50705, Oct. 31, 1975]

§20.6 Interpretations.

Except as specifically authorized by the Commission in writing, no interpretation of the meaning of the regulations in this part by any officer or employee of the Commission other than a written interpretation by the General Counsel will be recognized to be binding upon the Commission.

§20.7 Communications.

Except where otherwise specified in this part, all communications and reports concerning the regulations in this part should be addressed to the Executive Director for Operations, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555. Communications, reports, and applications may be delivered in person at the Commission's offices at 2120 L Street NW., Washington, D.C. or at 11555 Rockville Pike, Rockville, Maryland.

[40 FR 8783, Mar. 3, 1975]

§20.8 Information collection requirements: OMB approval.

(a) The Nuclear Regulatory Commission has submitted the information collection requirements contained in this part to the Office of Management and Budget (OMB) for approval as required by the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et seq.). OMB has approved the information collection requirements contained in this part under control number 3150-0014.

(b) The approved information collection requirements contained in this part appear in §§20.102, 20.103, 20.105, 20.106, 20.203, 20.205, 20.302, 20.311, 20.401, 20.402, 20.403, 20.405, 20.407, 20.408, and 20.409.

(c) This part contains information collection requirements in addition to those approved under the control number specified in paragraph (a) of this section. These information collection requirements and the control numbers under which they are approved are as follows:

(1) In §§20.101 and 20.102, Form NRC-4 is approved under control number 3150-0005.

(2) In §20.401, Form NRC-5 is approved under control number 3150-0006.

[49 FR 19624, May 9, 1984]

Permissible Doses, Levels, and Concentrations

§20.101 Radiation dose standards for individuals in restricted areas.

(a) In accordance with the provisions of §20.102(a), and except as provided in paragraph (b) of this section, no licensee shall possess, use, or transfer licensed material in such a manner as to cause any individual in a restricted area to receive in any period of one calendar quarter from radioactive material and other sources of radiation a total occupational dose in excess of the standards specified in the following table:

Rems per Calendar Quarter

1. Whole body; head and trunk; active blood-forming organs; lens of eyes; or gonads..... 1 1/4
2. Hands and forearms; feet and ankles..... 18 3/4
3. Skin of whole body 7 1/2

(b) A licensee may permit an individual in a restricted area to receive a total occupational dose to the whole body greater than that permitted under paragraph (a) of this section, provided:

(1) During any calendar quarter the total occupational dose to the whole body shall not exceed 3 rems; and

(2) The dose to the whole body, when added to the accumulated occupational dose to the whole body, shall not exceed 5 (N-18) rems where "N" equals the individual's age in years at his last birthday; and

(3) The licensee has determined the individual's accumulated occupational dose to the whole body on Form NRC-4, or on a clear and legible record containing all the information required in that form; and has otherwise complied with the requirements of §20.102. As used in paragraph (b), "Dose to the whole body" shall be deemed to include any dose to the whole body, gonads, active blood-forming organs, head and trunk, or lens of eye.

[25 FR 10914, Nov. 17, 1960, as amended at 44 FR 32352, June 6, 1979]

§20.102 Determination of prior dose.

(a) Each licensee shall require any individual, prior to first entry of the individual into the licensee's restricted area during each employment or work assignment under such circumstances that the individual will receive or is likely to receive in any period of one calendar quarter an occupational dose in excess of 25 percent of the applicable standards specified in §20.101(a) and §20.104(a), to disclose in a written, signed statement, either: (1) That the individual had no prior occupational dose during the current calendar quarter, or (2) the nature and amount of any occupational dose which the individual may have received during that specifically identified current calendar quarter from sources of radiation possessed or controlled by other persons. Each licensee shall maintain records of such statements until the Commission authorizes their disposition.

(b) Before permitting, pursuant to §20.101(b), any individual in a restricted area to receive an occupational radiation dose in excess of the standards specified in §20.101(a), each licensee shall:

(1) Obtain a certificate on Form NRC-4, or on a clear and legible record containing all the information required in that form, signed by the individual showing each period of time after the individual attained the age of 18 in which the individual received an occupational dose of radiation; and

(2) Calculate on Form NRC-4 in accordance with the instructions appearing therein, or on a clear and legible record containing all the information required in that form, the previously accumulated occupational dose received by the individual and the additional dose allowed for that individual under §20.101(b).

(c)(1) In the preparation of Form NRC-4, or a clear and legible record containing all the information required in that form, the licensee shall make a reasonable effort to obtain reports of the individual's previously accumulated occupational dose. For each period for which the licensee obtains such reports, the licensee shall use the dose shown in the report in preparing the form. In any case where a licensee is unable to obtain reports of the individual's occupational dose for a previous complete calendar quarter, it shall be assumed that the individual has received the occupational dose specified in whichever of the following columns apply:

Part of Body	Column 1—Assumed exposure in rems for Calendar quarters prior to Jan. 1, 1961	Column 2—Assumed exposure in rems for calendar quarters beginning on or after Jan. 1, 1961
Whole body, gonads, active blood-forming organs, head and trunk lens of eye	3¾	1¼

(2) The licensee shall retain and preserve records used in preparing Form NRC-4 until the Commission authorizes their disposition.

If calculation of the individual's accumulated occupational dose for all periods prior to January 1, 1961, yields a result higher than the applicable accumulated dose value for the individual as of that date, as specified in paragraph (b) of §20.101, the excess may be disregarded.

[25 FR 10914, Nov. 17, 1960, as amended at 41 FR 18301, May 3, 1976; 44 FR 32352, June 6, 1979]

§20.103 Exposure of individuals to concentrations of radioactive materials in air in restricted areas.

(a)(1) No licensee shall possess, use, or transfer licensed material in such a manner as to permit any individual in a restricted area to inhale a quantity of radioactive material in any period of one calendar quarter greater than the quantity which would result from inhalation for 40 hours per week for 13 weeks at uniform concentrations of radioactive material in air specified in Appendix B, Table 1, Column 1.[1,2,3] If the radioactive material is of such form that intake by absorption through the skin is likely, individual exposures to radioactive material shall be controlled so that the uptake of radioactive material by any organ from either inhalation or absorption or both routes of intake[4,5] in any calendar quarter does not exceed that which would result from inhaling such radioactive material for 40 hours per week for 13 weeks at uniform concentrations specified in Appendix B, Table I, Column 1.

(2) No licensee shall possess, use, or transfer mixtures of U-234, U-235, and U-238 in soluble form in such a manner as to permit any individual in a restricted area to inhale a quantity of such material in excess of the intake limits specified in Appendix B, Table I, Column 1 of this part. If such soluble uranium is of a form such that absorption through the skin is likely, individual exposures to such material shall be controlled so that the uptake of such material by any organ from either inhalation or absorption or both routes of intake[4] does not exceed that which would result from inhaling such material at the limits specified in Appendix B, Table I, Column 1 and footnote 4 thereto.

(3) For purposes of determining compliance with the requirements of this section the licensee shall use suitable measurements of concentrations of radioactive materials in air for detecting and evaluating airborne radioactivity in restricted areas and in addition, as appropriate, shall use measurements of radioactivity in the body, measurements of radioactivity excreted from the body, or any combination of such measurements as may be necessary for timely detection and assessment of individual intakes of radioactivity by exposed individuals. It is assumed that an individual inhales radioactive material at the airborne concentration in which he is present unless he uses respiratory protective equipment pursuant to paragraph (c) of this section. When assessment of a particular individual's intake of radioactive material is necessary, intakes less than those which would result from inhalation for 2 hours in any one day or for 10 hours in any one week at uniform concentrations specified in Appendix B, Table I, Column 1 need not be included in such assessment, provided that for any assessment in excess of these amounts the entire amount is included.

(b)(1) The licensee shall, as a precautionary procedure, use process or other engineering controls, to the extent practicable, to limit concentrations of radioactive materials in air to levels below those which delimit an airborne radioactivity area as defined in §20.203(d)(1)(ii).

(2) When it is impracticable to apply process or other engineering controls to limit concentrations of radioactive material in air below those defined in §20.203(d)(1)(ii), other precautionary procedures, such as increased surveillance, limitation of working times, or provision of respiratory protective equipment, shall be used to maintain intake of radioactive material by any individual within any period of seven consecutive days as far below that intake of radioactive material which would result from inhalation of such material for 40 hours at the uniform concentrations specified in Appendix B, Table 1, Column 1 as is reasonably achievable. Whenever the intake of radioactive material by any individual exceeds this 40-hour control measure, the licensee shall make such evaluations and take such actions as are necessary to assure against recurrence. The licensee shall maintain records of such occurrences, evaluations, and actions taken in a clear and readily identifiable form suitable for summary review and evaluation.

(c) When respiratory protective equipment is used to limit the inhalation of airborne radioactive material pursuant to paragraph (b)(2) of this section, the licensee shall use equipment that is certified or had certification extended by the National Institute for Occupational Safety and Health/Mine Safety and Health Administration (NIOSH/MSHA). The licensee may make allowance for this use of respiratory protective equipment in estimating exposures of individuals to this material provided that:

(1) The licensee selects respiratory protective equipment that provides a protection factor greater than the multiple by which peak concentrations of airborne radioactive materials in the working area are expected to exceed the values specified in Appendix B, Table I, Column 1 of this part. The equipment so selected shall be used so that the average concentration of radioactive material in the air that is inhaled during any period of uninterrupted use in an airborne radioactivity area, on any day, by any individual using the equipment, does not exceed the values specified in Appendix B, Table I, Column 1 of this part. For the purposes of this paragraph, the concentration of radioactive material in the air that is inhaled when respirators are worn may be estimated by dividing the ambient concentration in air by the protection factor specified in Appendix A of this part. If the exposure is later found to be greater than estimated, the corrected value shall be used; if the exposure is later found to be less than estimated, the corrected value may be used.

(2) The licensee maintains and implements a respiratory protection program that includes, as a minimum: air sampling sufficient to identify the hazard, permit proper equipment selection and estimate exposures; surveys and bioassays as appropriate to evaluate actual exposures; written procedures regarding selection, fitting, and maintenance of respirators, and testing of respirators for operability immediately prior to each use; written procedures regarding supervision and training of personnel and issuance records; and determination by a physician prior to initial use of respirators, and at least every 12 months thereafter, that the individual user is physically able to use the respiratory protective equipment.

(3) A written policy statement on respirator usage shall be issued covering such things as: use of practicable engineering controls instead of respirators; routine, nonroutine, and emergency use of respirators; and periods of respirator use and relief from respirator use. The licensee shall advise each respirator user that the user may leave the area at any time for relief from respirator use in the event of equipment malfunction, physical or psychological distress, procedural or communication failure, significant deterioration of operating conditions, or any other condition that might require such relief.

(4) The licensee uses equipment within limitations for type and mode of use and provides proper visual, communication, and other special capabilities (such as adequate skin protection) when needed.

(d) Unless otherwise authorized by the Commission, the licensee shall not assign protection factors in excess of those specified in Appendix A of this part in selecting and using respiratory protective equipment. The Commission may authorize a licensee to use

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[1] Since the concentration specified for tritium oxide vapor assumes equal intakes by skin absorption and inhalation, the total intake permitted is twice that which would result from inhalation alone at the concentration specified for H 3 S in Appendix B, Table I, Column 1 for 40 hours per week for 13 weeks.

[2] For radon-222, the limiting quantity is that inhaled in a period of one calendar year. For radioactive materials designated "Sub" in the "Isotope" column of the table, the concentration value specified is based upon exposure to the material as an external radiation source. Individual exposures to these materials may be accounted for as part of the limitation on individual dose in §20.101. These nuclides shall be subject to the precautionary procedures required by §20.103(b)(1).

[3] Multiply the concentration values specified in Appendix B, Table I, Column 1, by 6.3×10^8 ml to obtain the quarterly quantity limit. Multiply the concentration value specified in Appendix B, Table I, Column 1, by 2.5×10^9 ml to obtain the annual quantity limit for Rn-222.

[4] Significant intake by ingestion or injection is presumed to occur only as a result of circumstances such as accident, inadvertence, poor procedure, or similar special conditions. Such intakes must be evaluated and accounted for by techniques and procedures as may be appropriate to the circumstances of the occurrence. Exposures so evaluated shall be included in determining whether the limitation on individual exposures in §20.103(a)(1) has been exceeded.

[5] Regulatory guidance on assessment of individual intakes of radioactive material is given in Regulatory Guide 8.9, "Acceptable Concepts, Models, Equations, and Assumptions for a Bioassay Program," single copies of which are available from the Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, upon written request.

higher protection factors on receipt of an application (1) describing the situation for which a need exists for higher protection factors, and (2) demonstrating that the respiratory protective equipment will provide these higher protection factors under the proposed conditions of use.

(e) Where equipment of a particular type has not been tested and certified, or had certification extended, by NIOSH/MSHA, or where there is no existing schedule for test and certification of certain equipment, the licensee shall not make allowance for this equipment without specific authorization by the Commission. An application for this authorization must include a demonstration by testing, or on the basis of reliable test information, that the material and performance characteristics of the equipment are capable of providing the proposed degree of protection under anticipated conditions of use.

(f) Only equipment that has been specifically certified or had certification extended for emergency use by NIOSH/MSHA shall be used as emergency devices.

(g) The licensee shall notify, in writing, the Regional Administrator of the appropriate Nuclear Regulatory Commission Regional Office listed in Appendix D at least 30 days before the date that respiratory protective equipment is first used under the provisions of this section.

[41 FR 52301, Nov. 29, 1976, as amended at 43 FR 29270, July 7, 1978; 47 FR 16164, Apr. 15, 1982; 52 FR 31610, Aug. 21, 1987]

§20.104 Exposure of minors.

(a) No licensee shall possess, use, or transfer licensed material in such a manner as to cause any individual within a restricted area who is under 18 years of age, to receive in any period of one calendar quarter from radioactive material and other sources of radiation in the licensee's possession a dose in excess of 10 percent of the limits specified in the table in paragraph (a) of §20.101.

(b) No licensee shall possess, use or transfer licensed material in such a manner as to cause any individual within a restricted area, who is under 18 years of age to be exposed to airborne radioactive material possessed by the licensee in an average concentration in excess of the limits specified in Appendix B, Table II of this part. For purposes of this paragraph, concentrations may be averaged over periods not greater than a week.

(c) The provisions of §§20.103(b)(2) and 20.103(c) shall apply to exposures subject to paragraph (b) of this section except that the references in §§20.103(b)(2) and 20.103(c) to Appendix B, Table I, Column 1 shall be deemed to be references to Appendix B, Table II, Column 1.

[25 FR 10914, Nov. 17, 1960, as amended at 41 FR 52302, Nov. 29, 1976]

§20.105 Permissible levels of radiation in unrestricted areas.

(a) There may be included in any application for a license or for amendment of a license proposed limits upon levels of radiation in unrestricted areas resulting from the applicant's possession or use of radioactive material and other sources of radiation. Such applications should include information as to anticipated average radiation levels and anticipated occupancy times for each unrestricted area involved. The Commission will approve the proposed limits if the applicant demonstrates that the proposed limits are not likely to cause any individual to receive a dose to the whole body in any period of one calendar year in excess of 0.5 rem.

(b) Except as authorized by the Commission pursuant to paragraph (a) of this section, no licensee shall possess, use or transfer licensed material in such a manner as to create in any unrestricted area from radioactive material and other sources of radiation in his possession:

(1) Radiation levels which, if an individual were continuously present in the area, could result in his receiving a dose in excess of two millirems in any one hour, or

(2) Radiation levels which, if an individual were continuously present in the area, could result in his receiving a dose in excess of 100 millirems in any seven consecutive days.

(c) In addition to other requirements of this part, licensees engaged in uranium fuel cycle operations subject to the provisions of 40 CFR Part 190, "Environmental Radiation Protection Standards for Nuclear Power Operations," shall comply with that part.

[25 FR 10914, Nov. 17, 1960, and 46 FR 18526, Mar. 25, 1981]

§20.106 Radioactivity in effluents to unrestricted areas.

(a) A licensee shall not possess, use, or transfer licensed material so as to release to an unrestricted area radioactive material in concentrations which exceed the limits specified in Appendix B, Table II of this part, except as authorized pursuant to §20.302 or paragraph (b) of this section. For purposes of this section concentrations may be averaged over a period not greater than one year.

(b) An application for a license or amendment may include proposed limits higher than those specified in paragraph (a) of this section. The Commission will approve the proposed limits if the applicant demonstrates:

(1) That the applicant has made a reasonable effort to minimize the radioactivity contained in effluents to unrestricted areas; and

(2) That it is not likely that radioactive material discharged in the effluent would result in the exposure of an individual to concentrations of radioactive material in air or water exceeding the limits specified in Appendix B, Table II of this part.

(c) An application for higher limits pursuant to paragraph (b) of this section shall include information demonstrating that the applicant has made a reasonable effort to minimize the radioactivity discharged in effluents to unrestricted areas, and shall include, as pertinent:

(1) Information as to flow rates, total volume of effluent, peak concentration of each radionuclide in the effluent, and concentration of each radionuclide in the effluent averaged over a period of one year at the point where the effluent leaves a stack, tube, pipe, or similar conduit;

(2) A description of the properties of the effluents, including:

(i) Chemical composition;

(ii) Physical characteristics, including suspended solids content in liquid effluents, and nature of gas or aerosol for air effluents;

(iii) The hydrogen ion concentrations (p^H) of liquid effluents; and

(iv) The size range of particulates in effluents released into air.

(3) A description of the anticipated human occupancy in the unrestricted area where the highest concentration of radioactive material from the effluent is expected, and, in the case of a river or stream, a description of water uses downstream from the point of release of the effluent.

(4) Information as to the highest concentration of each radionuclide in an unrestricted area, including anticipated concentrations averaged over a period of one year:

(i) In air at any point of human occupancy; or

(ii) In water at points of use downstream from the point of release of the effluent.

(5) The background concentration of radionuclides in the receiving river or stream prior to the release of liquid effluent.

(6) A description of the environmental monitoring equipment, including sensitivity of the system, and procedures and calculations to determine concentrations of radionuclides in the unrestricted area and possible reconcentrations of radionuclides.

(7) A description of the waste treatment facilities and procedures used to reduce the concentration of radionuclides in effluents prior to their release.

(d) For the purposes of this section the concentration limits in Appendix B, Table II of this part shall apply at the boundary of the restricted area. The concentration of radioactive material discharged through a stack, pipe or similar conduit may be determined with respect to the point where the material leaves the conduit. If the conduit discharges within the restricted area, the concentration at the boundary may be determined by applying appropriate factors for dilution, dispersion, or decay between the point of discharge and the boundary.

(e) In addition to limiting concentrations in effluent streams, the Commission may limit quantities of radioactive materials released in air or water during a specified period of time if it appears that the daily intake of radioactive material from air, water, or food by a suitable sample of an exposed population group, averaged over a period not exceeding one year, would otherwise exceed the daily intake resulting from continuous exposure to air or water containing one-third the concentration of radioactive materials specified in Appendix B, Table II of this part.

(f) The provisions of paragraphs (a) through (e) of this section do not apply to disposal of radioactive material into sanitary sewerage systems, which is governed by §20.303.

(g) In addition to other requirements of this part, licensees engaged in uranium fuel cycle operations subject to the provisions of 40 CFR Part 190, "Environmental Radiation Protection Standard for Nuclear Power Operations," shall comply with that part.

(Secs. 161b., 161o., Pub. L. 83-703, 68 Stat. 948, 950 (42 U.S.C. 2201); sec. 201, as amended, Pub. L. 93-438, 88 Stat. 1243, Pub. L. 94-79, 89 Stat. 413, (42 U.S.C. 5841); Memorandum of Understanding between the Environmental Protection Agency and the Atomic Energy Commission, August 1973, 38 FR 24936, September 11, 1973) [29 FR 14434, Oct. 21, 1964, as amended at 46 FR 18526, Mar. 25, 1981]

§20.107 Medical diagnosis and therapy.

Nothing in the regulations in this part shall be interpreted as limiting the intentional exposure of patients to radiation for the purpose of medical diagnosis or medical therapy.

§20.108 Orders requiring furnishing of bio-assay services.

Where necessary or desirable in order to aid in determining the extent of an individual's exposure to concentrations of radioactive material, the Commission may incorporate appropriate provisions in any license, directing the licensee to make available to the individual appropriate bio-assay services and to furnish a copy of the reports of such services to the Commission.

Precautionary Procedures

§20.201 Surveys.

(a) As used in the regulations in this part, "survey" means an evaluation of the radiation hazards incident to the production, use, release, disposal, or presence of radioactive materials or other sources of radiation under a specific set of conditions. When appropriate, such evaluation includes a physical survey of the location of materials and equipment, and measurements of levels of radiation or concentrations of radioactive material present.

(b) Each licensee shall make or cause to be made such surveys as (1) may be necessary for the licensee to comply with the regulations in this part, and (2) are reasonable under the circumstances to evaluate the extent of radiation hazards that may be present.

[25 FR 10914, Nov. 17, 1960, as amended at 46 FR 53648, Oct. 30, 1981]

§20.202 Personnel monitoring.

(a) Each licensee shall supply appropriate personnel monitoring equipment to, and shall require the use of such equipment by:

(1) Each individual who enters a restricted area under such circumstances that he receives, or is likely to receive, a dose in any calendar quarter in excess of 25 percent of the applicable value specified in paragraph (a) of §20.101.

(2) Each individual under 18 years of age who enters a restricted area under such circumstances that he receives, or is likely to receive, a dose in any calendar quarter in excess of 5 percent of the applicable value specified in paragraph (a) of §20.101.

(3) Each individual who enters a high radiation area.

(b) As used in this part,

(1) "Personnel monitoring equipment" means devices designed to be worn or carried by an individual for the purpose of measuring the dose received (e.g., film badges, pocket chambers, pocket dosimeters, film rings, etc.);

(2) "Radiation area" means any area, accessible to personnel, in which there exists radiation, originating in whole or in part within licensed material, at such levels that a major portion of the body could receive in any one hour a dose in excess of 5 millirem, or in any 5 consecutive days a dose in excess of 100 millirems;

(3) "High radiation area" means any area, accessible to personnel, in which there exists radiation originating in whole or in part within licensed material at such levels that a major portion of the body could receive in any one hour a dose in excess of 100 millirem.

(c) All personnel dosimeters (except for direct and indirect reading pocket ionization chambers and those dosimeters used to measure the dose to hands and forearms, feet and ankles) that require processing to determine the radiation dose and that are utilized by licensees to comply with paragraph (a) of this section, with other applicable provisions of 10 CFR Chapter I, or with conditions specified in a licensee's license must be processed and evaluated by a dosimetry processor:

(1) Holding current personnel dosimetry accreditation from the National Voluntary Laboratory Accreditation Program (NVLAP) of the National Bureau of Standards, and

(2) Approved in this accreditation process for the type of radiation or radiations included in the NVLAP program that most closely approximate the type of radiation or radiations for which the individual wearing the dosimeter is monitored.

[25 FR 10914, Nov. 17, 1960, as amended at 52 FR 4604, Feb. 13, 1987]

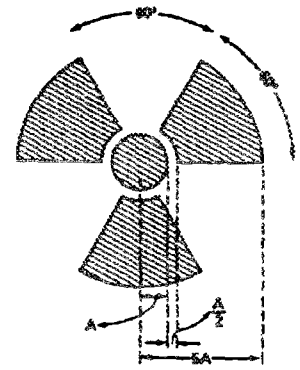
§20.203 Caution signs, labels, signals and controls.

(a) General.

(1) Except as otherwise authorized by the Commission, symbols prescribed by this section shall use the conventional radiation caution colors (magenta or purple on yellow background). The symbol prescribed by this section is the conventional three-bladed design:

Radiation Symbol

1. Cross-hatched area is to be magenta or purple.
2. Background is to be yellow.



(2) In addition to the contents of signs and labels prescribed in this section, licensees may provide on or near such signs and labels any additional information which may be appropriate in aiding individuals to minimize exposure to radiation or to radioactive material.

(b) Radiation areas. Each radiation area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

Caution[1]

Radiation Area

(c) High radiation areas.

(1) Each high radiation area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

Caution[1]

High Radiation Area

(2) Each entrance or access point to a high radiation area shall be:

(i) Equipped with a control device which shall cause the level of radiation to be reduced below that at which an individual might receive a dose

[1] Or "Danger".

of 100 millirems in 1 hour upon entry into the area; or

(ii) Equipped with a control device which shall energize a conspicuous visible or audible alarm signal in such a manner that the individual entering the high radiation area and the licensee or a supervisor of the activity are made aware of the entry; or

(iii) Maintained locked except during periods when access to the area is required, with positive control over each individual entry.

(3) The controls required by paragraph (c)(2) of this section shall be established in such a way that no individual will be prevented from leaving a high radiation area.

(4) In the case of a high radiation area established for a period of 30 days or less, direct surveillance to prevent unauthorized entry may be substituted for the controls required by paragraph (c)(2) of this section.

(5) Any licensee, or applicant for a license, may apply to the Commission for approval of methods not included in paragraphs (c)(2) and (4) of this section for controlling access to high radiation areas. The Commission will approve the proposed alternatives if the licensee or applicant demonstrates that the alternative methods of control will prevent unauthorized entry into a high radiation area, and that the requirement of paragraph (c)(3) of this section is met.

(6) Each area in which there may exist radiation levels in excess of 500 rems in one hour at one meter from a sealed radio-active source[1] that is used to irradiate materials shall:[2]

(i) Have each entrance or access point equipped with entry control devices which shall function automatically to prevent any individual from inadvertently entering the area when such radiation levels exist; permit deliberate entry into the area only after a control device is actuated that shall cause the radiation level within the area, from the sealed source, to be reduced below that at which it would be possible for an individual to receive a dose in excess of 100 mrem in one hour; and prevent operation of the source if the source would produce radiation levels in the area that could result in a dose to an individual in excess of 100 mrem in one hour. The entry control devices required by this paragraph (c)(6) shall be established in such a way that no individual will be prevented from leaving the area.

(ii) Be equipped with additional control devices such that upon failure of the entry control devices to function as required by paragraph (c)(6)(i) of this section the radiation level within the area, from the sealed source, shall be reduced below that at which it would be possible for an individual to receive a dose in excess of 100 mrem in one hour; and visible and audible alarm signals shall be generated to make an individual attempting to enter the area aware of the hazard and the licensee or at least one other individual, who is familiar with the activity and prepared to render or summon assistance, aware of such failure of the entry control devices.

(iii) Be equipped with control devices such that upon failure or removal of physical radiation barriers other than the source's shielded storage container the radiation level from the source shall be reduced below that at which it would be possible for an individual to receive a dose in excess of 100 mrem in one hour; and visible and audible alarm signals shall be generated to make potentially affected individuals aware of the hazard and the licensee or at least one other individual, who is familiar with the activity and prepared to render or summon assistance, aware of the failure or removal of the physical barrier. When the shield for the stored source is a liquid, means shall be provided to monitor the integrity of the shield and to signal, automatically, loss of adequate shielding. Physical radiation barriers that comprise permanent structural components, such as walls, that have no credible probability of failure or removal in ordinary circumstances need not meet the requirements of this paragraph (c)(6)(iii).

(iv) Be equipped with devices that will automatically generate visible and audible alarm signals to alert personnel in the area before the source can be put into operation and in sufficient time for any individual in the area to operate a clearly identified control device which shall be installed in the area and which can prevent the source from being put into operation.

(v) Be controlled by use of such administrative procedure and such devices as are necessary to assure that the area is cleared of personnel prior to each use of the source preceding which use it might have been possible for an individual to have entered the area.

(vi) Be checked by a physical radiation measurement to assure that prior to the first individual's entry into the area after any use of the source, the radiation level from the source in the area is below that at which it would be possible for an individual to receive a dose in excess of 100 mrem in one hour.

(vii) Have entry control devices required in paragraph (c)(6)(i) of this section which have been tested for proper functioning prior to initial operation with such source of radiation on any day that operations are not uninterruptedly continued from the previous day or before resuming operations after any unintended interruption, and for which records are kept of the dates, times, and results of such tests of function. No operations other than those necessary to place the source in safe condition or to effect repairs on controls shall be conducted with such source unless control devices are functioning properly. The licensee shall submit an acceptable schedule for more complete periodic tests of the entry control and warning systems to be established and adhered to as a condition of the license.

(viii) Have those entry and exit portals that are used in transporting materials to and from the irradiation area, and that are not intended for use by individuals, controlled by such devices and administrative procedures as are necessary to physically protect and warn against inadvertent entry by any individual through such portals. Exit portals for processed materials shall be equipped to detect and signal the presence of loose radiation sources that are carried toward such an exit and to automatically prevent such loose sources from being carried out of the area.

(7) Licensees with, or applicants for, licenses for radiation sources that are within the purview of paragraph (c)(6) of this section, and that must be used in a variety of positions or in peculiar locations, such as open fields or forests, that make it impracticable to comply with certain requirements of paragraph (c)(6) of this section, such as those for the automatic control of radiation levels, may apply to the Director, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, for approval, prior to use of safety measures that are alternative to those specified in paragraph (c)(6) of this section, and that will provide at least an equivalent degree of personnel protection in the use of such sources. At least one of the alternative measures must include an entry-preventing interlock control based on a physical measurement of radiation that assures the absence of high radiation levels before an individual can gain access to an area where such sources are used.

(d) Airborne radioactivity areas.

(1) As used in the regulations in this part "airborne radioactivity area" means (i) any room, enclosure, or operating area in which airborne radioactive materials composed wholly or partly of licensed material, exist in concentrations in excess of the amounts specified in Appendix B, Table I, Column 1 of this part; or (ii) any room, enclosure, or operating area in which airborne radioactive material composed wholly or partly of licensed material exists in concentrations which,

[1] This paragraph (c)(6) does not apply to radioactive sources that are used in teletherapy, in radiography, or in completely self-shielded irradiators in which the source is both stored and operated within the same shielding radiation barrier and, in the designed configuration of the irradiator, is always physically inaccessible to any individual and cannot create high levels of radiation in an area that is accessible to any individual. This paragraph (c)(6) also does not apply to sources from which the radiation is incidental to some other use nor to nuclear reactor generated radiation other than radiation from byproduct, source, or special clear materials that are used in sealed sources in non-self-shielded irradiators.

[2] These requirements apply after Mar. 14, 1978. Each person licensed to conduct activities to which this paragraph (c)(6) applies and who is not in compliance with the provisions of this paragraph on Mar. 14, 1978, shall file with the Director, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, on or before June 14, 1978, information describing in detail the actions taken or to be taken to achieve compliance with this paragraph by Dec. 14, 1978, and may continue activities in conformance with present license conditions and the provisions of the previously effective §20.2034 until such compliance is achieved. For such persons compliance must be achieved not later than Dec. 14, 1978.

averaged over the number of hours in any week during which individuals are in the area, exceed 25 percent of the amounts specified in Appendix B Table I, Column 1 of this part.

(2) Each airborne radioactivity area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

Caution[1]

Airborne Radioactivity Area

(e) Additional requirements.

(1) Each area or room in which licensed material is used or stored and which contains any radioactive material (other than natural uranium or thorium) in an amount exceeding 10 times the quantity of such material specified in Appendix C of this part shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

Caution[1]

Radioactive Material(s)

(2) Each area or room in which natural uranium or thorium is used or stored in any amount exceeding one hundred times the quantity specified in Appendix C of this part shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

Caution[1]

Radioactive Material(s)

(f) *Containers.*

(1) Except as provided in paragraph (f)(3) of this section, each container of licensed material shall bear a durable, clearly visible label identifying the radioactive contents.

(2) A label required pursuant to paragraph (f)(1) of this section shall bear the radiation caution symbol and the words "CAUTION, RADIOACTIVE MATERIAL" or "DANGER, RADIOACTIVE MATERIAL". It shall also provide sufficient information[2] to permit individuals handling or using the containers, or working in the vicinity thereof, to take precautions to avoid or minimize exposures.

(3) Notwithstanding the provisions of paragraph (f)(1) of this section labeling is not required:

(i) For containers that do not contain licensed materials in quantities greater than the applicable quantities listed in Appendix C of this part.

(ii) For containers containing only natural uranium or thorium in quantities no greater than 10 times the applicable quantities listed in Appendix C of this part.

(iii) For containers that do not contain licensed materials in concentrations greater than the applicable concentrations listed in Appendix B, Table I, Column 2, of this part.

(iv) For containers when they are attended by an individual who takes the precautions necessary to prevent the exposure of any individual to radiation or radioactive materials in excess of the limits established by the regulations in this part.

(v) For containers when they are in transport and packaged and labeled in accordance with regulations of the Department of Transportation.

(vi) For containers which are accessible[3] only to individuals authorized to handle or use them, or to work in the vicinity thereof, provided that the contents are identified to such individuals by a readily available written record.

(vii) For manufacturing or process equipment, such as nuclear reactors, reactor components, piping, and tanks.

(4) Each licensee shall, prior to disposal of an empty uncontaminated container to unrestricted areas, remove or deface the radioactive material label or otherwise clearly indicate that the container no longer contains radioactive materials.

[25 FR 10914, Nov. 17, 1960, as amended at 31 FR 10515, Aug. 5, 1966; 34 FR 19546, Dec. 11, 1969; 35 FR 5033, Mar. 25, 1970; 42 FR 64620, Dec. 27, 1977; 43 FR 2167, Jan. 16, 1978; 43 FR 22172, May 24, 1978]

§20.204 Same: Exceptions.

Notwithstanding the provisions of §20.203,

(a) A room or area is not required to be posted with a caution sign because of the presence of a sealed source provided the radiation level twelve inches from the surface of the source container or housing does not exceed five millirem per hour.

(b) Rooms or other areas in hospitals are not required to be posted with caution signs, and control of entrance or access thereto pursuant to §20.203(c) is not required, because of the presence of patients containing byproduct material provided that there are personnel in attendance who will take the precautions necessary to prevent the exposure of any individual to radiation or radioactive material in excess of the limits established in the regulations in this part.

(c) Caution signs are not required to be posted at areas or rooms containing radioactive materials for periods of less than eight hours provided that

(1) the materials are constantly attended during such periods by an individual who shall take the precautions necessary to prevent the exposure of any individual to radiation or radioactive materials in excess of the limits established in the regulations in this part and;

(2) such area or room is subject to the licensee's control.

(d) A room or other area is not required to be posted with a caution sign, and control is not required for each entrance or access point to a room or other area which is a high radiation area solely because of the presence of radioactive materials prepared for transport and packaged and labeled in accordance with regulations of the Department of Transportation.

[25 FR 10914, Nov. 17, 1960, as amended at 35 FR 5033, Mar. 25, 1970]

§20.205 Procedures for picking up, receiving, and opening packages.

(a)(1) Each licensee who expects to receive a package containing quantities of radioactive material in excess of the Type A quantities specified in paragraph (b) of this section shall:

(i) If the package is to be delivered to the licensee's facility by the carrier, make arrangements to receive the package when it is offered for delivery by the carrier; or

(ii) If the package is to be picked up by the licensee at the carrier's terminal, make arrangements to receive notification from the carrier of the arrival of the package, at the time of arrival.

(2) Each licensee who picks up a package of radioactive material from a carrier's terminal shall pick up the package expeditiously upon receipt of notification from the carrier of its arrival.

(b)(1) Each licensee, upon receipt of a package of radioactive material, shall monitor the external surfaces of the package for radioactive contamination caused by leakage of the radioactive contents, except:

(i) Packages containing no more than the exempt quantity specified in the table in this paragraph;

(ii) Packages containing no more than 10 millicuries of radioactive material consisting solely of tritium, carbon-14, sulfur-35, or iodine-125;

(iii) Packages containing only radioactive material as gases or in special form;

(iv) Packages containing only radioactive material in other than liquid form (including Mo-99/Tc-99m generators) and not exceeding the Type A quantity limit specified in the table in this paragraph; and

(v) Packages containing only radionuclides with half-lives of less than 30 days and a total quantity of no more than 100 millicuries.

The monitoring shall be performed as soon as practicable after receipt, but no later than three hours after the package is received at the licensee's facility if received during the licensee's normal working hours, or eighteen hours if received after normal working hours.

(2) If removable radioactive contamination in excess of 0.01 microcuries (22,000 disintegrations per minute) per 100 square centimeters of package surface is found on the external surfaces of the package, the licensee shall immediately notify the final delivering carrier and, by telephone and telegraph, mailgram or facsimile, the appropriate Nuclear Regulatory Commission Regional Office shown in Appendix D of this part.

[1] Or "Danger".

[2] As appropriate, the information will include radiation levels, kinds of material, estimate of activity, date for which activity is estimated, mass enrichment, etc.

[3] For example, containers in locations such as water-filled canals, storage vaults, or hot cells.

Table of Exempt and Type A Quantities

Transport Group	Exempt quantity limit (in millicuries)	Type A quantity limit (in curies)
I	.01	0.001
II	0.1	0.050
III	1	3
IV	1	20
V	1	20
VI	1	1000
VII	25,000	1000
Special Form	1	20

[1]The definitions of "transport group" and "special form" are specified in §71.4 of this chapter.

(c)(1) Each licensee, upon receipt of a package containing quantities of radioactive material in excess of the Type A quantities specified in paragraph (b) of this section, other than those transported by exclusive use vehicle, shall monitor the radiation levels external to the package. The package shall be monitored as soon as practicable after receipt, but no later than three hours after the package is received at the licensee's facility if received during the licensee's normal working hours, or 18 hours if received after normal working hours.

(2) If radiation levels are found on the external surface of the package in excess of 200 millirem per hour, or at three feet from the external surface of the package in excess of 10 millirem per hour, the licensee shall immediately notify by telephone and telegraph mailgram, or facsimile, the director of the appropriate NRC Regional Office listed in Appendix D, and the final delivering carrier.

(d) Each licensee shall establish and maintain procedures for safely opening packages in which licensed material is received, and shall assure that such procedures are followed and that due consideration is given to special instructions for the type of package being opened.

[39 FR 17974, May 22, 1974, as amended at 41 FR 16445, Apr. 19, 1976; 49 FR 19624, May 9, 1984]

§20.206 Instruction of personnel.

Instructions required for individuals working in or frequenting any portion of a restricted area are specified in §19.12 of this chapter.

[38 FR 22220, Aug. 17, 1973]

§20.207 Storage and control of licensed materials in unrestricted areas.

(a) Licensed materials stored in an unrestricted area shall be secured from unauthorized removal from the place of storage.

(b) Licensed materials in an unrestricted area and not in storage shall be tended under the constant surveillance and immediate control of the licensee.

[40 FR 26679, June 25, 1975]

Waste Disposal

§20.301 General requirement.

No licensee shall dispose of licensed material except:

(a) By transfer to an authorized recipient as provided in the regulations in Parts 30, 40, 60, 61, 70 or 72 of this chapter, whichever may be applicable; or

(b) As authorized pursuant to §20.302 or Part 61 of this chapter; or

(c) As provided in §20.303, applicable to the disposal of licensed material by release into sanitary sewerage systems, or in §20.306 for disposal of specific wastes, or in §20.106 (Radioactivity in effluents to unrestricted areas).

[25 FR 10914, Nov. 17, 1960, as amended at 46 FR 16234, Mar. 11, 1981; 46 FR 58282, Dec. 1, 1981; 47 FR 57479, Dec. 27, 1982]

§20.302 Method for obtaining approval of proposed disposal procedures.

(a) Any licensee or applicant for a license may apply to the Commission for approval of proposed procedures to dispose of licensed material in a manner not otherwise authorized in the regulations in this chapter. Each application should include a description of the licensed material and any other radioactive material involved, including the quantities and kinds of such material and the levels of radioactivity involved, and the proposed manner and conditions of disposal. The application should also include an analysis and evaluation of pertinent information as to the nature of the environment, including topographical, geological, meteoro- logical, and hydrological characteristics; usage of ground and surface waters in the general area; the nature and location of other potentially affected facilities; and procedures to be observed to minimize the risk of unexpected or hazardous exposures.

(b) The Commission will not approve any application for a license for disposal of licensed material at sea unless the applicant shows that sea disposal offers less harm to man or the environment than other practical alternative methods of disposal.

[25 FR 10914, Nov. 17, 1960, as amended at 26 FR 352, Jan. 18, 1961; 36 FR 23138, Dec. 4, 1971; 47 FR 57479, Dec. 27, 1982]

§20.303 Disposal by release into sanitary sewerage systems.

No licensee shall discharge licensed material into a sanitary sewerage system unless:

(a) It is readily soluble or dispersible in water; and

(b) The quantity of any licensed or other radioactive material released into the system by the licensee in any one day does not exceed the larger of paragraphs (b)(1) or (2) of this section.

(1) The quantity which, if diluted by the average daily quantity of sewage released into the sewer by the licensee, will result in an average concentration equal to the limits specified in Appendix B, Table I, Column 2 of this part; or

(2) Ten times the quantity of such material specified in Appendix C of this part; and

(c) The quantity of any licensed or other radioactive material released in any one month, if diluted by the average monthly quantity of water released by the licensee, will not result in an average concentration exceeding the limits specified in Appendix B, Table I, Column 2 of this part; and

(d) The gross quantity of licensed and other radioactive material, excluding hydrogen-3 and carbon-14, released into the sewerage system by the licensee does not exceed one curie per year. The quantities of hydrogen-3 and carbon-14 released into the sanitary sewerage system may not exceed 5 curies per year for hydrogen-3 and 1 curie per year for carbon-14. Excreta from individuals undergoing medical diagnosis or therapy with radioactive material shall be exempt from any limitations contained in this section.

[25 FR 10914, Nov. 17, 1960, as amended at 46 FR 16234, Mar. 11, 1981]

§20.305 Treatment or disposal by incineration.

No licensee shall treat or dispose of licensed material by incineration except for materials listed under §20.306 or as specifically approved by the Commission pursuant to §§20.106(b) and 20.302.

[46 FR 16234, Mar. 11, 1981]

§20.306 Disposal of specific wastes.

Any licensee may dispose of the following licensed material without regard to its radioactivity:

(a) 0.05 microcuries or less of hydrogen-3 or carbon-14, per gram of medium, used for liquid scintillation counting; and

(b) 0.05 microcuries or less of hydrogen-3 or carbon-14, per gram of animal tissue averaged over the weight of the entire animal; provided however, tissue may not be disposed of under this section in a manner that would permit its use either as food for humans or as animal feed.

(c) Nothing in this section, however, relieves the licensee of maintaining records showing the receipt, transfer and disposal of such byproduct material as specified in §30.51 of this chapter; and

(d) Nothing in this section relieves the licensee from complying with other applicable Federal, State and local regulations governing any other toxic or hazardous property of these materials.

[46 FR 16234, Mar. 11, 1981]

§20.311 Transfer for disposal and manifests.

(a) *Purpose*. The requirements of this section are designed to control transfers of radioactive waste intended for disposal at a land disposal facility and establish a manifest tracking system and supplement existing requirements concerning transfers and recordkeeping for such wastes. The reporting and recordkeeping requirements contained in this section have been approved by the Office of Management and Budget; OMB approval No. 3150-0014.

(b) Each shipment of radioactive waste to a licensed land disposal facility must be accompanied by a shipment manifest that contains the name, address, and telephone number of the person generating the waste. The manifest shall also include the name, address, and telephone number or the name and EPA hazardous waste identification number of the person transporting the waste to the land disposal facility. The manifest must also indicate as completely as practicable: a physical description of the waste; the volume; radionuclide identity and quantity; the total radioactivity; and the principal chemical form. The solidification agent must be specified. Waste containing more than 0.1% chelating agents by weight must be identified and the weight percentage of the chelating agent estimated. Wastes classified as Class A, Class B, or Class C in §61.55 of this chapter must be clearly identified as such in the manifest. The total quantity of the radionuclides H-3, C-14, Tc-99 and I-129 must be shown. The manifest required by this paragraph may be shipping papers used to meet Department of Transportation or Environmental Protection Agency regulations or requirements of the receiver, provided all the required information is included. Copies of manifests required by this section may be legible carbon copies or legible photocopies.

(c) Each manifest must include a certification by the waste generator that the transported materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation and the Commission. An authorized representative of the waste generator shall sign and date the manifest.

(d) Any generating licensee who transfers radioactive waste to a land disposal facility or a licensed waste collector shall comply with the requirements in paragraphs (d)(1) through (8) of this section. Any generating licensee who transfers waste to a licensed waste processor who treats or repackages waste shall comply with the requirements of paragraphs (d)(4) through (8) of this section. A licensee shall:

(1) Prepare all wastes so that the waste is classified according to §61.55 and meets the waste characteristics requirements in §61.56 of this chapter;

(2) Label each package of waste to identify whether it is Class A waste, Class B waste, or Class C waste, in accordance with §61.55 of this chapter;

(3) Conduct a quality control program to assure compliance with §§61.55 and 61.56 of this chapter; the program must include management evaluation of audits;

(4) Prepare shipping manifests to meet the requirements of §§20.311 (b) and (c) of this part;

(5) Forward a copy of the manifest to the intended recipient, at the time of shipment; or, deliver to a collector at the time the waste is collected, obtaining acknowledgement of receipt in the form of a signed copy of the manifest or equivalent documentation from the collector;

(6) Include one copy of the manifest with the shipment;

(7) Retain a copy of the manifest and documentation of acknowledgement of receipt as the record of transfer of licensed material as required by Parts 30, 40, and 70 of this chapter; and,

(8) For any shipments or any part of a shipment for which acknowledgement of receipt has not been received within the times set forth in this section, conduct an investigation in accordance with paragraph (h) of this section.

(e) Any waste collector licensee who handles only prepackaged waste shall:

(1) Acknowledge receipt of the waste from the generator within one week of receipt by returning a signed copy of the manifest or equivalent documentation;

(2) Prepare a new manifest to reflect consolidated shipments; the new manifest shall serve as a listing or index for the detailed generator manifests. Copies of the generator manifests shall be a part of the new manifest. The waste collector may prepare a new manifest without attaching the generator manifests, provided the new manifest contains for each package the information specified in paragraph (b) of this section. The collector licensee shall certify that nothing has been done to the waste which would invalidate the generator's certification;

(3) Forward a copy of the new manifest to the land disposal facility operator at the time of shipment;

(4) Include the new manifest with the shipment to the disposal site;

(5) Retain a copy of the manifest and documentation of acknowledgement of receipt as the record of transfer of licensed material as required by Parts 30, 40, and 70 of this chapter, and retain information from generator manifests until disposition is authorized by the Commission; and,

(6) For any shipments or any part of a shipment for which acknowledgement of receipt is not received within the times set forth in this section, conduct an investigation in accordance with paragraph (h) of this section.

(f) Any licensed waste processor who treats or repackages wastes shall:

(1) Acknowledge receipt of the waste from the generator within one week of receipt by returning a signed copy of the manifest or equivalent documentation;

(2) Prepare a new manifest that meets the requirements of paragraphs (b) and (c) of this section. Preparation of the new manifest reflects that the processor is responsible for the waste;

(3) Prepare all wastes so that the waste is classified according to §61.55 and meets the waste characteristics requirements in §61.56 of this chapter;

(4) Label each package of waste to identify whether it is Class A waste, Class B waste, or Class C waste, in accordance with §,18561.55 and 61.57 of this chapter;

(5) Conduct a quality control program to assure compliance with §§61.55 and 61.56 of this chapter. The program shall include management evaluation of audits;

(6) Forward a copy of the new manifest to the disposal site operator or waste collector at the time of shipment, or deliver to a collector at the time the waste is collected, obtaining acknowledgement of receipt in the form of a signed copy of the manifest or equivalent documentation by the collector;

(7) Include the new manifest with the shipment;

(8) Retain copies of original manifests and new manifests and documentation of acknowledgement of receipt as the record of transfer of licensed material required by Parts 30, 40, and 70 of this chapter; and

(9) For any shipment or part of a shipment for which acknowledgement is not received within the times set forth in this section, conduct an investigation in accordance with paragraph (h) of this section.

(g) The land disposal facility operator shall:

(1) Acknowledge receipt of the waste within one week of receipt by returning a signed copy of the manifest or equivalent documentation to the shipper. The shipper to be notified is the licensee who last possessed the waste and transferred the waste to the operator. The returned copy of the manifest or equivalent documentation shall indicate any discrepancies between materials listed on the manifest and materials received;

(2) Maintain copies of all completed manifests or equivalent documentation until the Commission authorizes their disposition; and

(3) Notify the shipper (i.e., the generator, the collector, or processor) and the Regional Administrator of the nearest Commission Regional Office listed in Appendix D of this part when any shipment or part of a shipment has not arrived within 60 days after the advance manifest was received.

(h) Any shipment or part of a shipment for which acknowledgement is not received within the times set forth in this section, must:

(1) Be investigated by the shipper if the shipper has not received notification of receipt within 20 days after transfer; and

(2) Be traced and reported. The investigation shall include tracing the shipment and filing a report with the nearest Commission Regional Office listed in Appendix D of this part. Each licensee who conducts a trace investigation shall file a written report with the nearest Commission's Regional office within 2 weeks of completion of the investigation.

[47 FR 57479, Dec. 27, 1982]

Records, Reports, and Notification

§20.401 Records of surveys, radiation monitoring, and disposal.

(a) Each licensee shall maintain records showing the radiation exposures of all individuals for whom personnel monitoring is required under §20.202 of the regulations in this part. Such records shall be kept on Form NRC-5, in accordance with the instructions contained in that form or on clear and legible records containing all the information required by Form NRC-5. The doses entered on the forms or records shall be for periods of time not exceeding one calendar quarter.

(b) Each licensee shall maintain records in the same units used in this part, showing the results of surveys required by §20.201(b), monitoring required by §§20.205(b) and 20.205(c), and disposals made under §§20.302, 20.303, removed §20.304,[1] and Part 61 of this chapter.

(c)(1) Records of individual exposure to radiation and to radioactive material which must be maintained pursuant to the provisions of paragraph (a) of this section and records of bioassays, including results of whole body counting examinations, made pursuant to §20.108, shall be preserved until the Commission authorizes disposition.

(2) Records of the results of surveys and monitoring which must be maintained pursuant to paragraph (b) of this section shall be preserved for two years after completion of the survey except that the following records shall be maintained until the Commission authorizes their disposition: (i) Records of the results of surveys to determine compliance with §20.103(a); (ii) in the absence of personnel monitoring data, records of the results of surveys to determine external radiation dose; and (iii) records of the results of surveys used to evaluate the release of radioactive effluents to the environment.

(3) Records of disposal of licensed materials made pursuant to §§20.302, 20,303, removed §20.304,1 and Part 61 of this chapter are to be maintained until the Commission authorizes their disposition.

(4) Records which must be maintained pursuant to this part may be the original or a reproduced copy or microform if such reproduced copy or microform is duly authenticated by authorized personnel and the microform is capable of producing a clear and legible copy after storage for the period specified by Commission regulations.

(5) If there is a conflict between the Commission's regulations in this part, license condition, or technical specification, or other written Commission approval or authorization pertaining to the retention period for the same type of record, the retention period specified in the regulations in this part for such records shall apply unless the Commission pursuant to §20.501, has granted a specific exemption from the record retention requirements specified in the regulations in this part.

[25 FR 10914, Nov. 17, 1960, as amended at 41 FR 18301, May 3, 1976; 47 FR 57480, Dec. 27, 1982]

§20.402 Reports of theft or loss of licensed material.

(a)(1) Each licensee shall report to the Commission, by telephone, immediately after it determines that a loss or theft of licensed material has occurred in such quantities and under such circumstances that it appears to the licensee that a substantial hazard may result to persons in unrestricted areas.

(2) Reports must be made as follows:

(i) Licensees having an installed Emergency Notification System shall make the reports to the NRC Operations Center in accordance with §50.72 of this chapter.

(ii) All other licensees shall make reports to the Administrator of the appropriate NRC Regional Office listed in Appendix D of this part.

(b) Each licensee who makes a report under paragraph (a) of this section shall, within 30 days after learning of the loss or theft, make a report in writing to the U.S. Nuclear Regulatory Commission, Document Control Desk, Washington, D.C. 20555, with a copy to the appropriate NRC Regional Office listed in Appendix D of this part. The report shall include the following information:

(1) A description of the licensed material involved, including kind, quantity, chemical, and physical form;

(2) A description of the circumstances under which the loss or theft occurred;

(3) A statement of disposition or probable disposition of the licensed material involved;

(4) Radiation exposures to individuals, circumstances under which the exposures occurred, and the extent of possible hazard to persons in unrestricted areas;

(5) Actions which have been taken, or will be taken, to recover the material; and

(6) Procedures or measures which have been or will be adopted to prevent a recurrence of the loss or theft of licensed material.

(c) Subsequent to filing the written report the licensee shall also report any substantive additional information on the loss or theft which becomes available to the licensee, within 30 days after he learns of such information.

(d) Any report filed with the Commission pursuant to this section shall be so prepared that names of individuals who may have received exposure to radiation are stated in a separate part of the report.

(e) For holders of an operating license for a nuclear power plant, the events included in paragraph (b) of this section must be reported in accordance with the procedures described in §50.73 (b), (c), (d), (e), and (g) of this chapter and must include the information required in paragraph (b) of this section. Events reported in accordance with §50.73 of this chapter need not be reported by a duplicate report under paragraph (b) of this section.

[34 FR 7500, May 9, 1969, as amended at 38 FR 1271, Jan. 11, 1973; 48 FR 33859, July 26, 1983]

§20.403 Notifications of incidents.

(a) *Immediate notification.* Each licensee shall immediately report any events involving byproduct, source, or special nuclear material possessed by the licensee that may have caused or threatens to cause:

(1) Exposure of the whole body of any individual to 25 rems or more of radiation; exposure of the skin of the whole body of any individual of 150 rems or more or radiation; or exposure of the feet, ankles, hands or forearms of any individual to 375 rems or more of radiation; or

(2) The release of radioactive material in concentrations which, if averaged over a period of 24 hours, would exceed 5,000 times the limits specified for such materials in Appendix B, Table II of this part.

(b) *Twenty-four hour notification.* Each licensee shall within 24 hours of discovery of the event, report any event involving licensed material possessed by the licensee that may have caused or threatens to cause:

(1) Exposure of the whole body of any individual to 5 rems or more of radiation; exposure of the skin of the whole body of any individual to 30 rems or more of radiation; or exposure of the feet, ankles, hands, or forearms to 75 rems or more of radiation; or

(2) The release of radioactive material in concentrations which, if averaged over a period of 24 hours, would exceed 500 times the limits specified for such materials in Appendix B, Table II of this part.

(c) Any report filed with the Commission pursuant to this section shall be prepared so that names of individuals who have received exposure to radiation will be stated in a separate part of the report.

(d) Reports made by licensees in response to the requirements of this section must be made as follows:

(1) Licensees that have an installed Emergency Notification System shall make the reports required by paragraphs (a) and (b) of this section to the NRC Operations Center in accordance with §50.72 of this chapter.

(2) All other licensees shall make the reports required by paragraphs (a) and (b) of this section by telephone to the NRC Operations Center[1] and by telegram, mailgram, or facsimile to the Administrator of the appropriate NRC Regional Office listed in Appendix D of this part.

[27 FR 5905, June 22, 1962, as amended at 28 FR 6823, July 3, 1963; 42 FR 43965, Sept. 1, 1977; 43 FR 2719, Jan. 19, 1978; 48 FR 33859, July 26, 1983; 52 FR 33917, Sept. 9, 1987]

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[1]Commercial telephone number of the NRC Operations Center is (202) 951-0550.

§20.404 [Reserved]

§20.405 Reports of overexposures and excessive levels and concentrations.

(a)(1) In addition to any notification required by §20.403 of this part, each licensee shall make a report in writing concerning any one of the following types of incidents within 30 days of its occurrence:

(i) Each exposure of an individual to radiation in excess of the applicable limits in §§20.101 or 20.104(a) of this part, or the license;

(ii) Each exposure of an individual to radioactive material in excess of the applicable limits in §§20.103(a)(1), 20.103(a)(2), or §20.104(b) of this part, or in the license;

(iii) Levels of radiation or concentrations of radioactive material in a restricted area in excess of any other applicable limit in the license;

(iv) Any incident for which notification is required by §20.403 of this part; or

(v) Levels of radiation or concentrations of radioactive material (whether or not involving excessive exposure of any individual) in an unrestricted area in excess of ten times any applicable limit set forth in this part or in the license.

(2) Each report required under paragraph (a)(1) of this section must describe the extent of exposure of individuals to radiation or to radioactive material, including:

(i) Estimates of each individual's exposure as required by paragraph (b) of this section;

(ii) Levels of radiation and concentrations of radioactive material involved;

(iii) The cause of the exposure, levels or concentrations; and

(iv) Corrective steps taken or planned to prevent a recurrence.

(b) Any report filed with the Commission pursuant to paragraph (a) of this section shall include for each individual exposed the name, social security number, and date of birth, and an estimate of the individual's exposure. The report shall be prepared so that this information is stated in a separate part of the report.

(c)(1) In addition to any notification required by §20.403 of this part, each licensee shall make a report in writing of levels of radiation or releases of radioactive material in excess of limits specified by 40 CFR Part 190, "Environmental Radiation Protection Standards for Nuclear Power Operations," or in excess of license conditions related to compliance with 40 CFR Part 190.

(2) Each report submitted under paragraph (c)(1) of this section must describe:

(i) The extent of exposure of individuals to radiation or to radioactive material;

(ii) Levels of radiation and concentrations of radioactive material involved;

(iii) The cause of the exposure, levels, or concentrations; and

(iv) Corrective steps taken or planned to assure against a recurrence, including the schedule for achieving conformance with 40 CFR Part 190 and with associated license conditions.

(d) For holders of an operating license for a nuclear power plant, the incidents included in paragraphs (a) or (c) of this section must be reported in accordance with the procedures described in §50.73 (b), (c), (d), (e), and (g) of this chapter and must also include the information required by paragraphs (a) and (c) of this section. Incidents reported in accordance with §50.73 of this chapter need not be reported by a duplicate report under paragraphs (a) or (c) of this section.

(e) All other licensees who make reports under paragraphs (a) or (c) of this section shall, within 30 days after learning of the overexposure or excessive level or concentration, make a report in writing to the U.S. Nuclear Regulatory Commission, Document Control Desk, Washington, D.C. 20555, with a copy to the appropriate NRC Regional Office listed in Appendix D of this part.

[25 FR 10914, Nov. 17, 1960, as amended at 35 FR 15068, Sept. 29, 1970; 46 FR 18526, Mar. 25, 1981; 48 FR 33860, July 26, 1983]

§20.406 [Reserved]

§20.407 Personnel monitoring reports.

Each person described in §20.408 of this part shall, within the first quarter of each calendar year, submit to the Director, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, DC 20555, the reports specified in paragraphs (a) and (b) of this section, covering the preceding calendar year.[1]

(a) A report of either (1) the total number of individuals for whom personnel monitoring was required under §20.202(a) or §34.33(a) of this chapter during the calendar year; or (2) the total number of individuals for whom personnel monitoring was provided during the calendar year: *Provided, however*, That such total includes at least the number of individuals required to be reported under paragraph (a)(1) of this section. The report shall indicate whether it is submitted in accordance with paragraph (a)(1) or (a)(2) of this section. If personnel monitoring was not required to be provided to any individual by the licensee under §§20.202(a) or 34.33(a) of this chapter during the calendar year, the licensee shall submit a negative report indicating that such personnel monitoring was not required.

(b) A statistical summary report of the personnel monitoring information recorded by the licensee for individuals for whom personnel monitoring was either required or provided, as described in paragraph (a) of this section, indicating the number of individuals whose total whole body exposure recorded during the previous calendar year was in each of the following estimated exposure ranges:

Estimated whole body exposure range (rems)[1]	Number of individuals in each range
No measureable exposure	
Measurable exposure less than 0.1	
0.1 to 0.25	
0.25 to 0.5	
0.5 to 0.75	
0.75 to 1	
1 to 2	
2 to 3	
3 to 4	
4 to 5	
5 to 6	
6 to 7	
7 to 8	
8 to 9	
9 to 10	
10 to 11	
11 to 12	
12 +	

[1]A licensee whose license expires or terminates prior to, or on the last day of the calendar year, shall submit reports at the expiration or termination of the license, covering that part of the year during which the license was in effect.

[1]Individual values exactly equal to the values separating exposure ranges shall be reported in the higher range.

The low exposure range data are required in order to obtain better information about the exposures actually recorded. This section does not require improved measurements.

[43 FR 44829, Sept. 29, 1978, as amended at 49 FR 24513, June 14, 1984]

§20.408 Reports of personnel monitoring on termination of employment or work.

(a) This section applies to each person licensed by the Commission to:

(1) Operate a nuclear reactor designed to produce electrical or heat energy pursuant to §50.21(b) or §50.22 of this chapter or a testing facility as defined in §50.2 of this chapter.

(2) Possess or use byproduct material for purposes of radiography pursuant to Parts 30 and 34 of this chapter;

(3) Possess or use at any one time, for purposes of fuel processing, fabricating, or reprocessing, special nuclear material in a quantity exceeding 5,000 grams of contained uranium-235, uranium-233, or plutonium or any combination thereof pursuant to Part 70 of this chapter;

(4) Possess high-level radioactive waste at a geologic repository operations area pursuant to Part 60 of this chapter; or

(5) Possess spent fuel in an independent spent fuel storage installation (ISFSI) or possess spent fuel or high level radioactive waste in a monitored retrievable storage installation (MRS) pursuant to Part 72 of this chapter; or

(6) Possess or use at any one time, for processing or manufacturing for distribution pursuant to Parts 30, 32, or 33 of this Chapter, byproduct material in quantities exceeding any one of the following quantities:

Radionuclide[1]	Quantity in curies
Cesium-137	1
Cobalt-60	1
Gold-198	100
Iodine-131	1
Iridium-192	10
Krypton-85	1,000
Prometium-147	10
Technetium-99m	1,000

[1]The Commission may require, as a license condition, or by rule, regulation or order pursuant to §20.502, reports from licensees who are licensed to use radionuclides not on this list, in quantities sufficient to cause comparable radiation levels.

(7) Receive radioactive waste from other persons for disposal under Part 61 of this chapter.

(b) When an individual terminates employment with a licensee described in paragraph (a) of this section, or an individual assigned to work in such a licensee's facility, the licensee shall furnish to the REIRS Project Manager, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, DC 20555, a report of the individual's exposures to radiation and radioactive material, incurred during the period of employment or work assignment in the licensee's facility, containing information recorded by the licensee pursuant to §§20.401(a) and 20.108. Such report shall be furnished within 30 days after the exposure of the individual gas been determined by the licensee or 90 days after the date of termination of employment or work assignment, whichever is earlier.

[43 FR 44829, Sept. 29, 1978, as amended at 46 FR 13978, Feb. 25, 1981; 46 FR 58282, Dec. 1, 1981; 47 FR 57480, Dec. 27, 1982; 49 FR 24513, June 14, 1984; 50 FR 34085, Aug. 23, 1985]

§20.409 Notifications and reports to individuals.

(a) Requirements for notifications and reports to individuals of exposure to radiation or radioactive material are specified in § 19.13 of this chapter.

(b) When a licensee is required pursuant to §§20.405 or 20.408 to report to the Commission any exposure of an individual to radiation or radioactive material, the licensee shall also notify the individual. Such notice shall be transmitted at a time not later than the transmittal to the Commission, and shall comply with the provisions of §19.13(a) of this chapter.

[38 FR 22220, Aug. 17, 1973]

Exceptions and Additional Requirements

§20.501 Applications for exemptions.

The Commission may, upon application by any licensee or upon its own initiative, grant such exemptions from the requirements of the regulations in this part as it determines are authorized by law and will not result in undue hazard to life or property.

§20.502 Additional requirements.

The Commission may, by rule, regulation, or order, impose upon any licensee such requirements, in addition to those established in the regulations in this part, as it deems appropriate or necessary to protect health or to minimize danger to life or property.

Enforcement

§20.601 Violations.

An injunction or other court order may be obtained prohibiting any violation of any provision of the Atomic Energy Act of 1954, as amended, or Title II of the Energy Reorganization Act of 1974, or any regulation or order issued thereunder. A court order may be obtained for the payment of a civil penalty imposed pursuant to section 234 of the Act for violation of section 53, 57, 62, 63, 81, 82, 101, 103, 104, 107, or 109 of the Act, or section 206 of the Energy Reorganization Act of 1974, or any rule, regulation, or order issued thereunder, or any term, condition, or limitation of any license issued thereunder, or for any violation for which a license may be revoked under section 186 of the Act. Any person who willfully violates any provision of the Act or any regulation or order issued thereunder may be guilty of a crime and, upon conviction, may be punished by fine or imprisonment or both, as provided by law.

[40 FR 8784, Mar. 3, 1975]

APPENDIX A—PROTECTION FACTORS FOR RESPIRATORS[a]

Description[b]	Modes[c]	Protection factors[d]		Tested and certified equipment—National Institute for Occupational Safety and Health/Mine Safety and health Adminstration tests for permissibility
		Particulates only	Particulates, gases and vapors[e]	
I. Air-purifying respirators[f]				
Facepiece, half-mask[g]	NP	10		30 CFR Part 11, Subpart K
Facepiece, full	NP	50		
Facepiece, half-mask, full, or hood	PP	1 s,000		
II. Atmosphere-supplying respirators				
1. Air-line respirator:				
Facepiece, half-mask	CF		1,000	
Facepiece, half-mask	D		5	
Facepiece, full	CF		2,000	
Facepiece, full	D		5	30 CFR Part 11, Subpart J
Facepiece, full	PD		2,000	
Hood	CF		([h])	
Suit	CF		([i])	([j])
2. Self-contained breathing apparatus (SCBA)				
Facepiece, full	D		50	
Facepiece, full	PD		[k]10,000	30 CFR Part 11, Subpart H
Facepiece, full	RD		50	
Facepiece, full	RP		[l]5,000	
III. Combination respirator: Any combination of air-purifying and atmosphere-supplying respirators				

[a]For use in the selection of respiratory protective devices to be used only where the contaminants have been identified and the concentrations (or possible concentrations) are known.

[b]Only for shaven faces and where nothing interferes with the seal of tightfitting facepieces against the skin. (Hoods and suits are excepted.)

[c]The mode symbols are defined as follows: CF = continuous flow; D = demand; NP = negative pressure (i.e., negative phase during inhalation); PD = pressure demand (i.e., always positive pressure); PP = positive pressure; RD = demand, recirculating (closed circuit); RP = positive pressure, recirculating (closed circuit).

[d-1] The protection factor is a measure of the degree of protection afforded by a respirator defined as the ratio of the concentration of airborne radioactive material outside the respiratory protective equipment to that inside the equipment (usually inside the facepiece) under conditions of use. It is applied to the ambient airborne concentration to estimate the concentrations inhaled by the wearer according to the following formula:

Concentration inhalled = (Ambient airborne concentrations)/(Protection factor)

[d-2]The protection factors apply:

(a) Only for trained individuals wearing properly fitted respirators used and maintained under supervision in a well-planned respiratory protective program.

(b) For air-purifying respirators only when high efficiency particulate filters [above 99.97% removal efficiency by thermally generated 0.3 μm dioctyl phthalate (DOP) test] are used in atmospheres not deficient in oxygen and not containing radioactive gas or vapor respiratory hazards.

(c) No allowance is to be made for the use of sorbents against radioactive gases or vapors.

(d) For atmosphere-supplying respirators only when supplied with adequate respirable air. Respirable air shall be provided of the quality and quantity required in accordance with NIOSH/MSHA certification (described in 30 CFR Part 11). Oxygen and air shall not be used in the same apparatus.

APPENDIX A—PROTECTION FACTORS FOR RESPIRATORS[a]

Description[b]	Modes[c]	Protection factors[d]		Tested and certified equipment—National Institute for Occupational Safety and Health/Mine Safety and health Adminstration tests for permissibility
		Particulates only	Particulates, gases and vapors[e]	

(continued)

[e]Excluding radioactive contaminants that present an absorption or submersion hazard. For tritium oxide, approximately one half of the intake occurs by absorption through the skin so that an overall protection factor of less than 2 is appropriate when atmosphere-supplying respirators are used to protect against tritium oxide. If the protection factor for a device is 5, the effective protection factor for tritium is about 1.4; for devices with protection factors of 10 the effective factor for tritium oxide is about 1.7; and for devices with protection factors of 100 or more the effective protection factor for tritium oxide is about 1.9. Air-purifying respirators are not suitable for protection against tritium oxide. See aslo footnote i concerning supplied-air suits.

[f]Canisters and cartidges shall not be used beyond service-life limitations.

[g]Under-chin type only. This type of respirator is not satisfactory for use where it might be possible (e.g., if an accident or emergency were to occur) for the ambient airborne concentration to reach instantaneous values greater than 10 times the pertinent values in Table 1. Column 1 of Appendix B of this part. This type of respirator is not suitable for protection against plutonium or other high-toxicity materials. The mask shall be tested for fit with irritant smoke, prior to use, each time it is donned.

[h]Equipment shall be operated in a manner that ensures that proper air flow-rates are maintained. A protection factor of no more than 1000 may be used for tested-and-certified supplied-air hoods when a minimum air flow of 6 cubic feet per minute is maintained and calibrated airline pressure gauges or flow measuring devices are used. A protection factor of up to 2000 may be used for tested and certified hoods only when the air flow is maintained at the manufacturer's recommended maximum rate for the equipment, this rate is greater than 6 cubic feet per minute, and calibrated airline pressure gauges or flow measuring devices are used.

The design of the supplied-air hood or helmet (with a minimum flow of 6 cfm of air) may determine its overall efficiency and the protection it provides. For example, some hoods aspirate contaminated air into the breathing zone when the wearer works with hands-over-head. This aspiration may be overcome if a short cape-like extension to the hood is worn under a coat or overalls. Other limitations specified by the approval agency shall be considered before using a hood in certain types of atmospheres, such as the design and its permeability to the contaminent under conditions of use.

[i]Appropriate protection factors shall be determined [see 20.103(e)], taking into account the design of the suit and its permeability to the contaminent under conditions of use. There shall be a standby rescue person equipped with self-contained breathing apparatus and communications equipment whenever supplied-air suits are used.

[j]No approval schedules are currently available for this equipment. Equipment shall be evaluated by testing or on the basis of reliable test information.

[k]This type of respirator may provide greater protection and be used as an emergency device in unknown concentrations for protection against inhalation hazards. External radiation hazards and other limitations to permitted exposure such as skin absorption shall be taken into account in these circumstances.

[l]Quantitative fit testing shall be performed on each individual and no more than 0.02% leakage is allowed with this type of apparatus. Perceptible outward leakage of gas from this or any positive pressure self-contained breathing apparatus is unacceptable because service life will be reduced substantially. Special training in the use of this type of apparatus shall be provided to the wearer (see footnote k).

[m]Protection factor for type and mode of operations as listed above.

NOTE 1: Protection factors for respirators, as may be approved by the U.S. Bureau of Mines/National Institute for Occupational Safety and Health (NIOSH) according to applicable approvals for respirators for type and mode of use to protect against airborne radionuclides, may be used to the extent that they do not exceed the protection factors listed in this table. The protection factors listed in this table may not be appropriate to circumstances where chemical or other respiratory hazards exist in addition to radiological hazards. The selection and use of respirators for these circumstances should take into account applicable approvals of the U.S. Bureau of Mines/NIOSH.

NOTE 2: Radioactive contaminants for which the concentration values in Table 1, column 1, Appendix B of this part are based on internal dose due to inhalation may, in addition, present external exposure hazards at higher concentrations. Under these circumstances, limitations on occupancy may have to be governed by external dose limits.

[47 FR 16165, Apr. 15, 1982; 47 FR 19511, May 6, 1982]

APPENDIX B—CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND

[See footnotes at end of Appendix B]

Element (atomic number)	Isotope[1]		Table I		Table II	
			Col—Air (μCi/ml)	Col 2—Water (μCi/ml)	Col 1—Air (μCi/ml)	Col 2—Water (μCi/ml)
Actinium (89)	Ac 227	S	2×10^{-12}	6×10^{-5}	8×10^{-14}	2×10^{-6}
		I	3×10^{-11}	9×10^{-3}	9×10^{-13}	3×10^{-4}
	Ac 228	S	8×10^{-8}	3×10^{-3}	3×10^{-9}	9×10^{-5}
		I	2×10^{-8}	3×10^{-3}	6×10^{-10}	9×10^{-5}
Americium (95)	Am 241	S	6×10^{-12}	1×10^{-4}	2×10^{-13}	4×10^{-6}
		I	1×10^{-10}	8×10^{-4}	4×10^{-12}	3×10^{-5}
	Am 242m	S	6×10^{-12}	1×10^{-13}	2×10^{-13}	4×10^{-6}
		I	3×10^{-10}	3×10^{-3}	9×10^{-12}	9×10^{-5}
	Am 242	S	4×10^{-8}	4×10^{-3}	1×10^{-9}	1×10^{-4}
		I	5×10^{-8}	4×10^{-3}	2×10^{-9}	1×10^{-4}
	Am 243	S	6×10^{-12}	1×10^{-4}	2×10^{-13}	4×10^{-4}
		I	1×10^{-10}	8×10^{-4}	4×10^{-12}	3×10^{-5}
	Am 244	S	4×10^{-6}	1×10^{-1}	1×10^{-7}	5×10^{-3}
		I	2×10^{-5}	1×10^{-1}	8×10^{-7}	5×10^{-3}
Antimony	Sb 122	S	2×10^{-1}	8×10^{-4}	6×10^{-9}	3×10^{-5}
		I	1×10^{-7}	8×10^{-4}	5×10^{-9}	3×10^{-5}
	Sb 124	S	2×10^{-7}	7×10^{-4}	5×10^{-9}	2×10^{-5}
		I	2×10^{-8}	7×10^{-4}	7×10^{-10}	2×10^{-5}
	Sb 125	S	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	3×10^{-8}	3×10^{-3}	9×10^{-10}	1×10^{-4}
Argon (18)	A 37	Sub[2]	6 x1-3		1×10^{-4}	
	A 41	Sub	2×10^{-6}		4×10^{-8}	
Arsenic (33)	As 73	S	2×10^{-6}	1×10^{-2}	7×10^{-8}	5×10^{-4}
		I	4×10^{-7}	1×10^{-2}	1×10^{-8}	5×10^{-4}
	As 74	S	3×10^{-7}	2×10^{-3}	1×10^{-8}	5×10^{-5}
		I	1×10^{-7}	2×10^{-3}	4×10^{-9}	5×10^{-5}
	As 76	S	1×10^{-7}	6×10^{-4}	4×10^{9}	2×10^{-5}
		I	1×10^{-7}	6×10^{-4}	3×10^{-9}	2×10^{-5}
	As 77	S	5×10^{-7}	2×10^{-3}	2×10^{-8}	8×10^{-5}
		I	4×10^{-7}	2×10^{-3}	1×10^{-8}	8×10^{-5}
Astatine (85)	At 211	s	7×10^{-9}	5×10^{-5}	2×10^{-10}	2×10^{-6}
		I	3×10^{-8}	2×10^{-3}	1×10^{-9}	7×10^{-5}
Barium (56)	Ba 131	S	1×10^{-6}	5×10^{-3}	4×10^{-8}	2×10^{-4}
		I	4×10^{-7}	5×10^{-3}	1×10^{-8}	2×10^{-4}

APPENDIX B—CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND

[See footnotes at end of Appendix B]

Element (atomic number)	Isotope[1]		Table I		Table II	
			Col—Air (μCi/ml)	Col 2—Water (μCi/ml)	Col 1—Air (μCi/ml)	Col 2—Water (μCi/ml)
	Ba 140	S	1×10^{-7}	8 x 10-4	4×10^{-9}	3×10^{-5}
		I	4×10^{8}	7×10^{-4}	1×10^{-9}	2×10^{-5}
Berkelium (97)	Bk 249	S	9×10^{-10}	2×10^{-2}	3×10^{-11}	6×10^{-4}
		I	1×10^{-7}	2×10^{-2}	4×10^{-9}	6×10^{-4}
	Bk 250	S	1×10^{-7}	6×10^{-3}	5×10^{-7}	2×10^{-4}
		I	1×10^{-6}	6×10^{-3}	4×10^{-8}	2×10^{-4}
Beryllium (4)	Be 7	S	6×10^{-6}	5×10^{-2}	2×10^{-7}	2×10^{-3}
		I	1×10^{-6}	5×10^{-2}	4×10^{-8}	2×10^{-3}
Bismuth (83)	Bi 206	S	2×10^{-7}	1×10^{-3}	6×10^{-9}	4×10^{-5}
		I	1×10^{-7}	1×10^{-3}	5×10^{-9}	4 x 10-5
	Bi 207	S	2×10^{-7}	2×10^{-3}	6×10^{-9}	6×10^{-5}
		I	1×10^{-8}	2×10^{-3}	5×10^{-10}	6×10^{-5}
	Bi 210	S	6×10^{-7}	1×10^{-3}	2×10^{-10}	4×10^{-5}
		I	6×10^{-9}	1×10^{-3}	2×10^{-10}	4×10^{-5}
	Bi 212	S	1×10^{-7}	1×10^{-2}	3×10^{-9}	4×10^{-4}
		I	2×10^{-7}	1×10^{-2}	7×10^{-9}	4×10^{-4}
Bromine (35)	Br 82	S	1×10^{-6}	8×10^{-3}	4×10^{-8}	3×10^{-4}
		I	2×10^{-7}	1×10^{-3}	6×10^{-9}	4×10^{-5}
Cadmium (48)	Cd 109	S	5×10^{-8}	5×10^{-3}	2×10^{-9}	2×10^{-4}
		I	7×10^{-8}	5×10^{-3}	3×10^{-9}	2×10^{-4}
	Cd 115m	S	4×10^{-8}	7×10^{-4}	1×10^{-9}	3×10^{-5}
		I	4×10^{-8}	7×10^{-4}	1×10^{-9}	3×10^{-5}
	Cd 115	S	2×10^{-7}	1×10^{-3}	8×10^{-9}	3×10^{-5}
		I	2×10^{-7}	1×10^{-3}	6×10^{-9}	4×10^{-5}
Calcium (20)	Ca 45	S	3×10^{-8}	3×10^{-4}	1×10^{-9}	9×10^{-6}
		I	1×10^{-7}	5×10^{-3}	4×10^{-9}	2×10^{-4}
	Ca 47	S	2×10^{-7}	1×10^{-3}	6×10^{-9}	5×10^{-5}
		I	2×10^{-7}	1×10^{-3}	6×10^{-9}	3×10^{-5}
Californium (98)	Cf 249	S	2×10^{-12}	1×10^{-4}	5×10^{-14}	4×10^{-6}
		I	1×10^{-10}	7×10^{-4}	3×10^{-12}	2×10^{-5}
	Cf 250	S	5×10^{-12}	4×10^{-4}	2×10^{-13}	1×10^{-5}
		I	1×10^{-10}	7×10^{-4}	3×10^{-12}	3×10^{-5}
	Cf 251	S	2×10^{-12}	1×10^{-4}	6×10^{-14}	4×10^{-6}
		I	1×10^{-10}	8×10^{-4}	3×10^{-12}	3×10^{-5}

APPENDIX B—CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND

[See footnotes at end of Appendix B]

Element (atomic number)	Isotope[1]		Table I		Table II	
			Col—Air (μCi/ml)	Col 2—Water (μCi/ml)	Col 1—Air (μCi/ml)	Col 2—Water (μCi/ml)
	Cf 252	S	6×10^{-12}	2×10^{-4}	2×10^{-13}	7×10^{-6}
		I	3×10^{-11}	2×10^{-4}	1×10^{-12}	7×10^{-6}
	Cf 253	S	8×10^{-10}	4×10^{-3}	3×10^{-11}	1×10^{-4}
		I	8×10^{-10}	4×10^{-3}	3×10^{-11}	1×10^{-4}
	Cf 254	S	5×10^{-12}	4×10^{-6}	2×10^{-13}	1×10^{-7}
		I	5×10^{-12}	4×10^{-6}	2×10^{-13}	1×10^{-7}
Carbon (6)	C 14	S	4×10^{-6}	2×10^{-2}	1×10^{-7}	8×10^{-4}
	(Co_2)	Sub	5×10^{-5}		1×10^{-6}	
Cerium (58)	Ce 141	S	4×10^{-7}	3×10^{-3}	2×10^{-8}	9×10^{-5}
		I	2×10^{-7}	3×10^{-3}	5×10^{-9}	9×10^{-5}
	Ce 143	S	3×10^{-7}	1×10^{-3}	9×10^{-9}	4×10^{-5}
		I	2×10^{-7}	1×10^{-3}	7×10^{-9}	4×10^{-5}
	Ce 144	S	1×10^{-8}	3×10^{-4}	3×10^{-10}	1×10^{-5}
		I	6×10^{-9}	3×10^{-4}	2×10^{-10}	1×10^{-5}
Cesium (55)	Cs 131	S	1×10^{-5}	7 x 10-2	4×10^{-7}	2×10^{-3}
		I	3×10^{-6}	3×10^{-2}	1×10^{-7}	9×10^{-4}
	Cs 134m	S	4×10^{-5}	2×10^{-1}	1×10^{-6}	6×10^{-3}
		I	6×10^{-6}	3×10^{-2}	2×10^{-7}	1×10^{-3}
	Cs 134	S	4×10^{-8}	3×10^{-4}	1×10^{-9}	9×10^{-6}
		I	1×10^{-8}	1×10^{-3}	4×10^{-10}	4×10^{-5}
	Cs 135	S	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	9×10^{-8}	7×10^{-3}	3×10^{-9}	2×10^{-4}
	Cs 136	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	9×10^{-5}
		I	2×10^{-7}	2×10^{-3}	6×10^{-9}	6×10^{-5}
	Cs 137	S	6×10^{-8}	4×10^{-4}	2×10^{-9}	2×10^{-5}
		I	1×10^{-8}	1×10^{-3}	5×10^{-10}	4×10^{-5}
Chlorine (17)	Cl 36	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	8×10^{-5}
		I	2×10^{-8}	2×10^{-3}	8×10^{-10}	6×10^{-5}
	Cl 38	S	3×10^{-6}	1×10^{-2}	9×10^{-8}	4×10^{-4}
		I	2×10^{-6}	1×10^{-2}	7×10^{-8}	4×10^{-4}
Chromium (24)	Cr 51	S	1×10^{-5}	5×10^{-2}	4×10^{-7}	2×10^{-3}
		I	2×10^{-6}	5×10^{-2}	8×10^{-8}	2×10^{-3}
Cobalt (27)	Co 57	S	3×10^{-6}	2×10^{-2}	1×10^{-7}	5×10^{-4}
		I	2×10^{-7}	1×10^{-2}	6×10^{-9}	4×10^{-4}

APPENDIX B—CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND

[See footnotes at end of Appendix B]

Element (atomic number)	Isotope[1]		Table I		Table II	
			Col—Air (μCi/ml)	Col 2—Water (μCi/ml)	Col 1—Air (μCi/ml)	Col 2—Water (μCi/ml)
	Co 58m	S	2×10^{-5}	8×10^{-2}	6×10^{-7}	3×10^{-3}
		I	9×10^{-6}	6×10^{-2}	3×10^{-8}	2×10^{-3}
	Co 58	S	8×10^{-7}	4×10^{-3}	3×10^{-8}	' x 10^{-4}
		I	5×10^{-8}	3×10^{-3}	2×10^{-9}	9×10^{-5}
	Co 60	S	3×10^{-7}	1×10^{-3}	1×10^{-8}	5×10^{-5}
		I	9×10^{-9}	1×10^{-2}	3×10^{-10}	3×10^{-5}
Copper (29)	Cu 64	S	2×10^{-6}	1×10^{-2}	7×10^{-8}	3×10^{-4}
		I	1×10^{-6}	6×10^{-3}	4×10^{-8}	2×10^{-4}
Curium (96)	Cm 242	S	1×10^{-10}	7×10^{-4}	4×10^{-12}	2×10^{-5}
		I	2×10^{-10}	7×10^{-4}	6×10^{-12}	2×10^{-5}
	Cm 243	S	6×10^{-12}	1×10^{-4}	2×10^{-13}	5×10^{-6}
		I	1×10^{-10}	7×10^{-4}	3×10^{-12}	2×10^{-5}
	Cm 244	S	9×10^{-12}	2×10^{-4}	3×10^{-13}	7 x 10-6
		I	1×10^{10}	8×10^{-4}	3×10^{-12}	3×10^{-5}
	Cm 245	S	5×10^{-12}	1×10^{-4}	2×10^{-13}	4×10^{-6}
		I	1×10^{-10}	8×10^{-4}	4×10^{-12}	3×10^{-5}
	Cm 246	S	5×10^{-12}	1×10^{-4}	2×10^{-13}	4×10^{-6}
		I	1×10^{-10}	8×10^{-4}	4×10^{-12}	3×10^{-5}
	Cm 247	S	5×10^{-12}	1×10^{-4}	2×10^{-13}	4×10^{-6}
		I	1×10^{-10}	6×10^{-4}	4×10^{-12}	2×10^{-5}
	Cm 248	S	6×10^{-13}	1×10^{-5}	2×10^{-14}	4×10^{-7}
		I	1×10^{-11}	4×10^{-5}	4×10^{-13}	1×10^{-6}
	Cm 249	S	1×10^{-5}	6×10^{-2}	4×10^{-7}	2×10^{-3}
		I	1×10^{-5}	6×10^{-2}	4×10^{-7}	2×10^{-3}
Dysporsium (66)	Dy 165	S	3×10^{-6}	1×10^{-2}	9×10^{-8}	4×10^{-4}
		I	2×10^{-6}	1×10^{-2}	7×10^{-8}	4×10^{-4}
	Dy 166	S	2×10^{-7}	1×10^{-3}	8×10^{-9}	4×10^{-5}
		I	2×10^{-7}	1×10^{-3}	7×10^{-9}	4×10^{-5}
Einsteinium (99)	Es 253	S	8×10^{-10}	7×10^{-4}	3×10^{-11}	2×10^{-5}
		I	6×10^{-10}	7×10^{-4}	2×10^{-11}	2×10^{-5}
	Es 254m	S	5×10^{-9}	5×10^{-4}	2×10^{-10}	2×10^{-5}
		I	6×10^{-9}	5×10^{-4}	2×10^{-10}	2×10^{-5}
	Es 254	S	2×10^{-11}	4×10^{-4}	6×10^{-13}	1×10^{-5}
		I	1×10^{-10}	4×10^{-4}	4×10^{-12}	1×10^{-5}

APPENDIX B—CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND

[See footnotes at end of Appendix B]

Element (atomic number)	Isotope[1]		Table I		Table II	
			Col—Air (μCi/ml)	Col 2—Water (μCi/ml)	Col 1—Air (μCi/ml)	Col 2—Water (μCi/ml)
	Es 255	S	5×10^{-10}	8×10^{-4}	2×10^{-11}	3×10^{-5}
		I	4×10^{-10}	8×10^{-4}	1×10^{-11}	3×10^{-5}
Erbium (68)	Er 169	S	6×10^{-7}	3×10^{-3}	2×10^{-8}	9×10^{-5}
		I	4×10^{-7}	3×10^{-3}	1×10^{-8}	9×10^{-5}
	Er 171	S	7×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	6×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
Europium (63)	Eu 152	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
	(T/2 = 9.2 hrs)	I	3×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
	Eu 152	S	1×10^{-8}	2×10^{-3}	4×10^{-10}	8×10^{-5}
	(T/2 = 13 yrs)	I	2×10^{-8}	2×10^{-3}	6×10^{-10}	8×10^{-5}
	Eu 154	S	4×10^{-9}	6×10^{-4}	1×10^{-10}	2×10^{-5}
		I	7×10^{-9}	6×10^{-4}	2×10^{-10}	2×10^{-5}
	Eu 155	S	9×10^{-8}	6×10^{-3}	3×10^{-9}	2×10^{-4}
		I	7×10^{-8}	6×10^{-3}	3×10^{-9}	2×10^{-4}
Ferium (100)	Fm 254	S	6×10^{-8}	4×10^{-3}	2×10^{-9}	1×10^{-4}
		I	7×10^{-8}	4×10^{-3}	2×10^{-9}	1×10^{-4}
	Fm 255	S	2×10^{-8}	1×10^{-3}	6×10^{-10}	3×10^{-5}
		I	1×10^{-8}	1×10^{-3}	4×10^{-10}	3×10^{-5}
	Fm 256	S	3×10^{-9}	3×10^{-5}	1×10^{-10}	9×10^{-7}
		I	2×10^{-9}	3×10^{-5}	6×10^{-11}	9×10^{-7}
Fluorine (9)	F 18	S	5×10^{-6}	2×10^{-2}	2×10^{-7}	8×10^{-4}
		I	3×10^{-6}	1×10^{-2}	9×10^{-8}	5×10^{-4}
Gadolinium (64)	Gd 153	S	2×10^{-7}	6×10^{-3}	8×10^{-9}	2×10^{-4}
		I	9×10^{-8}	6×10^{-3}	3×10^{-9}	2×10^{-4}
	Gd 159	S	5×10^{-7}	2×10^{-3}	2×10^{-8}	8×10^{-5}
		I	4×10^{-7}	2×10^{-3}	1×10^{-8}	8×10^{-5}
Gallium (31)	Ga 72	s	2×10^{-7}	1×10^{-3}	8×10^{-9}	4×10^{-5}
		I	2×10^{-7}	1×10^{-3}	6×10^{-9}	4×10^{-5}
Germanium (32)	Ge 71	S	1×10^{-5}	5×10^{-2}	4×10^{-7}	2×10^{-3}
		I	6×10^{-6}	5×10^{-2}	2×10^{-7}	2×10^{-3}
Gold (79)	Au 196	S	1×10^{-6}	5×10^{-3}	4×10^{-8}	2×10^{-4}
		I	6×10^{-7}	4×10^{-3}	2×10^{-8}	1×10^{-4}
	Au 198	S	3×10^{-7}	2×10^{-3}	1×10^{-8}	5×10^{-5}
		I	2×10^{-7}	1×10^{-3}	8×10^{-9}	5×10^{-5}

APPENDIX B—CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND

[See footnotes at end of Appendix B]

Element (atomic number)	Isotope[1]		Table I		Table II	
			Col—Air (μCi/ml)	Col 2—Water (μCi/ml)	Col 1—Air (μCi/ml)	Col 2—Water (μCi/ml)
	Au 199	S	1×10^{-6}	5×10^{-3}	4×10^{-8}	2×10^{-4}
		I	8×10^{-7}	4×10^{-3}	3×10^{-8}	2×10^{-4}
Hafnium (72)	Hf 181	S	4×10^{-8}	2×10^{-3}	1×10^{-9}	7×10^{-5}
		I	7×10^{-8}	2×10^{-3}	3×10^{-9}	$7 \times 1-^{-5}$
Holmium (67)	Ho 166	S	2×10^{-7}	9×10^{-4}	7×10^{-9}	3×10^{-5}
		I	2×10^{-7}	9×10^{-4}	6×10^{-9}	3×10^{-5}
Hydrogen (1)	H3	S	5×10^{-6}	1×10^{-1}	2×10^{-7}	3×10^{-3}
		I	5×10^{-6}	1×10^{-1}	2×10^{-7}	3×10^{-3}
		Sub	2×10^{-3}		4×10^{-5}	
Indium (49)	In 113m	S	8×10^{-6}	4×10^{-2}	3×10^{-7}	1×10^{-3}
		I	7×10^{-6}	4×10^{-2}	2×10^{-7}	1×10^{-3}
	In 114m	S	1×10^{-7}	5×10^{-4}	4×10^{-9}	2×10^{-5}
		I	2×10^{-8}	5×10^{-4}	7×10^{-10}	2×10^{-5}
	In 115m	S	2×10^{-6}	1×10^{-2}	8×10^{-8}	4×10^{-4}
		I	2×10^{-6}	1×10^{-2}	6×10^{-8}	4×10^{-4}
	In 115	S	2×10^{-7}	3×10^{-3}	9×10^{-9}	9×10^{-5}
		I	3×10^{-8}	3×10^{-3}	1×10^{-9}	9×10^{-5}
Iodine (53)	I 125	S	5×10^{-9}	4×10^{-5}	8×10^{-11}	2×10^{-7}
		I	2×10^{-7}	6×10^{-3}	6×10^{-9}	2×10^{-4}
	I 126	S	8×10^{-9}	5×10^{-5}	9×10^{-11}	3×10^{-7}
		I	3×10^{-7}	3×10^{-3}	1×10^{-8}	9×10^{-5}
	I129	S	2×10^{-9}	1×10^{-5}	2×10^{-11}	6×10^{-8}
		I	7×10^{-8}	6×10^{-3}	2×10^{-9}	2×10^{-4}
	I 131	S	9×10^{-9}	6×10^{-5}	1×10^{-10}	3×10^{-7}
		I	3×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
	I 132	S	2×10^{-7}	2×10^{-3}	3×10^{-9}	8×10^{-6}
		I	9×10^{-7}	5×10^{-3}	3×10^{-8}	2×10^{-4}
	I 133	S	3×10^{-8}	2×10^{-4}	4×10^{-10}	1×10^{-6}
		I	2×10^{-7}	1×10^{-3}	7×10^{-9}	4×10^{-5}
	I 134	S	5×10^{-7}	4×10^{-3}	6×10^{-9}	2×10^{-5}
		I	3×10^{-6}	2×10^{-2}	1×10^{-7}	6×10^{-4}
	I 135	S	1×10^{-7}	7×10^{-4}	1×10^{-0}	4×10^{-6}
		I	4×10^{-7}	2×10^{-3}	1×10^{-8}	7×10^{-5}
Indium (77)	Ir 190	S	1×10^{-6}	6×10^{-3}	4×10^{-8}	2×10^{-4}

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[See footnotes at end of Appendix B]

Element (atomic number)	Isotope[1]		Table I		Table II	
			Col—Air (μCi/ml)	Col 2—Water (μCi/ml)	Col 1—Air (μCi/ml)	Col 2—Water (μCi/ml)
		I	4×10^{-7}	5×10^{-3}	1×10^{-8}	2×10^{-4}
	Ir 192	S	1×10^{-7}	1×10^{-3}	4×10^{-9}	4×10^{-5}
		I	3×10^{-8}	1×10^{-3}	9×10^{-10}	4×10^{-5}
	Ir 194	S	2×10^{-7}	1×10^{-3}	8×10^{-9}	3×10^{-5}
		I	2×10^{-7}	9×10^{-4}	5×10^{-9}	3×10^{-5}
Iron (26)	Fe 55	S	9×10^{-7}	2×10^{-2}	3×10^{-8}	8×10^{-4}
		I	1×10^{-6}	7×10^{-2}	3×10^{-8}	2×10^{-3}
	Fe 59	S	1×10^{-7}	2×10^{-3}	5×10^{-9}	6×10^{-5}
		I	$5 \times 1\text{-}^{-8}$	2×10^{-3}	2×10^{-9}	5×10^{-5}
Krypton (36)	Kr 85m	Sub	6×10^{-6}		1×10^{-7}	
	Kr 85	Sub	1×10^{-5}		3×10^{-7}	
	Kr 87	Sub	1×10^{-6}		2×10^{-8}	
	Kr 88	Sub	1×10^{-6}		2×10^{-8}	
Lanthanum (57)	La 140	S	2×10^{-7}	7×10^{-4}	5×10^{-9}	2×10^{-5}
		I	1×10^{-7}	7×10^{-4}	4×10^{-9}	2×10^{-5}
Lead (82)	Pb 203	S	3×10^{-6}	1×10^{-2}	9×10^{-8}	4×10^{-4}
		I	2×10^{-6}	1×10^{-2}	6×10^{-8}	4×10^{-4}
	Pb 210	S	1×10^{-10}	4×10^{-6}	4×10^{-12}	1×10^{-7}
		I	2×10^{-10}	5×10^{-3}	8×10^{-12}	2×10^{-4}
	Pb 212	S	2×10^{-8}	6×10^{-4}	6×10^{-10}	2×10^{-5}
		I	2×10^{-8}	5×10^{-4}	7×10^{-10}	2×10^{-5}
Lutetium (71)	Lu 177	S	6×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
Manganese (25)	Mn 52	S	2×10^{-7}	1×10^{-3}	7×10^{-9}	3×10^{-5}
		I	1×10^{-7}	9×10^{-4}	5×10^{-9}	3×10^{-5}
	Mn 54	S	4×10^{-7}	4×10^{-3}	1×10^{-8}	1×10^{-4}
		I	4×10^{-8}	3×10^{-3}	1×10^{-9}	1×10^{-4}
	Mn 56	S	8×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
		I	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
Mercury (80)	Hg 197m	S	7×10^{-7}	6×10^{-3}	3×10^{-8}	2×10^{-4}
		I	8×10^{-7}	5×10^{-3}	3×10^{-8}	2×10^{-4}
	Hg 197	S	1×10^{-6}	9×10^{-3}	4×10^{-8}	3×10^{-4}
		I	3×10^{-6}	1×10^{-2}	9×10^{-8}	5×10^{-4}
	Hg 203	S	7×10^{-8}	5×10^{-4}	2×10^{-9}	2×10^{-5}

APPENDIX B—CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND

[See footnotes at end of Appendix B]

Element (atomic number)	Isotope[1]		Table I		Table II	
			Col—Air (μCi/ml)	Col 2—Water (μCi/ml)	Col 1—Air (μCi/ml)	Col 2—Water (μCi/ml)
		I	1×10^{-7}	3×10^{-3}	4×10^{-9}	1×10^{-4}
Molybdenum (42)	Mo 99	S	7×10^{-7}	5×10^{-3}	3×10^{-8}	2×10^{-4}
		I	2×10^{-7}	1×10^{-3}	7×10^{-9}	4×10^{-5}
Neodymiun 960)	Nd 144	S	8×10^{-11}	2×10^{-3}	3×10^{-12}	7×10^{-5}
		I	3×10^{-10}	2×10^{-3}	1×10^{-11}	8×10^{-5}
	Nd 147	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
		I	2×10^{-7}	2×10^{-3}	8×10^{-9}	6×10^{-5}
	Nd 149	S	2×10^{-6}	8×10^{-3}	6×10^{-8}	3×10^{-4}
		I	1×10^{-6}	8×10^{-3}	5×10^{-8}	3×10^{-4}
Neptuniom (93)	Np 237	S	4×10^{-12}	9×10^{-5}	1×10^{-13}	3×10^{-6}
		I	1×10^{-10}	9×10^{-4}	4×10^{-12}	3×10^{-5}
	Np 239	S	8×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
		I	7×10^{-7}	4×10^{-3}	2×10^{-8}	1×10^{-4}
Nickel (28)	Ni 59	S	5×10^{-7}	6×10^{-3}	2×10^{-8}	2×10^{-4}
		I	8×10^{-7}	6×10^{-2}	3×10^{-8}	2×10^{-3}
	Ni 63	S	6×10^{-8}	8×10^{-4}	2×10^{-9}	3×10^{-5}
		I	3×10^{-7}	2×10^{-2}	1×10^{-8}	7×10^{-4}
	Ni 65	S	9×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
		I	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
Niobium (Columbium) (41)	Nb 93m	S	1×10^{-7}	1×10^{-2}	4×10^{-9}	4×10^{-4}
		I	2×10^{-7}	1×10^{-2}	5×10^{-9}	4×10^{-4}
	Nb 95	S	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	1×10^{-7}	3×10^{-3}	3×10^{-9}	1×10^{-4}
	Nb 97	S	6×10^{-6}	3×10^{-2}	2×10^{-7}	9×10^{-4}
		I	5×10^{-6}	3×10^{-2}	2×10^{-7}	9×10^{-4}
Osmium (76)	Os 185	S	5×10^{-7}	2×10^{-3}	2×10^{-8}	7×10^{-5}
		I	5×10^{-8}	2×10^{-3}	2×10^{-9}	7×10^{-5}
	Os 191m	S	2×10^{-5}	7×10^{-2}	6×10^{-7}	3×10^{-3}
		I	9×10^{-6}	7×10^{-2}	3×10^{-7}	2×10^{-3}
	Os 191	S	1×10^{-6}	5×10^{-3}	4×10^{-8}	2×10^{-4}
		I	4×10^{-7}	5×10^{-3}	1×10^{-8}	2×10^{-4}
	Os 193	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
		I	3×10^{-7}	2×10^{-3}	9×10^{-9}	5×10^{-5}

APPENDIX B—CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND

[See footnotes at end of Appendix B]

Element (atomic number)	Isotope[1]		Table I		Table II	
			Col—Air (μCi/ml)	Col 2—Water (μCi/ml)	Col 1—Air (μCi/ml)	Col 2—Water (μCi/ml)
Palladium (46)	Pd 103	S	1×10^{-6}	1×10^{-2}	5×10^{-8}	3×10^{-4}
		I	7×10^{-7}	8×10^{-3}	3×10^{-8}	3×10^{-4}
	Pd 109	S	6×10^{-7}	3×10^{-3}	2×10^{-8}	$9 \times 1-^{-5}$
		I	4×10^{-7}	2×10^{-3}	1×10^{-8}	7×10^{-5}
Phosphorus (15)	P 32	S	7×10^{-8}	5×10^{-4}	2×10^{-9}	2×10^{-5}
		I	8×10^{-8}	7×10^{-4}	3×10^{-9}	2×10^{-5}
Platinum (78)	Pt 191	S	8×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
		I	6×10^{-6}	3×10^{-3}	2×10^{-8}	1×10^{-4}
	Pt 193m	S	7×10^{-6}	3×10^{-2}	2×10^{-7}	1×10^{-3}
		I	5×10^{-6}	3×10^{-2}	2×10^{-7}	1×10^{-3}
	Pt 193	S	1×10^{-6}	3×10^{-2}	4×10^{-8}	9×10^{-4}
		I	3×10^{-7}	5×10^{-2}	1×10^{-8}	2×10^{-3}
	Pt 197m	S	6×10^{-6}	3×10^{-2}	2×10^{-7}	1×10^{-3}
		I	5×10^{-6}	3×10^{-2}	2×10^{-7}	9×10^{-4}
	Pt 197	S	8×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
		I	6×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
Plutonium (94)	Pu 238	S	2×10^{-12}	1×10^{-4}	7×10^{-14}	5×10^{-6}
		I	3×10^{-11}	8×10^{-4}	1×10^{-12}	3×10^{-5}
	Pu 239	S	2×10^{-12}	1×10^{-4}	6×10^{-14}	5×10^{-6}
		I	4×10^{11}	8×10^{-4}	1×10^{-12}	3×10^{-5}
	Pu 240	S	2×10^{-12}	1×10^{-4}	6×10^{-14}	5×10^{-6}
		I	4×10^{-11}	8×10^{-4}	1×10^{-12}	3×10^{-5}
	Pu 241	S	9×10^{-11}	7×10^{-3}	3×10^{-12}	2×10^{-4}
		I	4×10^{-8}	4×10^{-2}	1×10^{-9}	1×10^{-3}
	Pu 242	S	2×10^{-12}	1×10^{-4}	6×10^{-14}	5×10^{-6}
		I	4×10^{-11}	9×10^{-4}	1×10^{-12}	3×10^{-5}
	Pu 243	S	2×10^{-6}	1×10^{-2}	6×10^{-8}	3×10^{-4}
		I	2×10^{-6}	1×10^{-2}	8×10^{-8}	3×10^{-4}
	Pu 244	S	2×10^{-12}	1×10^{-4}	6×10^{-14}	4×10^{-6}
		I	3×10^{-11}	3×10^{-4}	1×10^{-12}	1×10^{-5}
Polonium (84)	Po 210	S	5×10^{-10}	2×10^{-5}	2×10^{-11}	7×10^{-7}
		I	2×10^{-10}	8×10^{-4}	7×10^{-12}	3×10^{-5}
Potassium (19)	K 42	S	2×10^{-6}	9×10^{-3}	7×10^{-8}	3×10^{-4}
		I	1×10^{-7}	6×10^{-4}	4×10^{-9}	2×10^{-5}

APPENDIX B—CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND

[See footnotes at end of Appendix B]

Element (atomic number)	Isotope[1]		Table I		Table II	
			Col—Air (μCi/ml)	Col 2—Water (μCi/ml)	Col 1—Air (μCi/ml)	Col 2—Water (μCi/ml)
Praseodymium (59)	Pr 142	S	2×10^{-7}	9×10^{-4}	7×10^{-9}	3×10^{-5}
		I	2×10^{-7}	9×10^{-4}	5×10^{-9}	3×10^{-5}
	Pr 143	S	3×10^{-7}	1×10^{-3}	1×10^{-8}	5×10^{-5}
		I	2×10^{-7}	1×10^{-3}	6×10^{-9}	5×10^{-5}
Promethium (61)	Pm 147	S	6×10^{-8}	6×10^{-3}	2×10^{-9}	2×10^{-4}
		I	1×10^{-7}	6×10^{-3}	3×10^{-9}	2×10^{-4}
	Pm 149	S	3×10^{-7}	1×10^{-3}	1×10^{-8}	4×10^{-5}
		I	2×10^{-7}	1×10^{-3}	8×10^{-9}	4×10^{-5}
Protoactinium (91)	Pa 230	S	2×10^{-9}	7×10^{-3}	6×10^{-11}	2×10^{-4}
		I	8×10^{-10}	7×10^{-3}	2×10^{-11}	2×10^{-4}
	Pa 231	S	1×10^{-12}	3×10^{-5}	4×10^{-14}	9×10^{-7}
		I	1×10^{-10}	8×10^{-4}	4×10^{-12}	2×10^{-5}
	Pa 233	S	6×10^{-7}	4×10^{-3}	2×10^{-8}	1×10^{-4}
		I	2×10^{-7}	3×10^{-3}	6×10^{-9}	1×10^{-4}
Radium (88)	Ra 233	S	2×10^{-9}	2×10^{-5}	6×10^{-11}	7×10^{-7}
		I	2×10^{-10}	1×10^{-4}	8×10^{-12}	4×10^{-6}
	Ra 224	S	5×10^{-9}	7×10^{-5}	2×10^{-10}	2×10^{-6}
		I	7×10^{-10}	2×10^{-4}	2×10^{-11}	5×10^{-6}
	Ra 226	S	3×10^{-11}	4×10^{-7}	3×10^{-12}	3×10^{-8}
		I	5×10^{-11}	9×10^{-4}	2×10^{-12}	3×10^{-5}
	Ra 228	S	7×10^{-11}	8×10^{-7}	2×10^{-12}	3×10^{-8}
		I	4×10^{-11}	7×10^{-4}	1×10^{-12}	3×10^{-5}
Radon (86)	Rn 220	S	3×10^{-7}		1×10^{-8}	
	Rn 222[3]		3×10^{-8}		3×10^{-9}	
Rhenium (75)	Re 183	S	3×10^{-6}	2×10^{-2}	9×10^{-8}	6×10^{-4}
		I	2×10^{-7}	8×10^{-3}	5×10^{-9}	3×10^{-4}
	Re 186	S	6×10^{-7}	3×10^{-3}	2×10^{-8}	9×10^{-5}
		I	2×10^{-7}	1×10^{-3}	8×10^{-9}	5×10^{-5}
	Re 187	S	9×10^{-4}	7×10^{-2}	3×10^{-7}	3×10^{-3}
		I	5×10^{-7}	4×10^{-2}	2×10^{-8}	2×10^{-3}
	Re 188	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
		I	2×10^{-7}	9×10^{-4}	6×10^{-9}	3×10^{-5}
Rhodium (45)	Rh 103m	S	8×10^{-5}	4×10^{-1}	3×10^{-6}	1×10^{-2}
		I	6×10^{-5}	3×10^{-1}	2×10^{-6}	1×10^{-2}

APPENDIX B—CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND

[See footnotes at end of Appendix B]

Element (atomic number)	Isotope[1]		Table I		Table II	
			Col—Air (μCi/ml)	Col 2—Water (μCi/ml)	Col 1—Air (μCi/ml)	Col 2—Water (μCi/ml)
	Rh 105	S	8×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
		I	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
Rubidium (37)	Rb 86	S	3×10^{-7}	2×10^{-3}	1×10^{-8}	7×10^{-5}
		I	7×10^{-8}	7×10^{-4}	2×10^{-9}	2×10^{-5}
	Rb 87	S	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	7×10^{-8}	5×10^{-3}	2×10^{-9}	2×10^{-4}
Ruthenium (44)	Ru 97	S	2×10^{-6}	1×10^{-2}	8×10^{-8}	4×10^{-4}
		I	2×10^{-6}	1×10^{-2}	6×10^{-8}	3×10^{-4}
	Ru 103	S	5×10^{-7}	2×10^{-3}	2×10^{-8}	8×10^{-5}
		I	8×10^{-8}	2×10^{-3}	3×10^{-9}	8×10^{-5}
	Ru 105	S	7×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	5×10^{-7}	3×10^{-7}	2×10^{-8}	1×10^{-4}
	Ru 106	S	8×10^{-8}	4×10^{-4}	3×10^{-9}	1×10^{-3}
		I	6×10^{-9}	3×10^{-4}	2×10^{-10}	1×10^{-5}
Samarium (62)	Sm 147	S	7×10^{-11}	2×10^{-3}	2×10^{-12}	6×10^{-5}
		I	3×10^{-10}	2×10^{-3}	9×10^{-12}	7×10^{-5}
	Sm 151	S	6×10^{-8}	1×10^{-2}	2×10^{-9}	4×10^{-4}
		I	1×10^{-7}	1×10^{-2}	5×10^{-9}	4×10^{-4}
	Sm 153	S	5×10^{-7}	2×10^{-3}	2×10^{-8}	8×10^{-5}
		I	4×10^{-7}	2×10^{-3}	1×10^{-8}	8×10^{-5}
Scandium (21)	Sc 46	S	2×10^{-7}	1×10^{-3}	8×10^{-9}	4×10^{-5}
		I	2×10^{-8}	1×10^{-3}	8×10^{-10}	4×10^{-5}
	Sc 47	S	6×10^{-7}	3×10^{-3}	2×10^{-8}	9×10^{-5}
		I	5×10^{-7}	3×10^{-3}	2×10^{-8}	9×10^{-5}
	Sc 48	S	2×10^{-7}	8×10^{-4}	6×10^{-9}	3×10^{-5}
		I	1×10^{-7}	8×10^{-4}	5×10^{-9}	3×10^{-5}
Selenium (34)	Se 75	S	1×10^{-6}	9×10^{-3}	4×10^{-8}	3×10^{-4}
		I	1×10^{-7}	8×10^{-3}	4×10^{-9}	3×10^{-4}
Silicon (14)	Si 31	S	6×10^{-6}	3×10^{-2}	2×10^{-7}	9×10^{-4}
		I	1×10^{-6}	6×10^{-3}	3×10^{-8}	2×10^{-4}
Silver (47)	Ag 105	S	6×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	6×10^{-8}	3×10^{-3}	3×10^{-9}	1×10^{-4}
	Ag 110m	S	2×10^{-7}	9×10^{-4}	7×10^{-9}	3×10^{-5}
		I	1×10^{-8}	9×10^{-4}	3×10^{-10}	3×10^{-5}

APPENDIX B—CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND

[See footnotes at end of Appendix B]

Element (atomic number)	Isotope[1]		Table I		Table II	
			Col—Air (μCi/ml)	Col 2—Water (μCi/ml)	Col 1—Air (μCi/ml)	Col 2—Water (μCi/ml)
	Ag 111	S	3×10^{-7}	1×10^{-3}	1×10^{-8}	4×10^{-5}
		I	2×10^{-7}	1×10^{-3}	8×10^{-9}	4×10^{-5}
Sodium (11)	Na 22	S	2×10^{-7}	1×10^{-3}	6×10^{-9}	4×10^{-5}
		I	9×10^{-9}	9×10^{-4}	3×10^{-10}	3×10^{-5}
	Na 24	S	1×10^{-6}	6×10^{-3}	4×10^{-6}	2×10^{-4}
		I	1×10^{-7}	8×10^{-4}	5×10^{-9}	3×10^{-5}
Strontium (38)	Sr 85m	S	4×10^{-5}	2×10^{-1}	1×10^{-6}	7×10^{-3}
		I	3×10^{-5}	2×10^{-1}	1×10^{-6}	7×10^{-3}
	Sr 85	S	2×10^{-7}	3×10^{-3}	8×10^{-9}	1×10^{-4}
		I	1×10^{-7}	5×10^{-3}	4×10^{-9}	2×10^{-4}
	Sr 89	S	3×10^{-8}	3×10^{-4}	3×10^{-10}	3×10^{-6}
		I	4×10^{-8}	8×10^{-4}	1×10^{-9}	3×10^{-5}
	Sr 90	S	1×10^{-9}	1×10^{-5}	3×10^{-11}	3×10^{-7}
		I	5×10^{-9}	1×10^{-3}	2×10^{-10}	4×10^{-5}
	Sr 91	S	4×10^{-7}	2×10^{-3}	2×10^{-8}	7×10^{-5}
		I	3×10^{-7}	1×10^{-3}	9×10^{-9}	5×10^{-5}
	Sr 92	S	4×10^{-7}	2×10^{-3}	2×10^{-8}	7×10^{-5}
		I	3×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
Sulfur (16)	S 35	S	3×10^{-7}	2×10^{-3}	9×10^{-9}	6×10^{-5}
		I	3×10^{-7}	8×10^{-3}	9×10^{-9}	3×10^{-4}
Tantalum (73)	Ta 182	S	4×10^{-8}	1×10^{-3}	1×10^{-9}	4×10^{-5}
		I	2×10^{-8}	1×10^{-3}	7×10^{-10}	4×10^{-5}
Technetium (43)	Tc 96m	S	8×10^{-5}	4×10^{-1}	3×10^{-6}	1×10^{-2}
		I	3×10^{-5}	3×10^{-1}	1×10^{-6}	1×10^{-2}
	Tc 96	S	6×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	2×10^{-7}	1×10^{-3}	8×10^{-9}	$\times10^{-5}$
	Tc 97m	S	2×10^{-6}	1×10^{-2}	8×10^{-8}	4×10^{-4}
		I	2×10^{-7}	5×10^{-3}	5×10^{-9}	2×10^{-4}
	Tc 97	S	1×10^{-7}	5×10^{-2}	4×10^{-7}	2×10^{-3}
		I	3×10^{-7}	2×10^{-2}	1×10^{-8}	8×10^{-4}
	Tc 99m	S	4×10^{-5}	2×10^{-1}	1×10^{-6}	6×10^{-3}
		I	1×10^{-5}	8×10^{-2}	5×10^{-7}	3×10^{-3}
	Tc 99	S	2×10^{-6}	1×10^{-2}	7×10^{-8}	3×10^{-4}
		I	6×10^{-8}	5×10^{-3}	2×10^{-9}	2×10^{-4}

APPENDIX B—CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND

[See footnotes at end of Appendix B]

Element (atomic number)	Isotope[1]		Table I		Table II	
			Col—Air (μCi/ml)	Col 2—Water (μCi/ml)	Col 1—Air (μCi/ml)	Col 2—Water (μCi/ml)
Tellurium (52)	Te 125m	S	4×10^{-7}	5×10^{-3}	1×10^{-8}	2×10^{-4}
		I	1×10^{-7}	3×10^{-3}	4×10^{-9}	1×10^{-4}
	Te 127m	S	1×10^{-7}	2×10^{-3}	5×10^{-9}	6×10^{-5}
		I	4×10^{-8}	2×10^{-3}	1×10^{-9}	5×10^{-5}
	Te 127	S	2×10^{-6}	8×10^{-3}	6×10^{-8}	3×10^{-4}
		I	9×10^{-7}	5×10^{-3}	3×10^{-8}	2×10^{-4}
	Te 129m	S	8×10^{-8}	1×10^{-3}	3×10^{-9}	3×10^{-5}
		I	3×10^{-8}	6×10^{-4}	1×10^{-9}	2×10^{-5}
	Te 129	S	5×10^{-6}	2×10^{-2}	2×10^{-7}	8×10^{-4}
		I	4×10^{-6}	2×10^{-2}	1×10^{-7}	8×10^{-4}
	Te 131m	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
		I	2×10^{-7}	1×10^{-3}	6×10^{-9}	4×10^{-5}
	Te 132	S	2×10^{-7}	9×10^{-4}	7×10^{-9}	3×10^{-5}
		I	1×10^{-7}	6×10^{-4}	4×10^{-9}	2×10^{-5}
Terbium (65)	Tb 160	S	1×10^{-7}	1×10^{-3}	3×10^{-9}	4×10^{-5}
		I	3×10^{-5}			
Thallium (81)	Tl 200	S	3×10^{-6}	1×10^{-2}	9×10^{-8}	4×10^{-4}
		I	1×10^{-6}	7×10^{-3}	4×10^{-8}	2×10^{-4}
	Tl 201	S	2×10^{-6}	9×10^{-3}	7×10^{-8}	3×10^{-4}
		I	9×10^{-7}	5×10^{-3}	3×10^{-8}	2×10^{-4}
	Tl 202	S	8×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
		I	2×10^{-7}	2×10^{-3}	8×10^{-9}	7×10^{-5}
	Tl 204	S	6×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	3×10^{-8}	2×10^{-3}	9×10^{-10}	6×10^{-5}
Thorium (90)	Th 227	S	3×10^{-10}	5×10^{-4}	1×10^{-11}	2×10^{-5}
		I	2×10^{-10}	5×10^{-4}	6×10^{-12}	2×10^{-5}
	Th 228	S	9×10^{-12}	2×10^{-4}	3×10^{-13}	7×10^{-6}
		I	6×10^{-12}	4×10^{-4}	2×10^{-13}	1×10^{-5}
	Th 230	S	2×10^{-12}	5×10^{-5}	8×10^{-14}	2×10^{-6}
		I	1×10^{-11}	9×10^{-4}	3×10^{-13}	3×10^{-5}
	Th 231	S	1×10^{-6}	7×10^{-3}	5×10^{-8}	2×10^{-4}
		I	1×10^{-6}	7×10^{-3}	4×10^{-8}	2×10^{-4}
	Th 232	S	3×10^{-11}	5×10^{-5}	1×10^{-12}	2×10^{-6}
		I	3×10^{-11}	1×10^{-3}	1×10^{-12}	4×10^{-5}

APPENDIX B—CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND

[See footnotes at end of Appendix B]

Element (atomic number)	Isotope[1]		Table I		Table II	
			Col—Air (μCi/ml)	Col 2—Water (μCi/ml)	Col 1—Air (μCi/ml)	Col 2—Water (μCi/ml)
	Th natural	S	6×10^{-11}	6×10^{-5}	2×10^{-12}	2×10^{-6}
		I	6×10^{-11}	6×10^{-4}	2×10^{-12}	2×10^{-5}
	Th 234	S	6×10^{-8}	5×10^{-4}	2×10^{-9}	2×10^{-5}
		I	3×10^{-8}	5×10^{-4}	1×10^{-9}	2×10^{-5}
Thulium (69)	Tm 170	S	4×10^{-8}	1×10^{-3}	1×10^{-9}	5×10^{-5}
		I	3×10^{-8}	1×10^{-3}	1×10^{-9}	5×10^{-5}
	Tm 171	S	1×10^{-7}	1×10^{-2}	4×10^{-9}	5×10^{-4}
		I	2×10^{-7}	1×10^{-2}	8×10^{-9}	5×10^{-4}
Tin (50)	Sn 113	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	9×10^{-5}
		I	5×10^{-8}	2×10^{-3}	2×10^{-9}	8×10^{-5}
	Sn 125	S	1×10^{-7}	5×10^{-4}	4×10^{-9}	2×10^{-5}
		I	8×10^{-8}	5×10^{-4}	3×10^{-9}	2×10^{-5}
Tungsten (Wolfram) (74)	W 181	S	2×10^{-6}	1×10^{-2}	8×10^{-8}	4×10^{-4}
		I	1×10^{-7}	1×10^{-2}	4×10^{-9}	3×10^{-4}
	W 185	S	8×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
		I	1×10^{-7}	3×10^{-3}	4×10^{-9}	1×10^{-4}
	W 187	S	4×10^{-7}	2×10^{-3}	2×10^{-8}	7×10^{-5}
		I	3×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
Uranium (92)	U 230	S	3×10^{-10}	1×10^{-4}	1×10^{-11}	5×10^{-6}
		I	1×10^{-10}	1×10^{-4}	4×10^{-12}	5×10^{-6}
	U 232	S	1×10^{-10}	8×10^{-4}	3×10^{-12}	3×10^{-5}
		I	3×10^{-11}	8×10^{-4}	9×10^{-13}	3×10^{-5}
	U 233	S	5×10^{-10}	9×10^{-4}	2×10^{-11}	3×10^{-5}
		I	1×10^{-10}	9×10^{-4}	4×10^{-12}	3×10^{-5}
	U 234	S[4]	6×10^{-10}	9×10^{-4}	2×10^{-11}	3×10^{-5}
		I	1×10^{-10}	9×10^{-4}	4×10^{-12}	3×10^{-5}
	U 235	S[4]	5×10^{-10}	8×10^{-4}	2×10^{-11}	3×10^{-5}
		I	1×10^{-10}	8×10^{-4}	4×10^{-12}	3×10^{-5}
	U 236	S	6×10^{-10}	1×10^{-3}	2×10^{-11}	3×10^{-5}
		I	1×10^{-10}	1×10^{-3}	4×10^{-12}	3×10^{-5}
	U 238	S[4]	7×10^{-11}	1×10^{-3}	3×10^{-12}	4×10^{-5}
		I	1×10^{-10}	1×10^{-3}	5×10^{-12}	4×10^{-5}
	U 240	S	2×10^{-7}	1×10^{-3}	8×10^{-9}	3×10^{-5}

APPENDIX B—CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND

[See footnotes at end of Appendix B]

Element (atomic number)	Isotope[1]		Table I		Table II	
			Col—Air (μCi/ml)	Col 2—Water (μCi/ml)	Col 1—Air (μCi/ml)	Col 2—Water (μCi/ml)
		I	2×10^{-7}	1×10^{-3}	6×10^{-9}	3×10^{-5}
	U-natural	S[4]	1×10^{-10}	1×10^{-3}	5×10^{-12}	3×10^{-5}
		I	1×10^{-10}	1×10^{-3}	5×10^{-12}	3×10^{-5}
Vanadium (23)	V 48	S	2×10^{-7}	9×10^{-4}	6×10^{-9}	3×10^{-5}
		I	6×10^{-8}	8×10^{-4}	2×10^{-9}	3×10^{-5}
Xenon (54)	Xe 131m	Sub	2×10^{-5}		4×10^{-7}	
	Xe 133	Sub	1×10^{-5}		3×10^{-7}	
	Xe 133m	Sub	1×10^{-5}		3×10^{-7}	
	Xe 135	Sub	4×10^{-6}		1×10^{-7}	
Ytterbium (70)	Yb 175	S	7×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
		I	6×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
Yttrium (39)	Y 90	S	1×10^{-7}	6×10^{-4}	4×10^{-9}	2×10^{-5}
		I	1×10^{-7}	6×10^{-4}	3×10^{-9}	2×10^{-5}
	Y 91m	S	2×10^{-5}	1×10^{-1}	8×10^{-7}	3×10^{-3}
		I	2×10^{-5}	1×10^{-1}	6×10^{-7}	3×10^{-3}
	Y 91	S	4×10^{-8}	8×10^{-4}	1×10^{-9}	3×10^{-5}
		I	3×10^{-8}	8×10^{-4}	1×10^{-9}	3×10^{-5}
	Y 92	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
		I	3×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
	Y 93	S	2×10^{-7}	8×10^{-4}	6×10^{-9}	3×10^{-5}
		I	1×10^{-7}	8×10^{-4}	5×10^{-9}	3×10^{-5}
Zinc (30)	Zn 65	S	1×10^{-7}	3×10^{-3}	4×10^{-9}	1×10^{-4}
		I	6×10^{-8}	5×10^{-3}	2×10^{-9}	2×10^{-4}
	Zn 69m	S	4×10^{-7}	2×10^{-3}	1×10^{-8}	7×10^{-5}
		I	3×10^{-7}	2×10^{-3}	1×10^{-8}	6×10^{-5}
	Zn 69	S	7×10^{-6}	5×10^{-2}	2×10^{-7}	2×10^{-3}
		I	9×10^{-6}	5×10^{-2}	3×10^{-7}	2×10^{-3}
Zirconium (40)	Zr 93	S	1×10^{-7}	2×10^{-2}	4×10^{-9}	8×10^{-4}
		I	3×10^{-7}	2×10^{-2}	1×10^{-8}	8×10^{-4}
	Zr 95	S	1×10^{-7}	2×10^{-3}	4×10^{-9}	6×10^{-5}
		I	3×10^{-8}	2×10^{-3}	1×10^{-9}	6×10^{-5}
	Zr 97	S	1×10^{-7}	5×10^{-4}	4×10^{-9}	2×10^{-5}
		I	9×10^{-8}	5×10^{-4}	3×10^{-9}	2×10^{-5}

APPENDIX B—CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND

[See footnotes at end of Appendix B]

Element (atomic number)	Isotope[1]		Table I		Table II	
			Col—Air (μCi/ml)	Col 2—Water (μCi/ml)	Col 1—Air (μCi/ml)	Col 2—Water (μCi/ml)
Any single radionuclide not listed above with decay mode other than alpha emission or spontaneous fission and with radioactive half-life less than 2 hours.	.....	Sub	1×10^{-6}		3×10^{-8}	
Any single radionuclide not listed above with decay mode other than alpha emission or spontaneous fission and with radioactive half-life less than 2 hours.	.....		3×10^{-9}	9×10^{-5}	1×10^{-10}	3×10^{-6}
Any single radionuclide not listed above, which decays by alpha emission or spontaneous fission.	.....		6×10^{-13}	4×10^{-7}	2×10^{-14}	3×10^{-8}

[1]Soluble (S); Insoluble (I).

[2]"Sub" means that values given are for submersion in a semispherical infinite cloud of airborne material.

APPENDIX B—CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND

[See footnotes at end of Appendix B]

Element (atomic number)	Isotope[1]		Table I		Table II	
			Col—Air (μCi/ml)	Col 2—Water (μCi/ml)	Col 1—Air (μCi/ml)	Col 2—Water (μCi/ml)

[3]These radon concentrations are appropriate for protection from radon-222 combined with its short-lived daughters. Alternatively, the value in Table I may be replaced by one-third (1/3) "working level." (A "working level" is defined as any combination of short-lived radon-222 daughters, polonium-218, lead-214, bismouth-214 and polonium-214, in one liter of air, without regard to the degree of equilibrium, that will result in the ultimate emission of 1.3×10^{-5} MeV of alpha particle energy.) The Table II value may be replaced by one-thirtieth (1/30) of a "working level." The limit on radon-222 concentrations in restricted areas may be based on an annual average.

[4]For soluble mixtures of U-238, U-234 and U-235 in air chemical toxicity may be the limiting factor. If the percent by weight-enrichment of U-235 is less than 5, the concentration value for a 40-hour workweek, Table I, is 0.2 milligrams uranium per cubic meter of air average. For any enrichment, the product of the average concentration and time of exposure during a 40-hour workweek shall not exceed 8×10^{-3} SA μCi-hr/ml, where SA is the specific activity of the uranium inhaled. The concentration value for Table II is 0.007 milligrams uranium per cubic meter of air. The specific activity for natural uranium is 6.77×10^{-7} curies per gram U. The specific activity for other mixtures of U-238, U-235 and U-234, if not known, shall be:

$SA=3.6\times10^{-7}$ curies/gram U U-depleted

$SA=(0.4+0.38\ E+0.0034\ E^2)10^{-6}\ E\geq0.72$

where E is the percentage by weight of U-235, expressed as percent.

NOTE: In any case where there is a mixture in air or water of more than one radionuclide, the limiting values for purposes of this Appendix should be determined as follows:

1. If the identity and concentration of each radionuclide in the mixture are known, the limiting values should be derived as follows: Determine, for each radionuclide in the mixture, the ratio between the quantity present in the mixture and the limit otherwise established in Appendix B for the specific radionuclide when not in a mixture. The sum of such ratios for all the radionuclides in the mixture may not exceed "1" (i.e., "unity")

EXAMPLE: If radionuclides A, B, and C are present in concentrations C_A, C_B, and C_C, and if the applicable MPC's are MPC_A, and MPC_B, and MPC_C, respectively, then the concentrations shall be limited so that the following relationship exists:

$(C_A/MPC_A)+(C_B/MPC_B)+(C_C/MPC_C)\leq1$

2. If either the identity or the concentration of any radionuclide in the mixture is not known, the limiting values for purposes of Appendix B shall be:

a. For purposes of Table I, Col. 1-6×10^{-13}

b. For purposes of Table I, Col. 2-4×10^{-7}

APPENDIX B—CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND

[See footnotes at end of Appendix B]

Element (atomic number)	Isotope[1]		Table I		Table II	
			Col—Air (μCi/ml)	Col 2—Water (μCi/ml)	Col 1—Air (μCi/ml)	Col 2—Water (μCi/ml)

c. For purposes of Table II, Col.1-2×10^{-14}

d. For purposes of Table II, Col.2-3×10^{-8}

3. If any of the conditions specified below are met, the corresponding values specified below may be used in lieu of those specified in paragraph 2 above.

a. If the identity of each radionuclide in the mixture is known but the concentration of one or more or the radionuclides in the mixture is not known the concentration limit for the mixture is the limit specified in Appendix "B" for the radionuclide in the mixture having the lowest concentration limit; or

b. If the identity of each radionuclide in the mixture is not known, but it is known that certain radionuclides specified in Appendix "B" are not present in the mixture, the concentration limit for the mixture is the lowest concentration limit specified in Appendix "B" for any radionuclide which is not known to be absent from the mixture; or

c. Element (atomic number) and Isotope	Table I		Table II	
	Col—Air ([PT]1μCi/ml)	Col 2—Water (μCi/ml)	Col 1—Air (μCi/ml)	Col 2—Water (μCi/ml)
If it is known that Sr 90, I 125, I 126, I 129, I 131, (I 133, Table II only), Pb 210, Po 210, At 211, Ra 223, Ra 224, Ra 226, Ac 227, Ra 228, Th 230, Pa 231, Th 232, Th-nat, Cm 248, Cf 254, and Fm 256 are not present	.....	9×10^{-5}		3×10^{-6}
If it is known that Sr 90, I 125, I 126, I 129, (I 131, I 133, Table II only), Pb 210, Po 210, At 211, Ra 223, Ra 224, Ra 226, Ac 227, Ra 228, Th 230, Pa 231, Th 232, Th-nat, Cm 248, Cf 254, and Fm 256 are not present	.....	6×10^{-5}		2×10^{-6}
If it is known that Sr 90, I 129 (I 125, I 126, I 131, Table II only), Pb 210, Ra 226, Ra 228, Cm 248, and Cf 254 are not present	.....	2×10^{-5}		6×10^{-7}

c. Element (atomic number) and Isotope	Table I		Table II	
	Col 1—Air (PT[1] μCi/ml)	Col 2—Water (μCi/ml)	Col 1—Air (μCi/ml)	Col 2—Water (μCi/ml)
If it is known that (I 129, Table II only), Ra 226, and Ra 228 are not present	.....	3×10^{-6}		1×10^{-7}
If it is known that alpha-emitters and Sr 90, I 129, Pb 210, Ac 227, Ra 228, Pa 230, Pu 241, and Bk 249 are not present	3×10^{-9}.....		1×10^{-10}	
If it is known that alpha-emitters and Pb 210, Ac 227, Ra 228, and Pu 241 are not present	3×10^{-10}.....		1×10^{-11}	
If it is known that alpha-emitters and Ac 227 are not present	3×10^{-11}.....		1×10^{-12}	
If it is known that Ac 227, Th 230, Pa 231, Pu 238, Pu 239, Pu 240, Pu 242, Pu 244, Cm 248, Cf 249 and Cf 251 are not present	3×10^{-12}.....		1×10^{-13}	

4. If a mixture of radionuclides consists of uranium and its daughters in ore dust prior to chemical separation of the uranium from the ore, the values specified below may be used for uranium and its daughters through radium-226, instead of those from paragraphs 1, 2, or 3 above.

a. For purposes of Table I, Col. 1-1×10^{-10} μCi/ml gross alpha activity; or 5×10^{-11} μCi/ml natural uranium or 75 micrograms per cubic meter of air natural uranium.

b. For purposes of Table II, Col. 1-3×10^{-12} μCi/ml gross alpha activity; 2×10^{-12} μCi/ml natural uranium; or 3 micrograms per cubic meter of air natural uranium.

5. For purposes of this note, a radionuclide may be considered as not present in a mixture if (a) the ratio of the concentration of that radionuclide in the mixture (C_A) to the concentration limit for that radionuclide specified in Table II of Appendix "B" (MPC_A) does not exceed 1/10, (i.e. $C_A/MPC_A \leq 1/10$) and (b) the sum of such rations for all the radionuclides considered as not present in the mixture does not exceed 1/4 i.e.

$(CA/MPCA+MPC_B+\leq 1/4)$.

[25 FR 10914, Nov. 17, 1960, as amended at 25 FR 13953, Dec. 30, 1960; 26 FR 11046, Nov. 25, 1961; 29 FR 14435, Oct. 21, 1964; 30 FR 15801, Dec. 22, 1965; 31 FR 86, Jan. 5, 1966; 37 FR 23319, Nov. 2, 1972; 38 FR 29314, Oct. 24, 1973; 39 FR 23990, June 28, 1974; 39 FR 25463, July 11, 1974, 39 FR 27121, July 25, 1974; 40 FR 50705, Oct. 31, 1975]

APPENDIX C

Material	Microcuries
Americium-241	.01
Antimony-122	100
Antimony-124	10
Antimony-125	10
Arsenic-73	100
Arsenic-74	10
Arsenic-76	10
Arsenic-77	100
Barium-131	10
Barium-133	10
Barium-140	10
Bismuth-210	1
Bromine-82	10
Cadmium-109	10
Cadmium-115m	10
Cadmium-115	100
Calcium-45	10
Calcium-47	10
Carbon-14	100
Cerium-141	100
Cerium-143	100
Cerium-144	1
Cesium-131	1,000
Cesium-134m	100
Cesium-134	1
Cesium-135	10
Cesium-136	10
Cesium-137	10
Chlorine-36	10
Chlorine-38	10
Chromium-51	1,000
Cobalt-58m	10
Cobalt-58	10
Cobalt-60	1
Copper-64	100
Dysprosium-165	10
Dysprosium-166	100
Erbium-169	100
Erbium-171	100
Europium-152 9.2 h	100
Europium-152 13 yr	1
Europium-154	1
Europium-155	10

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Material	Microcuries
Fluorine-18	1,000
Gadolinium-153	10
Gadolinium-159	100
Gallium-72	10
Germanium-71	100
Gold-198	100
Gold-199	100
Hafnium-181	10
Holmium-166	100
Hydrogen-3	1,000
Indium-113m	100
Indium-114m	10
Indium-115m	100
Indium-115	10
Iodine-125	1
Iodine-126	1
Iodine-129	0.1
Iodine-131	1
Iodine-132	10
Iodine-133	1
Iodine-134	10
Iodine-135	10
Iridium-192	10
Iridium-194	100
Iron-55	100
Iron-59	10
Krypton-85	100
Krypton-87	10
Lanthanum-140	10
Lutetium-177	100
Manganese-52	10
Manganese-54	10
Manganese-56	10
Mercury-197m	100
Mercury-197	100
Mercury-203	10
Molybdenum-99	100
Neodymium-147	100
Neodymium-149	100
Nickel-59	100
Nickel-63	10
Nickel-65	100
Niobium-93m	10
Niobium-95	10

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Material	Microcuries
Niobium-97	10
Osmium-185	10
Osmium-191m	100
Osmium-191	100
Osmium-193	100
Palladium-103	100
Palladium-109	100
Phosphorus-32	10
Platinum-191	100
Platinum-193m	100
Platinum-193	100
Platinum-197m	100
Platinum-197	100
Plutonium-239	.01
Polonium-210	0.1
Potassium-42	10
Praseodymium-142	100
Praseodymium-143	100
Promethium-147	10
Promethium-149	10
Radium-226	.01
Rhenium-186	100
Rhenium-188	100
Rhodium-103m	100
Rhodium-105	100
Rubidium-86	10
Rubidium-87	10
Ruthenium-97	100
Ruthenium-103	10
Ruthenium-105	10
Ruthenium-106	1
Samarium-151	10
Samarium-153	100
Scandium-46	10
Scandium-47	100
Scandium-48	10
Selenium-75	10
Silicon-31	100
Silver-105	10
Silver-110m	1
Silver-111	100
Sodium-24	10
Strontium-85	10
Strontium-89	1

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Material	Microcuries
Strontium-90	0.1
Strontium-91	10
Strontium-92	10
Sulphur-35	100
Tnatalum-182	10
Technetium-96	10
Technetium-97m	100
Technetium-97	100
Technetium-99m	100
Technetium-99	10
Tellurium-125m	10
Tellurium-127m	10
Tellurium-127	100
Tellurium-129m	10
Tellurium-129	100
Tellurium-131m	10
Tellurium-132	10
Terbium-160	10
Thallium-200	100
Thallium-201	100
Thallium-202	100
Thallium-204	10
Thorium (natural)[1]	100
Thulium-170	10
Thulium-171	10
Tin-113	10
Tin-125	10
Tungsten-181	10
Tungsten-185	10
Tungsten-187	100
Uranium (natural)[2]	100
Uranium-233	.01
Uranium-234—Uranium-235	.01
Vanadium-48	10
Xenon-131m	1,000
Xenon-133	100
Xenon-135	100
Ytterbium-175	100
Yttrium-90	10
Yttrium-91	10
Yttrium-92	100
Yttrium-93	100
Zinc-65	10
Zinc-69m	100

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Material	Microcuries
Zinc-69	1,000
Zirconium-93	10
Zirconium-95	10
Zirconium-97	10
Any alpha emitting radionuclide not listed above or mixtures of alpha emitters of unknown composition	.01
Any radionuclide other than alpha emitting radionuclides, not listed above or mixtures of beta emitters of unknown composition	.1

[1]Based on alpha disintegration rate of Th-232, Th-230 and their daughter products.

[2]Based alpha disintegration rate of U-238, U-234, and U-235.

Note: For purposes of §20.303, where there is involved a combination of isotopes in known limit for the combination should be derived as follows: Determine, for each isotope in the combination, the ratio between the quantity present in the combination and the limit otherwise established for the specific isotope when not in combination. The sum of such ratios for all isotopes in the combination may not exceed "1" (i.e., "unity").

[35 FR 6425, Apr. 22, 1970, as amended at 36 FR 16898, Aug. 26, 1971; 38 FR 29314, Oct. 24, 1973; 39 FR 23991, June 28, 1974; 45 FR 71763, Oct. 30, 1980]

APPENDIX D TO §§20.1-20.601—U.S. NUCLEAR REGULATORY COMMISSION REGIONAL OFFICES

	Addresses	Telephone (24 hours)
Region I: Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.	USNRC, 475 Allendale Road, King of Prussia, PA 19406	(215) 337-5000 (FTS) 346-5000
Region II: Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, Puerto Rico, South Carolina, Tennessee, Virginia, Virgin Islands, and West Virginia.	USNRC, 101 Marietta Street, NW, Suite 2900, Atlanta, GA 30323.	(404) 331-4503 (FTS) 242-4503
Region III: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin.	USNRC, 799 Roosvelt Road, Glen Ellyn, IL 60137	(708) 790-5500 (FTS) 388-5500
Region IV: Arkansas, Colorado, Idaho, Kansas, Louisana, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah, and Wyoming.	USNRC, 611 Ryan Plaza Drive, Suite 1000, Arlington, TX 76011	(817) 860-8100 (FTS) 728-8100
Region IV: Field Office	USNRC, Region IV Uranium Recovery Field Office, 730 Simms Street, P.O. Box 25325, Denver, Co 80225.	(303) 236-2805 (FTS) 776-2805
Region V: Alaska, Arizona, California, Hawaii, Nevada, Oregon, Pacific Trust Territories, and Washington.	USNRC, 1450 Maria Lane, Suite 210, Walnut Creek, CA 94596.	(510) 975-0200

[49 FR 47823, Dec. 7, 1984, as amended at 50 FR 46631, Nov. 12, 1985; 51 FR 35500, Oct. 6, 1986]

Regulations Mandatory as of January 1, 1993 With Earlier Compliance Encouraged

Subpart A—General Provisions

§20.1001 Purpose.

(a) The regulations in this part establish standards for protection against ionizing radiation resulting from activities conducted under licenses issued by the Nuclear Regulatory Commission. These regulations are issued under the Atomic Energy Act of 1954, as amended, and the Energy Reorganization Act of 1974, as amended.

(b) It is the purpose of the regulations in this part to control the receipt, possession, use, transfer, and disposal of licensed material by any licensee in such a manner that the total dose to an individual (including doses resulting from licensed and unlicensed radioactive material and from radiation sources other than background radiation) does not exceed the standards for protection against radiation prescribed in the regulations in this part. However, nothing in this part shall be construed as limiting actions that may be necessary to protect health and safety.

§20.1002 Scope.

The regulations in this part apply to persons licensed by the Commission to receive, possess, use, transfer, or dispose of byproduct, source, or special nuclear material or to operate a production or utilization facility under parts 30 through 35, 39, 40, 50, 60, 61, 70, or 72 of this chapter. The limits in this part do not apply to doses due to background radiation, to exposure of patients to radiation for the purpose of medical diagnosis or therapy, or to voluntary participation in medical research programs.

§20.1003 Definitions.

As used in this part:

"Absorbed dose" means the energy imparted by ionizing radiation per unit mass of irradiated material. The units of absorbed dose are the rad and the gray (Gy).

"Act" means the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.), as amended.

"Activity" is the rate of disintegration (transformation) or decay of radioactive material. The units of activity are the curie (Ci) and the becquerel (Bq).

"Adult" means an individual 18 or more years of age.

"Airborne radioactive material" means radioactive material dispersed in the air in the form of dusts, fumes, particulates, mists, vapors, or gases.

"Airborne radioactivity area" means a room, enclosure, or area in which airborne radioactive materials, composed wholly or partly of licensed material, exist in concentrations—

(1) In excess of the derived air concentrations (DACs) specified in appendix B, to §§ 20.1001-20.2401, or

(2) To such a degree that an individual present in the area without respiratory protective equipment could exceed, during the hours an individual is present in a week, an intake of 0.6 percent of the annual limit on intake (ALI) or 12 DAC-hours.

"ALARA" (acronym for "as low as is reasonably achievable") means making every reasonable effort to maintain exposures to radiation as far below the dose limits in this part as is practical consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of nuclear energy and licensed materials in the public interest.

"Annual limit on intake" (ALI) means the derived limit for the amount of radioactive material taken into the body of an adult worker by inhalation or ingestion in a year. ALI is the smaller value of intake of a given radionuclide in a year by the reference man that would result in a committed effective dose equivalent of 5 rems (0.05 Sv) or a committed dose equivalent of 50 rems (0.5 Sv) to any individual organ or tissue. (ALI values for intake by ingestion and by inhalation of selected radionuclides are given in Table 1, Columns 1 and 2, of appendix B to §§ 20.1001-20.2401).

"Background radiation" means radiation from cosmic sources; naturally occurring radioactive materials, including radon (except as a decay product of source or special nuclear material) and global fallout as it exists in the environment from the testing of nuclear explosive devices. "Background radiation" does not include radiation from source, byproduct, or special nuclear materials regulated by the Commission.

"Bioassay" (radiobioassay) means the determination of kinds, quantities or concentrations, and, in some cases, the locations of radioactive material in the human body, whether by direct measurement (in vivo counting) or by analysis and evaluation of materials excreted or removed from the human body.

"Byproduct material" means—

(1) Any radioactive material (except special nuclear material) yielded in, or made radioactive by, exposure to the radiation incident to the process of producing or utilizing special nuclear material; and

(2) The tailings or wastes produced by the extraction or concentration of uranium or thorium from ore processed primarily for its source material content, including discrete surface wastes resulting from uranium solution extraction processes. Underground ore bodies depleted by these solution extraction operations do not constitute "byproduct material" within this definition.

"Class" (or "lung class or inhalation class") means a classification scheme for inhaled material according to its rate of clearance from the pulmonary region of the lung. Materials are classified as D, W, or Y, which applies to a range of clearance half-times: for Class D (Days) of less than 10 days, for Class W (Weeks) from 10 to 100 days, and for Class Y (Years) of greater than 100 days.

"Collective dose" is the sum of the individual doses received in a given period of time by a specified population from exposure to a specified source of radiation.

"Commission" means the Nuclear Regulatory Commission or its duly authorized representatives.

"Committed dose equivalent" ($H_{T,50}$) means the dose equivalent to organs or tissues of reference (T) that will be received from an intake of radioactive material by an individual during the 50-year period following the intake.

"Committed effective dose equivalent" ($H_{E,50}$) is the sum of the products of the weighting factors applicable to each of the body organs or tissues that are irradiated and the committed dose equivalent to these organs or tissues ($H_{E,50} = \Sigma w_T H_{T,50}$).

"Controlled area" means an area, outside of a restricted area but inside the site boundary, access to which can be limited by the licensee for any reason.

"Declared pregnant woman" means a woman who has voluntarily informed her employer, in writing, of her pregnancy and the estimated date of conception.

"Deep-dose equivalent" (H_d), which applies to external whole-body exposure, is the dose equivalent at a tissue depth of 1 cm (1000 mg/cm^2).

"Department" means the Department of Energy established by the Department of Energy Organization Act (Pub. L. 95-91, 91 Stat. 565, 42 U.S.C. 7101 et seq.) to the extent that the Department, or its duly authorized representatives, exercises functions formerly vested in the U.S. Atomic Energy Commission, its Chairman, members, officers, and components and transferred to the U.S. Energy Research and Development Administration and to the Administrator thereof pursuant to sections 104 (b), (c), and (d) of the Energy Reorganization Act of 1974 (Pub. L. 93-438, 88 Stat. 1233 at 1237, 42 U.S.C. 5814) and retransferred to the Secretary of Energy pursuant to section 301(a) of the Department of Energy Organization Act (Pub. L. 95-91, 91 Stat 565 at 577-578, 42 U.S.C. 7151).

"Derived air concentration" (DAC) means the concentration of a given radionuclide in air which, if breathed by the reference man for a working year of 2,000 hours under conditions of light work (inhalation rate 1.2 cubic meters of air per hour), results in an intake of one ALI. DAC values are given in Table 1, Column 3, of appendix B to §§ 20.1001-20.2401.

"Derived air concentration-hour" (DAC-hour) is the product of the concentration of radioactive material in air (expressed as a fraction or multiple of the derived air concentration for each radionuclide) and the time of exposure to that radionuclide, in hours. A licensee may take 2,000 DAC- hours to represent one ALI, equivalent to a committed effective dose equivalent of 5 rems (0.05 Sv).

"Dose or radiation dose" is a generic term that means absorbed dose, dose equivalent, effective dose equivalent, committed dose equivalent, committed effective dose equivalent, or total effective dose equivalent, as defined in other paragraphs of this section.

"Dose equivalent" (H_T) means the product of the absorbed dose in tissue, quality factor, and all other necessary modifying factors at the location of interest. The units of dose equivalent are the rem and sievert (Sv).

"Dosimetry processor" means an individual or an organization that processes and evaluates individual monitoring equipment in order to determine the radiation dose delivered to the equipment. ($H_{E,50} = \Sigma w_T H_{T,50}$)

"Effective dose equivalent" (H_E) is the sum of the products of the dose equivalent to the organ or tissue (H_T) and the weighting factors (W_T) applicable to each of the body organs or tissues that are irradiated ($H_E = \Sigma w_T H_T$).

"Embryo/fetus" means the developing human organism from conception until the time of birth.

"Entrance or access point" means any location through which an individual could gain access to radiation areas or to radioactive materials. This includes entry or exit portals of sufficient size to permit human entry, irrespective of their intended use.

"Exposure" means being exposed to ionizing radiation or to radioactive material.

"External dose" means that portion of the dose equivalent received from radiation sources outside the body.

"Extremity" means hand, elbow, arm below the elbow, foot, knee, or leg below the knee.

"Eye dose equivalent" applies to the external exposure of the lens of the eye and is taken as the dose equivalent at a tissue depth of 0.3 centimeter (300 mg/cm^2).

"Generally applicable environmental radiation standards" means standards issued by the Environmental Protection Agency (EPA) under the authority of the Atomic Energy Act of 1954, as amended, that impose limits on radiation exposures or levels, or concentrations or quantities of radioactive material, in the general environment outside the boundaries of locations

under the control of persons possessing or using radioactive material.

"Government agency" means any executive department, commission, independent establishment, corporation wholly or partly owned by the United States of America, which is an instrumentality of the United States, or any board, bureau, division, service, office, officer, authority, administration, or other establishment in the executive branch of the Government.

"Gray" [See § 20.1004].

"High radiation area" means an area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 0.1 rem (1 mSv) in 1 hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates.

"Individual" means any human being.

"Individual monitoring" means—

(1) The assessment of dose equivalent by the use of devices designed to be worn by an individual;

(2) The assessment of committed effective dose equivalent by bioassay (see *Bioassay*) or by determination of the time-weighted air concentrations to which an individual has been exposed, i.e., DAC-hours; or

(3) The assessment of dose equivalent by the use of survey data.

"Individual Monitoring Devices" ("individual monitoring equipment") means devices designed to be worn by a single individual for the assessment of dose equivalent such as film badges, thermoluminescent dosimeters (TLDs), pocket ionization chambers, and personal ("lapel") air sampling devices.

"Internal dose" means that portion of the dose equivalent received from radioactive material taken into the body.

"License" means a license issued under the regulations in parts 30 through 35, 39, 40, 50, 60, 61, 70, or 72 of this chapter.

"Licensed material" means source material, special nuclear material, or byproduct material received, possessed, used, transferred or disposed of under a general or specific license issued by the Commission.

"Licensee" means the holder of a license.

"Limits" (dose limits) means the permissible upper bounds of radiation doses.

"Lost or missing licensed material" means licensed material whose location is unknown. It includes material that has been shipped but has not reached its destination and whose location cannot be readily traced in the transportation system.

"Member of the public" means an individual in a controlled or unrestricted area. However, an individual is not a member of the public during any period in which the individual receives an occupational dose.

"Minor" means an individual less than 18 years of age.

"Monitoring" (radiation monitoring, radiation protection monitoring) means the measurement of radiation levels, concentrations, surface area concentrations or quantities of radioactive material and the use of the results of these measurements to evaluate potential exposures and doses.

"Nonstochastic effect" means health effects, the severity of which varies with the dose and for which a threshold is believed to exist. Radiation-induced cataract formation is an example of a nonstochastic effect (also called a deterministic effect).

"NRC" means the Nuclear Regulatory Commission or its duly authorized representatives.

"Occupational dose" means the dose received by an individual in a restricted area or in the course of employment in which the individual's assigned duties involve exposure to radiation and to radioactive material from licensed and unlicensed sources of radiation, whether in the possession of the licensee or other person. Occupational dose does not include dose received from background radiation, as a patient from medical practices, from voluntary participation in medical research programs, or as a member of the general public.

"Person" means—

(1) Any individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, Government agency other than the Commission or the Department of Energy (except that the Department shall be considered a person within the meaning of the regulations in 10 CFR chapter I to the extent that its facilities and activities are subject to the licensing and related regulatory authority of the Commission under section 202 of the Energy Reorganization Act of 1974 (88 Stat. 1244), the Uranium Mill Tailings Radiation Control Act of 1978 (92 Stat. 3021), the Nuclear Waste Policy Act of 1982 (96 Stat. 2201), and section 3(b)(2) of the Low-Level Radioactive Waste Policy Amendments Act of 1985 (99 Stat. 1842)), any State or any political subdivision of or any political entity within a State, any foreign government or nation or any political subdivision of any such government or nation, or other entity; and

(2) Any legal successor, representative, agent, or agency of the foregoing.

"Planned special exposure" means an infrequent exposure to radiation, separate from and in addition to the annual dose limits.

"Public dose" means the dose received by a member of the public from exposure to radiation and to radioactive material released by a licensee, or to another source of radiation either within a licensee's controlled area or in unrestricted areas. It does not include occupational dose or doses received from background radiation, as a patient from medical practices, or from voluntary participation in medical research programs.

"Quality Factor" (Q) means the modifying factor (listed in tables 1004(b).1 and 1004(b).2 of § 20.1004) that is used to derive dose equivalent from absorbed dose.

"Quarter" means a period of time equal to one-fourth of the year observed by the licensee (approximately 13 consecutive weeks), providing that the beginning of the first quarter in a year coincides with the starting date of the year and that no day is omitted or duplicated in consecutive quarters.

"Rad" (See § 20.1004).

"Radiation" (ionizing radiation) means alpha particles, beta particles, gamma rays, x-rays, neutrons, high-speed electrons, high-speed protons, and other particles capable of producing ions. Radiation, as used in this part, does not include non-ionizing radiation, such as radio- or microwaves, or visible, infrared, or ultraviolet light.

"Radiation area" means an area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 0.005 rem (0.05 mSv) in 1 hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates.

"Reference man" means a hypothetical aggregation of human physical and physiological characteristics arrived at by international consensus. These characteristics may be used by researchers and public health workers to standardize results of experiments and to relate biological insult to a common base.

"Rem" (See § 20.1004).

"Respiratory protective device" means an apparatus, such as a respirator, used to reduce the individual's intake of airborne radioactive materials.

"Restricted area" means an area, access to which is limited by the licensee for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials. Restricted area does not include areas used as residential quarters, but separate rooms in a residential building may be set apart as a restricted area.

"Sanitary sewerage" means a system of public sewers for carrying off waste water and refuse, but excluding sewage treatment facilities, septic tanks, and leach fields owned or operated by the licensee.

"Shallow-dose equivalent" (Hs), which applies to the external exposure of the skin or an extremity, is taken as the dose equivalent at a tissue depth of 0.007 centimeter (7 mg/cm^2) averaged over an area of 1 square centimeter.

"Sievert" (See § 20.1004).

"Site boundary" means that line beyond which the land or property is not owned, leased, or otherwise controlled by the licensee.

"Source material" means—

(1) Uranium or thorium or any combination of uranium and thorium in any physical or chemical form; or

(2) Ores that contain, by weight, one-twentieth of 1 percent (0.05 percent), or more, of uranium, thorium, or any combination of uranium and thorium. Source material does not include special nuclear material.

"Special nuclear material" means—

(1) Plutonium, uranium-233, uranium enriched in the isotope 233 or in the isotope 235, and any other material that the Commission, pursuant to the provisions of section 51 of the Act, determines to be special nuclear material, but does not include source material; or

(2) Any material artificially enriched by any of the foregoing but does not include source material.

"Stochastic effects" means health effects that occur randomly and for which the probability of the effect occurring, rather than its severity, is assumed to be a linear function of dose without threshold. Hereditary effects and cancer incidence are examples of stochastic effects.

"Survey" means an evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal, or presence of radioactive material or other sources of radiation. When appropriate, such an evaluation includes a physical survey of the location of radioactive material and measurements or calculations of levels of radiation, or concentrations or quantities of radioactive material present.

"Total Effective Dose Equivalent" (TEDE) means the sum of the deep-dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposures).

"Unrestricted area" means an area, access to which is neither limited nor controlled by the licensee.

"Uranium fuel cycle" means the operations of milling of uranium ore, chemical conversion of uranium, isotopic enrichment of uranium, fabrication of uranium fuel, generation of electricity by a light-water-cooled nuclear power plant using uranium fuel, and reprocessing of spent uranium fuel to the extent that these activities directly support the production of electrical power for public use. Uranium fuel cycle does not include mining operations, operations at waste disposal sites, transportation of radioactive material in support of these operations, and the reuse of recovered non-uranium special nuclear and byproduct materials from the cycle.

"Very high radiation area" means an area, accessible to individuals, in which radiation levels could result in an individual receiving an absorbed dose in excess of 500 rads (5 grays) in 1 hour at 1 meter from a radiation source or from any surface that the radiation penetrates.

(Note: At very high doses received at high dose rates, units of absorbed dose (e.g., rads and grays) are appropriate, rather than units of dose equivalent (e.g., rems and sieverts)).

"Week" means 7 consecutive days starting on Sunday.

"Weighting factor" w_T, for an organ or tissue (T) is the proportion of the risk of stochastic effects resulting from irradiation of that organ or tissue to the total risk of stochastic effects when the whole body is irradiated uniformly. For calculating the effective dose equivalent, the values of w_T are:

Organ Dose Weighting Factors

Organ or tissue	w_T
Gonads	0.25
Breast	0.15
Red bone marrow	0.12
Lung	0.12
Thyroid	0.03
Bone surfaces	0.03
Remainder	[1] 0.30
Whole Body	[2] 1.00

[1] 0.30 results from 0.06 for each of 5 "remainder" organs (excluding the skin and the lens of the eye) that receive the highest doses.

[2] For the purpose of weighting the external whole body dose (for adding it to the internal dose), a single weighting factor, w_T=1.0, has been specified. The use of other weighting factors for external exposure will be approved on a case-by-case basis until such time as specific guidance is issued.

"Whole body" means, for purposes of external exposure, head, trunk (including male gonads), arms above the elbow, or legs above the knee.

"Working level" (WL) is any combination of short-lived radon daughters (for radon-222: polonium-218, lead-214, bismuth-214, and polonium-214; and for radon-220: polonium-216, lead-212, bismuth-212, and polonium-212) in 1 liter of air that will result in the ultimate emission of 1.3×10^5MeV of potential alpha particle energy.

"Working level month" (WLM) means an exposure to 1 working level for 170 hours (2,000 working hours per year/12 months per year=approximately 170 hours per month).

"Year" means the period of time beginning in January used to determine compliance with the provisions of this part. The licensee may change the starting date of the year used to determine compliance by the licensee provided that the change is made at the beginning of the year and that no day is omitted or duplicated in consecutive years.

§20.1004 Units of radiation dose.

(a) Definitions. As used in this part, the units of radiation dose are:

"Gray" (Gy) is the SI unit of absorbed dose. One gray is equal to an absorbed dose of 1 Joule/kilogram (100 rads).

"Rad" is the special unit of absorbed dose. One rad is equal to an absorbed dose of 100 ergs/gram or 0.01 joule/kilogram (0.01 gray).

"Rem" is the special unit of any of the quantities expressed as dose equivalent. The dose equivalent in rems is equal to the absorbed dose in rads multiplied by the quality factor (1 rem=0.01 sievert).

"Sievert" is the SI unit of any of the quantities expressed as dose equivalent. The dose equivalent in sieverts is equal to the absorbed dose in grays multiplied by the quality factor (1 Sv=100 rems).

(b) As used in this part, the quality factors for converting absorbed dose to dose equivalent are shown in table 1004(b).1.

Table 1004(b).1.—Quality Factors and Absorbed Dose Equivalencies

Type of radiation	Quality factor (Q)	Absorbed dose equal to a unit[a]
X-, gamma, or beta radiation	1	1
Alpha particles, multiple-charged particles, fission fragments and heavy particles of unknown charge	20	0.05
Neutrons of unknown energy	10	0.1
High-energy protons	10	0.1

[a] Absorbed dose in rad equal to 1 rem or the absorbed dose in gray equal to 1 sievert.

(c) If it is more convenient to measure the neutron fluence rate than to determine the neutron dose equivalent rate in rems per hour or sieverts per hour, as provided in paragraph (b) of this section, 1 rem (0.01 Sv) of neutron radiation of unknown energies may, for purposes of the regulations in this part, be assumed to result from a total fluence of 25 million neutrons per square centimeter incident upon the body. If sufficient information exists to estimate the approximate energy distribution of the neutrons, the licensee may use the fluence rate per unit dose equivalent or the appropriate Q value from table 1004(b).2 to convert a measured tissue dose in rads to dose equivalent in rems.

Table 1004(b).2.—Mean Quality Factors, Q, and Fluence per Unit Dose Equivalent for Monoenergetic Neutrons

	Neutron Energy (MeV)	Quality Factor[a] (Q)	Fluence per unit dose equivalent[b] (neutrons cm^{-2} rem^{-1})
(thermal)	2.5×10^{-8}	2	980×10^6
	1×10^{-7}	2	980×10^6
	1×10^{-6}	2	810×10^6
	1×10^{-5}	2	810×10^6
	1×10^{-4}	2	840×10^6
	1×10^{-3}	2	980×10^6
	1×10^{-2}	2.5	1010×10^6
	1×10^{-1}	7.5	170×10^6

Table 1004(b).2.—Mean Quality Factors, Q, and Fluence per Unit Dose Equivalent for Monoenergetic Neutrons

Neutron Energy (MeV)	Quality Factor[a] (Q)	Fluence per unit dose equivalent[b] (neutrons cm^{-2} rem^{-1})
5×10^{-1}	11	39×10^{6}
1	11	27×10^{6}
2.5	9	29×10^{6}
5	8	23×10^{6}
7	7	24×10^{6}
10	6.5	24×10^{6}
14	7.5	17×10^{6}
20	8	16×10^{6}
40	7	14×10^{6}
60	5.5	16×10^{6}
1×10^{2}	4	20×10^{6}
2×10^{2}	3.5	19×10^{6}
3×10^{2}	3.5	16×10^{6}
4×10^{2}	3.5	14×10^{6}

[a] Value of quality factor (Q) at the point where the dose equivalent is maximum in a 30-cm diameter cylinder tissue-equivalent phantom.

[b] Monoenergetic neutrons incident normally on a 30-cm diameter cylinder tissue-equivalent phantom.

§20.1005 Units of radioactivity.

For the purposes of this part, activity is expressed in the special unit of curies (Ci) or in the SI unit of becquerels (Bq), or their multiples, or disintegrations (transformations) per unit of time.

(a) One becquerel=1 disintegration per second (s^{-1}).

(b) One curie=3.7×10^{10} disintegrations per second=3.7×10^{10} becquerels=2.22×10^{12} disintegrations per minute.

§20.1006 Interpretations.

Except as specifically authorized by the Commission in writing, no interpretation of the meaning of the regulations in this part by an officer or employee of the Commission other than a written interpretation by the General Counsel will be recognized to be binding upon the Commission.

§20.1007 Communications.

Unless otherwise specified, communications or reports concerning the regulations in this part should be addressed to the Executive Director for Operations, U.S. Nuclear Regulatory Commission, Washington, DC 20555. A communication, report, or application may be delivered in person to the Office of the Executive Director for Operations, 11555 Rockville Pike, Rockville, MD 20852.

§20.1008 Implementation.

(a) Licensees shall implement the provisions of §§20.1001-20.2401 on or before January 1, 1994. If a licensee chooses to implement the provisions of §§20.1001-20.2401 prior to January 1, 1994, the licensee shall implement all provision of these sections not otherwise exempted by paragraph (d) of this section, and shall provide written notification to either the Director of the Office of Nuclear Materials Safety and Safeguards or the Director of the Office of Nuclear Reactor Regulation, as appropriate, that the licensee is adopting early implementation of §§20.1001-20.2401 and associated appendices. Until January 1, 1994, or until the licensee notifies the Commission of early implementation, compliance will be required with §§20.1-20.601 of this part. 1

(b) After the time the licensee implements §§ 20.1001-20.2401, the applicable section of §§ 20.1001-20.2401 shall be used in lieu of any section in §§ 20.1-20.601 of this part that is cited in license conditions or technical specifications, except as specified in paragraphs (c), (d) and (e) of this section. If the requirements of this part are more restrictive than the existing license condition, then the licensee shall comply with this part unless exempted by paragraph (d) of this section.

(c) Any existing license condition or technical specification that is more restrictive than a requirement in §§ 20.1001-20.2401 remains in force until there is a technical specification change, license amendment, or license renewal.

(d) If a license condition or technical specification exempted a licensee from a provision of Part 20 in §§ 20.1-20.601, it exempts a licensee from the corresponding provision of §§ 20.1001-20.2401.

(e) If a license condition cites provisions in §§ 20.1-20.601 and there are no corresponding provisions in §§ 20.1001-20.2401, then the license condition remains in force until there is a technical specification change, license amendment, or license renewal that modifies or removes this condition.

§20.1009 Reporting, recording, and application requirements: OMB approval.

(a) The Nuclear Regulatory Commission will submit the information collection requirements contained in this part to the Office of Management and Budget for approval as required by the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et seq.). The information collection requirements in this part will not become effective until OMB clearance is obtained and published in the Federal Register.

(b) The information collection requirements contained in this part appear in §§ 20.1101, 20.1202, 20.1204, 20.1206, 20.1301, 20.1501, 20.1601, 20.1603, 20.1703, 20.1901, 20.1902, 20.1904, 20.1906, 20.2002, 20.2004, 20.2006, 20.2102, 20.2103, 20.2104, 20.2105, 20.2106, 20.2107, 20.2108, 20.2109, 20.2110, 20.2201, 20.2202, 20.2203, 20.2204, 20.2206, Appendix F to §§ 20.1001-20.2401, and NRC Form 4 and NRC Form 5.

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[1]An organ or tissue is deemed to be significantly irradiated if, for that organ or tissue, the product of the weighting factors, w_T, and the committed dose equivalent, H_{50}, per unit intake is greater than 10 percent of the maximum weighted value of H_{50} (i.e., $w_T H_{50,T}$) per unit intake for any organ or tissue.

Subpart B—Radiation Protection Programs

§20.1101 Radiation protection programs.

(a) Each licensee shall develop, document, and implement a radiation protection program commensurate with the scope and extent of licensed activities and sufficient to ensure compliance with the provisions of this part. (See § 20.2102 for recordkeeping requirements relating to these programs.)

(b) The licensee shall use, to the extent practicable, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA).

(c) The licensee shall periodically (at least annually) review the radiation protection program content and implementation.

Subpart C—Occupational Dose Limits

§20.1201 Occupational dose limits for adults.

(a) The licensee shall control the occupational dose to individual adults, except for planned special exposures under § 20.1206, to the following dose limits.

(1) An annual limit, which is the more limiting of—

(i) The total effective dose equivalent being equal to 5 rems (0.05 Sv); or

(ii) The sum of the deep-dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye being equal to 50 rems (0.5 Sv).

(2) The annual limits to the lens of the eye, to the skin, and to the extremities, which are:

(i) An eye dose equivalent of 15 rems (0.15 Sv), and

(ii) A shallow-dose equivalent of 50 rems (0.50 Sv) to the skin or to any extremity.

(b) Doses received in excess of the annual limits, including doses received during accidents, emergencies, and planned special exposures, must be subtracted from the limits for planned special

1 Revised, 57 FR 38588, August 26, 1992

exposures that the individual may receive during the current year (see § 20.1206(e)(1)) and during the individual's lifetime (see § 20.1206(e)(2)).

(c) The assigned deep-dose equivalent and shallow-dose equivalent must be for the part of the body receiving the highest exposure. The deep-dose equivalent, eye dose equivalent and shallow-dose equivalent may be assessed from surveys or other radiation measurements for the purpose of demonstrating compliance with the occupational dose limits, if the individual monitoring device was not in the region of highest potential exposure, or the results of individual monitoring are unavailable.

(d) Derived air concentration (DAC) and annual limit on intake (ALI) values are presented in table 1 of appendix B to §§ 20.1001-20.2401 and may be used to determine the individual's dose (see § 20.2106) and to demonstrate compliance with the occupational dose limits.

(e) In addition to the annual dose limits, the licensee shall limit the soluble uranium intake by an individual to 10 milligrams in a week in consideration of chemical toxicity (see footnote 3 of appendix B to §§ 20.1001-20.2401).

(f) The licensee shall reduce the dose that an individual may be allowed to receive in the current year by the amount of occupational dose received while employed by any other person (see § 20.2104(e)).

§20.1202 Compliance with requirements for summation of external and internal doses.

(a) If the licensee is required to monitor under both §§ 20.1502(a) and (b), the licensee shall demonstrate compliance with the dose limits by summing external and internal doses. If the licensee is required to monitor only under § 20.1502(a) or only under § 20.1502(b), then summation is not required to demonstrate compliance with the dose limits. The licensee may demonstrate compliance with the requirements for summation of external and internal doses by meeting one of the conditions specified in paragraph (b) of this section and the conditions in paragraphs (c) and (d) of this section.

(Note: The dose equivalents for the lens of the eye, the skin, and the extremities are not included in the summation, but are subject to separate limits.)

(b) *Intake by inhalation.* If the only intake of radionuclides is by inhalation, the total effective dose equivalent limit is not exceeded if the sum of the deep-dose equivalent divided by the total effective dose equivalent limit, and one of the following, does not exceed unity:

(1) The sum of the fractions of the inhalation ALI for each radionuclide, or

(2) The total number of derived air concentration-hours (DAC-hours) for all radionuclides divided by 2,000, or

(3) The sum of the calculated committed effective dose equivalents to all significantly irradiated[1] organs or tissues (T) calculated from bioassay data using appropriate biological models and expressed as a fraction of the annual limit.

(c) *Intake by oral ingestion.* If the occupationally exposed individual also receives an intake of radionuclides by oral ingestion greater than 10 percent of the applicable oral ALI, the licensee shall account for this intake and include it in demonstrating compliance with the limits.

(d) *Intake through wounds or absorption through skin.* The licensee shall evaluate and, to the extent practical, account for intakes through wounds or skin absorption.

Note: The intake through intact skin has been included in the calculation of DAC for hydrogen-3 and does not need to be further evaluated.

§20.1203 Determination of external dose from airborne radioactive material.

Licensees shall, when determining the dose from airborne radioactive material, include the contribution to the deep-dose equivalent, eye dose equivalent, and shallow-dose equivalent from external exposure to the radioactive cloud (see appendix B to §§ 20.1001-20.2401, footnotes 1 and 2).

Note: Airborne radioactivity measurements and DAC values should not be used as the primary means to assess the deep-dose equivalent when the airborne radioactive material includes radionuclides other than noble gases or if the cloud of airborne radioactive material is not relatively uniform. The determination of the deep-dose equivalent to an individual should be based upon measurements using instruments or individual monitoring devices.

§20.1204 Determination of internal exposure.

(a) For purposes of assessing dose used to determine compliance with occupational dose equivalent limits, the licensee shall, when required under § 20.1502, take suitable and timely measurements of—

(1) Concentrations of radioactive materials in air in work areas; or

(2) Quantities of radionuclides in the body; or

(3) Quantities of radionuclides excreted from the body; or

(4) Combinations of these measurements.

(b) Unless respiratory protective equipment is used, as provided in § 20.1703, or the assessment of intake is based on bioassays, the licensee shall assume that an individual inhales radioactive material at the airborne concentration in which the individual is present.

(c) When specific information on the physical and biochemical properties of the radionuclides taken into the body or the behavior or the material in an individual is known, the licensee may—

(1) Use that information to calculate the committed effective dose equivalent, and, if used, the licensee shall document that information in the individual's record; and

(2) Upon prior approval of the Commission, adjust the DAC or ALI values to reflect the actual physical and chemical characteristics of airborne radioactive material (e.g., aerosol size distribution or density); and

(3) Separately assess the contribution of fractional intakes of Class D, W, or Y compounds of a given radionuclide (see appendix B to §§ 20.1001-20.2401) to the committed effective dose equivalent.

(d) If the licensee chooses to assess intakes of Class Y material using the measurements given in § 20.1204(a)(2) or (3), the licensee may delay the recording and reporting of the assessments for periods up to 7 months, unless otherwise required by §§ 20.2202 or 20.2203, in order to permit the licensee to make additional measurements basic to the assessments.

(e) If the identity and concentration of each radionuclide in a mixture are known, the fraction of the DAC applicable to the mixture for use in calculating DAC-hours must be either—

(1) The sum of the ratios of the concentration to the appropriate DAC value (e.g., D, W, Y) from appendix B to §§ 20.1001-20.2401 for each radionuclide in the mixture; or

(2) The ratio of the total concentration for all radionuclides in the mixture to the most restrictive DAC value for any radionuclide in the mixture.

(f) If the identity of each radionuclide in a mixture is known, but the concentration of one or more of the radionuclides in the mixture is not known, the DAC for the mixture must be the most restrictive DAC of any radionuclide in the mixture.

(g) When a mixture of radionuclides in air exists, licensees may disregard certain radionuclides in the mixture if—

(1) The licensee uses the total activity of the mixture in demonstrating compliance with the dose limits in § 20.1201 and in complying with the monitoring requirements in § 20.1502(b), and

(2) The concentration of any radionuclide disregarded is less than 10 percent of its DAC, and

(3) The sum of these percentages for all of the radionuclides disregarded in the mixture does not exceed 30 percent.

(h)(1) In order to calculate the committed effective dose equivalent, the licensee may assume that the inhalation of one ALI, or an exposure of 2,000 DAC-hours, results in a committed effective dose equivalent of 5 rems (0.05 Sv) for radionuclides that have their ALIs or DACs based on the committed effective dose equivalent.

(2) When the ALI (and the associated DAC) is determined by the nonstochastic organ dose limit of 50 rems (0.5 Sv), the intake of radionuclides that would result in a committed effective dose equivalent of 5 rems (0.05 Sv) (the stochastic ALI) is listed in parentheses in table 1 of appendix B to §§ 20.1001-20.2401. In this case, the licensee may, as a simplifying assumption, use the stochastic ALIs to determine committed effective dose equivalent. However, if the licensee uses the stochastic ALIs, the licensee

must also demonstrate that the limit in § 20.1201(a)(1)(ii) is met.

§20.1205 [Reserved]

§20.1206 Planned special exposures.

A licensee may authorize an adult worker to receive doses in addition to and accounted for separately from the doses received under the limits specified in § 20.1201 provided that each of the following conditions is satisfied—

(a) The licensee authorizes a planned special exposure only in an exceptional situation when alternatives that might avoid the higher exposure are unavailable or impractical.

(b) The licensee (and employer if the employer is not the licensee) specifically authorizes the planned special exposure, in writing, before the exposure occurs.

(c) Before a planned special exposure, the licensee ensures that the individuals involved are—

(1) Informed of the purpose of the planned operation;

(2) Informed of the estimated doses and associated potential risks and specific radiation levels or other conditions that might be involved in performing the task; and

(3) Instructed in the measures to be taken to keep the dose ALARA considering other risks that may be present.

(d) Prior to permitting an individual to participate in a planned special exposure, the licensee ascertains prior doses as required by § 20.2104(b) during the lifetime of the individual for each individual involved.

(e) Subject to § 20.1201(b), the licensee does not authorize a planned special exposure that would cause an individual to receive a dose from all planned special exposures and all doses in excess of the limits to exceed—

(1) The numerical values of any of the dose limits in § 20.1201(a) in any year; and

(2) Five times the annual dose limits in § 20.1201(a) during the individual's lifetime.

(f) The licensee maintains records of the conduct of a planned special exposure in accordance with § 20.2105 and submits a written report in accordance with § 20.2204.

(g) The licensee records the best estimate of the dose resulting from the planned special exposure in the individual's record and informs the individual, in writing, of the dose within 30 days from the date of the planned special exposure. The dose from planned special exposures is not to be considered in controlling future occupational dose of the individual under § 20.1201(a) but is to be included in evaluations required by § 20.1206 (d) and (e).

§20.1207 Occupational dose limits for minors.

The annual occupational dose limits for minors are 10 percent of the annual dose limits specified for adult workers in § 20.1201.

§20.1208 Dose to an embryo/fetus.

(a) The licensee shall ensure that the dose to an embryo/fetus during the entire pregnancy, due to occupational exposure of a declared pregnant woman, does not exceed 0.5 rem (5 mSv). (For recordkeeping requirements, see § 20.2106.)

(b) The licensee shall make efforts to avoid substantial variation above a uniform monthly exposure rate to a declared pregnant woman so as to satisfy the limit in paragraph (a) of this section.

(c) The dose to an embryo/fetus shall be taken as the sum of—

(1) The deep-dose equivalent to the declared pregnant woman; and

(2) The dose to the embryo/fetus from radionuclides in the embryo/fetus and radionuclides in the declared pregnant woman.

(d) If the dose to the embryo/fetus is found to have exceeded 0.5 rem (5 mSv), or is within 0.05 rem (0.5 mSv) of this dose, by the time the woman declares the pregnancy to the licensee, the licensee shall be deemed to be in compliance with paragraph (a) of this section if the additional dose to the embryo/fetus does not exceed 0.05 rem (0.5 mSv) during the remainder of the pregnancy.

Subpart D—Radiation Dose Limits for Individual Members of the Public

§20.1301 Dose limits for individual members of the public.

(a) Each licensee shall conduct operations so that—

(1) The total effective dose equivalent to individual members of the public from the licensed operation does not exceed 0.1 rem (1 mSv) in a year, exclusive of the dose contribution from the licensee's disposal of radioactive material into sanitary sewerage in accordance with § 20.2003, and

(2) The dose in any unrestricted area from external sources does not exceed 0.002 rem (0.02 mSv) in any one hour.

(b) If the licensee permits members of the public to have access to controlled areas, the limits for members of the public continue to apply to those individuals.

(c) A licensee or license applicant may apply for prior NRC authorization to operate up to an annual dose limit for an individual member of the public of 0.5 rem (5 mSv). The licensee or license applicant shall include the following information in this application:

(1) Demonstration of the need for and the expected duration of operations in excess of the limit in paragraph (a) of this section;

(2) The licensee's program to assess and control dose within the 0.5 rem (5 mSv) annual limit; and

(3) The procedures to be followed to maintain the dose as low as is reasonably achievable.

(d) In addition to the requirements of this part, a licensee subject to the provisions of EPA's generally applicable environmental radiation standards in 40 CFR Part 190 shall comply with those standards.

(e) The Commission may impose additional restrictions on radiation levels in unrestricted areas and on the total quantity of radionuclides that a licensee may release in effluents in order to restrict the collective dose.

§20.1302 Compliance with dose limits for individual members of the public.

(a) The licensee shall make or cause to be made, as appropriate, surveys of radiation levels in unrestricted and controlled areas and radioactive materials in effluents released to unrestricted and controlled areas to demonstrate compliance with the dose limits for individual members of the public in § 20.1301.

(b) A licensee shall show compliance with the annual dose limit in § 20.1301 by—

(1) Demonstrating by measurement or calculation that the total effective dose equivalent to the individual likely to receive the highest dose from the licensed operation does not exceed the annual dose limit; or

(2) Demonstrating that—

(i) The annual average concentrations of radioactive material released in gaseous and liquid effluents at the boundary of the unrestricted area do not exceed the values specified in table 2 of appendix B to §§ 20.1001- 20.2401; and

(ii) If an individual were continually present in an unrestricted area, the dose from external sources would not exceed 0.002 rem (0.02 mSv) in an hour and 0.05 rem (0.5 mSv) in a year.

(c) Upon approval from the Commission, the licensee may adjust the effluent concentration values in appendix B to §§ 20.1001-20.2401, table 2, for members of the public, to take into account the actual physical and chemical characteristics of the effluents (e.g., aerosol size distribution, solubility, density, radioactive decay equilibrium, chemical form).

Subpart E—[Reserved]

Subpart F—Surveys and Monitoring

§20.1501 General.

(a) Each licensee shall make or cause to be made, surveys that—

(1) May be necessary for the licensee to comply with the regulations in this part; and

(2) Are reasonable under the circumstances to evaluate—

(i) The extent of radiation levels; and

(ii) Concentrations or quantities of radioactive material; and

(iii) The potential radiological hazards that could be present.

(b) The licensee shall ensure that instruments and equipment used for quantitative radiation measurements (e.g., dose rate and effluent monitoring) are calibrated periodically for the radiation measured.

(c) All personnel dosimeters (except for direct and indirect reading pocket ionization chambers and those dosimeters used to measure the dose to the extremities) that require processing to determine the radiation dose and that are used by licensees to comply with § 20.1201, with other applicable provisions of this chapter, or with conditions specified in a license must be processed and evaluated by a dosimetry processor—

(1) Holding current personnel dosimetry accreditation from the National Voluntary Laboratory Accreditation Program (NVLAP) of the National Institute of Standards and Technology; and

(2) Approved in this accreditation process for the type of radiation or radiations included in the NVLAP program that most closely approximates the type of radiation or radiations for which the individual wearing the dosimeter is monitored.

[2]This section applies to radiation from byproduct, source, or special nuclear materials that are used in sealed sources in non-self-shielded irradiators. This section does not apply to radioactive sources that are used in teletherapy, in radiography, or in completely self-shielded irradiators in which the source is both stored and operated within the same shielding radiation barrier and, in the designed configuration of the irradiator, is always physically inaccessible to any individual and cannot create high levels of radiation in an area that is accessible to any individual. This section also does not apply to sources from which the radiation is incidental to some other use or to nuclear reactor-generated radiation.

§20.1502 Conditions requiring individual monitoring of external and internal occupational dose.

Each licensee shall monitor exposures to radiation and radioactive material at levels sufficient to demonstrate compliance with the occupational dose limits of this part. As a minimum—

(a) Each licensee shall monitor occupational exposure to radiation and shall supply and require the use of individual monitoring devices by—

(1) Adults likely to receive, in 1 year from sources external to the body, a dose in excess of 10 percent of the limits in § 20.1201(a),

(2) Minors and declared pregnant women likely to receive, in 1 year from sources external to the body, a dose in excess of 10 percent of any of the applicable limits in § 20.1207 or § 20.1208, and

(3) Individuals entering a high or very high radiation area.

(b) Each licensee shall monitor (see § 20.1204) the occupational intake of radioactive material by and assess the committed effective dose equivalent to—

(1) Adults likely to receive, in 1 year, an intake in excess of 10 percent of the applicable ALI(s) in table 1, Columns 1 and 2, of appendix B to §§ 20.1001-20.2401; and

(2) Minors and declared pregnant women likely to receive, in 1 year, a committed effective dose equivalent in excess of 0.05 rem (0.5 mSv).

Subpart G—Control of Exposure From External Sources in Restricted Areas

§20.1601 Control of access to high radiation areas.

(a) The licensee shall ensure that each entrance or access point to a high radiation area has one or more of the following features—

(1) A control device that, upon entry into the area, causes the level of radiation to be reduced below that level at which an individual might receive a deep-dose equivalent of 0.1 rem (1 mSv) in 1 hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates;

(2) A control device that energizes a conspicuous visible or audible alarm signal so that the individual entering the high radiation area and the supervisor of the activity are made aware of the entry; or

(3) Entryways that are locked, except during periods when access to the areas is required, with positive control over each individual entry.

(b) In place of the controls required by paragraph (a) of this section for a high radiation area, the licensee may substitute continuous direct or electronic surveillance that is capable of preventing unauthorized entry.

(c) A licensee may apply to the Commission for approval of alternative methods for controlling access to high radiation areas.

(d) The licensee shall establish the controls required by paragraphs (a) and (c) of this section in a way that does not prevent individuals from leaving a high radiation area.

(e) Control is not required for each entrance or access point to a room or other area that is a high radiation area solely because of the presence of radioactive materials prepared for transport and packaged and labeled in accordance with the regulations of the Department of Transportation provided that—

(1) The packages do not remain in the area longer than 3 days; and

(2) The dose rate at 1 meter from the external surface of any package does not exceed 0.01 rem (0.1 mSv) per hour.

(f) Control of entrance or access to rooms or other areas in hospitals is not required solely because of the presence of patients containing radioactive material, provided that there are personnel in attendance who will take the necessary precautions to prevent the exposure of individuals to radiation or radioactive material in excess of the limits established in this part and to operate within the ALARA provisions of the licensee's radiation protection program.

§20.1602 Control of access to very high radiation areas.

In addition to the requirements in § 20.1601, the licensee shall institute additional measures to ensure that an individual is not able to gain unauthorized or inadvertent access to areas in which radiation levels could be encountered at 500 rads (5 grays) or more in 1 hour at 1 meter from a radiation source or any surface through which the radiation penetrates.

§20.1603 Control of access to very high radiation areas—irradiators.

(a) Each area in which there may exist radiation levels in excess of 500 rads (5 grays) in 1 hour at 1 meter from a sealed radioactive source[2] that is used to irradiate materials must meet the following requirements.

(1) Each entrance or access point must be equipped with entry control devices which—

(i) Function automatically to prevent any individual from inadvertently entering the area when very high radiation levels exist;

(ii) Permit deliberate entry into the area only after a control device is actuated that causes the radiation level within the area, from the sealed source, to be reduced below that at which it would be possible for an individual to receive a deep-dose equivalent in excess of 0.1 rem (1 mSv) in 1 hour; and

(iii) Prevent operation of the source if the source would produce radiation levels in the area that could result in a deep-dose equivalent to an individual in excess of 0.1 rem (1 mSv) in 1 hour.

(2) Additional control devices must be provided so that, upon failure of the entry control devices to function as required by paragraph (a)(1) of this section—

(i) The radiation level within the area, from the sealed source, is reduced below that at which it would be possible for an individual to receive a deep- dose equivalent in excess of 0.1 rem (1 mSv) in 1 hour; and

(ii) Conspicuous visible and audible alarm signals are generated to make an individual attempting to enter the area aware of the hazard and at least one other authorized individual, who is physically present, familiar with the activity, and prepared to render or summon assistance, aware of the failure of the entry control devices.

(3) The licensee shall provide control devices so that, upon failure or removal of physical radiation barriers other than the source's shielded storage container—

(i) The radiation level from the source is reduced below that at which it would be possible for an individual to receive a deep-dose equivalent in excess of 0.1 rem (1 mSv) in 1 hour; and

(ii) Conspicuous visible and audible alarm signals are generated to make potentially affected individuals aware of the hazard and the licensee or at least one other individual, who is familiar with the activity and prepared to render or summon assistance, aware of the failure or removal of the physical barrier.

(4) When the shield for the stored source is a liquid, the licensee shall provide means to monitor the integrity of the shield and to signal, automatically, loss of adequate shielding.

(5) Physical radiation barriers that comprise permanent structural components, such as walls, that have no credible probability of failure or removal in ordinary circumstances need not meet the requirements of paragraphs (a) (3) and (4) of this section.

(6) Each area must be equipped with devices that will automatically generate conspicuous visible and audible alarm signals to alert personnel in the area before the source can be put into operation and in sufficient time for any individual in the area to operate a clearly identified control device, which must be installed in the area and which can prevent the source from being put into operation.

(7) Each area must be controlled by use of such administrative procedures and such devices as are necessary to ensure that the area is cleared of personnel prior to each use of the source.

(8) Each area must be checked by a radiation measurement to ensure that, prior to the first individual's entry into the area after any use of the source, the radiation level from the source in the area is below that at which it would be possible for an individual to receive a deep-dose equivalent in excess of 0.1 rem (1 mSv) in 1 hour.

(9) The entry control devices required in paragraph (a)(1) of this section must have been tested for proper functioning (see § 20.2109 for recordkeeping requirements).

(i) Testing must be conducted prior to initial operation with the source of radiation on any day (unless operations were continued uninterrupted from the previous day); and

(ii) Testing must be conducted prior to resumption of operation of the source of radiation after any unintended interruption; and

(iii) The licensee shall submit and adhere to a schedule for periodic tests of the entry control and warning systems.

(10) The licensee may not conduct operations, other than those necessary to place the source in safe condition or to effect repairs on controls, unless control devices are functioning properly.

(11) Entry and exit portals that are used in transporting materials to and from the irradiation area, and that are not intended for use by individuals, must be controlled by such devices and administrative procedures as are necessary to physically protect and warn against inadvertent entry by any individual through these portals. Exit portals for processed materials must be equipped to detect and signal the presence of any loose radiation sources that are carried toward such an exit and to automatically prevent loose radiation sources from being carried out of the area.

(b) Persons holding licenses or applicants for licenses for radiation sources that are within the purview of paragraph (a) of this section and that will be used in a variety of positions or in locations, such as open fields or forests, that make it impracticable to comply with certain requirements of paragraph (a) of this section, such as those for the automatic control of radiation levels, may apply to the Director, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555, for approval of the use of alternative safety measures. Any alternative safety measures must provide a degree of personnel protection at least equivalent to those specified in paragraph (a) of this section. At least one of the alternative measures must include an entry-preventing interlock control based on a measurement of the radiation that ensures the absence of high radiation levels before an individual can gain access to the area where such radiation sources are used.

(c) The entry control devices required by paragraphs (a) and (b) of this section must be established in such a way that no individual will be prevented from leaving the area.

Subpart H—Respiratory Protection and Controls to Restrict Internal Exposure in Restricted Areas

§20.1701 Use of process or other engineering controls.

The licensee shall use, to the extent practicable, process or other engineering controls (e.g., containment or ventilation) to control the concentrations of radioactive material in air.

§20.1702 Use of other controls.

When it is not practicable to apply process or other engineering controls to control the concentrations of radioactive material in air to values below those that define an airborne radioactivity area, the licensee shall, consistent with maintaining the total effective dose equivalent ALARA, increase monitoring and limit intakes by one or more of the following means:

(a) Control of access;

(b) Limitation of exposure times;

(c) Use of respiratory protection equipment; or

(d) Other controls.

§20.1703 Use of individual respiratory protection equipment.

(a) If the licensee uses respiratory protection equipment to limit intakes pursuant to § 20.1702—

(1) The licensee shall use only respiratory protection equipment that is tested and certified or had certification extended by the National Institute for Occupational Safety and Health/Mine Safety and Health Administration (NIOSH/MSHA).

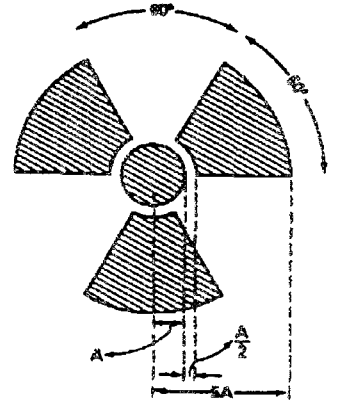
(2) If the licensee wishes to use equipment that has not been tested or certified by NIOSH/MSHA, has not had certification extended by NIOSH/MSHA, or for which there is no schedule for testing or certification, the licensee shall submit an application for authorized use of that equipment, including a demonstration by testing, or a demonstration on the basis of reliable test information, that the material and performance characteristics of the equipment are capable of providing the proposed degree of protection under anticipated conditions of use.

(3) The licensee shall implement and maintain a respiratory protection program that includes—

(i) Air sampling sufficient to identify the potential hazard, permit proper equipment selection, and estimate exposures;

(ii) Surveys and bioassays, as appropriate, to evaluate actual intakes;

(iii) Testing of respirators for operability immediately prior to each use;



RADIATION SYMBOL

(iv) Written procedures regarding selection, fitting, issuance, maintenance, and testing of respirators, including testing for operability immediately prior to each use; supervision and training of personnel; monitoring, including air sampling and bioassays; and recordkeeping; and

(v) Determination by a physician prior to initial fitting of respirators, and at least every 12 months thereafter, that the individual user is physically able to use the respiratory protection equipment.

(4) The licensee shall issue a written policy statement on respirator usage covering—

(i) The use of process or other engineering controls, instead of respirators; (ii) The routine, nonroutine, and emergency use of respirators; and

(iii) The periods of respirator use and relief from respirator use.

(5) The licensee shall advise each respirator user that the user may leave the area at any time for relief from respirator use in the event of equipment malfunction, physical or psychological distress, procedural or communication failure, significant deterioration of operating conditions, or any other conditions that might require such relief.

(6) The licensee shall use equipment within limitations for type and mode of use and shall provide proper visual, communication, and other special capabilities (such as adequate skin protection) when needed.

(b) In estimating exposure of individuals to airborne radioactive materials, the licensee may make allowance for respiratory protection equipment used to limit intakes pursuant to § 20.1702, provided that the following conditions, in addition to those in § 20.1703(a), are satisfied:

(1) The licensee selects respiratory protection equipment that provides a protection factor (see appendix A to §§ 20.1001-20.2401) greater than the multiple by which peak concentrations of airborne radioactive materials in the working area are expected to exceed the values specified in appendix B to §§ 20.1001-20.2401, table 1, column 3. If the selection of a respiratory protection device with a protection factor greater than the peak concentration is inconsistent with the goal specified in § 20.1702 of keeping the total effective dose equivalent ALARA, the licensee may select respiratory protection equipment with a lower protection factor only if such a selection would result in keeping the total effective dose equivalent ALARA. The concentration of radioactive material in the air that is inhaled when respirators are worn may be initially estimated by dividing the average concentration in air, during each period of uninterrupted use, by the protection factor. If the exposure is later found to be greater than estimated, the corrected value must be used; if the exposure is later found to be less than estimated, the corrected value may be used.

(2) The licensee shall obtain authorization from the Commission before assigning respiratory protection factors in excess of those specified in appendix A to §§ 20.1001-20.2401. The Commission may authorize a licensee to use higher protection factors on receipt of an application that—

(i) Describes the situation for which a need exists for higher protection factors, and

(ii) Demonstrates that the respiratory protection equipment provides these higher protection factors under the proposed conditions of use.

(c) The licensee shall use as emergency devices only respiratory protection equipment that has been specifically certified or had certification extended for emergency use by NOISH/MSHA.

(d) The licensee shall notify, in writing, the Director of the appropriate NRC Regional Office listed in appendix D to §§ 20.1001-20.2401 at least 30 days before the date that respiratory protection equipment is first used under the provisions of either § 20.1703 (a) or (b).

§20.1704 Further restrictions on the use of respiratory protection equipment.

The Commission may impose restrictions in addition to those in §§ 20.1702, 20.1703, and appendix A to §§ 20.1001-20.2401 to—

(a) Ensure that the respiratory protection program of the licensee is adequate to limit exposures of individuals to airborne radioactive materials; and

(b) Limit the extent to which a licensee may use respiratory protection equipment instead of process or other engineering controls.

Subpart I—Storage and Control of Licensed Material

§20.1801 Security of stored material.

The licensee shall secure from unauthorized removal or access licensed materials that are stored in controlled or unrestricted areas.

§20.1802 Control of material not in storage.

The licensee shall control and maintain constant surveillance of licensed material that is in a controlled or unrestricted area and that is not in storage.

Subpart J—Precautionary Procedures

§20.1901 Caution signs.

(a) *Standard radiation symbol.* Unless otherwise authorized by the Commission, the symbol prescribed by this part shall use the colors magenta, or purple, or black on yellow background. The symbol prescribed by this part is the three-bladed design:

(1) Cross-hatched area is to be magenta, or purple, or black, and

(2) The background is to be yellow.

(b) *Exception to color requirements for standard radiation symbol.* Notwithstanding the requirements of paragraph (a) of this section, licensees are authorized to label sources, source holders, or device components containing sources of licensed materials that are subjected to high temperatures, with conspicuously etched or stamped radiation caution symbols and without a color requirement.

(c) *Additional information on signs and labels.* In addition to the contents of signs and labels prescribed in this part, the licensee may provide, on or near the required signs and labels, additional information, as appropriate, to make individuals aware of potential radiation exposures and to minimize the exposures.

§20.1902 Posting requirements.

(a) *Posting of radiation areas.* The licensee shall post each radiation area with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, RADIATION AREA."

(b) *Posting of high radiation areas.* The licensee shall post each high radiation area with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, HIGH RADIATION AREA" or "DANGER, HIGH RADIATION AREA."

(c) *Posting of very high radiation areas.* The licensee shall post each very high radiation area with a conspicuous sign or signs bearing the radiation symbol and words "GRAVE DANGER, VERY HIGH RADIATION AREA."

(d) *Posting of airborne radioactivity areas.* The licensee shall post each airborne radioactivity area with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, AIRBORNE RADIOACTIVITY AREA" or "DANGER, AIRBORNE RADIOACTIVITY AREA."

(e) *Posting of areas or rooms in which licensed material is used or stored.* The licensee shall post each area or room in which there is used or stored an amount of licensed material exceeding 10 times the quantity of such material specified in appendix C to §§ 20.1001-20.2401 with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, RADIOACTIVE MATERIAL(S)" or "DANGER, RADIOACTIVE MATERIAL(S)."

§20.1903 Exceptions to posting requirements.

(a) A licensee is not required to post caution signs in areas or rooms containing radioactive materials for periods of less than 8 hours, if each of the following conditions is met:

(1) The materials are constantly attended during these periods by an individual who takes the precautions necessary to prevent the exposure of individuals to radiation or radioactive materials in excess of the limits established in this part; and

(2) The area or room is subject to the licensee's control.

(b) Rooms or other areas in hospitals that are occupied by patients are not required to be posted with caution signs pursuant to § 20.1902 provided that—

(1) The patient is being treated with sealed sources or has been treated with unsealed radioactive material in quantities less than 30 millicuries (110 MBq, or the measured dose rate at 1 meter from the patient is less than 0.005 rem (0.05 mSv) per hour; and

(2) There are personnel in attendance who will take the necessary precautions to prevent the exposure of individuals to radiation or radioactive material in excess of the limits established in this

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[3]Labeling of packages containing radioactive materials is required by the Department of Transportation (DOT) if the amount and type of radioactive material exceeds the limits for an excepted quantity or article as defined and limited by DOT regulations 49 CFR 173.403 (m) and (w) and 173.421-424.

part and to operate within the ALARA provisions of the licensee's radiation protection program.

(c) A room or area is not required to be posted with a caution sign because of the presence of a sealed source provided the radiation level at 30 centimeters from the surface of the source container or housing does not exceed 0.005 rem (0.05 mSv) per hour.

§20.1904 Labeling containers.

(a) The licensee shall ensure that each container of licensed material bears a durable, clearly visible label bearing the radiation symbol and the words "CAUTION, RADIOACTIVE MATERIAL" or "DANGER, RADIOACTIVE MATERIAL." The label must also provide sufficient information (such as the radionuclide(s) present, an estimate of the quantity of radioactivity, the date for which the activity is estimated, radiation levels, kinds of materials, and mass enrichment) to permit individuals handling or using the containers, or working in the vicinity of the containers, to take precautions to avoid or minimize exposures.

(b) Each licensee shall, prior to removal or disposal of empty uncontaminated containers to unrestricted areas, remove or deface the radioactive material label or otherwise clearly indicate that the container no longer contains radioactive materials.

§20.1905 Exemptions to labeling requirements.

A licensee is not required to label—

(a) Containers holding licensed material in quantities less than the quantities listed in appendix C to §§ 20.1001-20.2401; or

(b) Containers holding licensed material in concentrations less than those specified in table 3 of appendix B to §§ 20.1001-20.2401; or

(c) Containers attended by an individual who takes the precautions necessary to prevent the exposure of individuals in excess of the limits established by this part; or

(d) Containers when they are in transport and packaged and labeled in accordance with the regulations of the Department of Transportation,[3] or

(e) Containers that are accessible only to individuals authorized to handle or use them, or to work in the vicinity of the containers, if the contents are identified to these individuals by a readily available written record (examples of containers of this type are containers in locations such as water-filled canals, storage vaults, or hot cells). The record must be retained as long as the containers are in use for the purpose indicated on the record; or

(f) Installed manufacturing or process equipment, such as reactor components, piping, and tanks.

§20.1906 Procedures for receiving and opening packages.

(a) Each licensee who expects to receive a package containing quantities of radioactive material in excess of a Type A quantity, as defined in § 71.4 and appendix A to part 71 of this chapter, shall make arrangements to receive—

(1) The package when the carrier offers it for delivery; or

(2) Notification of the arrival of the package at the carrier's terminal and to take possession of the package expeditiously.

(b) Each licensee shall monitor the external surfaces of a package known to contain radioactive material for radioactive contamination and radiation levels if the package—

(1) Is labeled as containing radioactive material; or

(2) Has evidence of potential contamination, such as packages that are crushed, wet, or damaged.

(c) The licensee shall perform the monitoring required by paragraph (b) of this section as soon as practicable after receipt of the package, but not later than 3 hours after the package is received at the licensee's facility if it is received during the licensee's normal working hours, or not later than 3 hours from the beginning of the next working day if it is received after working hours.

(d) The licensee shall immediately notify the final delivery carrier and, by telephone and telegram, mailgram, or facsimile, the Administrator of the appropriate NRC Regional Office listed in appendix D to §§ 20.1001-20.2401 when—

(1) Removable radioactive surface contamination exceeds the limits of § 71.87(i) of this chapter; or

(2) External radiation levels exceed the limits of § 71.47 of this chapter.

(e) Each licensee shall—

(1) Establish, maintain, and retain written procedures for safely opening packages in which radioactive material is received; and

(2) Ensure that the procedures are followed and that due consideration is given to special instructions for the type of package being opened.

(f) Licensees transferring special form sources in licensee-owned or licensee-operated vehicles to and from a work site are exempt from the contamination monitoring requirements of paragraph (b) of this section, but are not exempt from the survey requirement in paragraph (b) of this section for measuring radiation levels that is required to ensure that the source is still properly lodged in its shield.

Subpart K—Waste Disposal

§20.2001 General requirements.

(a) A licensee shall dispose of licensed material only—

(1) By transfer to an authorized recipient as provided in § 20.2006 or in the regulations in parts 30, 40, 60, 61, 70, or 72 of this chapter; or

(2) By decay in storage; or

(3) By release in effluents within the limits in § 20.1301; or

(4) As authorized under §§ 20.2002, 20.2003, 20.2004, or § 20.2005.

(b) A person must be specifically licensed to receive waste containing licensed material from other persons for:

(1) Treatment prior to disposal; or

(2) Treatment or disposal by incineration; or

(3) Decay in storage; or

(4) Disposal at a land disposal facility licensed under part 61 of this chapter; or

(5) Disposal at a geologic repository under part 60 of this chapter.

§20.2002 Method for obtaining approval of proposed disposal procedures.

A licensee or applicant for a license may apply to the Commission for approval of proposed procedures, not otherwise authorized in the regulations in this chapter, to dispose of licensed material generated in the licensee's activities. Each application shall include:

(a) A description of the waste containing licensed material to be disposed of, including the physical and chemical properties important to risk evaluation, and the proposed manner and conditions of waste disposal; and

(b) An analysis and evaluation of pertinent information on the nature of the environment; and

(c) The nature and location of other potentially affected licensed and unlicensed facilities; and

(d) Analyses and procedures to ensure that doses are maintained ALARA and within the dose limits in this part.

§20.2003 Disposal by release into sanitary sewerage.

(a) A licensee may discharge licensed material into sanitary sewerage if each of the following conditions is satisfied:

(1) The material is readily soluble (or is readily dispersible biological material) in water; and

(2) The quantity of licensed or other radioactive material that the licensee releases into the sewer in 1 month divided by the average monthly volume of water released into the sewer by the licensee does not exceed the concentration listed in table 3 of appendix B to §§ 20.1001-20.2401; and

(3) If more than one radionuclide is released, the following conditions must also be satisfied:

(i) The licensee shall determine the fraction of the limit in table 3 of appendix B to §§ 20.1001-20.2401 represented by discharges into sanitary sewerage by dividing the actual monthly average concentration of each radionuclide released by the licensee into the sewer by the concentration of that radionuclide listed in table 3 of appendix B to §§ 20.1001-20.2401; and

(ii) The sum of the fractions for each radionuclide required by paragraph (a)(3)(i) of this section does not exceed unity; and

(4) The total quantity of licensed and other radioactive material that the licensee releases into the sanitary sewerage system in a year does not exceed 5 curies (185 GBq) of hydrogen-3, 1 curie (37 GBq) of carbon-14, and 1 curie (37 GBq) of all other radioactive materials combined.

(b) Excreta from individuals undergoing medical diagnosis or therapy with radioactive material are not subject to the limitations contained in paragraph (a) of this section.

§20.2004 Treatment or disposal by incineration.

A licensee may treat or dispose of licensed material by incineration only in the amounts and forms specified in § 20.2005 or as specifically approved by the Commission pursuant to § 20.2002.

§20.2005 Disposal of specific wastes.

(a) A licensee may dispose of the following licensed material as if it were not radioactive:

(1) 0.05 microcurie (1.85 kBq), or less, of hydrogen-3 or carbon-14 per gram of medium used for liquid scintillation counting; and

(2) 0.05 microcurie (1.85 kBq), or less, of hydrogen-3 or carbon-14 per gram of animal tissue, averaged over the weight of the entire animal.

(b) A licensee may not dispose of tissue under paragraph (a)(2) of this section in a manner that would permit its use either as food for humans or as animal feed.

(c) The licensee shall maintain records in accordance with § 20.2108.

§20.2006 Transfer for disposal and manifests.

(a) The requirements of this section and appendix F to §§ 20.1001- 20.2401 are designed to control transfers of low-level radioactive waste intended for disposal at a land disposal facility (as defined in part 61 of this chapter), establish a manifest tracking system, and supplement existing requirements concerning transfers and recordkeeping for those wastes.

(b) Each shipment of radioactive waste intended for disposal at a licensed land disposal facility must be accompanied by a shipment manifest as specified in section I of appendix F to §§ 20.1001-20.2401.

(c) Each shipment manifest must include a certification by the waste generator as specified in section II of appendix F to §§ 20.1001-20.2401.

(d) Each person involved in the transfer for disposal and disposal of waste, including the waste generator, waste collector, waste processor, and disposal facility operator, shall comply with the requirements specified in section III of appendix F to §§ 20.1001-20.2401.

§20.2007 Compliance with environmental and health protection regulations.

Nothing in this subpart relieves the licensee from complying with other applicable Federal, State, and local regulations governing any other toxic or hazardous properties of materials that may be disposed of under this subpart.

Subpart L—Records

§20.2101 General provisions.

(a) Each licensee shall use the units: curie, rad, rem, including multiples and subdivisions, and shall clearly indicate the units of all quantities on records required by this part.

(b) The licensee shall make a clear distinction among the quantities entered on the records required by this part (e.g., total effective dose equivalent, shallow-dose equivalent, eye dose equivalent, deep-dose equivalent, committed effective dose equivalent).

§20.2102 Records of radiation protection programs.

(a) Each licensee shall maintain records of the radiation protection program, including:

(1) The provisions of the program; and

(2) Audits and other reviews of program content and implementation.

(b) The licensee shall retain the records required by paragraph (a)(1) of this section until the Commission terminates each pertinent license requiring the record. The licensee shall retain the records required by paragraph (a)(2) of this section for 3 years after the record is made.

§20.2103 Records of surveys.

(a) Each licensee shall maintain records showing the results of surveys and calibrations required by §§ 20.1501 and 20.1906(b). The licensee shall retain these records for 3 years after the record is made.

(b) The licensee shall retain each of the following records until the Commission terminates each pertinent license requiring the record:

(1) Records of the results of surveys to determine the dose from external sources and used, in the absence of or in combination with individual monitoring data, in the assessment of individual dose equivalents; and

(2) Records of the results of measurements and calculations used to determine individual intakes of radioactive material and used in the assessment of internal dose; and

(3) Records showing the results of air sampling, surveys, and bioassays required pursuant to § 20.1703(a)(3) (i) and (ii); and

(4) Records of the results of measurements and calculations used to evaluate the release of radioactive effluents to the environment.

§20.2104 Determination of prior occupational dose.

(a) For each individual who may enter the licensee's restricted or controlled area and is likely to receive, in a year, an occupational dose requiring monitoring pursuant to § 20.1502, the licensee shall—

(1) Determine the occupational radiation dose received during the current year; and

(2) Attempt to obtain the records of lifetime cumulative occupational radiation dose.

(b) Prior to permitting an individual to participate in a planned special exposure, the licensee shall determine—

(1) The internal and external doses from all previous planned special exposures; and

(2) All doses in excess of the limits (including doses received during accidents and emergencies) received during the lifetime of the individual.

(c) In complying with the requirements of paragraph (a) of this section, a licensee may—

(1) Accept, as a record of the occupational dose that the individual received during the current year, a written signed statement from the individual, or from the individual's most recent employer for work involving radiation exposure, that discloses the nature and the amount of any occupational dose that the individual may have received during the current year;

(2) Accept, as the record of lifetime cumulative radiation dose, an up-to- date NRC Form 4, or equivalent, signed by the individual and countersigned by an appropriate official of the most recent employer for work involving radiation exposure, or the individual's current employer (if the individual is not employed by the licensee); and

(3) Obtain reports of the individual's dose equivalent(s) from the most recent employer for work involving radiation exposure, or the individual's current employer (if the individual is not employed by the licensee) by telephone, telegram, electronic media, or letter. The licensee shall request a written verification of the dose data

[4]Licensees are not required to reevaluate the separate external dose equivalents and internal committed dose equivalents or intakes of radionuclides assessed under §§ 20.1-20.601. Further, occupational exposure histories obtained and recorded on NRC Form 4 before January 1, 1991, would not have included effective dose equivalent, but may be used in the absence of specific information on the intake of radionuclides by the individual.

[5]Assessments of dose equivalent and records made using units in effect before the licensee's adoption of this part need not be changed.

[6]A previous § 20.304 permitted burial of small quantities of licensed materials in soil before January 28, 1981, without specific Commission authorization.

if the authenticity of the transmitted report cannot be established.

(d) The licensee shall record the exposure history, as required by paragraph (a) of this section, on NRC Form 4, or other clear and legible record, of all the information required on that form.[4] The form or record must show each period in which the individual received occupational exposure to radiation or radioactive material and must be signed by the individual who received the exposure. For each period for which the licensee obtains reports, the licensee shall use the dose shown in the report in preparing NRC Form 4. For any period in which the licensee does not obtain a report, the licensee shall place a notation on NRC Form 4 indicating the periods of time for which data are not available.

(e) If the licensee is unable to obtain a complete record of an individual's current and previously accumulated occupational dose, the licensee shall assume—

(1) In establishing administrative controls under § 20.1201(f) for the current year, that the allowable dose limit for the individual is reduced by 1.25 rems (12.5 mSv) for each quarter for which records were unavailable and the individual was engaged in activities that could have resulted in occupational radiation exposure; and

(2) That the individual is not available for planned special exposures.

(f) The licensee shall retain the records on NRC Form 4 or equivalent until the Commission terminates each pertinent license requiring this record. The licensee shall retain records used in preparing NRC Form 4 for 3 years after the record is made.

§20.2105 Records of planned special exposures.

(a) For each use of the provisions of § 20.1206 for planned special exposures, the licensee shall maintain records that describe—

(1) The exceptional circumstances requiring the use of a planned special exposure; and

(2) The name of the management official who authorized the planned special exposure and a copy of the signed authorization; and

(3) What actions were necessary; and

(4) Why the actions were necessary; and

(5) How doses were maintained ALARA; and

(6) What individual and collective doses were expected to result, and the doses actually received in the planned special exposure.

(b) The licensee shall retain the records until the Commission terminates each pertinent license requiring these records.

§20.2106 Records of individual monitoring results.

(a) *Recordkeeping requirement.* Each licensee shall maintain records of doses received by all individuals for whom monitoring was required pursuant to § 20.1502, and records of doses received during planned special exposures, accidents, and emergency conditions. These records[5] must include, when applicable—

(1) The deep-dose equivalent to the whole body, eye dose equivalent, shallow-dose equivalent to the skin, and shallow-dose equivalent to the extremities; and

(2) The estimated intake or body burden of radionuclides (see § 20.1202); and

(3) The committed effective dose equivalent assigned to the intake or body burden of radionuclides; and

(4) The specific information used to calculate the committed effective dose equivalent pursuant to § 20.1204(c); and

(5) The total effective dose equivalent when required by § 20.1202; and

(6) The total of the deep-dose equivalent and the committed dose to the organ receiving the highest total dose.

(b) *Recordkeeping frequency.* The licensee shall make entries of the records specified in paragraph (a) of this section at least annually.

(c) *Recordkeeping format.* The licensee shall maintain the records specified in paragraph (a) of this section on NRC Form 5, in accordance with the instructions for NRC Form 5, or in clear and legible records containing all the information required by NRC Form 5.

(d) *Privacy protection.* The records required under this section should be protected from public disclosure because of their personal privacy nature. These records are protected by most State privacy laws and, when transferred to the NRC, are protected by the Privacy Act of 1974, Public Law 93-579, 5 U.S.C. 552a, and the Commission's regulations in 10 CFR part 9.

(e) the licensee shall maintain the records of dose to an embryo/fetus with the records of dose to the declared pregnant woman. The declaration of pregnancy shall also be kept on file, but may be maintained separately from the dose records.

(f) The licensee shall retain each required form or record until the Commission terminates each pertinent license requiring the record.

§20.2107 Records of dose to individual members of the public.

(a) Each licensee shall maintain records sufficient to demonstrate compliance with the dose limit for individual members of the public (see § 20.1301).

(b) The licensee shall retain the records required by paragraph (a) of this section until the Commission terminates each pertinent license requiring the record.

§20.2108 Records of waste disposal.

(a) Each licensee shall maintain records of the disposal of licensed materials made under §§ 20.2002, 20.2003, 20.2004, 20.2005, 10 CFR part 61 and disposal by burial in soil, including burials authorized before January 28, 1981.[6]

(b) The licensee shall retain the records required by paragraph (a) of this section until the Commission terminates each pertinent license requiring the record.

§20.2109 Records of testing entry control devices for very high radiation areas.

(a) Each licensee shall maintain records of tests made under § 20.1603(a)(9) on entry control devices for very high radiation areas. These records must include the date, time, and results of each such test of function.

(b) The licensee shall retain the records required by paragraph (a) of this section for 3 years after the record is made.

§20.2110 Form of records.

Each record required by this part must be legible throughout the specified retention period. The record may be the original or a reproduced copy or a microform provided that the copy or microform is authenticated by authorized personnel and that the microform is capable of producing a clear copy throughout the required retention period. The record may also be stored in electronic media with the capability for producing legible, accurate, and complete records during the required retention period. Records, such as letters, drawings, and specifications, must include all pertinent information, such as stamps, initials, and signatures. The licensee shall maintain adequate safeguards against tampering with and loss of records.

Subpart M—Reports

§20.2201 Reports of theft or loss of licensed material.

(a) Telephone reports.

(1) Each licensee shall report by telephone as follows:

(i) Immediately after its occurrence becomes known to the licensee, any lost, stolen, or missing licensed material in an aggregate quantity equal to or greater than 1,000 times the quantity specified in appendix C to §§ 20.1001-20.2401 under such circumstances that it appears to the licensee that an exposure could result to persons in unrestricted areas; or

(ii) Within 30 days after the occurrence of any lost, stolen, or missing licensed material becomes known to the licensee, all licensed material in a quantity greater than 10 times the quantity specified in appendix C to §§ 20.1001-20.2401 that is still missing at this time.

(2) Reports must be made as follows:

(i) Licensees having an installed Emergency Notification System shall make the reports to the NRC Operations Center in accordance with § 50.72 of this chapter, and

(ii) All other licensees shall make reports to the NRC Operations Center.

(b) *Written reports.*

(1) Each licensee required to make a report under paragraph (a) of this section shall, within 30 days after making the telephone report, make a

written report setting forth the following information:

(i) A description of the licensed material involved, including kind, quantity, and chemical and physical form; and

(ii) A description of the circumstances under which the loss or theft occurred; and

(iii) A statement of disposition, or probable disposition, of the licensed material involved; and

(iv) Exposures of individuals to radiation, circumstances under which the exposures occurred, and the possible total effective dose equivalent to persons in unrestricted areas; and

(v) Actions that have been taken, or will be taken, to recover the material; and

(vi) Procedures or measures that have been, or will be, adopted to ensure against a recurrence of the loss or theft of licensed material.

(2) Reports must be made as follows:

(i) For holders of an operating license for a nuclear power plant, the events included in paragraph (b) of this section must be reported in accordance with the procedures described in § 50.73(b), (c), (d), (e), and (g) of this chapter and must include the information required in paragraph (b)(1) of this section, and

(ii) All other licensees shall make reports to the Administrator of the appropriate NRC Regional Office listed in appendix D to §§ 20.1001- 20.2401.

(c) A duplicate report is not required under paragraph (b) of this section if the licensee is also required to submit a report pursuant to §§ 30.55(c), 40.64(c), 50.72, 50.73, 70.52, 73.27(b), 73.67(e)(3)(vi), 73.67(g)(3)(iii), 73.71, or § 150.19(c) of this chapter.

(d) Subsequent to filing the written report, the licensee shall also report any additional substantive information on the loss or theft within 30 days after the licensee learns of such information.

(e) The licensee shall prepare any report filed with the Commission pursuant to this section so that names of individuals who may have received exposure to radiation are stated in a separate and detachable part of the report.

[7]With respect to the limit for the embryo-fetus (§ 20.1208), the identifiers should be those of the declared pregnant woman.

§20.2202 Notification of incidents.

(a) Immediate notification. Notwithstanding any other requirements for notification, each licensee shall immediately report any event involving byproduct, source, or special nuclear material possessed by the licensee that may have caused or threatens to cause any of the following conditions—

(1) An individual to receive—

(i) A total effective dose equivalent of 25 rems (0.25 Sv) or more; or

(ii) An eye dose equivalent of 75 rems (0.75 Sv) or more; or

(iii) A shallow-dose equivalent to the skin or extremities of 250 rads (2.5 Gy) or more; or

(2) The release of radioactive material, inside or outside of a restricted area, so that, had an individual been present for 24 hours, the individual could have received an intake five times the occupational annual limit on intake (the provisions of this paragraph do not apply to locations where personnel are not normally stationed during routine operations, such as hot-cells or process enclosures).

(b) Twenty-four hour notification. Each licensee shall, within 24 hours of discovery of the event, report any event involving loss of control of licensed material possessed by the licensee that may have caused, or threatens to cause, any of the following conditions:

(1) An individual to receive, in a period of 24 hours—

(i) A total effective dose equivalent exceeding 5 rems (0.05 Sv); or

(ii) An eye dose equivalent exceeding 15 rems (0.15 Sv); or

(iii) A shallow-dose equivalent to the skin or extremities exceeding 50 rems (0.5 Sv); or

(2) The release of radioactive material, inside or outside of a restricted area, so that, had an individual been present for 24 hours, the individual could have received an intake in excess of one occupational annual limit on intake (the provisions of this paragraph do not apply to locations where personnel are not normally stationed during routine operations, such as hot-cells or process enclosures).

(c) The licensee shall prepare any report filed with the Commission pursuant to this section so that names of individuals who have received exposure to radiation or radioactive material are stated in a separate and detachable part of the report.

(d) Reports made by licensees in response to the requirements of this section must be made as follows:

(1) Licensees having an installed Emergency Notification System shall make the reports required by paragraphs (a) and (b) of this section to the NRC Operations Center in accordance with 10 CFR 50.72; and

(2) All other licensees shall make the reports required by paragraphs (a) and (b) of this section by telephone to the NRC Operations Center and by telegram, mailgram, or facsimile to the Administrator of the appropriate NRC Regional Office listed in appendix D to §§ 20.1001-20.2401.

(e) The provisions of this section do not include doses that result from planned special exposures, that are within the limits for planned special exposures, and that are reported under § 20.2204.

§20.2203 Reports of exposures, radiation levels, and concentrations of radioactive material exceeding the limits.

(a) Reportable events. In addition to the notification required by § 20.2202, each licensee shall submit a written report within 30 days after learning of any of the following occurrences:

(1) Any incident for which notification is required by § 20.2202; or

(2) Doses in excess of any of the following:

(i) The occupational dose limits for adults in § 20.1201; or

(ii) The occupational dose limits for a minor in § 20.1207; or

(iii) The limits for an embryo/fetus of a declared pregnant woman in § 20.1208; or

(iv) The limits for an individual member of the public in § 20.1301; or

(v) Any applicable limit in the license; or

(3) Levels of radiation or concentrations of radioactive material in—

(i) A restricted area in excess of any applicable limit in the license; or

(ii) An unrestricted area in excess of 10 times any applicable limit set forth in this part or in the license (whether or not involving exposure of any individual in excess of the limits in § 20.1301); or

(4) For licensees subject to the provisions of EPA's generally applicable environmental radiation standards in 40 CFR part 190, levels of radiation or releases of radioactive material in excess of those standards, or of license conditions related to those standards.

(b) Contents of reports.

(1) Each report required by paragraph (a) of this section must describe the extent of exposure of individuals to radiation and radioactive material, including, as appropriate:

(i) Estimates of each individual's dose; and

(ii) The levels of radiation and concentrations of radioactive material involved; and

(iii) The cause of the elevated exposures, dose rates, or concentrations; and

(iv) Corrective steps taken or planned to ensure against a recurrence, including the schedule for achieving conformance with applicable limits, generally applicable environmental standards, and associated license conditions.

(2) Each report filed pursuant to paragraph (a) of this section must include for each individual[7] exposed: the name, Social Security account number, and date of birth. The report must be prepared so that this information is stated in a separate and detachable part of the report.

(c) For holders of an operating license for a nuclear power plant, the occurrences included in paragraph (a) of this section must be reported in accordance with the procedures described in § 50.73(b), (c), (d), (e), and (g) of this chapter and must also include the information required by paragraph (b) of this section. Occurrences reported in accordance with § 50.73 of this chapter need not be reported by a duplicate report under paragraph (a) of this section.

(d) All licensees, other than those holding an operating license for a nuclear power plant, who make reports under paragraph (a) of this section shall submit the report in writing to the U.S. Nuclear Regulatory Commission, Document Control Desk, Washington, DC 20555, with a copy to the appropriate NRC Regional Office listed in appendix D to §§ 20.1001-20.2401.

§20.2204 Reports of planned special exposures.

The licensee shall submit a written report to the Administrator of the appropriate NRC Regional Office listed in appendix D to §§ 20.1001-20.2401 within 30 days following any planned special exposure conducted in accordance with § 20.1206, informing the Commission that a planned special exposure was conducted and indicating the date the planned special exposure occurred and the information required by § 20.2105.

§20.2205 [Reserved]

§20.2206 Reports of individual monitoring.

(a) This section applies to each person licensed by the Commission to—

(1) Operate a nuclear reactor designed to produce electrical or heat energy pursuant to § 50.21(b) or § 50.22 of this chapter or a testing facility as defined in § 50.2 of this chapter; or

(2) Possess or use byproduct material for purposes of radiography pursuant to Parts 30 and 34 of this chapter; or

(3) Possess or use at any one time, for purposes of fuel processing, fabricating, or reprocessing, special nuclear material in a quantity exceeding 5,000 grams of contained uranium-235, uranium-233, or plutonium, or any combination thereof pursuant to part 70 of this chapter; or

(4) Possess high-level radioactive waste at a geologic repository operations area pursuant to part 60 of this chapter; or

(5) Possess spent fuel in an independent spent fuel storage installation (ISFSI) pursuant to part 72 of this chapter; or

(6) Receive radioactive waste from other persons for disposal under part 61 of this chapter; or

(7) Possess or use at any time, for processing or manufacturing for distribution pursuant to parts 30, 32, 33 or 35 of this chapter, byproduct material in quantities exceeding any one of the following quantities:

Radionuclide	Quantity of radionuclide[1] in curies
Cesium-137	1
Cobalt-60	1
Gold-198	100
Iodine-131	1
Iridium-192	10
Krypton-85	1,,000
Promethium-147	10
Technetium-99m	1,,000

[1]The Commission may require as a license condition, or by rule, regulation, or order pursuant to § 20.2302, reports from licensees who are licensed to use radionuclides not on this list, in quantities sufficient to cause comparable radiation levels.

(b) Each licensee in a category listed in paragraph (a) of this section shall submit an annual report of the results of individual monitoring carried out by the licensee for each individual for whom monitoring was required by § 20.1502 during that year. The licensee may include additional data for individuals for whom monitoring was provided but not required. The licensee shall use Form NRC 5 or electronic media containing all the information required by Form NRC 5.

(c) The licensee shall file the report required by §20.2206(b), covering the preceding year, on or before April 30 of each year. The licensee shall submit the report to the REIRS Project Manager, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

Subpart N—Exemptions and Additional Requirements

§20.2301 Applications for exemptions.

The Commission may, upon application by a licensee or upon its own initiative, grant an exemption from the requirements of the regulations in this part if it determines the exemption is authorized by law and would not result in undue hazard to life or property.

§20.2302 Additional requirements.

The Commission may, by rule, regulation, or order, impose requirements on a licensee, in addition to those established in the regulations in this part, as it deems appropriate or necessary to protect health or to minimize danger to life or property.

Subpart O—Enforcement

§20.2401 Violations.

(a) The Commission may obtain an injunction or other court order to prevent a violation of the provisions of—

(1) The Atomic Energy Act of 1954, as amended;

(2) Title II of the Energy Reorganization Act of 1974, as amended; or

(3) A regulation or order issued pursuant to those Acts.

(b) The Commission may obtain a court order for the payment of a civil penalty imposed under section 234 of the Atomic Energy Act:

(1) For violations of—

(i) Sections 53, 57, 62, 63, 81, 82, 101, 103, 104, 107 or 109 of the Atomic Energy Act of 1954, as amended;

(ii) Section 206 of the Energy Reorganization Act;

(iii) Any rule, regulation, or order issued pursuant to the sections specified in paragraph (b)(1)(i) of this section;

(iv) Any term, condition, or limitation of any license issued under the sections specified in paragraph (b)(1)(i) of this section.

(2) For any violation for which a license may be revoked under Section 186 of the Atomic Energy Act of 1954, as amended.

(c) Any person who willfully violates a provision of the Atomic Energy Act or regulation or order issued under the requirements of that Act may be guilty of a crime and, upon conviction, be punished by fine or imprisonment or both, as provided by law.

Appendix A to §§ 20.1001—20.2401—Protection Factors for Respirators[a]

Description[b]	Protection Factors[d]			Tested & Certified Equipment
	Modes[c]	Particulates only	Particulates, gases, & vapors[e]	National Institute for Occupational Safety & Health/Mine Safety and Health Administration tests for permissibility
I. Air-Purifying Respirators:[f]:				
Facepiece, half-mask[g]	NP	10		30 CFR Part 11, Subpart K.
Facepiece, full	NP	50,		
Facepiece, half-mask full, or hood	PP	1000		

Appendix A to §§ 20.1001—20.2401—Protection Factors for Respirators[a]

Description[b]	Protection Factors[d]			Tested & Certified Equipment
	Modes[c]	Particulates only	Particulates, gases, & vapors[e]	National Institute for Occupational Safety & Health/Mine Safety and Health Administration tests for permissibility
I. Air-Purifying Respirators:[f]:				
II. Atmosphere-Supplying Respirators:				
1. Air-line respirator:				
Facepiece, CF			1000	30 CFR Part 11, Subpart J
Facepiece, half-mask	D		5	
Facepiece, full	CF		2000	
Facepiece, full	D		5	
Facepiece, full	PD		2000	
Hood	CF		[h]	
Suit	CF		[i]	[j]
2. Self-contained breathing apparatus (SCBA):				
Facepiece, full	D		50	30 CFR Part 11
Facepiece, full	PD		[k]10,000	
Facepiece, full	RD		50	
Facepiece, full	RP		[l]5,000	
III. Combination Respirators:				
Any combination of air-purifying and atmosphere-supplying respirators		Protection factor for type and mode of operation as listed above.		30 CFR Part 11

Footnotes

a. For use in the selection of respiratory protective devices to be used only where the contaminants have been identified and the concentrations (or possible concentrations) are known.

b. Only for shaven faces and where nothing interferes with the seal of tight-fitting facepieces against the skin. (Hoods and suits are excepted.)

c. The mode symbols are defined as follows:

CF=continuous flow
D=demand
NP=negative pressure (i.e., negative phase during inhalation)
PD=pressure demand (i.e., always positive pressure)
PP=positive pressure
RD=demand, recirculating (closed circuit)
RP=pressure demand, recirculating (closed circuit)

d.1. The protection factor is a measure of the degree of protection afforded by a respirator, defined as the ratio of the concentration of airborne radioactive material outside the respiratory protective equipment to that inside the equipment (usually inside the facepiece) under conditions of use. It is applied to the ambient airborne concentration to estimate the concentrations inhaled by the wearer according to the following formula:

$$\textit{Concentration inhaled} = \frac{\textit{Ambient airborne concentration}}{\textit{Protection factor}}$$

2. The protection factors apply:

(a) Only for individuals trained in using respirators and wearing properly fitted respirators that are used and maintained under supervision in a well- planned respiratory protective program.

(b) For air-purifying respirators only when high efficiency particulate filters (above 99.97% removal efficiency by thermally generated 0.3 μm dioctyl phthalate (DOP) test or equivalent) are used in atmospheres not deficient in oxygen and not containing radioactive gas or vapor respiratory hazards.

(c) No adjustment is to be made for the use of sorbents against radioactive material in the form of gases or vapors.

(d) For atmosphere-supplying respirators only when supplied with adequate respirable air. Respirable air shall be provided of the quality and quantity required in accordance with NIOSH/MSHA certification (described in 30 CFR part 11). Oxygen and air shall not be used in the same apparatus.

e. Excluding radioactive contaminants that present an absorption or submersion hazard. For tritium oxide, approximately one-third of the intake occurs by absorption through the skin so that an overall protection factor of less than 2 is appropriate when atmosphere-supplying respirators are used to protect against tritium oxide. If the protection factor for a device is 5 the effective protection factor for tritium is about 1.4; for devices with protection factors of 10 the effective factor for tritium oxide is about 1.7, and for devices with protection factors of 100 or more the effective factor for tritium oxide is about 1.9. Air-purifying respirators are not suitable for protection against tritium oxide. See also footnote i concerning supplied-air suits.

f. Canisters and cartridges shall not be used beyond service-life limitations.

g. Under-chin type only. This type of respirator is not satisfactory for use where it might be possible (e.g., if an accident or emergency were to occur) for the ambient airborne concentrations to reach instantaneous values greater than 10 times the pertinent values in table 1, column 3 of appendix B to §§ 20.1001—20.2401 of this part. This type of respirator is not suitable for protection against plutonium or other high-toxicity materials. The mask is to be tested for fit prior to use, each time it is donned.

h.1. Equipment shall be operated in a manner that ensures that proper air flow-rates are maintained. A protection factor of no more than 1000 may be utilized for tested-and-certified supplied-air hoods when a minimum air flow of 6 cubic feet (0.17 cubic meters) per minute is maintained and calibrated air-line pressure gauges or flow measuring devices are used. A protection factor of up to 2000 may be used for tested and certified hoods only when the air flow is maintained at the manufacturer's recommended maximum rate for the equipment, this rate is greater than 6 cubic feet (0.17 cubic meters) per minute, and calibrated air-line pressure gauges or flow measuring devices are used.

2. The design of the supplied-air hood or helmet (with a minimum flow of 6 cfm (0.17 m^3 per minute) of air) may determine its overall efficiency and the protection it provides. For example, some hoods aspirate contaminated air into the breathing zone when the wearer works with hands-over-head. This aspiration may be overcome if a short cape-like extension to the hood is worn under a coat or overalls. Other limitations specified by the approval agency shall be considered before using a hood in certain types of atmospheres (see footnote i).

i. Appropriate protection factors shall be determined, taking into account the design of the suit and its permeability to the contaminant under conditions of use. There shall be a standby rescue person equipped with a respirator or other apparatus appropriate for the potential hazards and communications equipment whenever supplied-air suits are used.

j. No approval schedules are currently available for this equipment. Equipment is to be evaluated by testing or on the basis of reliable test information.

k. This type of respirator may provide greater protection and be used as an emergency device in unknown concentrations for protection against inhalation hazards. External radiation hazards and other limitations to permitted exposure, such as skin absorption, must be taken into account in such circumstances.

l. Quantitative fit testing shall be performed on each individual and no more than 0.02% leakage is allowed with this type of apparatus. Perceptible outward leakage of gas from this or any positive pressure self-contained breathing apparatus is unacceptable because service life will be reduced substantially. Special training in the use of this type of apparatus shall be provided to the wearer.

Note 1: Protection factors for respirators as may be approved by the U.S. Bureau of Mines/National Institute for Occupational Safety and Health (NIOSH), according to applicable approvals for respirators for type and mode of use to protect against airborne radionuclides, may be used to the extent that they do not exceed the protection factors listed in this table. The protection factors listed in this table may not be appropriate to circumstances where chemical or other respiratory hazards exist in addition to radioactive hazards. The selection and use of respirators for such circumstances should take into account applicable approvals of the U.S. Bureau of Mines/NIOSH.

Note 2: Radioactive contaminants for which the concentration values in Table 1, Column 3 of Appendix B to §§ 20.1001-20.2401 of this part are based on internal dose due to inhalation may, in addition, present external exposure hazards at higher concentrations. Under these circumstances, limitations on occupancy may have to be governed by external dose limits.

Appendix B to §§ 20.1001-20.2401—Annual Limits on Intake (ALIs) and Derived Air Concentrations (DACs) of Radionuclides for Occupational Exposure; Effluent Concentrations; Concentrations for Release to Sewerage

Introduction

For each radionuclide Table 1 indicates the chemical form which is to be used for selecting the appropriate ALI or DAC value. The ALIs and DACs for inhalation are given for an aerosol with an activity median aerodynamic diameter (AMAD) of 1 micro-m and for three classes (D,W,Y) of radioactive material, which refer to their retention (approximately days, weeks or years) in the pulmonary region of the lung. This classification applies to a range of clearance half-times of less than 10 days, for W from 10 to 100 days, and for Y greater than 100 days. Table 2 provides concentration limits for airborne and liquid effluents released to the general environment. Table 3 provides concentration limits for discharges to sanitary sewer systems.

Notation

The values in Tables 1, 2, and 3 are presented in the computer "E" notation. In this notation a value of 6E-02 represents a value of 6×10^{-2} or 0.06, 6E+2 represents 6×10^{2} or 600, and 6E+0 represents 6×10^{0} or 6.

Table 1 "Occupational"

Note that the columns in Table 1, of this appendix captioned "Oral Ingestion ALI," "Inhalation ALI," and "DAC," are applicable to occupational exposure to radioactive material.

The ALIs in this appendix are the annual intakes of a given radionuclide by "Reference Man" which would result in either (1) a committed effective dose equivalent of 5 rems (stochastic ALI) or (2) a committed dose equivalent of 50 rems to an organ or tissue (non-stochastic ALI). The stochastic ALIs were derived to result in a risk, due to irradiation of organs and tissues, comparable to the risk associated with deep dose equivalent to the whole body of 5 rems. The derivation includes multiplying the committed dose equivalent to an organ or tissue by a weighting factor, w_T. This weighting factor is the proportion of the risk of stochastic effects resulting from irradiation of the organ or tissue, T, to the total risk of stochastic effects when the whole body is irradiated uniformly. The values of w_T are listed under the definition of weighting factor in § 20.1003. The non-stochastic ALIs were derived to avoid non-stochastic effects, such as prompt damage to tissue or reduction in organ function.

A value of w_T=0.06 is applicable to each of the five organs or tissues in the "remainder" category receiving the highest dose equivalents, and the dose equivalents of all other remaining tissues may be disregarded. The following parts of the GI tract—stomach, small intestine, upper large intestine, and lower large intestine—are to be treated as four separate organs.

Note that the dose equivalents for extremities (hands and forearms, feet and lower legs), skin, and lens of the eye are not considered in computing the committed effective dose equivalent, but are subject to limits that must be met separately.

When an ALI is defined by the stochastic dose limit, this value alone, is given. When an ALI is determined by the non-stochastic dose limit to an organ, the organ or tissue to which the limit applies is shown, and the ALI for the stochastic limit is shown in parentheses. (Abbreviated organ or tissue designations are used: LLI wall = lower large intestine wall; St. wall = stomach wall; Blad wall = bladder wall; and Bone surf = bone surface.)

The use of the ALIs listed first, the more limiting of the stochastic and non-stochastic ALIs, will ensure that non-stochastic effects are avoided and that the risk of stochastic effects is limited to an acceptably low value. If, in a particular situation involving a radionuclide for which the non-stochastic ALI is limiting, use of that non-stochastic ALI is considered unduly conservative, the licensee may use the stochastic ALI to determine the committed effective dose equivalent. However, the licensee shall also ensure that the 50-rem dose equivalent limit for any organ or tissue is not exceeded by the sum of the external deep dose equivalent plus the internal committed dose to that organ (not the effective dose). For the case where there is no external dose contribution, this would be demonstrated if the sum of the fractions of the nonstochastic ALIs (ALI_{ns}) that contribute to the committed dose equivalent to the organ receiving the highest dose does not exceed unity (i.e., Σ (intake (in μCi) of each radionuclide/ ALI_{ins})). If there is an external deep dose equivalent contribution of H_d then this sum must be less than $1-(H_d/50)$ instead of being < 1.0.

Note that the dose equivalents for extremities (hand and forearms, feet and lower legs), skin, and lens of the eye are not considered in computing the committed effective dose equivalent, but are subject to limits that must be met separately.

The derived air concentration (DAC) values are derived limits intended to control chronic occupational exposures. The relationship between the DAC and the ALI is given by: DAC=ALI(in μCi)/(2000 hours per working year×60 minutes/hour×2×10^4 ml per minute)= [ALI/2.4×10^9] μCi/ml, where 2×10^4 ml is the volume of air breathed per minute at work by "Reference Man" under working conditions of "light work."

The DAC values relate to one of two modes of exposure: either external submersion or the internal committed dose equivalents resulting from inhalation of radioactive materials. Derived air concentrations based upon submersion are for immersion in a semi-infinite cloud of uniform concentration and apply to each radionuclide separately.

The ALI and DAC values relate to exposure to the single radionuclide named, but also include contributions from the in-growth of any daughter radionuclide produced in the body by the decay of the parent. However, intakes that include both the parent and daughter radionuclides should be treated by the general method appropriate for mixtures.

The value of ALI and DAC do not apply directly when the individual both ingests and inhales a radionuclide, when the individual is exposed to a mixture of radionuclides by either inhalation or ingestion or both, or when the individual is exposed to both internal and external radiation (see § 20.1202). When an individual is exposed to radioactive materials which fall under several of the translocation classifications (i.e., Class D, Class W, or Class Y) of the same radionuclide, the exposure may be evaluated as if it were a mixture of different radionuclides.

It should be noted that the classification of a compound as Class D, W, or Y is based on the chemical form of the compound and does not take into account the radiological half-life of different radioisotopes. For this reason, values are given for Class D, W, and Y compounds, even for very short-lived radionuclides.

Table 2

The columns in Table 2 of this appendix captioned "Effluents," "Air," and "Water," are applicable to the assessment and control of dose to the public, particularly in the implementation of the provisions of § 20.1302. The concentration values given in Columns 1 and 2 of Table 2 are equivalent to the radionuclide concentrations which, if inhaled or ingested continuously over the course of a year, would produce a total effective dose equivalent of 0.05 rem (50 millirem or 0.5 millisieverts).

Consideration of non-stochastic limits has not been included in deriving the air and water effluent concentration limits because non-stochastic effects are presumed not to occur at the dose levels established for individual members of the public. For radionuclides, where the non-stochastic limit was governing in deriving the occupational DAC, the stochastic ALI was used in deriving the corresponding airborne effluent limit in Table 2. For this reason, the DAC and airborne effluent limits are not always proportional as was the case in appendix B to §§ 20.1-20.601.

The air concentration values listed in Table 2, Column 1, were derived by one of two methods. For those radionuclides for which the stochastic limit is governing, the occupational stochastic inhalation ALI was divided by 2.4×10^9, relating the inhalation ALI to the DAC, as explained above, and then divided by a factor of 300. The factor of 300 includes the following components: a factor of 50 to relate the 5-rem annual occupational dose limit to the 0.1-rem limit for members of the public, a factor of 3 to adjust for the difference in exposure time and the inhalation rate for a worker and that for members of the public; and a factor of 2 to adjust the occupational values (derived for adults) so that they are applicable to other age groups.

For those radionuclides for which submersion (external dose) is limiting, the occupational DAC in Table 1, Column 3, was divided by 219. The factor of 219 is composed of a factor of 50, as described above, and a factor of 4.38 relating occupational exposure for 2,000 hours per year to full-time exposure (8,760 hours per year). Note that an additional factor of 2 for age considerations is not warranted in the submersion case.

The water concentrations were derived by taking the most restrictive occupational stochastic oral ingestion ALI and dividing by 7.3×10^7. The factor of 7.3×10^7 (ml) includes the following components: the factors of 50 and 2 described above and a factor of 7.3×10^5 (ml) which is the annual water intake of "Reference Man."

Note 2 of this appendix provides groupings of radionuclides which are applicable to unknown mixtures of radionuclides. These groupings (including occupational inhalation ALIs and DACs, air and water effluent concentrations and sewerage) require demonstrating that the most limiting radionuclides in successive classes are absent. The limit for the unknown mixture is defined when the presence of the one of the listed radionuclides cannot be definitely excluded as being present either from knowledge of the radionuclide composition of the source or from actual measurements.

Table 3 "Sewer Disposal"

The monthly average concentrations for release to sanitary sewers are applicable to the provisions in § 20.2003. The concentration values were derived by taking the most restrictive occupational stochastic oral ingestion ALI and dividing by 7.3×10^6(ml). The factor of 7.3×10^6(ml) is composed of a factor of 7.3×10^5(ml), the annual water intake by "Reference Man," and a factor of 10, such that the concentrations, if the sewage released by the licensee were the only source of water ingested by a reference man during a year, would result in a committed effective dose equivalent of 0.5 rem.

List of Elements

Name	Atomic	
	Symbol	No.
Actinium	Ac	89
Aluminum	Al	13
Americium	Am	95
Antimony	Sb	51
Argon	Ar	18
Arsenic	As	33
Astatine	At	85
Barium	Ba	56
Berkelium	Bk	97
Beryllium	Be	4
Bismuth	Bi	83
Bromine	Br	35
Cadmium	Cd	48
Calcium	Ca	20
Californium	Cf	98
Carbon	C	6

List of Elements

Name	Atomic Symbol	Atomic No.
Cerium	Ce	58
Cesium	Cs	55
Chlorine	Cl	17
Chromium	Cr	24
Cobalt	Co	27
Copper	Cu	29
Curium	Cm	96
Dysprosium	Dy	66
Einsteinium	Es	99
Erbium	Er	68
Europium	Eu	63
Fermium	Fm	100
Fluorine	F	9
Francium	Fr	87
Gadolinium	Gd	64
Gallium	Ga	31
Germanium	Ge	32
Gold	Au	79
Hafnium	Hf	72
Holmium	Ho	67

List of Elements

Name	Atomic Symbol	Atomic No.
Hydrogen	H	1
Indium	In	49
Iodine	I	53
Iridium	Ir	77
Iron	Fe	26
Krypton	Kr	36
Lanthanum	La	57
Lead	Pb	82
Lutetium	Lu	71
Magnesium	Mg	12
Manganese	Mn	25
Mendelevium	Md	101
Mercury	Hg	80
Molybdenum	Mo	42
Neodymium	Nd	60
Neptunium	Np	93
Nickel	Ni	28
Niobium	Nb	41
Osmium	Os	76
Palladium	Pd	46

List of Elements

Name	Atomic Symbol	Atomic No.
Phosphorus	P	15
Platinum	Pt	78
Plutonium	Pu	94
Polonium	Po	84
Potassium	K	19
Praseodymium	Pr	59
Promethium	Pm	61
Protactinium	Pa	91
Radium	Ra	88
Radon	Rn	86
Rhenium	Re	75
Rhodium	Rh	45
Rubidium	Rb	37
Ruthenium	Ru	44
Samarium	Sm	62
Scandium	Sc	21
Selenium	Se	34
Silicon	Si	14
Silver	Ag	47
Sodium	Na	11

List of Elements

Name	Atomic Symbol	Atomic No.
Strontium	Sr	38
Sulfur	S	16
Tantalum	Ta	73
Technetium	Tc	43
Tellurium	Te	52
Terbium	Tb	65
Thallium	Tl	81
Thorium	Th	90
Thalium	Tm	69
Tin	Sn	50
Titanium	Ti	22
Tungsten	W	74
Uranium	U	92
Vanadium	V	23
Xenon	Xe	54
Ytterbium	Yb	70
Yttrium	Y	39
Zinc	Zn	30
Zirconium	Zr	40

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI (μCi)	ALI (μCi)	DAC (μCi/ml)	Air (μCi/ml)	Water (μCi/ml)	Concentration (μCi/ml)
1	Hydrogen-3	Water, DAC Includes skin absorption	8E+4	8E+4	2E-5	1E-7	1E-3	1E-2
		Gas (HT or T_2) Submersion[1]: Use above values as HT and T_2 oxide in air and in the body to MTD						
4	Beryllium-7	W, all compounds except those given for Y	4E+4	2E+4	9E-6	3E-8	6E-4	6E-3
		T, oxides, halides, and nitrates	-	2E+4	8E-6	3E-8	-	-
4	Beryllium-10	W, see[7] Be	1E+3	2E+2	6E-8	2E-10	-	-
			LLI Wall					
			(1E+3)	-	-	-	2E-5	2E-4
		Y, see[7] Be	-	1E+1	6E-9	2E-11	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI (μCi)	ALI (μCi)	DAC (μCi/ml)	Air (μCi/ml)	Water (μCi/ml)	Concentration (μCi/ml)
6	Carbon-11[2]	Monoxide	-	1E+6	5E-4	2E-5	-	-
		Dioxide	-	6E+5	3E-4	9E-7	-	-
		Compounds	4E+5	4E+5	2E-4	6E-7	6E-3	6E-2
6	Carbon-14	Monoxide	-	2E+6	7E-4	2E-6	-	-
		Dioxide	-	2E+5	9E-5	3E-7	-	-
		Compounds	2E+3	2E+3	1E-6	3E-9	3E-5	3E-4
9	Fluorine-1B[2]	B, fluorides of H, Li, He, K, Rb, Cs, and Fr	5E+4	7E+4	3E-5	1E-7	-	-
			St Wall (5E+4)	-	-	-	7E-4	7E-3
		W, fluorides of Be, Ng, Ca, Sr, Ba, Ra, Al, Ga, In, Tl, As, Sb, Bi, Fe, Ru, Os, Co, Wi, Pd, Pt, Cu, Ag, Au, Zn, Cd, Hg, Sc, Y, Ti, Zr, W, Nb, Ta, Mn, Tc, and Re	-	9E+4	4E-5	1E-7	-	-
		Y, lanthanum fluoride	-	8E+4	3E-5	1E-7	-	-
11	Sodium-22	D, all compounds	4E+2	6E+2	3E-7	9E-10	6E-6	6E-5
11	Sodium-24	D, all compounds	4E+3	5E+3	2E-6	7E-9	5E-5	5E-4
12	Magnesium-28	D, all compounds except those given for W	7E+2	2E+3	7E-7	2E-9	9E-6	9E-5
		W, oxides, hydroxides, carbides, halides, and nitrates	-	1E+3	5E-7	2E-9	-	-
13	Aluminum-26	D, all compounds except those given for W	4E+2	6E+1	3E-8	9E-11	6E-6	6E-5
		W, oxides, hydroxides, carbides, halides, and nitrates	-	9E+1	4E-8	1E-10	-	-
14	Silicon-31	D, all compounds except those given for W and Y	9E+3	3E+4	1E-5	4E-8	1E-4	1E-3
		W, oxides, hydroxides, carbides, and nitrates	-	3E+4	1E-5	5E-8	-	-
		Y, aluminosilicate glass	-	3E+4	1E-5	4E-8	-	-
14	Silicon-32	D, see[31] Si	2E+3	2E+2	1E-7	3E-10	-	-
			LLI wall (3E+3)	-		-	4E-5	4E-4
		W, see[31] Si	-	1E+2	5E-8	2E-10	-	-
		Y, see[31] Si	-	5E+0	2E-9	7E-12	-	-
15	Phosphorous-32	D, all compounds except phosphates given for W	6E+2	9E+2	4E-7	1E-9	9E-6	9E-5
		W, phosphates of Zn^{2+}, S^{3+}, Mg^{2+}, Fe^{3+}, Bi^{3+}, and lanthanides	-	4E+2	2E-7	5E-10	-	-
15	Phosphorous-33	D, see[32] p	6E+3	8E+3	4E-6	1E-8	8E-5	8E-4
		W, see[32] p	-	3E+3	1E-6	4E-9	-	-
16	Sulfur-35	Vapor	-	1E+4	6E-6	2E-8	-	-
		D, sulfides and sulfates except those given for W	1E+4 LLI wall	2E+4	7E-6	2E-8	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
			(8E+3)	-	-	-	1E-4	1E-3
		W, elemental sulfur, sulfides of Sr, Ba, Ge, Sn, Pb, As, Sb, Bi, Cu, Ag, Au, Zn, Cd, Hg, W, and Mo. Sulfates of Ca, Sr, Ba, Ra, As, Sb, and Bi	6E+3	2E+3	9E-7	3E-9	-	-
17	Chlorine-36	D, chlorides of H, Li, Na, K, Rb, Cs, and Fr	2E+3	2E+3	1E-6	3E-9	2E-5	2E-4
		W, chlorides of lanthanides, Be, Mg, Ca, Sr, Ba, Ra, Al, Ga, In, Tl, Ge, Sn, Pb, As, Sb, Bi, Fe, Ru, Os, Co, Rh, Ir, Ni, Pd, Pt, Cu, Ag, Au, Zn, Cd, Hg, Sc, Y, Ti, Zr, Hf, V, Nb, Ta, Cr, Mo, W, Mn, Tc, and Re	-	2E+2	1E-7	3E-10	-	-
17	Chlorine-38[2]	D, see ^{36}Cl	2E+4	4E+4	2E-5	6E-8	-	-
			St. wall (3E+4)	-	-	-	3E-4	3E-3
		W, see ^{36}Cl	-	5E+4	2E-5	6E-8	-	-
17	Chlorine-39[2]	D, see ^{36}Cl	2E+4	5E+4	2E-5	7E-8	-	-
			St. wall (4E+4)	-	-	-	5E-4	5E-3
		W, see ^{36}Cl	-	6E+4	2E-5	8E-8	-	-
18	Argon-37	Submersion[1]	-	-	1E+0	6E-3	-	-
18	Argon-39	Submersion[1]	-	-	2E-4	8E-7	-	-
18	Argon-41	Submersion[1]	-	-	3E-6	1E-8	-	-
19	Potassium-40	D, all compounds	3E+2	4E+2	2E-7	6E-10	4E-6	4E-5
19	Potassium-42	D, all compounds	5E+3	5E+3	2E-6	7E-9	6E-5	6E-4
19	Potassium-43	D, all compounds	6E+3	9E+3	4E-6	1E-8	9E-5	9E-4
19	Potassium-44[2]	D, all compounds	2E+4	7E+4	3E-5	9E-8	-	-
			St. wall (4E+4)	-	-	-	5E-4	5E-3
19	Potassium-45[2]	D, all compounds	3E+4	1E+5	5E-5	2E-7	-	-
			St. wall (5E+4)	-	-	-	7E-4	7E-3
20	Calcium-41	W, all compounds	3E+3	4E+3	2E-6	-	-	-
			Bone surf (4E+3)	Bone surf (4E+3)	-	5E-9	6E-5	6E-4
20	Calcium-45	W, all compounds	2E+3	8E+2	4E-7	1E-9	2E-5	2E-4
20	Calcium-47	W, all compounds	8E+2	9E+2	4E-7	1E-9	1E-5	1E-4
21	Scandium-43	Y, all compounds	7E+3	2E+4	9E-6	3E-8	1E-4	1E-3
21	Scandium-44m	Y, all compounds	5E+2	7E+2	3E-7	1E-9	7E-6	7E-5
21	Scandium-44	Y, all compounds	4E+3	1E+4	5E-6	2E-8	5E-5	5E-4

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI (μCi)	ALI (μCi)	DAC (μCi/ml)	Air (μCi/ml)	Water (μCi/ml)	Concentration (μCi/ml)
21	Scandium-46	Y, all compounds	9E+2	2E+2	1E-7	3E-10	1E-5	1E-4
21	Scandium-47	Y, all compounds	2E+3	3E+3	1E-6	4E-9	-	-
			LLI wall (3E+3)	-	-	-	4E-5	4E-4
21	Scandium-48	Y, all compounds	8E+2	1E+3	6E-7	2E-9	1E-5	1E-4
21	Scandium-49[2]	Y, all compounds	2E+4	5E+4	2E-5	8E-8	3E-4	3E-3
22	Titanium-44	D, all compounds except those given for W and Y	3E+2	1E+1	5E-9	2E-11	4E-6	4E-5
		W, oxides, hydroxides, carbides, halides, and nitrates	-	3E+1	1E-8	4E-11	-	-
		Y, $SrTiO_3$	-	6E+0	2E-9	8E-12	-	-
22	Titanium-45	D, see ^{44}Ti	9E+3	3E+4	1E-5	3E-8	1E-4	1E-3
		W, see ^{44}Ti	-	4E+4	1E-5	5E-8	-	-
		Y, see ^{44}Ti	-	3E+4	1E-5	4E-8	-	-
23	Vanadium-47[2]	D, all compounds except those given for W	3E+4	8E+4	3E-5	1E-7	-	-
			St. wall (3E+4)	-	-	-	4E-4	4E-3
		W, oxides, hydroxides, carbides, and halides	-	1E+5	4E-5	1E-7	-	-
23	Vanadium-48	D, see ^{47}V	6E+2	1E+3	5E-7	2E-9	9E-6	9E-5
		W, see ^{47}V	-	6E+2	3E-7	9E-10	-	-
23	Vanadium-49	D, see ^{47}V	7E+4	3E+4	1E-5	-	-	-
			LLI wall (9E+4)	Bone surf (3E+4)	-	5E-8	1E-3	1E-2
		W, see ^{47}V	-	2E+4	8E-6	2E-8	-	-
24	Chromium-48	D, all compounds except those given for W and Y	6E+3	1E+4	5E-6	2E-8	8E-5	8E-4
		W, halides and nitrates	-	7E+3	3E-6	1E-8	-	-
		Y, oxides and hydroxides	-	7E+3	3E-6	1E-8	-	-
24	Chromium-49[2]	D, see ^{48}Cr	3E+4	8E+4	4E-5	1E-7	4E-4	4E-3
		W, see ^{48}Cr	-	1E+5	4E-5	1E-7	-	-
		Y, see ^{48}Cr	-	9E+4	4E-5	1E-7	-	-
24	Chromium-51	D, see ^{48}Cr	4E+4	5E+4	2E-5	6E-8	5E-4	5E-3
		W, see ^{48}Cr	-	2E+4	1E-5	3E-8	-	-
		Y, see ^{48}Cr	-	2E+4	8E-6	3E-8	-	-
25	Manganese-51[2]	D, all compounds except those given for W	2E+4	5E+4	2E-5	7E-8	3E-4	3E-3
		W, oxides, hydroxides, halides, and nitrates	-	6E+4	3E-5	8E-8	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
25	Manganese-52m[2]	D, see ^{51}Mn	3E+4	9E+4	4E-5	1E-7	-	-
			St. wall (4E+4)	-	-	-	5E-4	5E-3
		W, see ^{51}Mn	-	1E+5	4E-5	1E-7	-	-
25	Manganese-52	D, see ^{51}Mn	7E+2	1E+3	5E-7	2E-9	1E-5	1E-4
		W, see ^{51}Mn	-	9E+2	4E-7	1E-9	-	-
25	Manganese-53	D, see ^{51}Mn	5E+4	1E+4	5E-6	-	7E-4	7E-3
			-	Bone surf (2E+4)	-	3E-8	-	-
		W, see ^{51}Mn	-	1E+4	5E-6	2E-8	-	-
25	Manganese-54	D, see ^{51}Mn	2E+3	9E+2	4E-7	1E-9	3E-5	3E-4
		W, see ^{51}Mn	-	8E+2	3E-7	1E-9	-	-
25	Manganese-56	D, see ^{51}Mn	5E+3	2E+4	6E-6	2E-8	7E-5	7E-4
		W, see ^{51}Mn	-	2E+4	9E-6	3E-8	-	-
26	Iron-52	D, all compounds except those given for W	9E+2	3E+3	1E-6	4E-9	1E-5	1E-4
		W, oxides, hydroxides, and halides	-	2E+3	1E-6	3E-9	-	-
26	Iron-55	D, see ^{52}Fe	9E+3	2E+3	8E-7	3E-9	1E-4	1E-3
		W, see ^{52}Fe	-	4E+3	2E-6	6E-9	-	-
26	Iron-59	D, see ^{52}Fe	8E+2	3E+2	1E-7	5E-10	1E-5	1E-4
		W, see ^{52}Fe	-	5E+2	2E-7	7E-10	-	-
26	Iron-60	D, see ^{52}Fe	3E+1	6E+0	3E-9	9E-12	4E-7	4E-6
		W, see ^{52}Fe	-	2E+1	8E-9	3E-11	-	-
27	Cobalt-55	W, all compounds except those given for Y	1E+3	3E+3	1E-6	4E-9	2E-5	2E-4
		Y, oxides, hydroxides, halides, and nitrates	-	3E+3	1E-6	4E-9	-	-
27	Cobalt-56	W, see ^{55}Co	5E+2	3E+2	1E-7	4E-10	6E-6	6E-5
		Y, see ^{55}Co	4E+2	2E+2	8E-8	3E-10	-	-
27	Cobalt-57	W, see ^{55}Co	8E+3	3E+3	1E-6	4E-9	6E-5	6E-4
		Y, see ^{55}Co	4E+3	7E+2	3E-7	9E-10	-	-
27	Cobalt-58m	W, see ^{55}Co	6E+4	9E+4	4E-5	1E-7	8E-4	8E-3
		Y, see ^{55}Co	-	6E+4	3E-5	9E-8	-	-
27	Cobalt-58	W, see ^{55}Co	2E+3	1E+3	5E-7	2E-9	2E-5	2E-4
		Y, see ^{55}Co	1E+3	7E+2	3E-7	1E-9	-	-
27	Cobalt-60m[2]	W, see ^{55}Co	1E+6	4E+6	2E-3	6E-6	-	-
			St. wall					

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
			(1E+6)	-	-	-	2E-2	2E-1
		Y, see ^{55}Co	-	3E+6	1E-3	4E-6	-	-
27	Cobalt-60	W, see ^{55}Co	5E+2	2E+2	7E-8	2E-10	3E-6	3E-5
		Y, see ^{55}Co	2E+2	3E+1	1E-8	5E-11	-	-
27	Cobalt-61[2]	W, see ^{55}Co	2E+4	6E+4	3E-5	9E-8	3E-4	3E-3
		Y, see ^{55}Co	2E+4	6E+4	2E-5	8E-8	-	-
27	Cobalt-62m[2]	W, see ^{55}Co	4E+4	2E+5	7E-5	2E-7	-	-
			St. wall (5E+4)	-	-	-	7E-4	7E-3
		Y, see ^{55}Co	-	2E+5	6E-5	2E-7	-	-
28	Nickel-56	D, all compounds except those given for W	1E+3	2E+3	8E-7	3E-9	2E-5	2E-4
		W, oxides, hydroxides, and carbides	-	1E+3	5E-7	2E-9	-	-
		Vapor	-	1E+3	5E-7	2E-9	-	-
28	Nickel-57	D, see ^{56}Ni	2E+3	5E+3	2E-6	7E-9	2E-5	2E-4
		W, see ^{56}Ni	-	3E+3	1E-6	4E-9	-	-
		Vapor	-	6E+3	3E-6	9E-9	-	-
28	Nickel-59	D, see ^{56}Ni	2E+4	4E+3	2E-6	5E-9	3E-4	3E-3
		W, see ^{56}Ni	-	7E-3	3E-6	1E-8	-	-
		Vapor	-	2E+3	8E-7	3E-9	-	-
28	Nickel-63	D, see ^{56}Ni	9E+3	2E+3	7E-7	2E-9	1E-4	1E-3
		W, see ^{56}Ni	-	3E+3	1E-6	4E-9	-	-
		Vapor	-	8E+2	3E-7	1E-9	-	-
28	Nickel-65	D, see ^{56}Ni	8E+3	2E+4	1E-5	3E-8	1E-4	1E-3
		W, see ^{56}Ni	-	3E+4	1E-5	4E-8	-	-
		Vapor	-	2E+4	7E-6	2E-8	-	-
28	Nickel-66	D, see ^{56}Ni	4E+2	2E+3	7E-7	2E-9	-	-
			LLI wall (5E+2)	-	-	-	6E-6	6E-5
		W, see ^{56}Ni	-	6E+2	3E-7	9E-10	-	-
		Vapor	-	3E+3	1E-6	4E-9	-	-
29	Copper-60[2]	D, all compounds except those given for W and Y	3E+4	9E+4	4E-5	1E-7	-	-
			St. wall (3E+4)	-	-	-	4E-4	4E-3
		W, sulfides, halides, and nitrates	-	1E+5	5E-5	2E-7	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI (μCi)	ALI (μCi)	DAC (μCi/ml)	Air (μCi/ml)	Water (μCi/ml)	Concentration (μCi/ml)
		Y, oxides and hydroxides	-	1E+5	4E-5	1E-7	-	-
29	Copper-61	D, see ^{60}Cu	1E+4	3E+4	1E-5	4E-8	2E-4	2E-3
		W, see ^{60}Cu	-	4E+4	2E-5	6E-8	-	-
		Y, see ^{60}Cu	-	4E+4	1E-5	5E-8	-	-
29	Copper-64	D, see ^{60}Cu	1E+4	3E+4	1E-5	4E-8	2E-4	2E-3
		W, see ^{60}Cu	-	2E+4	1E-5	3E-8	-	-
		Y, see ^{60}Cu	-	2E+4	9E-6	3E-8	-	-
29	Copper-67	D, see ^{60}Cu	5E+3	8E+3	3E-6	1E-8	6E-5	6E-4
		W, see ^{60}Cu	-	5E+3	2E-6	7E-9	-	-
		Y, see ^{60}Cu	-	5E+3	2E-6	6E-9	-	-
30	Zinc-62	Y, all compounds	1E+3	3E+3	1E-6	4E-9	2E-5	2E-4
30	Zinc-63[2]	Y, all compounds	2E+4	7E+4	3E-5	9E-8	-	-
			St. wall (3E+4)	-	-	-	3E-4	3E-3
30	Zinc-65	Y, all compounds	4E+2	3E+2	1E-7	4E-10	5E-6	5E-5
30	Zinc-69m	Y, all compounds	4E+3	7E+3	3E-6	1E-8	6E-5	6E-4
30	Zinc-69[2]	Y, all compounds	6E+4	1E+5	6E-5	2E-7	8E-4	8E-3
30	Zinc-71m	Y, all compounds	6E+3	2E+4	7E-6	2E-8	8E-5	8E-4
30	Zinc-72	Y, all compounds	1E+3	1E+3	5E-7	2E-9	1E-5	1E-4
31	Gallium-65[2]	D, all compounds except those given for W	5E+4	2E+5	7E-5	2E-7	-	-
			St. wall (6E+4)	-	-	-	9E-4	9E-3
		W, oxides, hydroxides, carbides, halides, and nitrates	-	2E+5	8E-5	3E-7	-	-
31	Gallium-66	D, see ^{65}Ga	1E+3	4E+3	1E-6	5E-9	1E-5	1E-4
		W, see ^{65}Ga	-	3E+3	1E-6	4E-9	-	-
31	Gallium-67	D, see ^{65}Ga	7E+3	1E+4	6E-6	2E-8	1E-4	1E-3
		W, see ^{65}Ga	-	1E+4	4E-6	1E-8	-	-
31	Gallium-68[2]	D, see ^{65}Ga	2E+4	4E+4	2E-5	6E-8	2E-4	2E-3
		W, see ^{65}Ga	-	5E+4	2E-5	7E-8	-	-
31	Gallium-70[2]	D, see ^{65}Ga	5E+4	2E+5	7E-5	2E-7	-	-
			St. wall (7E+4)	-	-	-	1E-3	1E-2
		W, see ^{65}Ga	-	2E+5	8E-5	3E-7	-	-
31	Gallium-72	D, see ^{65}Ga	1E+3	4E+3	1E-6	5E-9	2E-5	2E-4

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
		W, see ^{65}Ga	-	3E+3	1E-6	4E-9	-	-
31	Gallium-73	D, see ^{65}Ga	5E+3	2E+4	6E-6	2E-8	7E-5	7E-4
		W, see ^{65}Ga	-	2E+4	6E-6	2E-8	-	-
32	Germanium-66	D, all compounds except those given for W	2E+4	3E+4	1E-5	4E-8	3E-4	3E-3
		W, oxides, sulfides, and halides	-	2E+4	8E-6	3E-8	-	-
32	Germanium-67[2]	D, see ^{66}Ge	3E+4	9E+4	4E-5	1E-7	-	-
			St. wall (4E+4)	-	-	-	6E-4	6E-3
		W, see ^{66}Ge	-	1E+5	4E-5	1E-7	-	-
32	Germanium-68	D, see ^{66}Ge	5E+3	4E+3	2E-6	5E-9	6E-5	6E-4
		W, see ^{66}Ge	-	1E+2	4E-8	1E-10	-	-
32	Germanium-69	D, see ^{66}Ge	1E+4	2E+4	6E-6	2E-8	2E-4	2E-3
		W, see ^{66}Ge	-	8E+3	3E-6	1E-8	-	-
32	Germanium-71	D, see ^{66}Ge	5E+5	4E+5	2E-4	6E-7	7E-3	7E-2
		W, see ^{66}Ge	-	4E+4	2E-5	6E-8	-	-
32	Germanium-75[2]	D, see ^{66}Ge	4E+4	8E+4	3E-5	1E-7	-	-
			St. wall (7E+4)	-	-	-	9E-4	9E-3
		W, see ^{66}Ge	-	8E+4	4E-5	1E-7	-	-
32	Germanium-77	D, see ^{66}Ge	9E+3	1E+4	4E-6	1E-8	1E-4	1E-3
		W, see ^{66}Ge	-	6E+3	2E-6	8E-9	-	-
32	Germanium-78[2]	D, see ^{66}Ge	2E+4	2E+4	9E-6	3E-8	-	-
			St. wall (2E+4)	-	-	-	3E-4	3E-3
		W, see ^{66}Ge	-	2E+4	9E-6	3E-8	-	-
33	Arsenic-69[2]	W, all compounds	3E+4	1E+5	5E-5	2E-7	-	-
			St. wall (4E+4)	-	-	-	6E-4	6E-3
33	Arsenic-70[2]	W, all compounds	1E+4	5E+4	2E-5	7E-8	2E-4	2E-3
33	Arsenic-71	W, all compounds	4E+3	5E+3	2E-6	6E-9	5E-5	5E-4
33	Arsenic-72	W, all compounds	9E+2	1E+3	6E-7	2E-9	1E-5	1E-4
33	Arsenic-73	W, all compounds	8E+3	2E+3	7E-7	2E-9	1E-4	1E-3
33	Arsenic-74	W, all compounds	1E+3	8E+2	3E-7	1E-9	2E-5	2E-4
33	Arsenic-76	W, all compounds	1E+3	1E+3	6E-7	2E-9	1E-5	1E-4

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1 Oral Ingestion	Col. 2 Inhalation	Col. 3 Inhalation	Col. 1	Col. 2	Monthly Average
			ALI (μCi)	ALI (μCi)	DAC (μCi/ml)	Air (μCi/ml)	Water (μCi/ml)	Concentration (μCi/ml)
33	Arsenic-77	W, all compounds	4E+3	5E+3	2E-6	7E-9	-	-
			LLI wall (5E+3)	-	-	-	6E-5	6E-4
33	Arsenic-78[2]	W, all compounds	8E+3	2E+4	9E-6	3E-8	1E-4	1E-3
33	Selenium-70[2]	D, all compounds except those given for W	2E+4	4E+4	2E-5	5E-8	1E-4	1E-3
		W, oxides, hydroxides, carbides, and elemental Se	1E+4	4E+4	2E-5	6E-8	-	-
34	Selenium-73m[2]	D, see ^{70}Se	6E+4	2E+5	6E-5	2E-7	4E-4	4E-3
		W, see ^{70}Se	3E+4	1E+5	6E-5	2E-7	-	-
34	Selenium-73	D, see ^{70}Se	3E+3	1E+4	5E-6	2E-8	4E-5	4E-4
		W, see ^{70}Se	-	2E+4	7E-6	2E-8	-	-
34	Selenium-75	D, see ^{70}Se	5E+2	7E+2	3E-7	1E-9	7E-6	7E-5
		W, see ^{70}Se	-	6E+2	3E-7	8E-10	-	-
34	Selenium-79	D, see ^{70}Se	6E+2	8E+2	3E-7	1E-9	8E-6	8E-5
		W, see ^{70}Se	-	6E+2	2E-7	8E-10	-	-
34	Selenium-81m[2]	D, see ^{70}Se	4E+4	7E+4	3E-5	9E-8	3E-4	3E-3
		W, see ^{70}Se	2E+4	7E+4	3E-5	1E-7	-	-
34	Selenium-81[2]	D, see ^{70}Se	6E+4	2E+5	9E-5	3E-7	-	-
			St. wall (8E+4)	-	-	-	1E-3	1E-2
		W, see ^{70}Se	-	2E+5	1E-4	3E-7	-	-
34	Selenium-83[2]	D, see ^{70}Se	4E+4	1E+5	5E-5	2E-7	4E-4	4E-3
		W, see ^{70}Se	3E+4	1E+5	5E-5	2E-7	-	-
35	Bromine-74m[2]	D, bromides of H, Li, Na, K, Rb, Cs, and Fr	1E+4	4E+4	2E-5	5E-8	-	-
			St. wall (2E+4)	-	-	-	3E-4	3E-3
		W, bromides of lanthanides, Be, Mg, Ca, Sr, Ba, Ra, Al, Ga, In, Tl, Ge, Sn, Pb, As, Sb, Bi, Fe, Ru, Os, Co, Rh, Ir, Ni, Pd, Pt, Cu, Ag, Au, Zn, Cd, Hg, Sc, Y, Ti, Zr, Hf, V, Nb, Ta, Mn, Tc, and Re	-	4E+4	2E-5	6E-8	-	-
35	Bromine-74[2]	D, see ^{74m}Br	2E+4	7E+4	3E-5	1E-7	-	-
			St. wall (4E+4)	-	-	-	5E-4	5E-3
		W, see ^{74m}Br	-	8E+4	4E-5	1E-7	-	-
35	Bromine-75[2]	D, see ^{74m}Br	3E+4	5E+4	2E-5	7E-8	-	-
			St. wall (4E+4)	-	-	-	5E-4	5E-3

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
		W, see ^{74m}Br	-	5E+4	2E-5	7E-8	-	-
35	Bromine-76	D, see ^{74m}Br	4E+3	5E+3	2E-6	7E-9	5E-5	5E-4
		W, see ^{74m}Br	-	4E+3	2E-6	6E-9	-	-
35	Bromine-77	D, see ^{74m}Br	2E+4	2E+4	1E-5	3E-8	2E-4	2E-3
		W, see ^{74m}Br	-	2E+4	8E-6	3E-8	-	-
35	Bromine-80m	D, see ^{74m}Br	2E+4	2E+4	7E-6	2E-8	3E-4	3E-3
		W, see ^{74m}Br	-	1E+4	6E-6	2E-8	-	-
35	Bromine-80[2]	D, see ^{74m}Br	5E+4	2E+5	8E-5	3E-7	-	-
			St. wall (9E+4)	-	-	-	1E-3	1E-2
		W, see ^{74m}Br	-	2E+5	9E-5	3E-7	-	-
35	Bromine-82	D, see ^{74m}Br	3E+3	4E+3	2E-6	6E-9	4E-5	4E-4
		W, see ^{74m}Br	-	4E+3	2E-6	5E-9	-	-
35	Bromine-83	D, see ^{74m}Br	5E+4	6E+4	3E-5	9E-8	-	-
			St. wall (7E+4)	-	-	-	9E-4	9E-3
		W, see ^{74m}Br	-	6E+4	3E-5	9E-8	-	-
35	Bromine-84[2]	D, see ^{74m}Br	2E+4	6E+4	2E-5	8E-8	-	-
			St. wall (3E+4)	-	-	-	4E-4	4E-3
		W, see ^{74m}Br	-	6E+4	3E-5	9E-8	-	-
36	Krypton-74[2]	Submersion[1]	-	-	3E-6	1E-8	-	-
36	Krypton-76	Submersion[1]	-	-	9E-6	4E-8	-	-
36	Krypton-77[2]	Submersion[1]	-	-	4E-6	2E-8	-	-
36	Krypton-79	Submersion[1]	-	-	2E-5	7E-8	-	-
36	Krypton-81	Submersion[1]	-	-	7E-4	3E-6	-	-
36	Krypton-83m[2]	Submersion[1]	-	-	1E-2	5E-5	-	-
36	Krypton-85m	Submersion[1]	-	-	2E-5	1E-7	-	-
36	Krypton-85	Submersion[1]	-	-	1E-4	7E-7	-	-
36	Krypton-87[2]	Submersion[1]	-	-	5E-6	2E-8	-	-
36	Krypton-88	Submersion[1]	-	-	2E-6	9E-9	-	-
37	Rubidium-79[2]	D, all compounds	4E+4	1E+5	5E-5	2E-7	-	-
			St. wall (6E+4)	-	-	-	8E-4	8E-3

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
37	Rubidium-81m[2]	D, all compounds	2E+5	3E+5	1E-4	5E-7	-	-
			St. wall (3E+5)	-	-	-	4E+3	4E-2
37	Rubidium-81	D, all compounds	4E+4	5E+4	2E-5	7E-8	5E-4	5E-3
37	Rubidium-82m	D, all compounds	1E+4	2E+4	7E-6	2E-8	2E-4	2E-3
37	Rubidium-83	D, all compounds	6E+2	1E+3	4E-7	1E-9	9E-6	9E-5
37	Rubidium-84	D, all compounds	5E+2	8E+2	3E-7	1E-9	7E-6	7E-5
37	Rubidium-86	D, all compounds	5E+2	8E+2	3E-7	1E-9	7E-6	7E-5
37	Rubidium-87	D, all compounds	1E+3	2E+3	6E-7	2E-9	1E-5	1E-4
37	Rubidium-88[2]	D, all compounds	2E+4	6E+4	3E-5	9E-8	-	-
			St. wall (3E+4)	-	-	-	4E-4	4E-3
37	Rubidium-89[2]	D, all compounds	4E+4	1E+5	6E-5	2E-7	-	-
			St. wall (6E+4)	-	-	-	9E-4	9E-3
38	Strontium-80[2]	D, all soluble compounds except $SrTiO^3$	4E+3	1E+4	5E-6	2E-8	6E-5	6E-1
		Y, all insoluble compounds and $SrTiO^3$	-	1E+4	5E-6	2E-8	-	-
38	Strontium-81[2]	D, see ^{80}Sr	3E+4	8E+4	3E-5	1E-7	3E-4	3E-3
		Y, see ^{80}Sr	2E+4	8E+4	3E-5	1E-7	-	-
38	Strontium-82	D, see ^{80}Sr	3E+2	4E+2	2E-7	6E-10	-	-
			LLI wall (2E+2)	-	-	-	3E-6	3E-5
		Y, see ^{80}Sr	2E+2	9E+1	4E-8	1E-10	-	-
38	Strontium-83	D, see ^{80}Sr	3E+3	7E+3	3E-6	1E-8	3E-5	3E-4
		Y, see ^{80}Sr	2E+3	4E+3	1E-6	5E-9	-	-
38	Strontium-85m[2]	D, see ^{80}Sr	2E+5	6E+5	3E-4	9E-7	3E-3	3E-2
		Y, see ^{80}Sr	-	8E+5	4E-4	1E-6	-	-
38	Strontium-85	D, see ^{80}Sr	3E+3	3E+3	1E-6	4E-9	4E-5	4E-4
		Y, see ^{80}Sr	-	2E+3	6E-7	2E-9	-	-
38	Strontium-87m	D, see ^{80}Sr	5E+4	1E+5	5E-5	2E-7	6E-4	6E-3
		Y, see ^{80}Sr	4E+4	2E+5	6E-5	2E-7	-	-
38	Strontium-89	D, see ^{80}Sr	6E+2	8E+2	4E-7	1E-9	-	-
			LLI wall (6E+2)	-	-	-	8E-6	8E-5

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
		Y, see ^{80}Sr	5E+2	1E+2	6E-8	2E-10	-	-
38	Strontium-90	D, see ^{80}Sr	3E+1	2E+1	8E-9	-	-	-
			Bone surf	Bone surf				
			(4E+1)	(2E+1)	-	3E-11	5E-7	5E-6
		Y, see ^{80}Sr	-	4E+0	2E-9	6E-12	-	-
38	Strontium-91	D, see ^{80}Sr	2E+3	6E+3	2E-6	8E-9	2E-5	2E-4
		Y, see ^{80}Sr	-	4E+3	1E-6	5E-9	-	-
38	Strontium-92	D, see ^{80}Sr	3E+3	9E+3	4E-6	1E-8	4E-5	4E-4
		Y, see ^{80}Sr	-	7E+3	3E-6	9E-9	-	-
39	Yttrium-86m[2]	W, all compounds except those given for Y	2E+4	6E+4	2E-5	8E-8	3E-4	3E-3
		Y, oxides and hydroxides	-	5E+4	2E-5	8E-8	-	-
39	Yttrium-86	W, see ^{86m}Y	1E+3	3E+3	1E-6	5E-9	2E-5	2E-4
		Y, see ^{86m}Y	-	3E+3	1E-6	5E-9	-	-
39	Yttrium-87	W, see ^{86m}Y	2E+3	3E+3	1E-6	5E-9	3E-5	3E-4
		Y, see ^{86m}Y	-	3E+3	1E-6	5E-9	-	-
39	Yttrium-88	W, see ^{86m}Y	1E+3	3E+2	1E-7	3E-10	1E-5	1E-4
		Y, see ^{86m}Y	-	2E+2	1E-7	3E-10	-	-
39	Yttrium-90m	W, see ^{86m}Y	8E+3	1E+4	5E-6	2E-8	1E-4	1E-3
		Y, see ^{86m}Y	-	1E+4	5E-6	2E-8	-	-
39	Yttrium-90	W, see ^{86m}Y	4E+2	7E+2	3E-7	9E-10	-	-
			LLI wall					
			(5E+2)	-	-	-	7E-6	7E-5
		Y, see ^{86m}Y	-	6E+2	3E-7	9E-10	-	-
39	Yttrium-91m[2]	W, see ^{86m}Y	1E+5	2E+5	1E-4	3E-7	2E-3	2E-2
		Y, see ^{86m}Y	-	2E+5	7E-5	2E-7	-	-
39	Yttrium-91	W, see ^{86m}Y	5E+2	2E+2	7E-8	2E-10	-	-
			LLI wall					
			(6E+2)	-	-	-	8E-6	8E-5
		Y, see ^{86m}Y	-	1E+2	5E-8	2E-10	-	-
39	Yttrium-92	W, see ^{86m}Y	3E+3	9E+3	4E-6	1E-8	4E-5	4E-4
		Y, see ^{86m}Y	-	8E+3	3E-6	1E-8	-	-
39	Yttrium-93	W, see ^{86m}Y	1E+3	3E+3	1E-6	4E-9	2E-5	2E-4
		Y, see ^{86m}Y	-	2E+3	1E-6	3E-9	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Col. 2 Inhalation ALI (µCi)	Col. 3 Inhalation DAC (µCi/ml)	Table 2 Effluent Concentrations Col. 1 Air (µCi/ml)	Col. 2 Water (µCi/ml)	Table 3 Releases to Sewers Monthly Average Concentration (µCi/ml)
39	Yttrium-94[2]	W, see ^{86m}Y	2E+4	8E+4	3E-5	1E-7	-	-
			St. wall (3E+4)	-	-	-	4E-4	4E-3
		Y, see ^{86m}Y	-	8E+4	3E-5	1E-7	-	-
39	Yttrium-95[2]	W, see ^{86m}Y	4E+4	2E+5	6E-5	2E-7	-	-
			St. wall (5E+4)	-	-	-	7E-4	7E-3
		Y, see ^{86m}Y	-	1E+5	6E-5	2E-7	-	-
40	Zirconium-86	D, all compounds except those given for W and Y	1E+3	1E+3	2E-6	6E-9	2E-5	2E-4
		W, oxides, hydroxides, halides, and nitrates	-	3E+3	1E-6	4E-9	-	-
		Y, carbide	-	2E+3	1E-6	3E-9	-	-
40	Zirconium-88	D, see ^{86}Zr	4E+3	2E+2	9E-8	3E-10	5E-5	5E-4
		W, see ^{86}Zr	-	5E+2	2E-7	7E-10	-	-
		Y, see ^{86}Zr	-	3E+2	1E-7	4E-10	-	-
40	Zirconium-89	D, see ^{86}Zr	2E+3	4E+3	1E-6	5E-9	2E-5	2E-4
		W, see ^{86}Zr	-	2E+3	1E-6	3E-9	-	-
		Y, see ^{86}Zr	-	2E+3	1E-6	3E-9	-	-
40	Zirconium-93	D, see ^{86}Zr	2E+3	8E+0	3E-9	-	-	-
			Bone surf (3E+3)	Bone surf (2E+1)	-	2E-11	4E-5	4E-4
		W, see ^{86}Zr	-	2E+1	1E-8	-	-	-
			-	Bone surf (6E+1)	-	9E-11	-	-
		Y, see ^{86}Zr	-	6E+1	2E-8	-	-	-
			-	Bone surf (7E+1)	-	9E-11	-	-
40	Zirconium-95	D, see ^{86}Zr	1E+3	1E+2	5E-8	-	2E-5	2E-4
			-	Bone surf (3E+2)	-	4E-10	-	-
		W, see ^{86}Zr	-	4E+2	2E-7	9E-10	-	-
		Y, see ^{86}Zr	-	3E+2	1E-7	4E-10	-	-
40	Zirconium-97	D, see ^{86}Zr	6E+2	2E+3	8E-7	3E-9	9E-6	9E-5
		W, see ^{86}Zr	-	1E+3	6E-7	2E-9	-	-
		Y, see ^{86}Zr	-	1E+3	5E-7	2E-9	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values Col. 1 Oral Ingestion ALI (μCi)	Col. 2 Inhalation ALI (μCi)	Col. 3 Inhalation DAC (μCi/ml)	Table 2 Effluent Concentrations Col. 1 Air (μCi/ml)	Col. 2 Water (μCi/ml)	Table 3 Releases to Sewers Monthly Average Concentration (μCi/ml)
41	Niobium-88[2]	W, all compounds except those given for Y	5E+4	2E+5	9E-5	3E-7	-	-
			St. wall (7E+4)	-	-	-	1E-3	1E-2
		Y, oxides and hydroxides	-	2E+5	9E-5	3E-7	-	-
41	Niobium-89m[2]	W, see ^{88}Nb	1E+4	4E+4	2E-5	6E-8	1E-4	1E-3
	(66 min)	Y, see ^{88}Nb	-	4E+4	2E-5	9E-8	-	-
41	Niobium-89	W, see ^{88}Nb	5E+3	2E+4	8E-6	3E-8	7E-5	7E-4
	(122 min)	Y, see ^{88}Nb	-	2E+4	6E-6	2E-8	-	-
41	Niobium-90	W, see ^{88}Nb	1E+3	3E+3	1E-6	4E-9	1E-5	1E-4
		Y, see ^{88}Nb	-	2E+3	1E-6	3E-9	-	-
41	Niobium-93m	W, see ^{88}Nb	9E+3	2E+3	8E-7	3E-9	-	-
			LLI wall (1E+4)	-	-	-	2E-4	2E-3
		Y, see ^{88}Nb	-	2E+2	7E-8	2E-10	-	-
41	Niobium-94	W, see ^{88}Nb	9E+2	2E+2	8E-8	3E-10	1E-5	1E-4
		Y, see ^{88}Nb	-	2E+1	6E-9	2E-11	-	-
41	Niobium-95m	W, see ^{88}Nb	2E+8	3E+3	1E-6	4E-9	-	-
			LLI wall (2E+3)	-	-	-	3E-5	3E-4
		Y, see ^{88}Nb	-	2E+3	9E-7	3E-9	-	-
41	Niobium-95	W, see ^{88}Nb	2E+3	1E+3	5E-7	2E-9	3E-5	3E-4
		Y, see ^{88}Nb	-	1E+3	5E-7	2E-9	-	-
41	Niobium-96	W, see ^{88}Nb	1E+3	3E+3	1E-6	4E-9	2E-5	2E-4
		Y, see ^{88}Nb	-	2E+3	1E-6	3E-9	-	-
41	Niobium-97[2]	W, see ^{88}Nb	2E+4	8E+4	3E-5	1E-7	3E-4	3E-3
		Y, see ^{88}Nb	-	7E+4	3E-5	1E-7	-	-
41	Niobium-98[2]	W, see ^{88}Nb	1E+4	5E+4	2E-5	8E-8	2E-4	2E-3
		Y, see ^{88}Nb	-	5E+4	2E-5	7E-8	-	-
42	Molybdenum-90	D, all compounds except those given for Y	4E+3	7E+3	3E-6	1E-8	3E-5	3E-4
		Y, oxides, hydroxides, and MoS_2	2E+3	5E+3	2E-6	6E-9	-	-
42	Molybdenum-93m	D, see ^{90}Mo	9E+3	2E+4	7E-6	2E-8	6E-5	6E-4
		Y, see ^{90}Mo	4E+3	1E+4	6E-6	2E-8	-	-
42	Molybdenum-93	D, see ^{90}Mo	4E+3	5E+3	2E-6	8E-9	5E-5	5E-4
		Y, see ^{90}Mo	2E+4	2E+2	8E-8	2E-10	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
42	Molybdenum-99	D, see ^{90}Mo	2E+3	3E+3	1E-6	4E-9	-	-
			LLI wall (1E+3)	-	-	-	2E-5	2E-4
		Y, see ^{90}Mo	1E+3	1E+3	6E-7	2E-9	-	-
42	Molybdenum-101[2]	D, see ^{90}Mo	4E+4	1E+5	6E-5	2E-7	-	-
			St. wall (5E+4)	-	-	-	7E-4	7E-3
		Y, see ^{90}Mo	-	1E+5	6E-5	2E-7	-	-
43	Technetium-93m[2]	D, all compounds except those given for W	7E+4	2E+5	6E-5	2E-7	1E-3	1E-2
		W, oxides, hydroxides, halides, and nitrates	-	3E+5	1E-4	4E-7	-	-
43	Technetium-93	D, see ^{93m}Tc	3E+4	7E+4	3E-5	1E-7	4E-4	4E-3
		W, see ^{93m}Tc	-	1E+5	4E-5	1E-7	-	-
43	Technetium-94m[2]	D, see ^{93m}Tc	2E+4	4E+4	2E-5	6E-8	3E-4	3E-3
		W, see ^{93m}Tc	-	6E+4	2E-5	8E-8	-	-
43	Technetium-94	D, see ^{93m}Tc	9E+3	2E+4	8E-6	3E-8	1E-4	1E-3
		W, see ^{93m}Tc	-	2E+4	1E-5	3E-8	-	-
43	Technetium-95m	D, see ^{93m}Tc	4E+3	5E+3	2E-6	8E-9	5E-5	5E-4
		W, see ^{93m}Tc	-	2E+3	8E-7	3E-9	-	-
43	Technetium-95	D, see ^{93m}Tc	1E+4	2E+4	9E-6	3E-8	1E-4	1E-3
		W, see ^{93m}Tc	-	2E+4	8E-6	3E-8	-	-
43	Technetium-96m[2]	D, see ^{93m}Tc	2E+5	3E+5	1E-4	4E-7	2E-3	2E-2
		W, see ^{93m}Tc	-	2E+5	1E-4	3E-7	-	-
43	Technetium-96	D, see ^{93m}Tc	2E+3	3E+3	1E-6	5E-9	3E-5	3E-4
		W, see ^{93m}Tc	-	2E+3	9E-7	3E-9	-	-
43	Technetium-97m	D, see ^{93m}Tc	5E+3	7E+3	3E-6	-	6E-5	6E-4
			-	St. wall (7E+3)	-	1E-8	-	-
		W, see ^{93m}Tc	-	1E+3	5E-7	2E-9	-	-
43	Technetium-97	D, see ^{93m}Tc	4E+4	5E+4	2E-5	7E-8	5E-4	5E-3
		W, see ^{93m}Tc	-	6E+3	2E-6	8E-9	-	-
43	Technetium-98	D, see ^{93m}Tc	1E+3	2E+3	7E-7	2E-9	1E-5	1E-4
		W, see ^{93m}Tc	-	3E+2	1E-7	4E-10	-	-
43	Technetium-99m	D, see ^{93m}Tc	8E+4	2E+5	6E-5	2E-7	1E-3	1E-2
		W, see ^{93m}Tc	-	2E+5	1E-4	3E-7	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
43	Technetium-99	D, see ^{93m}Tc	4E+3	5E+3	2E-6	-	6E-5	6E-4
			-	St. wall (6E+3)	-	8E-9	-	-
		W, see ^{93m}Tc	-	7E+2	3E-7	9E-10	-	-
43	Technetium-101[2]	D, see ^{93m}Tc	9E+4	3E+5	1E-4	5E-7	-	-
			St. wall (1E+5)	-	-	-	2E-3	2E-2
		W, see ^{93m}Tc	-	4E+5	2E-4	5E-7	-	-
43	Technetium-104[2]	D, see ^{93m}Tc	2E+4	7E+4	3E-5	1E-7	-	-
			St. wall (3E+4)	-	-	-	4E-4	4E-3
		W, see ^{93m}Tc	-	9E+4	4E-5	1E-7	-	-
44	Ruthenium-94[2]	D, all compounds except those given for W and Y	2E+4	4E+4	2E-5	6E-8	2E-4	2E-3
		W, halides	-	6E+4	3E-5	9E-8	-	-
		Y, oxides and hydroxides	-	6E+4	2E-5	8E-8	-	-
44	Ruthenium-97	D, see ^{94}Ru	8E+3	2E+4	8E-6	3E-8	1E-4	1E-3
		W, see ^{94}Ru	-	1E+4	5E-6	2E-8	-	-
		Y, see ^{94}Ru	-	1E+4	5E-6	2E-8	-	-
44	Ruthenium-103	D, see ^{94}Ru	2E+3	2E+3	7E-7	2E-9	3E-5	3E-4
		W, see ^{94}Ru	-	1E+3	4E-7	1E-9	-	-
		Y, see ^{94}Ru	-	6E+2	3E-7	9E-10	-	-
44	Ruthenium-105	D, see ^{94}Ru	5E+3	1E+4	6E-6	2E-8	7E-5	7E-4
		W, see ^{94}Ru	-	1E+4	6E-6	2E-8	-	-
		Y, see ^{94}Ru	-	1E+4	5E-6	2E-8	-	-
44	Ruthenium-106	D, see ^{94}Ru	2E+2	9E+1	4E-8	1E-10	-	-
			LLI wall (2E+2)	-	-	-	3E-6	3E-5
		W, see ^{94}Ru	-	5E+1	2E-8	8E-11	-	-
		Y, see ^{94}Ru	-	1E+1	5E-9	2E-11	-	-
45	Rhodium-99	D, all compounds except those given for W and Y	2E+4	6E+4	2E-5	8E-8	2E-4	2E-3
		W, halides	-	8E+4	3E-5	1E-7	-	-
		Y, oxides and hydroxides	-	7E+4	3E-5	9E-8	-	-
45	Rhodium-99	D, see ^{99m}Rh	2E+3	3E+3	1E-6	4E-9	3E-5	3E-4
		W, see ^{99m}Rh	-	2E+3	9E-7	3E-9	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
		Y, see ^{99m}Rh	-	2E+3	8E-7	3E-9	-	-
45	Rhodium-100	D, see ^{99m}Rh	2E+3	5E+3	2E-6	7E-9	2E-5	2E-4
		W, see ^{99m}Rh	-	4E+3	2E-6	6E-9	-	-
		Y, see ^{99m}Rh	-	4E+3	2E-6	5E-9	-	-
45	Rhodium-101m	D, see ^{99m}Rh	6E+3	1E+4	5E-6	2E-8	8E-5	8E-4
		W, see ^{99m}Rh	-	8E+3	4E-6	1E-8	-	-
		Y, see ^{99m}Rh	-	8E+3	3E-6	1E-8	-	-
45	Rhodium-101	D, see ^{99m}Rh	2E+3	5E+2	2E-7	7E-10	3E-5	3E-4
		W, see ^{99m}Rh	-	8E+2	3E-7	1E-9	-	-
		Y, see ^{99m}Rh	-	2E+2	6E-8	2E-10	-	-
45	Rhodium-102m	D, see ^{99m}Rh	1E+3	5E+2	2E-7	7E-10	-	-
			LLI wall					
			(1E+3)	-	-	-	2E-5	2E-4
		W, see ^{99m}Rh	-	4E+2	2E-7	5E-10	-	-
		Y, see ^{99m}Rh	-	1E+2	5E-8	2E-10	-	-
45	Rhodium-102	D, see ^{99m}Rh	6E+2	9E+1	4E-8	1E-10	8E-6	8E-5
		W, see ^{99m}Rh	-	2E+2	7E-8	2E-10	-	-
		Y, see ^{99m}Rh	-	6E+1	2E-8	8E-11	-	-
45	Rhodium-103m[2]	D, see ^{99m}Rh	4E+5	1E+6	5E-4	2E-6	6E-3	6E-2
		W, see ^{99m}Rh	-	1E+6	5E-4	2E-6	-	-
		Y, see ^{99m}Rh	-	1E+6	5E-4	2E-6	-	-
45	Rhodium-105	D, see ^{99m}Rh	4E+3	1E+4	5E-6	2E-8	-	-
			LLI wall					
			(4E+3)	-	-	-	5E-5	5E-4
		W, see ^{99m}Rh	-	6E+3	3E-6	9E-9	-	-
		Y, see ^{99m}Rh	-	6E+3	2E-6	8E-9	-	-
45	Rhodium-106m	D, see ^{99m}Rh	8E+3	3E+4	1E-5	4E-8	1E-4	1E-3
		W, see ^{99m}Rh	-	4E+4	2E-5	5E-8	-	-
		Y, see ^{99m}Rh	-	4E+4	1E-5	5E-8	-	-
45	Rhodium-107[2]	D, see ^{99m}Rh	7E+4	2E+5	1E-4	3E-7	-	-
			St. wall					
			(9E+4)	-	-	-	1E-3	1E-2
		W, see ^{99m}Rh	-	3E+5	1E-4	4E-7	-	-
		Y, see ^{99m}Rh	-	3E+5	1E-4	3E-7	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
46	Palladium-100	D, all compounds except those given for W and Y	1E+3	1E+3	6E-7	2E-9	2E-5	2E-4
		W, nitrates	-	1E+3	5E-7	2E-9	-	-
		Y, oxides and hydroxides	-	1E+3	6E-7	2E-9	-	-
46	Palladium-101	D, see ^{100}Pd	1E+4	3E+4	1E-5	5E-8	2E-4	2E-3
		W, see ^{100}Pd	-	3E+4	1E-5	5E-8	-	-
		Y, see ^{100}Pd	-	3E+4	1E-5	4E-8	-	-
46	Palladium-103	D, see ^{100}Pd	5E+3	6E+3	3E-6	9E-9	-	-
			LLI wall (7E+3)	-	-	-	1E-4	1E-3
		W, see ^{100}Pd	-	4E+3	2E-6	6E-9	-	-
		Y, see ^{100}Pd	-	4E+3	1E-6	5E-9	-	-
46	Palladium-107	D, see ^{100}Pd	3E+4	2E+4	9E-6	-	-	-
			LLI wall (4E+4)	Kidneys (2E+4)	-	3E-8	5E-4	5E-3
		W, see ^{100}Pd	-	7E+3	3E-6	1E-8	-	-
		Y, see ^{100}Pd	-	4E+2	2E-7	6E-10	-	-
46	Palladium-109	D, see ^{100}Pd	2E+3	6E+3	3E-6	9E-9	3E-5	3E-4
		W, see ^{100}Pd	-	5E+3	2E-6	8E-9	-	-
		Y, see ^{100}Pd	-	5E+3	2E-6	6E-9	-	-
47	Silver-102[2]	D, all compounds except those given for W and Y	5E+4	2E+5	8E-5	2E-7	-	-
			St. wall (6E+4)	-	-	-	9E-4	9E-3
		W, nitrates and sulfides	-	2E+5	9E-5	3E-7	-	-
		Y, oxides and hydroxides	-	2E+5	8E-5	3E-7	-	-
47	Silver-103[2]	D, see ^{102}Ag	4E+4	1E+5	4E-5	1E-7	5E-4	5E-3
		W, see ^{102}Ag	-	1E+5	5E-5	2E-7	-	-
		Y, see ^{102}Ag	-	1E+5	5E-5	2E-7	-	-
47	Silver-104m[2]	D, see ^{102}Ag	3E+4	9E+4	4E-5	1E-7	4E-4	4E-3
		W, see ^{102}Ag	-	1E+5	5E-5	2E-7	-	-
		Y, see ^{102}Ag	-	1E+5	5E-5	2E-7	-	-
47	Silver-104[2]	D, see ^{102}Ag	2E+4	7E+4	3E-5	1E-7	3E-4	3E-3
		W, see ^{102}Ag	-	1E+5	6E-5	2E-7	-	-
		Y, see ^{102}Ag	-	1E+5	6E-5	2E-7	-	-
47	Silver-105	D, see ^{102}Ag	3E+3	1E+3	4E-7	1E-9	4E-5	4E-4

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1 Oral Ingestion	Col. 2 Inhalation	Col. 3 Inhalation	Col. 1	Col. 2	Monthly Average
			ALI (μCi)	ALI (μCi)	DAC (μCi/ml)	Air (μCi/ml)	Water (μCi/ml)	Concentration (μCi/ml)
		W, see ^{102}Ag	-	2E+3	7E-7	2E-9	-	-
		Y, see ^{102}Ag	-	2E+3	7E-7	2E-9	-	-
47	Silver-106m	D, see ^{102}Ag	8E+2	7E+2	3E-7	1E-9	1E-5	1E-4
		W, see ^{102}Ag	-	9E+2	4E-7	1E-9	-	-
		Y, see ^{102}Ag	-	9E+2	4E-7	1E-9	-	-
47	Silver-106[2]	D, see ^{102}Ag	6E+4	2E+5	8E-5	3E-7	-	-
			St. wall (6E+4)	-	-	-	9E-4	9E-3
		W, see ^{102}Ag	-	2E+5	9E-5	3E-7	-	-
		Y, see ^{102}Ag	-	2E+5	8E-5	3E-7	-	-
47	Silver-108m	D, see ^{102}Ag	6E+2	2E+2	8E-8	3E-10	9E-6	9E-5
		W, see ^{102}Ag	-	3E+2	1E-7	4E-10	-	-
		Y, see ^{102}Ag	-	2E+1	1E-8	3E-11	-	-
47	Silver-110m	D, see ^{102}Ag	5E+2	1E+2	5E-8	2E-10	6E-6	6E-5
		W, see ^{102}Ag	-	2E+2	8E-8	3E-10	-	-
		Y, see ^{102}Ag	-	9E+1	4E-8	1E-10	-	-
47	Silver-111	D, see ^{102}Ag	9E+2	2E+3	6E-7	-	-	-
			LLI wall (1E+3)	Liver (2E+3)	-	2E-9	2E-5	2E-4
		W, see ^{102}Ag	-	9E+2	4E-7	1E-9	-	-
		Y, see ^{102}Ag	-	9E+2	4E-7	1E-9	-	-
47	Silver-112	D, see ^{102}Ag	3E+3	8E+3	3E-6	1E-8	4E-5	4E-4
		W, see ^{102}Ag	-	1E+4	4E-6	1E-8	-	-
		Y, see ^{102}Ag	-	9E+3	4E-6	1E-8	-	-
47	Silver-115[2]	D, see ^{102}Ag	3E+4	9E+4	4E-5	1E-7	-	-
			St. wall (3E+4)	-	-	-	4E-4	4E-3
		W, see ^{102}Ag	-	9E+4	4E-5	1E-7	-	-
		Y, see ^{102}Ag	-	8E+4	3E-5	1E-7	-	-
48	Cadmium-104[2]	D, all compounds except those given for W and Y	2E+4	7E+4	3E-5	9E-8	3E-4	3E-3
		W, sulfides, halides, and nitrates	-	1E+5	5E-5	2E-7	-	-
		Y, oxides and hydroxides	-	1E+5	5E-5	2E-7	-	-
48	Cadmium-107	D, see ^{104}Cd	2E+4	5E+4	2E-5	8E-8	3E-4	3E-3
		W, see ^{104}Cd	-	6E+4	2E-5	8E-8	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI (μCi)	ALI (μCi)	DAC (μCi/ml)	Air (μCi/ml)	Water (μCi/ml)	Concentration (μCi/ml)
		Y, see ^{104}Cd	-	5E+4	2E-5	7E-8	-	-
48	Cadmium-109	D, see ^{104}Cd	3E+2	4E+1	1E-8	-	-	-
			Kidneys (4E+2)	Kidneys (5E+1)	-	7E-11	6E-6	6E-5
		W, see ^{104}Cd	-	1E+2	5E-8	-	-	-
			-	Kidneys (1E+2)	-	2E-10	-	-
		Y, see ^{104}Cd	-	1E+2	5E-8	2E-10	-	-
48	Cadmium-113m	D, see ^{104}Cd	2E+1	2E+0	1E-9	-	-	-
			Kidneys (4E+1)	Kidneys (4E+0)	-	5E-12	5E-7	5E-6
		W, see ^{104}Cd	-	8E+0	4E-9	-	-	-
			-	Kidneys (1E+1)	-	2E-11	-	-
		Y, see ^{104}Cd	-	1E+1	5E-9	2E-11	-	-
48	Cadmium-113	D, see ^{104}Cd	2E+1	2E+0	9E-10	-	-	-
			Kidneys (3E+1)	Kidneys (3E+0)	-	5E-12	4E-7	4E-6
		W, see ^{104}Cd	-	8E+0	3E-9	-	-	-
			-	Kidneys (1E+1)	-	2E-11	-	-
		Y, see ^{104}Cd	-	1E+1	6E-9	2E-11	-	-
48	Cadmium-115m	D, see ^{104}Cd	3E+2	5E+1	2E-8	-	4E-6	4E-5
			-	Kidneys (8E+1)	-	1E-10	-	-
		W, see ^{104}Cd	-	1E+2	5E-8	2E-10	-	-
		Y, see ^{104}Cd	-	1E+2	6E-8	2E-10	-	-
48	Cadmium-115	D, see ^{104}Cd	9E+2	1E+3	6E-7	2E-9	-	-
			LLI wall (1E+3)	-	-	-	1E-5	1E-4
		W, see ^{104}Cd	-	1E+3	5E-7	2E-9	-	-
		Y, see ^{104}Cd	-	1E+3	6E-7	2E-9	-	-
48	Cadmium-117m	D, see ^{104}Cd	5E+3	1E+4	5E-6	2E-8	6E-5	6E-4
		W, see ^{104}Cd	-	2E+4	7E-6	2E-8	-	-
		Y, see ^{104}Cd	-	1E+4	6E-6	2E-8	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
48	Cadmium-117	D, see ^{104}Cd	5E+3	1E+4	5E-6	2E-8	6E-5	6E-4
		W, see ^{104}Cd	-	2E+4	7E-6	2E-8	-	-
		Y, see ^{104}Cd	-	1E+4	6E-6	2E-8	-	-
49	Indium-109	D, all compounds except those given for W	2E+4	4E+4	2E-5	6E-8	3E-4	3E-3
		W, oxides, hydroxides, and nitrates	-	6E+4	3E-5	9E-8	-	-
49	Indium-110[2] (69.1 min.)	D, see ^{109}In	2E+4	4E+4	2E-5	6E-8	2E-4	2E-3
		W, see ^{109}In	-	6E+4	2E-5	8E-8	-	-
49	Indium-110 (4.9 h)	D, see ^{109}In	5E+3	2E+4	7E-6	2E-8	7E-5	7E-4
		W, see ^{109}In	-	2E+4	8E-6	3E-8	-	-
49	Indium-111	D, see ^{109}In	4E+3	6E+3	3E-6	9E-9	6E-5	6E-4
		W, see ^{109}In	-	6E+3	3E-6	9E-9	-	-
49	Indium-112[2]	D, see ^{109}In	2E+5	6E+5	3E-4	9E-7	2E-3	2E-2
		W, see ^{109}In	-	7E+5	3E-4	1E-6	-	-
49	Indium-113m[2]	D, see ^{109}In	5E+4	1E+5	6E-5	2E-7	7E-4	7E-3
		W, see ^{109}In	-	2E+5	8E-5	3E-7	-	-
49	Indium-114m	D, see ^{109}In	3E+2	6E+1	3E-8	9E-11	-	-
			LLI wall (4E+2)	-	-	-	5E-6	5E-5
		W, see ^{109}In	-	1E+2	4E-8	1E-10	-	-
49	Indium-115m	D, see ^{109}In	1E+4	4E+4	2E-5	6E-8	2E-4	2E-3
		W, see ^{109}In	-	5E+4	2E-5	7E-8	-	-
49	Indium-115	D, see ^{109}In	4E+1	1E+0	6E-10	2E-12	5E-7	5E-6
		W, see ^{109}In	-	5E+0	2E-9	8E-12	-	-
49	Indium-116m[2]	D, see ^{109}In	2E+4	8E+4	3E-5	1E-7	3E-4	3E-3
		W, see ^{109}In	-	1E+5	5E-5	2E-7	-	-
49	Indium-117m[2]	D, see ^{109}In	1E+4	3E+4	1E-5	5E-8	2E-4	2E-3
		W, see ^{109}In	-	4E+4	2E-5	6E-8	-	-
49	Indium-117[2]	D, see ^{109}In	6E+4	2E+5	7E-5	2E-7	8E-4	8E-3
		W, see ^{109}In	-	2E+5	9E-5	3E-7	-	-
49	Indium-119m[2]	D, see ^{109}In	4E+4	1E+5	5E-5	2E-7	-	-
			St. wall (5E+4)	-	-	-	7E-4	7E-3

Atomic No.	Radionuclide	Class	Table 1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Col. 2 Inhalation ALI (µCi)	Col. 3 Inhalation DAC (µCi/ml)	Table 2 Effluent Concentrations Col. 1 Air (µCi/ml)	Col. 2 Water (µCi/ml)	Table 3 Releases to Sewers Monthly Average Concentration (µCi/ml)
		W, see ^{109}In	-	1E+5	6E-5	2E-7	-	-
50	Tin-110	D, all compounds except those given for W	4E+3	1E+4	5E-6	2E-8	5E-5	5E-4
		W, sulfides, oxides, hydroxides, halides, nitrates, and stannic phosphate	-	1E+4	5E-6	2E-8	-	-
50	Tin-111[2]	D, see ^{110}Sn	7E+4	2E+5	9E-5	3E-7	1E-3	1E-2
		W, see ^{110}Sn	-	3E+5	1E-4	4E-7	-	-
50	Tin-113	D, see ^{110}Sn	2E+3	1E+3	5E-7	2E-9	-	-
			LLI wall (2E+3)	-	-	-	3E-5	3E-4
		W, see ^{110}Sn	-	5E+2	2E-7	8E-10	-	-
50	Tin-117m	D, see ^{110}Sn	2E+3	1E+3	5E-7	-	-	-
			LLI wall (2E+3)	Bone Surf (2E+3)	-	3E-9	3E-5	3E-4
		W, see ^{110}Sn	-	1E+3	6E-7	2E-9	-	-
50	Tin-119m	D, see ^{110}Sn	3E+3	2E+3	1E-6	3E-9	-	-
			LLI wall (4E+3)	-	-	6E-5	6E-4	-
		W, see ^{110}Sn	-	1E+3	4E-7	1E-9	-	-
50	Tin-121m	D, see ^{110}Sn	3E+3	9E+2	4E-7	1E-9	-	-
			LLI wall (4E+3)	-	-	-	5E-5	5E-4
		W, see ^{110}Sn	-	5E+2	2E-7	8E-10	-	-
50	Tin-121	D, see ^{110}Sn	6E+3	2E+4	6E-6	2E-8	-	-
			LLI wall (6E+3)	-	-	-	8E-5	8E-4
		W, see ^{110}Sn	-	1E+4	5E-6	2E-8	-	-
50	Tin-123m[2]	D, see ^{110}Sn	5E+4	1E+5	5E-5	2E-7	7E-4	7E-3
		W, see ^{110}Sn	-	1E+5	6E-5	2E-7	-	-
50	Tin-123	D, see ^{110}Sn	5E+2	6E+2	3E-7	9E-10	-	-
			LLI wall (6E+2)	-	-	-	9E-6	9E-5
		W, see ^{110}Sn	-	2E+2	7E-8	2E-10	-	-
50	Tin-125	D, see ^{110}Sn	4E+2	9E+2	4E-7	1E-9	-	-
			LLI wall (5E+2)	-	-	-	6E-6	6E-5

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
		W, see ^{110}Sn	-	4E+2	1E-7	5E-10	-	-
50	Tin-126	D, see ^{110}Sn	3E+2	6E+1	2E-8	8E-11	4E-6	4E-5
		W, see ^{110}Sn	-	7E+1	3E-8	9E-11	-	-
50	Tin-127	D, see ^{110}Sn	7E+3	2E+4	8E-6	3E-8	9E-5	9E-4
		W, see ^{110}Sn	-	2E+4	8E-6	3E-8	-	-
50	Tin-128[2]	D, see ^{110}Sn	9E+3	3E+4	1E-5	4E-8	1E-4	1E-3
		W, see ^{110}Sn	-	4E+4	1E-5	5E-8	-	-
51	Antimony-115[2]	D, all compounds except those given for W	8E+4	2E+5	1E-4	3E-7	1E-3	1E-2
		W, oxides, hydroxides, halides, sulfides, sulfates, and nitrates	-	3E+5	1E-4	4E-7	-	-
51	Antimony-116m[2]	D, see ^{115}Sb	2E+4	7E+4	3E-5	1E-7	3E-4	3E-3
		W, see ^{115}Sb	-	1E+5	6E-5	2E-7	-	-
51	Antimony-116[2]	D, see ^{115}Sb	7E+4	3E+5	1E-4	4E-7	-	-
			St. wall (9E+4)	-	-	-	1E-3	1E-2
		W, see ^{115}Sb	-	3E+5	1E-4	5E-7	-	-
51	Antimony-117	D, see ^{115}Sb	7E+4	2E+5	9E-5	3E-7	9E-4	9E-3
		W, see ^{115}Sb	-	3E+5	1E-4	4E-7	-	-
51	Antimony-118m	D, see ^{115}Sb	6E+3	2E+4	8E-6	3E-8	7E-5	7E-4
		W, see ^{115}Sb	5E+3	2E+4	9E-6	3E-8	-	-
51	Antimony-119	D, see ^{115}Sb	2E+4	5E+4	2E-5	6E-8	2E-4	2E-3
		W, see ^{115}Sb	2E+4	3E+4	1E-5	4E-8	-	-
51	Antimony-120[2] (16 min)	D, see ^{115}Sb	1E+5	4E+5	2E-4	6E-7	-	-
			St. wall (2E+5)	-	-	-	2E-3	2E-2
		W, see ^{115}Sb	-	5E+5	2E-4	7E-7	-	-
51	Antimony-120 (5.76 d)	D, see ^{115}Sb	1E+3	2E+3	9E-7	3E-9	1E-5	1E-4
		W, see ^{115}Sb	9E+2	1E+3	5E-7	2E-9	-	-
51	Antimony-122	D, see ^{115}Sb	8E+2	2E+3	1E-6	3E-9	-	-
			LLI wall (8E+2)	-	-	-	1E-5	1E-4
		W, see ^{115}Sb	7E+2	1E+3	4E-7	2E-9	-	-
51	Antimony-124m[2]	D, see ^{115}Sb	3E+5	8E+5	4E-4	1E-6	3E-3	3E-2
		W, see ^{115}Sb	2E+5	6E+5	2E-4	8E-7	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
51	Antimony-124	D, see ^{115}Sb	6E+2	9E+2	4E-7	1E-9	7E-6	7E-5
		W, see ^{115}Sb	5E+2	2E+2	1E-7	3E-10	-	-
51	Antimony-125	D, see ^{115}Sb	2E+3	2E+3	1E-6	3E-9	3E-5	3E-4
		W, see ^{115}Sb	-	5E+2	2E-7	7E-10	-	-
51	Antimony-126m[2]	D, see ^{115}Sb	5E+4	2E+5	8E-5	3E-7	-	-
			St. wall (7E+4)	-	-	-	9E-4	9E-3
		W, see ^{115}Sb	-	2E+5	8E-5	3E-7	-	-
51	Antimony-126	D, see ^{115}Sb	6E+2	1E+3	5E-7	2E-9	7E-6	7E-5
		W, see ^{115}Sb	-	5E+2	5E+2	2E-7	7E-10	-
51	Antimony-127	D, see ^{115}Sb	8E+2	2E+3	9E-7	3E-9	-	-
			LLI wall (8E+2)	-	-	-	1E-5	1E-4
		W, see ^{115}Sb	7E+2	9E+2	4E-7	1E-9	-	-
51	Antimony-128[2] (10.4 min)	D, see ^{115}Sb	8E+4	4E+5	2E-4	5E-7	-	-
			St. wall (1E+5)	-	-	-	1E-3	1E-2
		W, see ^{115}Sb	-	4E+5	2E-4	6E-7	-	-
51	Antimony-128 (9.01 h)	D, see ^{115}Sb	1E+3	4E+3	2E-6	6E-9	2E-5	2E-4
		W, see ^{115}Sb	-	3E+3	1E-6	5E-9	-	-
51	Antimony-129 (9.01 h)	D, see ^{115}Sb	3E+3	9E+3	4E-6	1E-8	4E-5	4E-4
		W, see ^{115}Sb	-	9E+3	4E-6	1E-8	-	-
51	Antimony-130[2]	D, see ^{115}Sb	2E+4	6E+4	3E-5	9E-8	3E-4	3E-3
		W, see ^{115}Sb	-	8E+4	3E-5	1E-7	-	-
51	Antimony-131[2]	D, see ^{115}Sb	1E+4	2E+4	1E-5	-	-	-
			Thyroid (2E+4)	Thyroid (4E+4)	-	6E-8	2E-4	2E-3
		W, see ^{115}Sb	-	2E+4	1E-5	-	-	-
			-	Thyroid (4E+4)	-	6E-8	-	-
52	Tellurium-116	D, all compounds except those given for W	8E+3	2E+4	9E-6	3E-8	1E-4	1E-3
		W, oxides, hydroxides, and nitrates	-	3E+4	1E-5	4E-8	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
52	Tellurium-121m	D, see ^{116}Te	5E+2	2E+2	8E-8	-	-	-
			Bone surf	Bone surf				
			(7E+2)	(4E+2)	-	5E-10	1E-5	1E-4
		W, see ^{116}Te	-	4E+2	2E-7	6E-10	-	-
52	Tellurium-121	D, see ^{116}Te	3E+3	4E+3	2E-6	6E-9	4E-5	4E-4
		W, see ^{116}Te	-	3E+3	1E-6	4E-9	-	-
52	Tellurium-123m	D, see ^{116}Te	6E+2	2E+2	9E-8	-	-	-
			Bone surf	Bone surf				
			(1E+3)	(5E+2)	-	8E-10	1E-5	1E-4
		W, see ^{116}Te	-	5E+2	2E-7	8E-10	-	-
52	Tellurium-123	D, see ^{116}Te	5E+2	2E+2	8E-8	-	-	-
			Bone surf	Bone surf				
			(1E+3)	(5E+2)	-	7E-10	2E-5	2E-4
		W, see ^{116}Te	-	4E+2	2E-7	-	-	-
				Bone surf				
			-	(1E+3)	-	2E-9	-	-
52	Tellurium-125m	D, see ^{116}Te	1E+3	4E+2	2E-7	-	-	-
			Bone surf	Bone surf				
			(1E+3)	(1E+3)	-	1E-9	2E-5	2E-4
		W, see ^{116}Te	-	7E+2	3E-7	1E-9	-	-
52	Tellurium-127m	D, see ^{116}Te	6E+2	3E+2	1E-7	-	9E-6	9E-5
				Bone surf				
			-	(4E+2)	-	6E-10	-	-
		W, see ^{116}Te	-	3E+2	1E-7	4E-10	-	-
52	Tellurium-127	D, see ^{116}Te	7E+3	2E+4	9E-6	3E-8	1E-4	1E-3
		W, see ^{116}Te	-	2E+4	7E-6	2E-8	-	-
52	Tellurium-129	D, see ^{116}Te	5E+2	6E+2	3E-7	9E-10	7E-6	7E-5
		W, see ^{116}Te	-	2E+2	1E-7	3E-10	-	-
52	Tellurium-129[2]	D, see ^{116}Te	3E+4	6E+4	3E-5	9E-8	4E-4	4E-3
		W, see ^{116}Te	-	7E+4	3E-5	1E-7	-	-
52	Tellurium-131m	D, see ^{116}Te	3E+2	4E+2	2E-7	-	-	-
			Thyroid	Thyroid				
			(6E+2)	(1E+3)	-	2E-9	8E-6	8E-5
		W, see ^{116}Te	-	4E+2	2E-7	-	-	-
				Thyroid				

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1 Oral Ingestion	Col. 2 Inhalation	Col. 3 Inhalation	Col. 1	Col. 2	Monthly Average
			ALI (μCi)	ALI (μCi)	DAC (μCi/ml)	Air (μCi/ml)	Water (μCi/ml)	Concentration (μCi/ml)
			-	(9E+2)	-	1E-9	-	-
52	Tellurium-131[2]	D, see ^{116}Te	3E+3 Thyroid	5E+3 Thyroid	2E-6	-	-	-
			(6E+3)	(1E+4)	-	2E-8	8E-5	8E-4
		W, see ^{116}Te	-	5E+3 Thyroid	2E-6	-	-	-
			-	(1E+4)	-	2E-8	-	-
52	Tellurium-132	D, see ^{116}Te	2E+2 Thyroid	2E+2 Thyroid	9E-8	-	-	-
			(7E+2)	(8E+2)	-	1E-9	9E-6	9E-5
		W, see ^{116}Te	-	2E+2 Thyroid	9E-8	-	-	-
			-	(6E+2)	-	9E-10	-	-
52	Tellurium-133m[2]	D, see ^{116}Te	3E+3 Thyroid	5E+3 Thyroid	2E-6	-	-	-
			(6E+3)	(1E+4)	-	2E-8	9E-5	9E-4
		W, see ^{116}Te	-	5E+3 Thyroid	2E-6	-	-	-
			-	(1E+4)	-	2E-8	-	-
52	Tellurium-133[2]	D, see ^{116}Te	1E+4 Thyroid	2E+4 Thyroid	9E-6	-	-	-
			(3E+4)	(6E+4)	-	8E-8	4E-4	4E-3
		W, see ^{116}Te	-	2E+4 Thyroid	9E-6	-	-	-
			-	(6E+4)	-	8E-8	-	-
52	Tellurium-134[2]	D, see ^{116}Te	2E+4 Thyroid	2E+4 Thyroid	1E-5	-	-	-
			(2E+4)	(5E+4)	-	7E-8	3E-4	3E-3
		W, see ^{116}Te	-	2E+4 Thyroid	1E-5	-	-	-
			-	(5E+4)	-	7E-8	-	-
53	Iodine-120m[2]	D, all compounds	1E+4 Thyroid	2E+4	9E-6	3E-8	-	-
			(1E+4)	-	-	-	2E-4	2E-3
53	Iodine-120[2]	D, all compounds	4E+3 Thyroid	9E+3 Thyroid	4E-6	-	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
			(8E+3)	(1E+4)	-	2E-8	1E-4	1E-3
53	Iodine-121	D, all compounds	1E+4 Thyroid	2E+4 Thyroid	8E-6	-	-	-
			(3E+4)	(5E+4)	-	7E-8	4E-4	4E-3
53	Iodine-123	D, all compounds	3E+3 Thyroid	6E+3 Thyroid	3E-6	-	-	-
			(1E+4)	(2E+4)	-	2E-8	1E-4	1E-3
53	Iodine-124	D, all compounds	5E+1 Thyroid	8E+1 Thyroid	3E-8	-	-	-
			(2E+2)	(3E+2)	-	4E-10	2E-6	2E-5
53	Iodine-125	D, all compounds	4E+1 Thyroid	6E+1 Thyroid	3E-8	-	-	-
			(1E+2)	(2E+2)	-	3E-10	2E-6	2E-5
53	Iodine-126	D, all compounds	2E+1 Thyroid	4E+1 Thyroid	1E-8	-	-	-
			(7E+1)	(1E+2)	-	2E-10	1E-6	1E-5
53	Iodine-128[2]	D, all compounds	4E+4 St. wall	1E+5	5E-5	2E-7	-	-
			(6E-4)	-	-	-	8E-4	8E-3
53	Iodine-129	D, all compounds	5E+0 Thyroid	9E+0 Thyroid	4E-9	-	-	-
			(2E+1)	(3E+1)	-	4E-11	2E-7	2E-6
53	Iodine-130	D, all compounds	4E+2 Thyroid	7E+2 Thyroid	3E-7	-	-	-
			(1E+3)	(2E+3)	-	3E-9	2E-5	2E-4
53	Iodine-131	D, all compounds	3E+1 Thyroid	5E+1 Thyroid	2E-8	-	-	-
			(9E+1)	(2E+2)	-	2E-10	1E-6	1E-5
53	Iodine-132m[2]	D, all compounds	4E+3 Thyroid	8E+3 Thyroid	4E-6	-	-	-
			(1E+4)	(2E+4)	-	3E-8	1E-4	1E-3
53	Iodine-132	D, all compounds	4E+3 Thyroid	8E+3 Thyroid	3E-6	-	-	-
			(9E+3)	(1E+4)	-	2E-8	1E-4	1E-3
53	Iodine-133	D, all compounds	1E+2 Thyroid	3E+2 Thyroid	1E-7	-	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(µCi)	(µCi)	(µCi/ml)	(µCi/ml)	(µCi/ml)	(µCi/ml)
			(5E+2)	(9E+2)	-	1E-9	7E-6	7E-5
53	Iodine-134[2]	D, all compounds	2E+4	5E+4	2E-5	6E-8	-	-
			Thyroid					
			(3E+4)	-	-	-	4E-4	4E-3
53	Iodine-135	D, all compounds	8E+2	2E+3	7E-7	-	-	-
			Thyroid	Thyroid				
			(3E+3)	(4E+3)	-	6E-9	3E-5	3E-4
54	Xenon-120[2]	Submersion[1]	-	-	1E-5	4E-8	-	-
54	Xenon-121[2]	Submersion[1]	-	-	2E-6	1E-8	-	-
54	Xenon-122	Submersion[1]	-	-	7E-5	3E-7	-	-
54	Xenon-123	Submersion[1]	-	-	6E-6	3E-8	-	-
54	Xenon-125	Submersion[1]	-	-	2E-5	7E-8	-	-
54	Xenon-127	Submersion[1]	-	-	1E-5	6E-8	-	-
54	Xenon-129m	Submersion[1]	-	-	2E-4	9E-7	-	-
54	Xenon-131m	Submersion[1]	-	-	4E-4	2E-6	-	-
54	Xenon-133m	Submersion[1]	-	-	1E-4	6E-7	-	-
54	Xenon-133	Submersion[1]	-	-	1E-4	5E-7	-	-
54	Xenon-135m[2]	Submersion[1]	-	-	9E-6	4E-8	-	-
54	Xenon-135	Submersion[1]	-	-	1E-5	7E-8	-	-
54	Xenon-138[2]	Submersion[1]	-	-	4E-6	2E-8	-	-
55	Cesium-125[2]	D, all compounds	5E+4	1E+5	6E-5	2E-7	-	-
			St. wall					
			(9E+4)	-	-	-	1E-3	1E-2
55	Cesium-127	D, all compounds	6E+4	9E+4	4E-5	1E-7	9E-4	9E-3
55	Cesium-129	D, all compounds	2E+4	3E+4	1E-5	5E-8	3E-4	3E-3
55	Cesium-130[2]	D, all compounds	6E+4	2E+5	8E-5	3E-7	-	-
			St. wall					
			(1E+5)	-	-	-	1E-3	1E-2
55	Cesium-131	D, all compounds	2E+4	3E+4	1E-5	4E-8	3E-4	3E-3
55	Cesium-132	D, all compounds	3E+3	4E+3	2E-6	6E-9	4E-5	4E-4
55	Cesium-134m	D, all compounds	1E+5	1E+5	6E-5	2E-7	-	-
			St. wall					
			(1E+5)	-	-	-	2E-3	2E-2
55	Cesium-134	D, all compounds	7E+1	1E+2	4E-8	2E-10	9E-7	9E-6

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
55	Cesium-135m[2]	D, all compounds	1E+5	2E+5	8E-5	3E-7	1E-3	1E-2
55	Cesium-135	D, all compounds	7E+2	1E+3	5E-7	2E-9	1E-5	1E-4
55	Cesium-136	D, all compounds	4E+2	7E+2	3E-7	9E-10	6E-6	6E-5
55	Cesium-137	D, all compounds	1E+2	2E+2	6E-8	2E-10	1E-6	1E-5
55	Cesium-138[2]	D, all compounds	2E+4	6E+4	2E-5	8E-8	-	-
			St. wall (3E+4)	-	-	-	4E-4	4E-3
56	Barium-126[2]	D, all compounds	6E+3	2E+4	6E-6	2E-8	8E-5	8E-4
56	Barium-128	D, all compounds	5E+2	2E+3	7E-7	2E-9	7E-6	7E-5
56	Barium-131m[2]	D, all compounds	4E+5	1E+6	6E-4	2E-6	-	-
			St. wall (5E+5)	-	-	-	7E-3	7E-2
56	Barium-131	D, all compounds	3E+3	8E+3	3E-6	1E-8	4E-5	4E-4
56	Barium-133m	D, all compounds	2E+3	9E+3	4E-6	1E-8	-	-
			LLI wall (3E+3)	-	-	-	4E-5	4E-4
56	Barium-133	D, all compounds	2E+3	7E+2	3E-7	9E-10	2E-5	2E-4
56	Barium-135m	D, all compounds	3E+3	1E+4	5E-6	2E-8	4E-5	4E-4
56	Barium-139[2]	D, all compounds	1E+4	3E+4	1E-5	4E-8	2E-4	2E-3
56	Barium-140	D, all compounds	5E+2	1E+3	6E-7	2E-9	-	-
			LLI wall (6E+2)	-	-	-	8E-6	8E-5
56	Barium-141[2]	D, all compounds	2E+4	7E+4	3E-5	1E-7	3E-4	3E-3
56	Barium-142[2]	D, all compounds	5E+4	1E+5	6E-5	2E-7	7E-4	7E-3
57	Lanthanum-131[2]	D, all compounds except those given for W	5E+4	1E+5	5E-5	2E-7	6E-4	6E-3
		W, oxides and hydroxides	-	2E+5	7E-5	2E-7	-	-
57	Lanthanum-132	D, see ^{131}La	3E+3	1E+4	4E-6	1E-8	4E-5	4E-4
		W, see ^{131}La	-	1E+4	5E-6	2E-8	-	-
57	Lanthanum-135	D, see ^{131}La	4E+4	1E+5	4E-5	1E-7	5E-4	5E-3
		W, see ^{131}La	-	9E+4	4E-5	1E-7	-	-
57	Lanthanum-137	D, see ^{131}La	1E+4	6E+1	3E-8	-	2E-4	2E-3
			-	Liver (7E+1)	-	1E-10	-	-
		W, see ^{131}La	-	3E+2 Liver	1E-7	-	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
			-	(3E+2)	-	4E-10	-	-
57	Lanthanum-138	D, see ^{131}La	9E+2	4E+0	1E-9	5E-12	1E-5	1E-4
		W, see ^{131}La	-	1E+1	6E-9	2E-11	-	-
57	Lanthanum-140	D, see ^{131}La	6E+2	1E+3	6E-7	2E-9	9E-6	9E-5
		W, see ^{131}La	-	1E+3	5E-7	2E-9	-	-
57	Lanthanum-141	D, see ^{131}La	4E+3	9E+3	4E-6	1E-8	5E-5	5E-4
		W, see ^{131}La	-	1E+4	5E-6	2E-8	-	-
57	Lanthanum-142[2]	D, see ^{131}La	8E+3	2E+4	9E-6	3E-8	1E-4	1E-3
		W, see ^{131}La	-	3E+4	1E-5	5E-8	-	-
57	Lanthanum-143[2]	D, see ^{131}La	4E+4	1E+5	4E-5	1E-7	-	-
			St. wall (4E+4)	-	-	-	5E-4	5E-3
		W, see ^{131}La	-	9E+4	4E-5	1E-7	-	-
58	Cerium-134	W, all compounds except those given for Y	5E+2	7E+2	3E-7	1E-9	-	-
			LLI wall (6E+2)	-	-	-	8E-6	8E-5
		Y, oxides, hydroxides, and fluorides	-	7E+2	3E-7	9E-10	-	-
58	Cerium-135	W, see ^{134}Ce	2E+3	4E+3	2E-6	5E-9	2E-5	2E-4
		Y, see ^{134}Ce	-	4E+3	1E-6	5E-9	-	-
58	Cerium-137m	W, see ^{134}Ce	2E+3	4E+3	2E-6	6E-9	-	-
			LLI wall (2E+3)	-	-	-	3E-5	3E-4
		Y, see ^{134}Ce	-	4E+3	2E-6	5E-9	-	-
58	Cerium-137	W, see ^{134}Ce	5E+4	1E+5	6E-5	2E-7	7E-4	7E-3
		Y, see ^{134}Ce	-	1E+5	5E-5	2E-7	-	-
58	Cerium-139	W, see ^{134}Ce	5E+3	8E+2	3E-7	1E-9	7E-5	7E-4
		Y, see ^{134}Ce	-	7E+2	3E-7	9E-10	-,-	
58	Cerium-141	W, see ^{134}Ce	2E+3	7E+2	3E-7	1E-9	-	-
			LLI wall (2E+3)	-	-	-	3E-5	3E-4
		Y, see ^{134}Ce	-	6E+2	2E-7	8E-10	-	-
58	Cerium-143	W, see ^{134}Ce	1E+3	2E+3	8E-7	3E-9	-	-
			LLI wall (1E+3)	-	-	-	2E-5	2E-4

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
		Y, see ^{134}Ce	-	2E+3	7E-7	2E-9	-	-
58	Cerium-144	W, see ^{134}Ce	2E+2	3E+1	1E-8	4E-11	-	-
			LLI wall (3E+2)	-	-	-	3E-6	3E-5
		Y, see ^{134}Ce	-	1E+1	6E-9	2E-11	-	-
59	Praseodymium-136[2]	W, all compounds except those given for Y	5E+4	2E+5	1E-4	3E-7	-	-
			St. wall (7E+4)	-	-	-	1E-3	1E-2
		Y, oxides, hydroxides, carbides, and fluorides	-	2E+5	9E-5	3E-7	-	-
59	Praseodymium-137[2]	W, see ^{136}Pr	4E+4	2E+5	6E-5	2E-7	5E-4	5E-3
		Y, see ^{136}Pr	-	1E+5	6E-5	2E-7	-	-
59	Praseodymium-138m	W, see ^{136}Pr	1E+4	5E+4	2E-5	8E-8	1E-4	1E-3
		Y, see ^{136}Pr	-	4E+4	2E-5	6E-8	-	-
59	Praseodymium-139	W, see ^{136}Pr	4E+4	1E+5	5E-5	2E-7	6E-4	6E-3
		Y, see ^{136}Pr	-	1E+5	5E-5	2E-7	-	-
59	Praseodymium-142m[2]	W, see ^{136}Pr	8E+4	2E+5	7E-5	2E-7	1E-3	1E-2
		Y, see ^{136}Pr	-	1E+5	6E-5	2E-7	-	-
59	Praseodymium-142	W, see ^{136}Pr	1E+3	2E+3	9E-7	3E-9	1E-5	1E-4
		Y, see ^{136}Pr	-	2E+3	8E-7	3E-9	-	-
59	Praseodymium-143	W, see ^{136}Pr	9E+2	8E+2	3E-7	1E-9	-	-
			LLI wall (1E+3)	-	-	-	2E-5	2E-4
		Y, see ^{136}Pr	-	7E+2	3E-7	9E-10	-	-
59	Praseodymium-144[2]	W, see ^{136}Pr	3E+4	1E+5	5E-5	2E-7	-	-
			St. wall (4E+4)	-	-	-	6E-4	6E-3
		Y, see ^{136}Pr	-	1E+5	5E-5	2E-7	-	-
59	Praseodymium-145	W, see ^{136}Pr	3E+3	9E+3	4E-6	1E-8	4E-5	4E-4
		Y, see ^{136}Pr	-	8E+3	3E-6	1E-8	-	-
59	Praseodymium-147[2]	W, see ^{136}Pr	5E+4	2E+5	8E-5	3E-7	-	-
			St. wall (8E+4)	-	-	-	1E-3	1E-2
		Y, see ^{136}Pr	-	2E+5	8E-5	3E-7	-	-
60	Neodymium-136[2]	W, all compounds except those given for Y	1E+4	6E+4	2E-5	8E-8	2E-4	2E-3

Atomic No.	Radionuclide	Class	Table 1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Col. 2 Inhalation ALI (µCi)	Col. 3 Inhalation DAC (µCi/ml)	Table 2 Effluent Concentrations Col. 1 Air (µCi/ml)	Col. 2 Water (µCi/ml)	Table 3 Releases to Sewers Monthly Average Concentration (µCi/ml)
		Y, oxides, hydroxides, carbides, and fluorides	-	5E+4	2E-5	8E-8	-	-
60	Neodymium-138	W, see ^{136}Nd	2E+3	6E+3	3E-6	9E-9	3E-5	3E-4
		Y, see ^{136}Nd	-	5E+3	2E-6	7E-9	-	-
60	Neodymium-139m	W, see ^{136}Nd	5E+3	2E+4	7E-6	2E-8	7E-5	7E-4
		Y, see ^{136}Nd	-	1E+4	6E-6	2E-8	-	-
60	Neodymium-139[2]	W, see ^{136}Nd	9E+4	3E+5	1E-4	5E-7	1E-3	1E-2
		Y, see ^{136}Nd	-	3E+5	1E-4	4E-7	-	-
60	Neodymium-141	W, see ^{136}Nd	2E+5	7E-5	3E-4	1E-6	2E-3	2E-2
		Y, see ^{136}Nd	-	6E+5	3E-4	9E-7	-	-
60	Neodymium-147	W, see ^{136}Nd	1E+3	9E+2	4E-7	1E-9	-	-
			LLI wall (1E+3)	-	-	-	2E-5	2E-4
		Y, see ^{136}Nd	-	8E+2	4E-7	1E-9	-	-
60	Neodymium-149[2]	W, see ^{136}Nd	1E+4	3E+4	1E-5	4E-8	1E-4	1E-3
		Y, see ^{136}Nd	-	2E+4	1E-5	3E-8	-	-
60	Neodymium-151[2]	W, see ^{136}Nd	7E+4	2E+5	8E-5	3E-7	9E-4	9E-3
		Y, see ^{136}Nd	-	2E+5	8E-5	3E-7	-	-
61	Promethium-141[2]	W, all compounds except those given for Y	5E+4	2E+5	8E-5	3E-7	-	-
			St. wall (6E+4)	-	-	-	8E-4	8E-3
		Y, oxides, hydroxides, carbides, and fluorides	-	2E+5	7E-5	2E-7	-	-
61	Promethium-143	W, see ^{141}Pm	5E+3	6E+2	2E-7	8E-10	7E-5	7E-4
		Y, see ^{141}Pm	-	7E+2	3E-7	1E-9	-	-
61	Promethium-144	W, see ^{141}Pm	1E+3	1E+2	5E-8	2E-10	2E-5	2E-4
		Y, see ^{141}Pm	-	1E+2	5E-8	2E-10	-	-
61	Promethium-145	W, see ^{141}Pm	1E+4	2E+2	7E-8	-	1E-4	1E-3
			-	Bone surf (2E+2)	-	3E-10	-	-
		Y, see ^{141}Pm	-	2E+2	8E-8	3E-10	-	-
61	Promethium-146	W, see ^{141}Pm	2E+3	5E+1	2E-8	7E-11	2E-5	2E-4
		Y, see ^{141}Pm	-	4E+1	2E-8	6E-11	-	-
61	Promethium-147	W, see ^{141}Pm	4E+3	1E+2	5E-8	-	-	-
			LLI wall (5E+3)	Bone surf (2E+2)	-	3E-10	7E-5	7E-4

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1 Oral Ingestion	Col. 2 Inhalation	Col. 3 Inhalation	Col. 1	Col. 2	Monthly Average
			ALI (μCi)	ALI (μCi)	DAC (μCi/ml)	Air (μCi/ml)	Water (μCi/ml)	Concentration (μCi/ml)
		Y, see ^{141}Pm	-	1E+2	6E-8	2E-10	-	-
61	Promethium-148m	W, see ^{141}Pm	7E+2	3E+2	1E-7	4E-10	1E-5	1E-4
		Y, see ^{141}Pm	-	3E+2	1E-7	5E-10	-	-
61	Promethium-148	W, see ^{141}Pm	4E+2	5E+2	2E-7	8E-10	-	-
			LLI wall (5E+2)	-	-	-	7E-6	7E-5
		Y, see ^{141}Pm	-	5E+2	2E-7	7E-10	-	-
61	Promethium-149	W, see ^{141}Pm	1E+3	2E+3	8E-7	3E-9	-	-
			LLI wall (1E+3)	-	-	-	2E-5	2E-4
		Y, see ^{141}Pm	-	2E+3	8E-7	2E-9	-	-
61	Promethium-150	W, see ^{141}Pm	5E+3	2E+4	8E-6	3E-8	7E-5	7E-4
		Y, see ^{141}Pm	-	2E+4	7E-6	2E-8	-	-
61	Promethium-151	W, see ^{141}Pm	2E+3	4E+3	1E-6	5E-9	2E-5	2E-4
		Y, see ^{141}Pm	-	3E+3	1E-6	4E-9	-	-
62	Samarium-141m[2]	W, all compounds	3E+4	1E+5	4E-5	1E-7	4E-4	4E-3
62	Samarium-141[2]	W, all compounds	5E+4	2E+5	8E-5	2E-7	-	-
			St. wall (6E+4)	-	-	-	8E-4	8E-3
62	Samarium-142[2]	W, all compounds	8E+3	3E+4	1E-5	4E-8	1E-4	1E-3
62	Samarium-145	W, all compounds	6E+3	5E+2	2E-7	7E-10	8E-5	8E-4
62	Samarium-146	W, all compounds	1E+1	4E-2	1E-11	-	-	-
			Bone surf (3E+1)	Bone surf (6E-2)	-	9E-14	3E-7	3E-6
62	Samarium-147	W, all compounds	2E+1	4E-2	2E-11	-	-	-
			Bone surf (3E+1)	Bone surf (7E-2)	-	1E-13	4E-7	4E-6
62	Samarium-151	W, all compounds	1E+4	1E+2	4E-8	-	-	-
			LLI wall (1E+4)	Bone surf (2E+2)	-	2E-10	2E-4	2E-3
62	Samarium-153	W, all compounds	2E+3	3E+3	1E-6	4E-9	-	-
			LLI wall (2E+3)	-	-	-	3E-5	3E-4
62	Samarium-155[2]	W, all compounds	6E+4	2E+5	9E-5	3E-7	-	-
			St. wall					

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1 Oral Ingestion	Col. 2 Inhalation	Col. 3 Inhalation	Col. 1	Col. 2	Monthly Average
			ALI (μCi)	ALI (μCi)	DAC (μCi/ml)	Air (μCi/ml)	Water (μCi/ml)	Concentration (μCi/ml)
			(8E+4)	-	-	-	1E-3	1E-2
62	Samarium-156	W, all compounds	5E+3	9E+3	4E-6	1E-8	7E-5	7E-4
63	Europium-145	W, all compounds	2E+3	2E+3	8E-7	3E-9	2E-5	2E-4
63	Europium-146	W, all compounds	1E+3	1E+3	5E-7	2E-9	1E-5	1E-4
63	Europium-147	W, all compounds	3E+3	2E+3	7E-7	2E-9	4E-5	4E-4
63	Europium-148	W, all compounds	1E+3	4E+2	1E-7	5E-10	1E-5	1E-4
63	Europium-149	W, all compounds	1E+4	3E+3	1E-6	4E-9	2E-4	2E-3
63	Europium-150 (12.62 h)	W, all compounds	3E+3	8E+3	4E-6	1E-8	4E-5	4E-4
63	Europium-150 (34.2 y)	W, all compounds	8E+2	2E+1	8E-9	3E-11	1E-5	1E-4
63	Europium-152m	W, all compounds	3E+3	6E+3	3E-6	9E-9	4E-5	4E-4
63	Europium-152	W, all compounds	8E+2	2E+1	1E-8	3E-11	1E-5	1E-4
63	Europium-154	W, all compounds	5E+2	2E+1	8E-9	3E-11	7E-6	7E-5
63	Europium-155	W, all compounds	4E+3	9E+1	4E-8	-	5E-5	5E-4
			-	Bone surf (1E+2)	-	2E-10	-	-
63	Europium-156	W, all compounds	6E+2	5E+2	2E-7	6E-10	8E-6	8E-5
63	Europium-157	W, all compounds	2E+3	5E+3	2E-6	7E-9	3E-5	3E-4
63	Europium-158[2]	W, all compounds	2E+4	6E+4	2E-5	8E-8	3E-4	3E-3
64	Gadolinium-145[2]	D, all compounds except those given for W	5E+4	2E+5	6E-5	2E-7	-	-
			St. wall (5E+4)	-	-	-	6E-4	6E-3
		W, oxides, hydroxides, and fluorides	-	2E+5	7E-5	2E-7	-	-
64	Gadolinium-146	D, see ^{145}Gd	1E+3	1E+2	5E-8	2E-10	2E-5	2E-4
		W, see ^{145}Gd	-	3E+2	1E-7	4E-10	-	-
64	Gadolinium-147	D, see ^{145}Gd	2E+3	4E+3	2E-6	6E-9	3E-5	3E-4
		W, see ^{145}Gd	-	4E+3	1E-6	5E-9	-	-
64	Gadolinium-148	D, see ^{145}Gd	1E+1	8E-3	3E-12	-	-	-
			Bone surf (2E+1)	Bone surf (2E-2)	-	2E-14	3E-7	3E-6
		W, see ^{145}Gd	-	3E-2	1E-11	-	-	-
			-	Bone surf (6E-2)	-	8E-14	-	-
64	Gadolinium-149	D, see ^{145}Gd	3E+3	2E+3	9E-7	3E-9	4E-5	4E-4
		W, see ^{145}Gd	-	2E+3	1E-6	3E-9	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
64	Gadolinium-151	D, see ^{145}Gd	6E+3	4E+2	2E-7	-	9E-5	9E-4
				Bone surf				
			-	(6E+2)	-	9E-10	-	-
		W, see ^{145}Gd	-	1E+3	5E-7	2E-9	-	-
64	Gadolinium-152	D, see ^{145}Gd	2E+1	1E-2	4E-12	-	-	-
			Bone surf	Bone surf				
			(3E+1)	(2E-2)	-	3E-14	4E-7	4E-6
		W, see ^{145}Gd	-	4E-2	2E-11	-	-	-
				Bone surf				
			-	(8E-2)	-	1E-13	-	-
64	Gadolinium-153	D, see ^{145}Gd	5E+3	1E+2	6E-8	-	6E-5	6E-4
				Bone surf				
			-	(2E+2)	-	3E-10	-	-
		W, see ^{145}Gd	-	6E+2	2E-7	8E-10	-	-
64	Gadolinium-159	D, see ^{145}Gd	3E+3	8E+3	3E-6	1E-8	4E-5	4E-4
		W, see ^{145}Gd	-	6E+3	2E-6	8E-9	-	-
65	Terbium-147[2]	W, all compounds	9E+3	3E+4	1E-5	5E-8	1E-4	1E-3
65	Terbium-149	W, all compounds	5E+3	7E+2	3E-7	1E-9	7E-5	7E-4
65	Terbium-150	W, all compounds	5E+3	2E+4	9E-6	3E-8	7E-5	7E-4
65	Terbium-151	W, all compounds	4E+3	9E+3	4E-6	1E-8	5E-5	5E-4
65	Terbium-153	W, all compounds	5E+3	7E+3	3E-6	1E-8	7E-5	7E-4
65	Terbium-154	W, all compounds	2E+3	4E+3	2E-6	6E-9	2E-5	2E-4
65	Terbium-155	W, all compounds	6E+3	8E+3	3E-6	1E-8	8E-5	8E-4
65	Terbium-156m (5.0 h)	W, all compounds	2E+4	3E+4	1E-5	4E-8	2E-4	2E-3
65	Terbium-156m (24.4 h)	W, all compounds	7E+3	8E+3	3E-6	1E-8	1E-4	1E-3
65	Terbium-156	W, all compounds	1E+3	1E+3	6E-7	2E-9	1E-5	1E-4
65	Terbium-157	W, all compounds	5E+4	3E+2	1E-7	-	-	-
			LLI wall	Bone surf				
			(5E+4)	(6E+2)	-	8E-10	7E-4	7E-3
65	Terbium-158	W, all compounds	1E+3	2E+1	8E-9	3E-11	2E-5	2E-4
65	Terbium-160	W, all compounds	8E+2	2E+2	9E-8	3E-10	1E-5	1E-4
65	Terbium-161	W, all compounds	2E+3	2E+3	7E-7	2E-9	-	-
			LLI wall					

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
			(2E+3)	-	-	-	3E-5	3E-4
66	Dysprosium-155	W, all compounds	9E+3	3E+4	1E-5	4E-8	1E-4	1E-3
66	Dysprosium-157	W, all compounds	2E+4	6E+4	3E-5	9E-8	3E-4	3E-3
66	Dysprosium-159	W, all compounds	1E+4	2E+3	1E-6	3E-9	2E-4	2E-3
66	Dysprosium-165	W, all compounds	1E+4	5E+4	2E-5	6E-8	2E-4	2E-3
66	Dysprosium-166	W, all compounds	6E+2	7E+2	3E-7	1E-9	-	-
			LLI wall					
			(8E+2)	-	-	-	1E-5	1E-4
67	Holmium-155[2]	W, all compounds	4E+4	2E+5	6E-5	2E-7	6E-4	6E-3
67	Holmium-157[2]	W, all compounds	3E+5	1E+6	6E-4	2E-6	4E-3	4E-2
67	Holmium-159[2]	W, all compounds	2E+5	1E+6	4E-4	1E-6	3E-3	3E-2
67	Holmium-161	W, all compounds	1E+5	4E+5	2E-4	6E-7	1E-3	1E-2
67	Holmium-162m[2]	W, all compounds	5E+4	3E+5	1E-4	4E-7	7E-4	7E-3
67	Holmium-162[2]	W, all compounds	5E+5	2E+6	1E-3	3E-6	-	-
			St. wall					
			(8E+5)	-	-	-	1E-2	1E-1
67	Holmium-164m[2]	W, all compounds	1E+5	3E+5	1E-4	4E-7	1E-3	1E-2
67	Holmium-164[2]	W, all compounds	2E+5	6E+5	3E-4	9E-7	-	-
			St. wall					
			(2E+5)	-	-	-	3E-3	3E-2
67	Holmium-166m	W, all compounds	6E+2	7E+0	3E-9	9E-12	9E-6	9E-5
67	Holmium-166	W, all compounds	9E+2	2E+3	7E-7	2E-9	-	-
			LLI wall					
			(9E+2)	-	-	-	1E-5	1E-4
67	Holmium-167	W, all compounds	2E+4	6E+4	2E-5	8E-8	2E-4	2E-3
68	Erbium-161	W, all compounds	2E+4	6E+4	3E-5	9E-8	2E-4	2E-3
68	Erbium-165	W, all compounds	6E+4	2E+5	8E-5	3E-7	9E-4	9E-3
68	Erbium-169	W, all compounds	3E+3	3E+3	1E-6	4E-9	-	-
			LLI wall					
			(4E+3)	-	-	-	5E-5	5E-4
68	Erbium-171	W, all compounds	4E+3	1E+4	4E-6	1E-8	5E-5	5E-4
68	Erbium-172	W, all compounds	1E+3	1E+3	6E-7	2E-9	-	-
			LLI wall					
			(1E+3)	-	-	-	2E-5	2E-4

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1 Oral Ingestion	Col. 2 Inhalation	Col. 3 Inhalation	Col. 1	Col. 2	Monthly Average
			ALI (μCi)	ALI (μCi)	DAC (μCi/ml)	Air (μCi/ml)	Water (μCi/ml)	Concentration (μCi/ml)
69	Thulium-162[2]	W, all compounds	7E+4	3E+5	1E-4	4E-7	-	-
			St. wall (7E+4)	-	-	-	1E-3	1E-2
69	Thulium-166[2]	W, all compounds	4E+3	1E+4	6E-6	2E-8	6E-5	6E-4
69	Thulium-167	W, all compounds	2E+3	2E+3	8E-7	3E-9	-	-
			LLI wall (2E+3)	-	-	-	3E-5	3E-4
69	Thulium-170	W, all compounds	8E+2	2E+2	9E-8	3E-10	-	-
			LLI wall (1E+3)	-	-	-	1E-5	1E-4
69	Thulium-171	W, all compounds	1E+4	3E+2	1E-7	-	-	-
			LLI wall (1E+4)	Bone surf (6E+2)	-	8E-10	2E-4	2E-3
69	Thulium-172	W, all compounds	7E+2	1E+3	5E-7	2E-9	-	-
			LLI wall (8E+2)	-	-	-	1E-5	1E-4
69	Thulium-173	W, all compounds	4E+3	1E+4	5E-6	2E-8	6E-5	6E-4
69	Thulium-175[2]	W, all compounds	7E+4	3E+5	1E-4	4E-7	-	-
			St. wall (9E+4)	-	-	-	1E-3	1E-2
70	Ytterbium-162[2]	W, all compounds except those given for Y	7E+4	3E+5	1E-4	4E-7	1E-3	1E-2
		Y, oxides, hydroxides, and fluorides	-	3E+5	1E-4	4E-7	-	-
70	Ytterbium-166	W, see ^{162}Yb	1E+3	2E+3	8E-7	3E-9	2E-5	2E-4
		Y, see ^{162}Yb	-	2E+3	8E-7	3E-9	-	-
70	Ytterbium-167[2]	W, see ^{162}Yb	3E+5	8E+5	3E-4	1E-6	4E-3	4E-2
		Y, see ^{162}Yb	-	7E+5	3E-4	1E-6	-	-
70	Ytterbium-169	W, see ^{162}Yb	2E+3	8E+2	4E-7	1E-9	2E-5	2E-4
		Y, see ^{162}Yb	-	7E+2	3E-7	1E-9	-	-
70	Ytterbium-175	W, see ^{162}Yb	3E+3	4E+3	1E-6	5E-9	-	-
			LLI wall (3E+3)	-	-	-	4E-5	4E-4
		Y, see ^{162}Yb	-	3E+3	1E-6	5E-9	-	-
70	Ytterbium-177[2]	W, see ^{162}Yb	2E+4	5E+4	2E-5	7E-8	2E-4	2E-3
		Y, see ^{162}Yb	-	5E+4	2E-5	6E-8	-	-
70	Ytterbium-178[2]	W, see ^{162}Yb	1E+4	4E+4	2E-5	6E-8	2E-4	2E-3

Atomic No.	Radionuclide	Class	Table 1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Col. 2 Inhalation ALI (µCi)	Col. 3 Inhalation DAC (µCi/ml)	Table 2 Effluent Concentrations Col. 1 Air (µCi/ml)	Col. 2 Water (µCi/ml)	Table 3 Releases to Sewers Monthly Average Concentration (µCi/ml)
		Y, see ^{162}Yb	-	4E+4	2E-5	5E-8	-	-
71	Lutetium-169	W, all compounds except those given for Y	3E+3	4E+3	2E-6	6E-9	3E-5	3E-4
		Y, oxides, hydroxides, and fluorides	-	4E+3	2E-6	6E-9	-	-
71	Lutetium-170	W, see ^{169}Lu	1E+3	2E-3	9E-7	3E-9	2E-5	2E-4
		Y, see ^{169}Lu	-	2E+3	8E-7	3E-9	-	-
71	Lutetium-171	W, see ^{169}Lu	2E+3	2E+3	8E-7	3E-9	3E-5	3E-4
		Y, see ^{169}Lu	-	2E+3	8E-7	3E-9	-	-
71	Lutetium-172	W, see ^{169}Lu	1E+3	1E+3	5E-7	2E-9	1E-5	1E-4
		Y, see ^{169}Lu	-	1E+3	5E-7	2E-9	-	-
71	Lutetium-173	W, see ^{169}Lu	5E+3	3E+2	1E-7	-	7E-5	7E-4
			-	Bone Surf (5E+2)	-	6E-10	-	-
		Y, see ^{169}Lu	-	3E+2	1E-7	4E-10	-	-
71	Lutetium-174m	W, see ^{169}Lu	2E+3	2E+2	1E-7	-	-	-
			LLI wall (3E+3)	Bone surf (3E+2)	-	5E-10	4E-5	4E-4
		Y, see ^{169}Lu	-	2E+2	9E-8	3E-10	-	-
71	Lutetium-174	W, see ^{169}Lu	5E+3	1E+2	5E-8	-	7E-5	7E-4
			-	Bone surf (2E+2)	-	3E-10	-	-
		Y, see ^{169}Lu	-	2E+2	6E-8	2E-10	-	-
71	Lutetium-176m	W, see ^{169}Lu	8E+3	3E+4	1E-5	3E-8	1E-4	1E-3
		Y, see ^{169}Lu	-	2E+4	9E-6	3E-8	-	-
71	Lutetium-176	W, see ^{169}Lu	7E+2	5E+0	2E-9	-	1E-5	1E-4
			-	Bone surf (1E+1)	-	2E-11	-	-
		Y, see ^{169}Lu	-	8E+0	3E-9	1E-11	-	-
71	Lutetium-177m	W, see ^{169}Lu	7E+2	1E+2	5E-8	-	1E-5	1E-4
			-	Bone surf (1E+2)	-	2E-10	-	-
		Y, see ^{169}Lu	-	8E+1	3E-8	1E-10	-	-
71	Lutetium-177	W, see ^{169}Lu	2E+3	2E+3	9E-7	3E-9	-	-
			LLI wall (3E+3)	-	-	-	4E-5	4E-4
		Y, see ^{169}Lu	-	2E+3	9E-7	3E-9	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1 Oral Ingestion	Col. 2 Inhalation	Col. 3 Inhalation	Col. 1	Col. 2	Monthly Average
			ALI (μCi)	ALI (μCi)	DAC (μCi/ml)	Air (μCi/ml)	Water (μCi/ml)	Concentration (μCi/ml)
71	Lutetium-178m[2]	W, see ^{169}Lu	5E+4	2E+5	8E-5	3E-7	-	-
			St. wall (6E+4)	-	-	-	8E-4	8E-3
		Y, see ^{169}Lu	-	2E+5	7E-5	2E-7	-	-
71	Lutetium-178[2]	W, see ^{169}Lu	4E+4	1E+5	5E-5	2E-7	-	-
			St. wall (4E+4)	-	-	-	6E-4	6E-3
		Y, see ^{169}Lu	-	1E+5	5E-5	2E-7	-	-
71	Lutetium-179	W, see ^{169}Lu	6E+3	2E+4	8E-6	3E-8	9E-5	9E-4
		Y, see ^{169}Lu	-	2E+4	6E-6	3E-8	-	-
72	Hafnium-170	D, all compounds except those given for W	3E+3	6E+3	2E-6	8E-9	4E-5	4E-4
		W, oxides, hydroxides, carbides, and nitrates	-	5E+3	2E-6	6E-9	-	-
72	Hafnium-172	D, see ^{170}Hf	1E+3	9E+0	4E-9	-	2E-5	2E-4
			-	Bone surf (2E+1)	-	3E-11	-	-
		W, see ^{170}Hf	-	4E+1	2E-8	-	-	-
			-	Bone surf (6E+1)	-	8E-11	-	-
72	Hafnium-173	D, see ^{170}Hf	5E+3	1E+4	5E-6	2E-8	7E-5	7E-4
		W, see ^{170}Hf	-	1E+4	5E-6	2E-8	-	-
72	Hafnium-175	D, see ^{170}Hf	3E+3	9E+2	4E-7	-	4E-5	4E-4
			-	Bone surf (1E+3)	-	1E-9	-	-
		W, see ^{170}Hf	-	1E+3	5E-7	2E-9	-	-
72	Hafnium-177m[2]	D, see ^{170}Hf	2E+4	6E+4	2E-5	8E-8	3E-4	3E-3
		W, see ^{170}Hf	-	9E+4	4E-5	1E-7	-	-
72	Hafnium-178m	D, see ^{170}Hf	3E+2	1E+0	5E-10	-	3E-6	3E-5
			-	Bone surf (2E+0)	-	3E-12	-	-
		W, see ^{170}Hf	-	5E+0	2E-9	-	-	-
			-	Bone surf (9E+0)	-	1E-11	-	-
72	Hafnium-179m	D, see ^{170}Hf	1E+3	3E+2	1E-7	-	1E-5	1E-4
			-	Bone surf (6E+2)	-	8E-10	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
		W, see ^{170}Hf	-	6E+2	3E-7	8E-10	-	-
72	Hafnium-180m	D, see ^{170}Hf	7E+3	2E+4	9E-6	3E-8	1E-4	1E-3
		W, see ^{170}Hf	-	3E+4	1E-5	4E-8	-	-
72	Hafnium-181	D, see ^{170}Hf	1E+3	2E+2	7E-8	-	2E-5	2E-4
			-	Bone surf (4E+2)	-	6E-10	-	-
		W, see ^{170}Hf	-	4E+2	2E-7	6E-10	-	-
72	Hafnium-182m[2]	D, see ^{170}Hf	4E+4	9E+4	4E-5	1E-7	5E-4	5E-3
		W, see ^{170}Hf	-	1E+5	6E-5	2E-7	-	-
72	Hafnium-182	D, see ^{170}Hf	2E+2	8E+1	3E-10	-	-	-
			Bone surf (4E+2)	Bone surf (2E+0)	-	2E-12	5E-6	5E-5
		W, see ^{170}Hf	-	3E+0	1E-9	-	-	-
			-	Bone surf (7E+0)	-	1E-11	-	-
72	Hafnium-183[2]	D, see ^{170}Hf	2E+4	5E+4	2E-5	6E-8	3E-4	3E-3
		W, see ^{170}Hf	-	6E+4	2E-5	8E-8	-	-
72	Hafnium-184	D, see ^{170}Hf	2E+3	8E+3	3E-6	1E-8	3E-5	3E-4
		W, see ^{170}Hf	-	6E+3	3E-6	9E-9	-	-
73	Tantalum-172[2]	W, all compounds except those given for Y	4E+4	1E+5	5E-5	2E-7	5E-4	5E-3
		Y, elemental Ta, oxides, hydroxides, halides, carbides, nitrates, and nitrides	-	1E+5	4E-5	1E-7	-	-
73	Tantalum-173	W, see ^{172}Ta	7E+3	2E+4	8E-6	3E-8	9E-5	9E-4
		Y, see ^{172}Ta	-	2E+4	7E-6	2E-8	-	-
73	Tantalum-174[2]	W, see ^{172}Ta	3E+4	1E+5	4E-5	1E-7	4E-4	4E-3
		Y, see ^{172}Ta	-	9E+4	4E-5	1E-7	-	-
73	Tantalum-175	W, see ^{172}Ta	6E+3	2E+4	7E-6	2E-8	8E-5	8E-4
		Y, see ^{172}Ta	-	1E+4	6E-6	2E-8	-	-
73	Tantalum-176	W, see ^{172}Ta	4E+3	1E+4	5E-6	2E-8	5E-5	5E-4
		Y, see ^{172}Ta	-	1E+4	5E-6	2E-8	-	-
73	Tantalum-177	W, see ^{172}Ta	1E+4	2E+4	8E-6	3E-8	2E-4	2E-3
		Y, see ^{172}Ta	-	2E+4	7E-6	2E-8	-	-
73	Tantalum-178	W, see ^{172}Ta	2E+4	9E+4	4E-5	1E-7	2E-4	2E-3
		Y, see ^{172}Ta	-	7E+4	3E-5	1E-7	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
73	Tantalum-179	W, see ^{172}Ta	2E+4	5E+3	2E-6	8E-9	3E-4	3E-3
		Y, see ^{172}Ta	-	9E+2	4E-7	1E-9	-	-
73	Tantalum-180m	W, see ^{172}Ta	2E+4	7E+4	3E-5	9E-8	3E-4	3E-3
		Y, see ^{172}Ta	-	6E+4	2E-5	8E-8	-	-
73	Tantalum-180	W, see ^{172}Ta	1E+3	4E+2	2E-7	6E-10	2E-5	2E-4
		Y, see ^{172}Ta	-	2E+1	1E-8	3E-11	-	-
73	Tantalum-182m[2]	W, see ^{172}Ta	2E+5	5E+5	2E-4	8E-7	-	-
			St. wall (2E+5)	-	-	-	3E-3	3E-2
		Y, see ^{172}Ta	-	4E+5	2E-4	6E-7	-	-
73	Tantalum-182	W, see ^{172}Ta	8E+2	3E+2	1E-7	5E-10	1E-5	1E-4
		Y, see ^{172}Ta	-	1E+2	6E-8	2E-10	-	-
73	Tantalum-183	W, see ^{172}Ta	9E+2	1E+3	5E-7	2E-9	-	-
			LLI wall (1E+3)	-	-	-	2E-5	2E-4
		Y, see ^{172}Ta	-	1E+3	4E-7	1E-9	-	-
73	Tantalum-184	W, see ^{172}Ta	2E+3	5E+3	2E-6	8E-9	3E-5	3E-4
		Y, see ^{172}Ta	-	5E+3	2E-6	7E-9	-	-
73	Tantalum-185[2]	W, see ^{172}Ta	3E+4	7E+4	3E-5	1E-7	4E-4	4E-3
		Y, see ^{172}Ta	-	6E+4	3E-5	9E-8	-	-
73	Tantalum-186[2]	W, see ^{172}Ta	5E+4	2E+5	1E-4	3E-7	-	-
			St. wall (7E+4)	-	-	-	1E-3	1E-2
		Y, see ^{172}Ta	-	2E+5	9E-5	3E-7	-	-
74	Tungsten-176	D, all compounds	1E+4	5E+4	2E-5	7E-8	1E-4	1E-3
74	Tungsten-177	D, all compounds	2E+4	9E+4	4E-5	1E-7	3E-4	3E-3
74	Tungsten-178	D, all compounds	5E+3	2E+4	8E-6	3E-8	7E-5	7E-4
74	Tungsten-179[2]	D, all compounds	5E+5	2E+6	7E-4	2E-6	7E-3	7E-2
74	Tungsten-181	D, all compounds	2E+4	3E+4	1E-5	5E-8	2E-4	2E-3
74	Tungsten-185	D, all compounds	2E+3	7E+3	3E-6	9E-9	-	-
			LLI wall (3E+3)	-	-	-	4E-5	4E-4
74	Tungsten-187	D, all compounds	2E+3	9E+3	4E-6	1E-8	3E-5	3E-4

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
74	Tungsten-188	D, all compounds	4E+2	1E+3	5E-7	2E-9	-	-
			LLI wall (5E+2)	-	-	-	7E-6	7E-5
75	Rhenium-177[2]	D, all compounds except those given for W	9E+4	3E+5	1E-4	4E-7	-	-
			St. wall (1E+5)	-	-	-	2E-3	2E-2
		W, oxides, hydroxides, and nitrates	-	4E+5	1E-4	5E-7	-	-
75	Rhenium-178[2]	D, see ^{177}Re	7E+4	3E+5	1E-4	4E-7	-	-
			St. wall (1E+5)	-	-	-	1E-3	1E-2
		W, see ^{177}Re	-	3E+5	1E-4	4E-7	-	-
75	Rhenium-181	D, see ^{177}Re	5E+3	9E+3	4E-6	1E-8	7E-5	7E-4
		W, see ^{177}Re	-	9E+3	4E-6	1E-8	-	-
75	Rhenium-182 (12.7 h)	D, see ^{177}Re	7E+3	1E+4	5E-6	2E-8	9E-5	9E-4
		W, see ^{177}Re	-	2E+4	6E-6	2E-8	-	-
75	Rhenium-182 (60.4 h)	D, see ^{177}Re	1E+3	2E+3	1E-6	3E-9	2E-5	2E-4
		W, see ^{177}Re	-	2E+3	9E-7	3E-9	-	-
75	Rhenium-184m	D, see ^{177}Re	2E+3	3E+3	1E-6	4E-9	3E-5	3E-4
		W, see ^{177}Re	-	4E+2	2E-7	6E-10	-	-
75	Rhenium-184	D, see ^{177}Re	2E+3	4E+3	1E-6	5E-9	3E-5	3E-4
		W, see ^{177}Re	-	1E+3	6E-7	2E-9	-	-
75	Rhenium-186m	D, see ^{177}Re	1E+3	2E+3	7E-7	-	-	-
			St. wall (2E+3)	St. wall (2E+3)	-	3E-9	2E-5	2E-4
		W, see ^{177}Re	-	2E+2	6E-8	2E-10	-	-
75	Rhenium-186	D, see ^{177}Re	2E+3	3E+3	1E-6	4E-9	3E-5	3E-4
		W, see ^{177}Re	-	2E+3	7E-7	2E-9	-	-
75	Rhenium-187	D, see ^{177}Re	6E+5	8E+5	4E-4	-	8E-3	8E-2
			-	St. wall (9E+5)	-	1E-6	-	-
		W, see ^{177}Re	-	1E+5	4E-5	1E-7	-	-
75	Rhenium-188m[2]	D, see ^{177}Re	8E+4	1E+5	6E-5	2E-7	1E-3	1E-2
		W, see ^{177}Re	-	1E+5	6E-5	2E-7	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
75	Rhenium-188	D, see ^{177}Re	2E+3	3E+3	1E-6	4E-9	2E-5	2E-4
		W, see ^{177}Re	-	3E+3	1E-6	4E-9	-	-
75	Rhenium-189	D, see ^{177}Re	3E+3	5E+3	2E-6	7E-9	4E-5	4E-4
		W, see ^{177}Re	-	4E+3	2E-6	6E-9	-	-
76	Osmium-180[2]	D, all compounds except those given for W and Y	1E+5	4E+5	2E-4	5E-7	1E-3	1E-2
		W, halides and nitrates	-	5E+5	2E-4	7E-7	-	-
		Y, oxides and hydroxides	-	5E+5	2E-4	6E-7	-	-
76	Osmium-181[2]	D, see ^{180}Os	1E+4	4E+4	2E-5	6E-8	2E-4	2E-3
		W, see ^{180}Os	-	5E+4	2E-5	6E-8	-	-
		Y, see ^{180}Os	-	4E+4	2E-5	6E-8	-	-
76	Osmium-182	D, see ^{180}Os	2E+3	6E+3	2E-6	8E-9	3E-5	3E-4
		W, see ^{180}Os	-	4E+3	2E-6	6E-9	-	-
		Y, see ^{180}Os	-	4E+3	2E-6	6E-9	-	-
76	Osmium-185	D, see ^{180}Os	2E+3	5E+2	2E-7	7E-10	3E-5	3E-4
		W, see ^{180}Os	-	8E+2	3E-7	1E-9	-	-
		Y, see ^{180}Os	-	8E+2	3E-7	1E-9	-	-
76	Osmium-189m	D, see ^{180}Os	8E+4	2E+5	1E-4	3E-7	1E-3	1E-2
		W, see ^{180}Os	-	2E+5	9E-5	3E-7	-	-
		Y, see ^{180}Os	-	2E+5	7E-5	2E-7	-	-
76	Osmium-191m	D, see ^{180}Os	1E+4	3E+4	1E-5	4E-8	2E-4	2E-3
		W, see ^{180}Os	-	2E+4	8E-6	3E-8	-	-
		Y, see ^{180}Os	-	2E+4	7E-6	2E-8	-	-
76	Osmium-191	D, see ^{180}Os	2E+3	2E+3	9E-7	3E-9	-	-
			LLI wall					
			(3E+3)	-	-	-	3E-5	3E-4
		W, see ^{180}Os	-	2E+3	7E-7	2E-9	-	-
		Y, see ^{180}Os	-	1E+3	6E-7	2E-9	-	-
76	Osmium-193	D, see ^{180}Os	2E+3	5E+3	2E-6	6E-9	-	-
			LLI wall					
			(2E+3)	-	-	-	2E-5	2E-4
		W, see ^{180}Os	-	3E+3	1E-6	4E-9	-	-
		Y, see ^{180}Os	-	3E+3	1E-6	4E-9	-	-
76	Osmium-194	D, see ^{180}Os	4E+2	4E+1	2E-8	6E-11	-	-
			LLI wall					

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1 Oral Ingestion	Col. 2 Inhalation	Col. 3 Inhalation	Col. 1	Col. 2	Monthly Average
			ALI (μCi)	ALI (μCi)	DAC (μCi/ml)	Air (μCi/ml)	Water (μCi/ml)	Concentration (μCi/ml)
			(6E+2)	-	-	-	8E-6	8E-5
		W, see ^{180}Os	-	6E+1	2E-8	8E-11	-	-
		Y, see ^{180}Os	-	8E+0	3E-9	1E-11	-	-
77	Iridium-182[2]	D, all compounds except those given for W and Y	4E+4	1E+5	6E-5	2E-7	-	-
			St. wall (4E+4)	-	-	-	6E-4	6E-3
		W, halides, nitrates, and metallic iridium	-	2E+5	6E-5	2E-7	-	-
		Y, oxides and hydroxides	-	1E+5	5E-5	2E-7	-	-
77	Iridium-184	D, see ^{182}Ir	8E+3	2E+4	1E-5	3E-8	1E-4	1E-3
		W, see ^{182}Ir	-	3E+4	1E-5	5E-8	-	-
		Y, see ^{182}Ir	-	3E+4	1E-5	4E-8	-	-
77	Iridium-185	D, see ^{182}Ir	5E+3	1E+4	5E-6	2E-8	7E-5	7E-4
		W, see ^{182}Ir	-	1E+4	5E-6	2E-8	-	-
		Y, see ^{182}Ir	-	1E+4	4E-6	1E-8	-	-
77	Iridium-186	D, see ^{182}Ir	2E+3	8E+3	3E-6	1E-8	3E-5	3E-4
		W, see ^{182}Ir	-	6E+3	3E-6	9E-9	-	-
		Y, see ^{182}Ir	-	6E+3	2E-6	8E-9	-	-
77	Iridium-187	D, see ^{182}Ir	1E+4	3E+4	1E-5	5E-8	1E-4	1E-3
		W, see ^{182}Ir	-	3E+4	1E-5	4E-8	-	-
		Y, see ^{182}Ir	-	3E+4	1E-5	4E-8	-	-
77	Iridium-188	D, see ^{182}Ir	2E+3	5E+3	2E-6	6E-9	3E-5	3E-4
		W, see ^{182}Ir	-	4E+3	1E-6	5E-9	-	-
		Y, see ^{182}Ir	-	3E+3	1E-6	5E-9	-	-
77	Iridium-189	D, see ^{182}Ir	5E+3	5E+3	2E-6	7E-9	-	-
			LLI wall (5E+3)	-	-	-	7E-5	7E-4
		W, see ^{182}Ir	-	4E+3	2E-6	5E-9	-	-
		Y, see ^{182}Ir	-	4E+3	1E-6	5E-9	-	-
77	Iridium-190m[2]	D, see ^{182}Ir	2E+5	2E+5	8E-5	3E-7	2E-3	2E-2
		W, see ^{182}Ir	-	2E+5	9E-5	3E-7	-	-
		Y, see ^{182}Ir	-	2E+5	8E-5	3E-7	-	-
77	Iridium-190	D, see ^{182}Ir	1E+3	9E+2	4E-7	1E-9	1E-5	1E-4
		W, see ^{182}Ir	-	1E+3	4E-7	1E-9	-	-
		Y, see ^{182}Ir	-	9E+2	4E-7	1E-9	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
77	Iridium-192m	D, see ^{182}Ir	3E+3	9E+1	4E-8	1E-10	4E-5	4E-4
		W, see ^{182}Ir	-	2E+2	9E-8	3E-10	-	-
		Y, see ^{182}Ir	-	2E+1	6E-9	2E-11	-	-
77	Iridium-192	D, see ^{182}Ir	9E+2	3E+2	1E-7	4E-10	1E-5	1E-4
		W, see ^{182}Ir	-	4E+2	2E-7	6E-10	-	-
		Y, see ^{182}Ir	-	2E+2	9E-8	3E-10	-	-
77	Iridium-194m	D, see ^{182}Ir	6E+2	9E+1	4E-8	1E-10	9E-6	9E-5
		W, see ^{182}Ir	-	2E+2	7E-8	2E-10	-	-
		Y, see ^{182}Ir	-	1E+2	4E-8	1E-10	-	-
77	Iridium-194	D, see ^{182}Ir	1E+3	3E+3	1E-6	4E-9	1E-5	1E-4
		W, see ^{182}Ir	-	2E+3	9E-7	3E-9	-	-
		Y, see ^{182}Ir	-	2E+3	8E-7	3E-9	-	-
77	Iridium-195m	D, see ^{182}Ir	8E+3	2E+4	1E-5	3E-8	1E-4	1E-3
		W, see ^{182}Ir	-	3E+4	1E-5	4E-8	-	-
		Y, see ^{182}Ir	-	2E+4	9E-6	3E-8	-	-
77	Iridium-195	D, see ^{182}Ir	1E+4	4E+4	2E-5	6E-8	2E-4	2E-3
		W, see ^{182}Ir	-	5E+4	2E-5	7E-8	-	-
		Y, see ^{182}Ir	-	4E+4	2E-5	6E-8	-	-
78	Platinum-186	D, all compounds	1E+4	4E+4	2E-5	5E-8	2E-4	2E-3
78	Platinum-188	D, all compounds	2E+3	2E+3	7E-7	2E-9	2E-5	2E-4
78	Platinum-189	D, all compounds	1E+4	3E+4	1E-5	4E-8	1E-4	1E-3
78	Platinum-191	D, all compounds	4E+3	8E+3	4E-6	1E-8	5E-5	5E-4
78	Platinum-193m	D, all compounds	3E+3	6E+3	3E-6	8E-9	-	-
			LLI wall (3E+4)	-	-	-	4E-5	4E-4
78	Platinum-193	D, all compounds	4E+4	2E+4	1E-5	3E-8	-	-
			LLI wall (5E+4)	-	-	-	6E-4	6E-3
78	Platinum-195m	D, all compounds	2E+3	4E+3	2E-6	6E-9	-	-
			LLI wall (2E+3)	-	-	-	3E-5	3E-4
78	Platinum-197m[2]	D, all compounds	2E+4	4E+4	2E-5	6E-8	2E-4	2E-3
78	Platinum-197	D, all compounds	3E+3	1E+4	4E-6	1E-8	4E-5	4E-4
78	Platinum-199[2]	D, all compounds	5E+4	1E+5	6E-5	2E-7	7E-4	7E-3

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1 Oral Ingestion	Col. 2 Inhalation	Col. 3 Inhalation	Col. 1	Col. 2	Monthly Average
			ALI (μCi)	ALI (μCi)	DAC (μCi/ml)	Air (μCi/ml)	Water (μCi/ml)	Concentration (μCi/ml)
78	Platinum-200	D, all compounds	1E+3	3E+3	1E-6	5E-9	2E-5	2E-4
79	Gold-193	D, all compounds except those given for W and Y	9E+3	3E+4	1E-5	4E-8	1E-4	1E-3
		W, halides and nitrates	-	2E+4	9E-6	3E-8	-	-
		Y, oxides and hydroxides	-	2E+4	8E-6	3E-8	-	-
79	Gold-194	D, see ^{193}Au	3E+3	8E+3	3E-6	1E-8	4E-5	4E-4
		W, see ^{193}Au	-	5E+3	2E-6	8E-9	-	-
		Y, see ^{193}Au	-	5E+3	2E-6	7E-9	-	-
79	Gold-195	D, see ^{193}Au	5E+3	1E+4	5E-6	2E-8	7E-5	7E-4
		W, see ^{193}Au	-	1E+3	6E-7	2E-9	-	-
		Y, see ^{193}Au	-	4E+2	2E-7	6E-10	-	-
79	Gold-198m	D, see ^{193}Au	1E+3	3E+3	1E-6	4E-9	1E-5	1E-4
		W, see ^{193}Au	-	1E+3	5E-7	2E-9	-	-
		Y, see ^{193}Au	-	1E+3	5E-7	2E-9	-	-
79	Gold-198	D, see ^{193}Au	1E+3	4E+3	2E-6	5E-9	2E-5	2E-4
		W, see ^{193}Au	-	2E+3	8E-7	3E-9	-	-
		Y, see ^{193}Au	-	2E+3	7E-7	2E-9	-	-
79	Gold-199	D, see ^{193}Au	3E+3	9E+3	4E-6	1E-8	-	-
			LLI wall (3E+3)	-	-	-	4E-5	4E-4
		W, see ^{193}Au	-	4E+3	2E-6	6E-9	-	-
		Y, see ^{193}Au	-	4E+3	2E-6	5E-9	-	-
79	Gold-200m	D, see ^{193}Au	1E+3	4E+3	1E-6	5E-9	2E-5	2E-4
		W, see ^{193}Au	-	3E+3	1E-6	4E-9	-	-
		Y, see ^{193}Au	-	2E+4	1E-6	3E-9	-	-
79	Gold-200[2]	D, see ^{193}Au	3E+4	6E+4	3E-5	9E-8	4E-4	4E-3
		W, see ^{193}Au	-	8E+4	3E-5	1E-7	-	-
		Y, see ^{193}Au	-	7E+4	3E-5	1E-7	-	-
79	Gold-201[2]	D, see ^{193}Au	7E+4	2E+5	9E-5	3E-7	-	-
			St. wall (9E+4)	-	-	-	1E-3	1E-2
		W, see ^{193}Au	-	2E+5	1E-4	3E-7	-	-
		Y, see ^{193}Au	-	2E+5	9E-5	3E-7	-	-
80	Mercury-193m	Vapor	-	8E+3	4E-6	1E-8	-	-
		Organic D	4E+3	1E+4	5E-6	2E-8	6E-5	6E-4

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI (μCi)	ALI (μCi)	DAC (μCi/ml)	Air (μCi/ml)	Water (μCi/ml)	Concentration (μCi/ml)
		D, sulfates	3E+3	9E+3	4E-6	1E-8	4E-5	4E-4
		W, oxides, hydroxides, halides, nitrates, and, sulfides	-	8E+3	3E-6	1E-8	-	-
80	Mercury-193	Vapor	-	3E+4	1E-5	4E-8	-	-
		Organic D	2E+4	6E+4	3E-5	9E-8	3E-4	3E-3
		D, see ^{193m}Hg	2E+4	4E+4	2E-5	6E-8	2E-4	2E-3
		W, see ^{193m}Hg	-	4E+4	2E-5	6E-8	-	-
80	Mercury-194	Vapor	-	3E+1	1E-8	4E-11	-	-
		Organic D	2E+1	3E+1	1E-8	4E-11	2E-7	2E-6
		D, see ^{193m}Hg	8E+2	4E+1	2E-8	6E-11	1E-5	1E-4
		W, see ^{193m}Hg	-	1E+2	5E-8	2E-10	-	-
80	Mercury-195m	Vapor	-	4E+3	2E-6	6E-9	-	-
		Organic D	3E+3	6E+3	3E-6	8E-9	4E-5	4E-4
		D, see ^{193m}Hg	2E+3	5E+3	2E-6	7E-9	3E-5	3E-4
		W, see ^{193m}Hg	-	4E+3	2E-6	5E-9	-	-
80	Mercury-195	Vapor	-	3E+4	1E-5	4E-8	-	-
		Organic D	2E+4	5E+4	2E-5	6E-8	2E-4	2E-3
		D, see ^{193m}Hg	1E+4	4E+4	1E-5	5E-8	2E-4	2E-3
		W, see ^{193m}Hg	-	3E+4	1E-5	5E-8	-	-
80	Mercury-197m	Vapor	-	5E+3	2E-6	7E-9	-	-
		Organic D	4E+3	9E+3	4E-6	1E-8	5E-5	5E-4
		D, see ^{193m}Hg	3E+3	7E+3	3E-6	1E-8	4E-5	4E-4
		W, see ^{193m}Hg	-	5E+3	2E-6	7E-9	-	-
80	Mercury-197	Vapor	-	8E+3	4E-6	1E-8	-	-
		Organic D	7E+3	1E+4	6E-6	2E-8	9E-5	9E-4
		D, see ^{193m}Hg	6E+3	1E+4	5E-6	2E-8	8E-5	8E-4
		W, see ^{193m}Hg	-	9E+3	4E-6	1E-8	-	-
80	Mercury-199m[2]	Vapor	-	8E+4	3E-5	1E-7	-	-
		Organic D	6E+4	2E+5	7E-5	2E-7	-	-
			St. wall (1E+5)	-	-	-	1E-3	1E-2
		D, see ^{193m}Hg	6E+4	1E+5	6E-5	2E-7	8E-4	8E-3
		W, see ^{193m}Hg	-	2E+5	7E-5	2E-7	-	-
80	Mercury-203	Vapor	-	8E+2	4E-7	1E-9	-	-
		Organic D	5E+2	8E+2	3E-7	1E-9	7E-6	7E-5

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
		D, see ^{193m}Hg	2E+3	1E+3	5E-7	2E-9	3E-5	3E-4
		W, see ^{193m}Hg	-	1E+3	5E-7	2E-9	-	-
81	Thallium-194m[2]	D, all compounds	5E+4	2E+5	6E-5	2E-7	-	-
			St. wall (7E+4)	-	-	-	1E-3	1E-2
81	Thallium-194[2]	D, all compounds	3E+5	6E+5	2E-4	8E-7	-	-
			St. Wall (3E+5)	-	-	-	4E-3	4E-2
81	Thallium-195[2]	D, all compounds	6E+4	1E+5	5E-5	2E-7	9E-4	9E-3
81	Thallium-197	D, all compounds	7E+4	1E+5	5E-5	2E-7	1E-3	1E-2
81	Thallium-198m[2]	D, all compounds	3E+4	5E+4	2E-5	8E-8	4E-4	4E-3
81	Thallium-198	D, all compounds	2E+4	3E+4	1E-5	5E-8	3E-4	3E-3
81	Thallium-199	D, all compounds	6E+4	8E+4	4E-5	1E-7	9E-4	9E-3
81	Thallium-200	D, all compounds	8E+3	1E+4	5E-6	2E-8	1E-4	1E-3
81	Thallium-201	D, all compounds	2E+4	2E+4	9E-6	3E-8	2E-4	2E-3
81	Thallium-202	D, all compounds	4E+3	5E+3	2E-6	7E-9	5E-5	5E-4
81	Thallium-204	D, all compounds	2E+3	2E+3	9E-7	3E-9	2E-5	2E-4
82	Lead-195m[2]	D, all compounds	6E+4	2E+5	8E-5	3E-7	8E-4	8E-3
82	Lead-198	D, all compounds	3E+4	6E+4	3E-5	9E-8	4E-4	4E-3
82	Lead-199[2]	D, all compounds	2E+4	7E+4	3E-5	1E-7	3E-4	3E-3
82	Lead-200	D, all compounds	3E+3	6E+3	3E-6	9E-9	4E-5	4E-4
82	Lead-201	D, all compounds	7E+3	2E+4	8E-6	3E-8	1E-4	1E-3
82	Lead-202m	D, all compounds	9E+3	3E+4	1E-5	4E-8	1E-4	1E-3
82	Lead-202	D, all compounds	1E+2	5E+1	2E-8	7E-11	2E-6	2E-5
82	Lead-203	D, all compounds	5E+3	9E+3	4E-6	1E-8	7E-5	7E-4
82	Lead-205	D, all compounds	4E+3	1E+3	6E-7	2E-9	5E-5	5E-4
82	Lead-209	D, all compounds	2E+4	6E+4	2E-5	8E-8	3E-4	3E-3
82	Lead-210	D, all compounds	6E-1	2E-1	1E-10	-	-	-
			Bone surf (1E+0)	Bone surf (4E-1)	-	6E-13	1E-8	1E-7
82	Lead-211[2]	D, all compounds	1E+4	6E+2	3E-7	9E-10	2E-4	2E-3
82	Lead-212	D, all compounds	3E+1	3E+1	1E-8	9E-11	-	-
			Bone surf (1E+2)	-	-	-	2E-6	2E-5

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
82	Lead-214[2]	D, all compounds	9E+3	8E+2	3E-7	1E-9	1E-4	1E-3
83	Bismuth-200[2]	D, nitrates	3E+4	8E+4	4E-5	1E-7	4E-4	4E-3
		W, all other compounds	-	1E+5	4E-5	1E-7	-	-
83	Bismuth-201[2]	D, see ^{200}Bi	1E+4	3E+4	1E-5	4E-8	2E-4	2E-3
		W, see ^{200}Bi	-	4E+4	2E-5	5E-8	-	-
83	Bismuth-202[2]	D, see ^{200}Bi	1E+4	4E+4	2E-5	6E-8	2E-4	2E-3
		W, see ^{200}Bi	-	8E+4	3E-5	1E-7	-	-
83	Bismuth-203	D, see ^{200}Bi	2E+3	7E+3	3E-6	9E-9	3E-5	3E-4
		W, see ^{200}Bi	-	6E+3	3E-6	9E-9	-	-
83	Bismuth-205	D, see ^{200}Bi	1E+3	3E+3	1E-6	3E-9	2E-5	2E-4
		W, see ^{200}Bi	-	1E+3	5E-7	2E-9	-	-
83	Bismuth-206	D, see ^{200}Bi	6E+2	1E+3	6E-7	2E-9	9E-6	9E-5
		W, see ^{200}Bi	-	9E+2	4E-7	1E-9	-	-
83	Bismuth-207	D, see ^{200}Bi	1E+3	2E+3	7E-7	2E-9	1E-5	1E-4
		W, see ^{200}Bi	-	4E+2	1E-7	5E-10	-	-
83	Bismuth-210m	D, see ^{200}Bi	4E+1	5E+0	2E-9	-	-	-
			Kidneys	Kidneys				
		W, see ^{200}Bi	(6E+1)	(6E-0)	-	9E-12	8E-7	8E-6
83	Bismuth-210	D, see ^{200}Bi	-	7E-1	3E-10	9E-13	-	-
			8E+2	2E+2	1E-7	-	1E-5	1E-4
				Kidneys				
		W, see ^{200}Bi	-	(4E+2)	-	5E-10	-	-
83	Bismuth-212[2]	D, see ^{200}Bi	-	3E+1	1E-8	4E-11	-	-
		W, see ^{200}Bi	5E+3	2E+2	1E-7	3E-10	7E-5	7E-4
83	Bismuth-213[2]Bi	D, see ^{200}Bi	-	3E+2	1E-7	4E-10	-	-
		W, see ^{200}Bi	7E+3	3E+2	1E-7	4E-10	1E-4	1E-3
83	Bismuth-214Bi	D, see ^{200}Bi	-	4E+2	1E-7	5E-10	-	-
			2E+4	8E+2	3E-7	1E-9	-	-
			St. wall					
		W, see ^{200}Bi	(2E+4)	-	-	-	3E-4	3E-3
84	Polonium-203[2]	D, all compounds except those given for W	-	9E-2	4E-7	1E-9	-	-
		W, oxides, hydroxides,,	3E+4	6E+4	3E-5	9E-8	3E-4	3E-3
		and nitrates	-	9E-4	4E-5	1E-7	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1 Oral Ingestion	Col. 2 Inhalation	Col. 3 Inhalation	Col. 1	Col. 2	Monthly Average
			ALI (μCi)	ALI (μCi)	DAC (μCi/ml)	Air (μCi/ml)	Water (μCi/ml)	Concentration (μCi/ml)
84	Polonium-205[2]	D, see ^{203}Po	2E+4	4E+4	2E-5	5E-8	3E-4	3E-3
		W, see ^{203}Po	-	7E+4	3E-5	1E-7	-	-
84	Polonium-207	D, see ^{203}Po	8E+3	3E+4	1E-5	3E-8	1E-4	1E-3
		W, see ^{203}Po	-	3E+4	1E-5	4E-8	-	-
84	Polonium-210	D, see ^{203}Po	3E+0	6E-1	3E-10	9E-13	4E-8	4E-7
		W, see ^{203}Po	-	6E-1	3E-10	9E-13	-	-
85	Astatine-207[2]	D, halides	6E+3	3E+3	1E-6	4E-9	8E-5	8E-4
		W	-	2E+3	9E-7	3E-9	-	-
85	Astatine-211	D, halides	1E+2	8E+1	3E-8	1E-10	2E-6	2E-5
		W	-	5E+1	2E-8	8E-11	-	-
86	Radon-220	With daughters removed	-	2E+4	7E-6	2E-8	-	-
		With daughters present	-	2E+1 (or 12 working level months)	9E-9 (or 1.0 working level)	3E-11	-	-
86	Radon-222	With daughters removed	-	1E+4	4E-6	1E-8	-	-
		With daughters present	-	1E+2 (or 4 working level months)	3E-8 (or 0.33 working level)	1E-10	-	-
87	Francium-222[2]	D, all compounds	2E+3	5E+2	2E-7	6E-10	3E-5	3E-4
87	Francium-223[2]	D, all compounds	6E+2	8E+2	3E-7	1E-9	8E-6	8E-5
88	Radium-223	W, all compounds	5E+0	7E-1	3E-10	9E-13	-	-
			Bone surf (9E+0)	-	-	-	1E-7	1E-6
88	Radium-224	W, all compounds	8E+0	2E+0	7E-10	2E-12	-	-
			Bone surf (2E+1)	-	-	-	2E-7	2E-6
88	Radium-225	W, all compounds	8E+0	7E-1	3E-10	9E-13	-	-
			Bone surf (2E+1)	-	-	-	2E-7	2E-6
88	Radium-226	W, all compounds	2E+0	6E-1	3E-10	9E-13	-	-
			Bone surf (5E+0)	-	-	-	6E-8	6E-7
88	Radium-227[2]	W, all compounds	2E+4	1E+4	6E-6	-	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
			Bone surf	Bone surf				
			(2E+4)	(2E+4)	-	3E-8	3E-4	3E-3
88	Radium-228	W, all compounds	2E+0	1E+0	5E-10	2E-12	-	-
			Bone surf					
			(4E+0)	-	-	-	6E-8	6E-7
89	Actinium-224	D, all compounds except						
		those given for W and Y	2E+3	3E+1	1E-8	-	-	-
			LLI wall	Bone surf				
			(2E+3)	(4E+1)	-	5E-11	3E-5	3E-4
		W, halides and nitrates	-	5E+1	2E-8	7E-11	-	-
		Y, oxides and hydroxides	-	5E+1	2E-8	6E-11	-	-
89	Actinium-225	D, see ^{224}Ac	5E+1	3E-1	1E-10	-	-	-
			LLI wall	Bone surf				
			(5E+1)	(5E-1)	-	7E-13	7E-7	7E-6
		W, see ^{224}Ac	-	6E-1	3E-10	9E-13	-	-
		Y, see ^{224}Ac	-	6E-1	3E-10	9E-13	-	-
89	Actinium-226	D, see ^{224}Ac	1E+2	3E+0	1E-9	-	-	-
			LLI wall	Bone surf				
			(1E+2)	(4E+0)	-	5E-12	2E-6	2E-5
		W, see ^{224}Ac	-	5E+0	2E-9	7E-12	-	-
		Y, see ^{224}Ac	-	5E+0	2E-9	6E-12	-	-
89	Actinium-227	D, see ^{224}Ac	2E-1	4E-4	2E-13	-	-	-
			Bone surf	Bone surf				
			(4E-1)	(8E-4)	-	1E-15	5E-9	5E-8
		W, see ^{224}Ac	-	2E-3	7E-13	-	-	-
				Bone surf				
			-	(3E-3)	-	4E-15	-	-
		Y, see ^{224}Ac	-	4E-3	2E-12	6E-15	-	-
89	Actinium-228	D, see ^{224}Ac	2E+3	9E+0	4E-9	-	3E-5	3E-4
				Bone surf				
			-	(2E+1)	-	2E-11	-	-
		W, see ^{224}Ac	-	4E+1	2E-8	-	-	-
				Bone surf				
			-	(6E+1)	-	8E-11	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1 Oral Ingestion	Col. 2 Inhalation	Col. 3 Inhalation	Col. 1	Col. 2	Monthly Average
			ALI (μCi)	ALI (μCi)	DAC (μCi/ml)	Air (μCi/ml)	Water (μCi/ml)	Concentration (μCi/ml)
		Y, see ^{224}Ac	-	4E+1	2E-8	6E-11	-	-
90	Thorium-226[2]	W, all compounds except those given for Y	5E+3	2E+2	6E-8	2E-10	-	-
			St. wall (5E+3)	-	-	-	7E-5	7E-4
		Y, oxides and hydroxides	-	1E+2	6E-8	2E-10	-	-
90	Thorium-227	W, see ^{226}Th	1E+2	3E-1	1E-10	5E-13	2E-6	2E-5
		Y, see ^{226}Th	-	3E-1	1E-10	5E-13	-	-
90	Thorium-228	W, see ^{226}Th	6E+0	1E-2	4E-12	-	-	-
			Bone surf (1E+1)	Bone surf (2E-2)	-	3E-14	2E-7	2E-6
		Y, see ^{226}Th	-	2E-2	7E-12	2E-14	-	-
90	Thorium-229	W, see ^{226}Th	6E-1	9E-4	4E-13	-	-	-
			Bone surf (1E+0)	Bone surf (2E-3)	-	3E-15	2E-8	2E-7
		Y, see ^{226}Th	-	2E-3	1E-12	-	-	-
			-	Bone surf (3E-3)	-	4E-15	-	-
90	Thorium-230	W, see ^{226}Th	4E+0	6E-3	3E-12	-	-	-
			Bone surf (9E+0)	Bone surf (2E-2)	-	2E-14	1E-7	1E-6
		Y, see ^{226}Th	-	2E-2	6E-12	-	-	-
			-	Bone surf (2E-2)	-	3E-14	-	-
90	Thorium-231	W, see ^{226}Th	4E+3	6E+3	3E-6	9E-9	5E-5	5E-4
		Y, see ^{226}Th	-	6E+3	3E-6	9E-9	-	-
90	Thorium-232	W, see ^{226}Th	7E-1	1E-3	5E-13	-	-	-
			Bone surf (2E+0)	Bone surf (3E-3)	-	4E-15	3E-8	3E-7
		Y, see ^{226}Th	-	3E-3	1E-12	-	-	-
			-	Bone surf (4E-3)	-	6E-15	-	-
90	Thorium-234	W, see ^{226}Th	3E+2	2E+2	8E-8	3E-10	-	-
			St. wall					

Atomic No.	Radionuclide	Class	Table 1 Occupational Values Col. 1 Oral Ingestion ALI (µCi)	Col. 2 Inhalation ALI (µCi)	Col. 3 Inhalation DAC (µCi/ml)	Table 2 Effluent Concentrations Col. 1 Air (µCi/ml)	Col. 2 Water (µCi/ml)	Table 3 Releases to Sewers Monthly Average Concentration (µCi/ml)
			(4E+2)	-	-	-	5E-6	5E-5
		Y, see ^{226}Th	-	2E+2	6E-8	2E-10	-	-
91	Protactinium-227[2]	W, all compounds except those given for Y	4E+3	1E+2	5E-8	2E-10	5E-5	5E-4
		Y, oxides and hydroxides	-	1E+2	4E-8	1E-10	-	-
91	Protactinium-228	W, see ^{227}Ra	1E+3	1E+1	5E-9	-	2E-5	2E-4
			-	Bone surf (2E+1)	-	3E-11	-	-,
		Y, see ^{226}Ra	-	1E+1	5E-9	2E-11	-	-
91	Protactinium-230	W, see ^{227}Pa	6E+2	5E+0	2E-9	7E-12	-	-
			Bone surf (9E+2)	-	-	-	1E-5	1E-4
		Y, see ^{227}Pa	-	4E+0	1E-9	5E-12	-	-
91	Protactinium-231	W, see ^{227}Pa	2E-1	2E-3	6E-13	-	-	-
			Bone surf (5E-1)	Bone surf (4E-3)	-	6E-15	6E-9	6E-8
		Y, see ^{226}Pa	-	4E-3	2E-12	-	-	-
			-	Bone surf (6E-3)	-	8E-15	-	-
91	Protactinium-232	W, see ^{227}Pa	1E+3	2E+1	9E-9	-	2E-5	2E-4
			-	Bone surf (6E+1)	-	8E-11	-	-
		Y, see ^{226}Pa	-	6E+1	2E-8	-	-	-
			-	Bone surf (7E+1)	-	1E-10	-	-
91	Protactinium-233	W, see ^{227}Pa	1E+3	7E+2	3E-7	1E-9	-	-
			LLI wall (2E+3)	-	-	-	2E-5	2E-4
		Y, see ^{227}Pa	-	6E+2	2E-7	8E-10	-	-
91	Protactinium-234	W, see ^{227}Pa	2E+3	8E+3	3E-6	1E-8	3E-5	3E-4
		Y, see ^{227}Pa	-	7E+3	3E-6	9E-9	-	-
92	Uranium-230	D, UF_6, UO_2F_2, $UO_2(NO_3)_2$	4E+0	4E-1	2E-10	-	-	-
			Bone surf (6E+0)	Bone surf (6E-1)	-	8E-13	8E-8	8E-7

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI (μCi)	ALI (μCi)	DAC (μCi/ml)	Air (μCi/ml)	Water (μCi/ml)	Concentration (μCi/ml)
		W, UO_3, UF_4, UCl_4	-	4E-1	1E-10	5E-13	-	-
		Y, UO_2, U_3O_8	-	3E-1	1E-10	4E-13	-	-
92	Uranium-231	D, see ^{230}U	5E+3	8E+3	3E-6	1E-8	-	-
			LLI wall (4E+3)	-	-	-	6E-5	6E-4
		W, see ^{230}U	-	6E+3	2E-6	8E-9	-	-
		Y, see ^{230}U	-	5E+3	2E-6	6E-9	-	-
92	Uranium-232	D, see ^{230}U	2E+0	2E-1	9E-11	-	-	-
			Bone surf (4E+0)	Bone surf (4E-1)	-	6E-13	6E-8	6E-7
		W, see ^{230}U	-	4E-1	2E-10	5E-13	-	-
		Y, see ^{230}U	-	8E-3	3E-12	1E-14	-	-
92	Uranium-233	D, see ^{230}U	1E+1	1E+0	5E-10	-	-	-
			Bone surf (2E+1)	Bone surf (2E+0)	-	3E-12	3E-7	3E-6
		W, see ^{230}U	-	7E-1	3E-10	1E-12	-	-
		Y, see ^{230}U	-	4E-2	2E-11	5E-14	-	-
92	Uranium-234[3]	D, see ^{230}U	1E+1	1E+0	5E-10	-	-	-
			Bone surf (2E+1)	Bone surf (2E+0)	-	3E-12	3E-7	3E-6
		W, see ^{230}U	-	7E-1	3E-10	1E-12	-	-
		Y, see ^{230}U	-	4E-2	2E-11	5E-14	-	-
92	Uranium-235[3]	D, see ^{230}U	1E+1	1E+0	6E-10	-	-	-
			Bone surf (2E+1)	Bone surf (2E+0)	-	3E-12	3E-7	3E-6
		W, see ^{230}U	-	8E-1	3E-10	1E-12	-	-
		Y, see ^{230}U	-	4E-2	2E-11	6E-14	-	-
92	Uranium-236	D, see ^{230}U	1E+1	1E+0	5E-10	-	-	-
			Bone surf (2E+1)	Bone surf (2E+0)	-	3E-12	3E-7	3E-6
		W, see ^{230}U	-	8E-1	3E-10	1E-12	-	-
		Y, see ^{230}U	-	4E-2	2E-11	6E-14	-	-
92	Uranium-237	D, see ^{230}U	2E+3	3E+3	1E-6	4E-9	-	-
			LLI wall					

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
			(2E+3)	-	-	-	3E-5	3E-4
		W, see ^{230}U	-	2E+3	7E-7	2E-9	-	-
		Y, see ^{230}U	-	2E+3	6E-7	2E-9	-	-
92	Uranium-238[3]	D, see ^{230}U	1E+1	1E+0	6E-10	-	-	-
			Bone surf	Bone surf				
			(2E+1)	(2E+0)	-	3E-12	3E-7	3E-6
		W, see ^{230}U	-	8E-1	3E-10	1E-12	-	-
		Y, see ^{230}U	-	4E-2	2E-11	6E-14	-	-
92	Uranium-239[2]	D, see ^{230}U	7E+4	2E+5	8E-5	3E-7	9E-4	9E-3
		W, see ^{230}U	-	2E+5	7E-5	2E-7	-	-
		Y, see ^{230}U	-	2E+5	6E-5	2E-7	-	-
92	Uranium-240	D, see ^{230}U	1E+3	4E+3	2E-6	5E-9	2E-5	2E-4
		W, see ^{230}U	-	3E+3	1E-6	4E-9	-	-
		Y, see ^{230}U	-	2E+3	1E-6	3E-9	-	-
92	Uranium-natural[3]	D, see ^{230}U	1E+1	1E+0	5E-10	-	-	-
			Bone surf	Bone surf				
			(2E+1)	(2E+0)	-	3E-12	3E-7	3E-6
		W, see ^{230}U	-	8E-1	3E-10	9E-13	-	-
		Y, see ^{230}U	-	5E-2	2E-11	9E-14	-	-
93	Neptunium-232[2]	W, all compounds	1E+5	2E+3	7E-7	-	2E+3	2E-2
				Bone surf				
			-	(5E+2)	-	6E-9	-	-
93	Neptunium-233[2]	W, all compounds	8E+5	3E+6	1E-3	4E-6	1E-2	1E-1
93	Neptunium-234	W, all compounds	2E+3	3E+3	1E-6	4E-9	3E-5	3E-4
93	Neptunium-235	W, all compounds	2E+4	8E+2	3E-7	-	-	-
			LLI wall	Bone surf				
			(2E+4)	(1E+3)	-	2E-9	3E-4	3E-3
93	Neptunium-236	W, all compounds	3E+0	2E-2	9E-12	-	-	-
	(1.15E+5 y)		Bone surf	Bone surf				
			(6E+0)	(5E-2)	-	8E-14	9E-8	9E-7
93	Neptunium-236m	W, all compounds	3E+3	3E+1	1E-8	-	-	-
	(22.5 h)		Bone surf	Bone surf				
			(4E+3)	(7E+1)	-	1E-10	5E-5	5E-4
93	Neptunium-237	W, all compounds	5E-1	4E-3	2E-12	-	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
			Bone surf	Bone surf				
			(1E+0)	1E-2)	-	1E-14	2E-8	2E-7
93	Neptunium-238	W, all compounds	1E+3	6E+1	3E-8	-	2E-5	2E-4
				Bone surf				
			-	(2E+2)	-	2E-10	-	-
93	Neptunium-239	W, all compounds	2E+3	2E+3	9E-7	3E-9	-	-
			LLI wall					
			(2E+3)	-	-	-	2E-5	2E-4
93	Neptunium-240[2]	W, all compounds	2E+4	8E+4	3E-5	1E-7	3E-4	3E-3
94	Plutonium-234	W, all compounds except PuO_2	8E+3	2E+2	9E-8	3E-10	1E-4	1E-3
		Y, PuO_2	-	2E+2	8E-8	3E-10	-	-
94	Plutonium-235[2]	W, see ^{234}Pu	9E+5	3E+6	1E-3	4E-6	1E-2	1E-1
		Y, see ^{234}Pu	-	3E+6	1E-3	3E-6	-	-
94	Plutonium-236	W, see ^{234}Pu	2E+0	2E-2	8E-12	-	-	-
			Bone surf	Bone surf				
			(4E+0)	(4E-2)	-	5E-14	6E-8	6E-7
		Y, see ^{234}Pu	-	4E-2	2E-11	6E-14	-	-
94	Plutonium-237	W, see ^{234}Pu	1E+4	3E+3	1E-6	5E-9	2E-4	2E-3
		Y, see ^{234}Pu	-	3E+3	1E-6	4E-9	-	-
94	Plutonium-238	W, see ^{234}Pu	9E-1	7E-3	3E-12	-	-	-
			Bone surf	Bone surf				
			(2E+0)	(1E-2)	-	2E-14	2E-8	2E-7
		Y, see ^{234}Pu	-	2E-2	8E-12	2E-14	-	-
94	Plutonium-239	W, see ^{234}Pu	8E-1	6E-3	3E-12	-	-	-
			Bone surf	Bone surf				
			(1E+0)	(1E-2)	-	2E-14	2E-8	2E-7
		Y, see ^{234}Pu	-	2E-2	7E-12	-	-	-
				Bone surf				
			-	(2E-2)	-	2E-14	-	-
94	Plutonium-240	W, see ^{234}Pu	8E-1	6E-3	3E-12	-	-	-
			Bone surf	Bone surf				
			(1E+0)	(1E-2)	-	2E-14	2E-8	2E-7
		Y, see ^{234}Pu	-	2E-2	7E-12	-	-	-
				Bone surf				
			-	(2E-2)	-	2E-14	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI (μCi)	ALI (μCi)	DAC (μCi/ml)	Air (μCi/ml)	Water (μCi/ml)	Concentration (μCi/ml)
94	Plutonium-241	W, see ^{234}Pu	4E+1 Bone surf (7E+1)	3E-1 Bone surf (6E-1)	1E-10 -	- 8E-13	- 1E-6	- 1E-5
		Y, see ^{234}Pu	- -	8E-1 Bone surf (1E+0)	3E-10 -	- 1E-12	- -	- -
94	Plutonium-242	W, see ^{234}Pu	8E-1 Bone surf (1E+0)	7E-3 Bone surf (1E-2)	3E-12 -	- 2E-14	- 2E-8	- 2E-7
		Y, see ^{234}Pu	- -	2E-2 Bone surf (2E-2)	7E-12 -	- 2E-14	- -	- -
94	Plutonium-243	W, see ^{234}Pu	2E+4	4E+4	2E-5	5E-8	2E-4	2E-3
		Y, see ^{234}Pu	-	4E+4	2E-5	5E-8	-	-
94	Plutonium-244	W, see ^{234}Pu	8E-1 Bone surf (2E+0)	7E-3 Bone surf (1E-2)	3E-12 -	- 2E-14	- 2E-8	- 2E-7
		Y, see ^{234}Pu	- -	2E-2 Bone surf (2E-2)	7E-12 -	- 2E-14	- -	- -
94	Plutonium-245	W, see ^{234}Pu	2E+3	5E+3	2E-6	6E-9	3E-5	3E-4
		Y, see ^{234}Pu	-	4E+3	2E-6	6E-9	-	-
94	Plutonium-246	W, see ^{234}Pu	4E+2 LLI wall (4E+2)	3E+2 -	1E-7 -	4E-10 -	- 6E-6	- 6E-5
		Y, see ^{234}Pu	-	3E+2	1E-7	4E-10	-	-
95	Americium-237[2]	W, all compounds	8E+4	3E+5	1E-4	4E-7	1E-3	1E-2
95	Americium-238[2]	W, all compounds	4E+4 -	3E+3 Bone surf (6E+3)	1E-6 -	- 9E-9	5E-4 -	5E-3 -
95	Americium-239	W, all compounds	5E+3	1E+4	5E-6	2E-8	7E-5	7E-4
95	Americium-240	W, all compounds	2E+3	3E+3	1E-6	4E-9	3E-5	3E-4
95	Americium-241	W, all compounds	8E-1 Bone surf (1E+0)	6E-3 Bone surf (1E-2)	3E-12 -	- 2E-14	- 2E-8	- 2E-7

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1 Oral Ingestion	Col. 2 Inhalation	Col. 3 Inhalation	Col. 1	Col. 2	Monthly Average
			ALI (µCi)	ALI (µCi)	DAC (µCi/ml)	Air (µCi/ml)	Water (µCi/ml)	Concentration (µCi/ml)
95	Americium-242m	W, all compounds	8E-1 Bone surf (1E+0)	6E-3 Bone surf (1E-2)	3E-12 -	- 2E-14	- 2E-8	- 2E-7
95	Americium-242	W, all compounds	4E+3 -	8E+1 Bone surf (9E+1)	4E-8 -	- 1E-10	5E-5 -	5E-4 -
95	Americium-243	W, all compounds	8E-1 Bone surf (1E+0)	6E-3 Bone surf (1E-2)	3E-12 -	- 2E-14	- 2E-8	- 2E-7
95	Americium-244m[2]	W, all compounds	6E+4 St. wall (8E+4)	4E+3 Bone surf (7E+3)	2E-6 -	- 1E-8	- 1E-3	- 1E-2
95	Americium-244	W, all compounds	3E+3 -	2E+2 Bone surf (3E+2)	8E-8 -	- 4E-10	4E-5 -	4E-4 -
95	Americium-245	W, all compounds	3E+4	8E+4	3E-5	1E-7	4E-4	4E-3
95	Americium-246m[2]	W, all compounds	5E+4 St. wall (6E+4)	2E+5 -	8E-5 -	3E-7 -	- 8E-4	- 8E-3
95	Americium-246[2]	W, all compounds	3E+4	1E+5	4E-5	1E-7	4E-4	4E-3
96	Curium-238	W, all compounds	2E+4	1E+3	5E-7	2E-9	2E-4	2E-3
96	Curium-240	W, all compounds	6E+1 Bone surf (8E+1)	6E-1 Bone surf (6E-1)	2E-10 -	- 9E-13	- 1E-6	- 1E-5
96	Curium-241	W, all compounds	1E+3 -	3E+1 Bone surf (4E+1)	1E-8 -	- 5E-11	2E-5 -	2E-4 -
96	Curium-242	W, all compounds	3E+1 Bone surf (5E+1)	3E-1 Bone surf (3E-1)	1E-10 -	- 4E-13	- 7E-7	- 7E-6
96	Curium-243	W, all compounds	1E+0 Bone surf (2E+0)	9E-3 Bone surf (2E-2)	4E-12 -	- 2E-14	- 3E-8	- 3E-7
96	Curium-244	W, all compounds	1E+0 Bone surf	1E-2 Bone surf	5E-12	-	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
			(3E+0)	(2E-2)	-	3E-14	3E-8	3E-7
96	Curium-245	W, all compounds	7E-1	6E-3	3E-12	-	-	-
			Bone surf	Bone surf				
			(1E+0)	(1E-2)	-	2E-14	2E-8	2E-7
96	Curium-246	W, all compounds	7E-1	6E-3	3E-12	-	-	-
			Bone surf	Bone surf				
			(1E+0)	(1E-2)	-	2E-14	2E-8	2E-7
96	Curium-247	W, all compounds	8E-1	6E-3	3E-12	-	-	-
			Bone surf	Bone surf				
			(1E+0)	(1E-2)	-	2E-14	2E-8	2E-7
96	Curium-248	W, all compounds	2E-1	2E-3	7E-13	-	-	-
			Bone surf	Bone surf				
			(4E-1)	(3E-3)	-	4E-15	5E-9	5E-8
96	Curium-249[2]	W, all compounds	5E+4	2E+4	7E-6	-	7E-4	7E-3
				Bone surf				
			-	(3E+4)	-	4E-8	-	-
96	Curium-250	W, all compounds	4E-2	3E-4	1E-13	-	-	-
			Bone surf	Bone surf				
			(6E-2)	(5E-4)	-	8E-16	9E-10	9E-9
97	Berkelium-245	W, all compounds	2E+3	1E+3	5E-7	2E-9	3E-5	3E-4
97	Berkelium-246	W, all compounds	3E+3	3E+3	1E-6	4E-9	4E-5	4E-4
97	Berkelium-247	W, all compounds	5E-1	4E-3	2E-12	-	-	-
			Bone surf	Bone surf				
			(1E+0)	(9E-3)	-	1E-14	2E-8	2E-7
97	Berkelium-249	W, all compounds	2E+2	2E+0	7E-10	-	-	-
			Bone surf	Bone surf				
			(5E+2)	(4E+0)	-	5E-12	6E-6	6E-5
97	Berkelium-250	W, all compounds	9E+3	3E+2	1E-7	-	1E-4	1E-3
				Bone surf				
			-	(7E+2)	-	1E-9	-	-
98	Californium-244[2]	W, all compounds except those given for Y	3E+4	6E+2	2E-7	8E-10	-	-
			St. wall					
			(3E+4)	-	-	-	4E-4	4E-3
		Y, oxides and hydroxides	-	6E+2	2E-7	8E-10	-	-
98	Californium-246	W, see ^{244}Cf	4E+2	9E+0	4E-9	1E-11	5E-6	5E-5

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI	ALI	DAC	Air	Water	Concentration
			(μCi)	(μCi)	(μCi/ml)	(μCi/ml)	(μCi/ml)	(μCi/ml)
		Y, see ^{244}Cf	-	9E+0	4E-9	1E-11	-	-
98	Californium-248	W, see ^{244}Cf	8E+0	6E-2	3E-11	-	-	-
			Bone surf (2E+1)	Bone surf (1E-1)	-	2E-13	2E-7	2E-6
		Y, see ^{244}Cf	-	1E-1	4E-11	1E-13	-	-
98	Californium-249	W, see ^{244}Cf	5E-1	4E-3	2E-12	-	-	-
			Bone surf (1E+0)	Bone surf (9E-3)	-	1E-14	2E-8	2E-7
		Y, see ^{244}Cf	-	1E-2	4E-12	-	-	-
			-	Bone surf (1E-2)	-	2E-14	-	-
98	Californium-250	W, see ^{244}Cf	1E+0	9E-3	4E-12	-	-	-
			Bone surf (2E+0)	Bone surf (2E-2)	-	3E-14	3E-8	3E-7
		Y, see ^{244}Cf	-	3E-2	1E-11	4E-14	-	-
98	Californium-251	W, see ^{244}Cf	5E-1	4E-3	2E-12	-	-	-
			Bone surf (1E+0)	Bone surf (9E-3)	-	1E-14	2E-8	2E-7
		Y, see ^{244}Cf	-	1E-2	4E-12	-	-	-
			-	Bone surf (1E-2)	-	2E-14	-	-
98	Californium-252	W, see ^{244}Cf	2E+0	2E-2	8E-12	-	-	-
			Bone surf (5E+0)	Bone surf (4E-2)	-	5E-14	7E-8	7E-7
		Y, see ^{244}Cf	-	3E-2	1E-11	5E-14	-	-
98	Californium-253	W, see ^{244}Cf	2E+2	2E+0	8E-10	3E-12	-	-
			Bone surf (4E+2)	-	-	-	5E-6	5E-5
		Y, see ^{244}Cf	-	2E+0	7E-10	2E-12	-	-
98	Californium-254	W, see ^{244}Cf	2E+0	2E-2	9E-12	3E-14	3E-8	3E-7
		Y, see ^{244}Cf	-	2E-2	7E-12	2E-14	-	-
99	Einsteinium-250	W, all compounds	4E+4	5E+2	2E-7	-	6E-4	6E-3
			-	Bone surf (1E+3)	-	2E-9	-	-

Atomic No.	Radionuclide	Class	Table 1 Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
			Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
			Oral Ingestion	Inhalation				Monthly Average
			ALI (μCi)	ALI (μCi)	DAC (μCi/ml)	Air (μCi/ml)	Water (μCi/ml)	Concentration (μCi/ml)
99	Einsteinium-251	W, all compounds	7E+3	9E+2	4E-7	-	1E-4	1E-3
			-	Bone surf (1E+3)	-	2E-9	-	-
99	Einsteinium-253	W, all compounds	2E+2	1E+0	6E-10	2E-12	2E-6	2E-5
99	Einsteinium-254m	W, all compounds	3E+2	1E+1	4E-9	1E-11	-	-
			LLI wall (3E+2)	-	-	-	4E-6	4E-5
99	Einsteinium-254	W, all compounds	8E+0	7E-2	3E-11	-	-	-
			Bone surf (2E+1)	Bone surf (1E-1)	-	2E-13	2E-7	2E-6
100	Fermium-252	W, all compounds	5E+2	1E+1	5E-9	2E-11	6E-6	6E-5
100	Fermium-253	W, all compounds	1E+3	1E+1	4E-9	1E-11	1E-5	1E-4
100	Fermium-254	W, all compounds	3E+3	9E+1	4E-8	1E-10	4E-5	4E-4
100	Fermium-255	W, all compounds	5E+2	2E+1	9E-9	3E-11	7E-6	7E-5
100	Fermium-257	W, all compounds	2E+1	2E-1	7E-11	-	-	-
			Bone surf (4E+1)	Bone surf (2E-1)	-	3E-13	5E-7	5E-6
101	Mendelevium-257	W, all compounds	7E+3	8E+1	4E-8	-	1E-4	1E-3
			-	Bone surf (9E+1)	-	1E-10	-	-
101	Mendelevium-258	W, all compounds	3E+1	2E-1	1E-10	-	-	-
			Bone surf (5E+1)	Bone surf (3E-1)	-	5E-13	6E-7	6E-6
-	Any single radionuclide not listed above with decay mode other than alpha emission or spontaneous fission and with radioactive half-life less than 2 hours	Submersion[1]	-	2E+2	1E-7	1E-9	-	

Radionuclide	Table Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
	Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	
	Oral Ingestion	Inhalation				Monthly Average Concentration (μCi/ml)
	ALI (μCi)	ALI (μCi)	DAC (μCi/ml)	Air (μCi/ml)	Water (μCi/ml)	
If it is known that Ac-227-D and Cm-250-W are not present	-	7E-4	3E-13	-		-
If, in addition, it is known that Ac-227-W, Y, Th-229-W, Y, Th-230-W, Th-232-W, Y, Pa-231-W, Y, Np-237-W, Pu-240-W, Pu-242-W, Am-241-W, Am-242m-W, Am-243-W, Cm-245-W, Cm-246-W, Cm-247-W, Cm-248-W, Bk-247-W, Cf-249-W, and Cf-251-W are not present	-	7E-3	3E-12	-	-	-
If, in addition, it is known that Sm-146-W, Sm-147-W, Gd-148-D, W, Gd-152-D, W, Th-228-W, Y, Th-230-Y, U-232-Y, U-233-Y, U-234-Y, U-235-Y, U-236-Y, U-238-Y, Np-236-W, Pu-236-W, Y, Pu-238-W, Y, Pu-239-Y, Pu-240-Y, Pu-242-Y, Pu-244-W, Y, Cm-243-W, Cm-244-W, Cf-248-W, Cf-249-Y, Cf-250-W, Y, Cf-251-Y, Cf-252-W, Y, and Cf-254-W, Y are not present	-	7E-2	3E-11	-	-	-
If, in addition, it is known that Pb-210-D, Bi-210m-W, Po-210-D, W, Ra-223-W, Ra-225-W, Ra-226-W, Ac-225-D, W, Y, Th-227-W, Y, U-230-D, W, Y, U-232-D, W, Pu-241-W, Cm-240-W, Cm-242-W, Cf-248-Y, Es-254-W, Fm-257-W, and Md-258-W are not present	-	7E-1	3E-10	-	-	-
If, in addition, it is known that Si-32-Y, Ti-44-Y, Fe-60-D, Sr-90-Y, Ti-44-Y, Fe-60-D, Sr-90-Y, Zr-93-D, Cd-113m-D, Cd-113-D, In-115-D, W, La-138-D, Lu-176-W, Hf-178m-D, W, Hf-182-D, W, Bi-210m-D, Ra-224-W, Ra-228-W, Ac-226-D, W, Y, Pa-230-W, Y, U-233-D, W, U-234-D, W, U-235-D, W, U-236-D, W, U-238-D, W, Pu-241-Y, Bk-249-Y, Cf-253-W, Y, and Es-253-W are not present	-	7E+0	3E-9	-	-	-
If it is known that Ac-227-D, W, Y, Th-229-W, Y, Th-232-W, Y, Pa-231-W, Y, Cm-250-W are not present	-	-	-	1E-14	-	-
If, in addition, it is known that Sm-146-W, Gd-148-D, W, Ge-152-D, Th-228-W, Y, Th-230-W, Y, U-232-Y, U-233-Y, U-234-Y, U-235-Y, U-236-Y, U-238-Y, U-Nat-Y, Np-236-W, Np-237-W, Pu-236-W, Y, Pu-238-W, Y, Pu-239-W, Y, Pu-240-W, Y, Pu-242-W, Y, Pu-244-W, Y, Am-241-W, Am-242m-W, Am-243-W, Cm-243-W, Cm-244-W, Cm-245-W, Cm-246-W, Cm-247-W, Bk-247-W, Cf-249-W, Y, Cf-250-W, Y, Cf-251-W, Y, Cf-252-W, Y, and Cf-254-W, Y are not present	-	-	-	1E-13	-	-
If, in addition, it is known that Sm-147-W, Gd-152-W, Pb-210-D, Bi-210m-W, Po-210-D, W, Ra-223-W, Ra-225-W, Ra-226-W, Ac-225-D, W, Y, Th-227-W, Y, U-230-D, W, Y, U-232-D, W, U-Nat-W, Pu-241-W, Cm-240-W, Cm-242-W, Cf-248-W, Y, Es-254-W, Fm-257-W, and Md-258-W are not present	-	-	-	1E-12	-	
If, in addition it is known that Fe-60, Sr-90, Cd-113m, Cd-113, In-115, I-129, Cs-134, Sm-145, Sm-147, Gd-148, Gd-152, Hg-194 (organic), Bi-210m, Ra-223, Ra-224, Ra-225, Ac-225, Th-228, Th-230, U-233, U-234, U-235, U-236, U-238, U-nat, Cm-242, Cf-248, Es-254, Fm-257, and Md-258 are not present	-	-	-	-	1E-6	1E-5

3. If a mixture of radionuclides consists of uranium and its daughters in ore dust (10 μm AMAD particle distribution assumed) prior to chemical separation of the uranium from the ore, the following values may be used for the DAC of the mixture: 6E-11 μCi of gross alpha activity form uranium-238, uranium-234, thorium-230, and radium-226 per milliliter of air: 3E-11 μCi of natural uranium per milliliter of air; or 45 micrograms of natural uranium per cubic meter of air.

4. If the identity and concentration of each radionuclide in a mixture are known, the limiting values should be derived as follows: determine, for each radionuclide in the mixture, the ration between the concentration present in the mixture and the concentration otherwise established in Appendix B for the specific radionuclide when not in a mixture. The sum of such ratios for all of the radionuclides in the mixture may not exceed "1" (i.e., "unity").

Radionuclide	Table Occupational Values			Table 2 Effluent Concentrations		Table 3 Releases to Sewers
	Col. 1 Oral Ingestion	Col. 2 Inhalation	Col. 3 Inhalation	Col. 1	Col. 2	
	ALI (μCi)	ALI (μCi)	DAC (μCi/ml)	Air (μCi/ml)	Water (μCi/ml)	Monthly Average Concentration (μCi/ml)

Example: If radionuclides "A," "B," and "C" are present in concentrations C_A, C_B, and C_C, and if the applicable DAC's are DAC_A, DAC_B, and DAC_C, respectively, then the concentrations shall be limited so that the following relationship exists:

$$\frac{C_A}{DAC_A} + \frac{C_B}{DAC_B} + \frac{C_C}{DAC_C} < 1$$

Appendix C to §§ 20.1001-20.2401 Quantities[1] of Licensed Material Requiring Labeling

Radionuclide	Quantity (μCi)
Hydrogen-3	1,000
Beryllium-7	1,000
Beryllium-10	1
Carbon-11	1,000
Carbon-14	1,000
Fluorine-18	1,000
Sodium-22	10
Sodium-24	100
Magnesium-28	100
Aluminum-26	10
Silicon-31	1,000
Silicon-32	1
Phosphorus-32	10
Phosphorus-33	100
Sulfur-35	100
Chlorine-36	10
Chlorine-38	1,000
Chlorine-39	1,000
Argon-39	1,000
Argon-41	1,000
Potassium-40	100
Potassium-42	1,000
Potassium-43	1,000

Appendix C to §§ 20.1001-20.2401 Quantities[1] of Licensed Material Requiring Labeling

Radionuclide	Quantity (μCi)
Potassium-44	1,000
Potassium-45	1,000
Calcium-41	100
Calcium-45	100
Calcium-47	100
Scandium-43	1,000
Scandium-44m	100
Scandium-44	100
Scandium-46	10
Scandium-47	100
Scandium-48	100
Scandium-49	1,000
Titanium-44	1
Titanium-45	1,000
Vanadium-47	1,000
Vanadium-48	100
Vanadium-49	1,000
Chromium-48	1,000
Chromium-49	1,000
Chromium-51	1,000
Manganese-51	1,000
Manganese-52m	1,000
Manganese-52	100
Manganese-53	1,000
Manganese-54	100

Appendix C to §§ 20.1001-20.2401 Quantities[1] of Licensed Material Requiring Labeling

Radionuclide	Quantity (μCi)
Manganese-56	1,000
Iron-52	100
Iron-55	100
Iron-59	10
Iron-60	1
Cobalt-55	100
Cobalt-56	10
Cobalt-57	100
Cobalt-58m	1,000
Cobalt-58	100
Cobalt-60m	1,000
Cobalt-60	1
Cobalt-61	1,000
Cobalt-62m	1,000
Nickel-56	100
Nickel-57	100
Nickel-59	100
Nickel-63	100
Nickel-65	1,000
Nickel-66	10
Copper-60	1,000
Copper-61	1,000
Copper-64	1,000
Copper-67	1,000
Zinc-62	100

Appendix C to §§ 20.1001-20.2401 Quantities[1] of Licensed Material Requiring Labeling

Radionuclide	Quantity (μCi)
Zinc-63	1,000
Zinc-65	10
Zinc-69m	100
Zinc-69	1,000
Zinc-71m	1,000
Zinc-72	100
Gallium-65	1,000
Gallium-66	100
Gallium-67	1,000
Gallium-68	1,000
Gallium-70	1,000
Gallium-72	100
Gallium-73	1,000
Germanium-66	1,000
Germanium-67	1,000
Germanium-68	10
Germanium-69	1,000
Germanium-71	1,000
Germanium-75	1,000
Germanium-77	1,000
Germanium-78	1,000
Arsenic-69	1,000
Arsenic-70	1,000
Arsenic-71	100
Arsenic-72	100

Appendix C to §§ 20.1001-20.2401 Quantities[1] of Licensed Material Requiring Labeling

Radionuclide	Quantity (μCi)
Arsenic-73	100
Arsenic-74	100
Arsenic-76	100
Arsenic-77	100
Arsenic-78	1,000
Selenium-70	1,000
Selenium-73m	1,000
Selenium-73	100
Selenium-75	100
Selenium-79	100
Selenium-81m	1,000
Selenium-81	1,000
Selenium-83	1,000
Bromine-74m	1,000
Bromine-74	1,000
Bromine-75	1,000
Bromine-76	100
Bromine-77	1,000
Bromine-80m	1,000
Bromine-80	1,000
Bromine-82	100
Bromine-83	1,000
Bromine-84	1,000
Krypton-74	1,000
Krypton-76	1,000
Krypton-77	1,000
Krypton-79	1,000
Krypton-81	1,000
Krypton-83m	1,000
Krypton-85m	1,000
Krypton-85	1,000
Krypton-87	1,000
Krypton-88	1,000
Rubidium-79	1,000
Rubidium-81m	1,000
Rubidium-81	1,000
Rubidium-82m	1,000
Rubidium-83	100
Rubidium-84	100
Rubidium-86	100
Rubidium-87	100

Appendix C to §§ 20.1001-20.2401 Quantities[1] of Licensed Material Requiring Labeling

Radionuclide	Quantity (μCi)
Rubidium-88	1,000
Rubidium-89	1,000
Strontium-80	100
Strontium-81	1,000
Strontium-83	100
Strontium-85m	1,000
Strontium-85	100
Strontium-87m	1,000
Strontium-89	10
Strontium-90	0.1
Strontium-91	100
Strontium-92	100
Yttrium-86m	1,000
Yttrium-86	100
Yttrium-87	100
Yttrium-88	10
Yttrium-90m	1,000
Yttrium-90	10
Yttrium-91m	1,000
Yttrium-91	10
Yttrium-92	100
Yttrium-93	100
Yttrium-94	1,000
Yttrium-95	1,000
Zirconium-86	100
Zirconium-88	10
Zirconium-89	100
Zirconium-93	1
Zirconium-95	10
Zirconium-97	100
Niobium-88	1,000
Niobium-89m (66 min)	1,000
Niobium-89 (122 min)	1,000
Niobium-90	100
Niobium-93m	10
Niobium-94	1
Niobium-95m	100
Niobium-95	100
Niobium-96	100
Niobium-97	1,000
Niobium-98	1,000

Appendix C to §§ 20.1001-20.2401 Quantities[1] of Licensed Material Requiring Labeling

Radionuclide	Quantity (μCi)
Molybdenum-90	100
Molybdenum-93m	100
Molybdenum-93	10
Molybdenum-99	100
Molybdenum-101	1,000
Technetium-93m	1,000
Technetium-93	1,000
Technetium-94m	1,000
Technetium-94	1,000
Technetium-96m	1,000
Technetium-96	100
Technetium-97m	100
Technetium-97	1,000
Technetium-98	10
Technetium-99m	1,000
Technetium-99	100
Technetium-101	1,000
Technetium-104	1,000
Ruthenium-94	1,000
Ruthenium-97	1,000
Ruthenium-103	100
Ruthenium-105	1,000
Ruthenium-106	1
Rhodium-99m	1,000
Rhodium-99	100
Rhodium-100	100
Rhodium-101m	1,000
Rhodium-101	10
Rhodium-102m	10
Rhodium-102	10
Rhodium-103m	1,000
Rhodium-105	100
Rhodium-106m	1,000
Rhodium-107	1,000
Palladium-100	100
Palladium-101	1,000
Palladium-103	100
Palladium-107	10
Palladium-109	100
Silver-102	1,000
Silver-103	1,000

Appendix C to §§ 20.1001-20.2401 Quantities[1] of Licensed Material Requiring Labeling

Radionuclide	Quantity (μCi)
Silver-104	1,000
Silver-105	100
Silver-106m	100
Silver-106	1,000
Silver-108m	1
Silver-110m	10
Silver-111	100
Silver-112	100
Silver-115	1,000
Cadmium-104	1,000
Cadmium-107	1,000
Cadmium-109	1
Cadmium-113m	0.1
Cadmium-113	100
Cadmium-115m	10
Cadmium-115	100
Cadmium-117m	1,000
Cadmium-117	1,000
Indium-109	1,000
Indium-110 (69.1min.)	1,000
Indium-110 (4.9h)	1,000
Indium-111	100
Indium-112	1,000
Indium-113m	1,000
Indium-114m	10
Indium-115m	1,000
Indium-115	100
Indium-116m	1,000
Indium-117m	1,000
Indium-117	1,000
Indium-119m	1,000
Tin-110	100
Tin-111	1,000
Tin-113	100
Tin-117m	100
Tin-119m	100
Tin-121m	100
Tin-121	1,000
Tin-123m	1,000
Tin-123	10
Tin-125	10

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Radionuclide	Quantity (μCi)
Tin-126	10
Tin-127	1,000
Tin-128	1,000
Antimony-115	1,000
Antimony-116m	1,000
Antimony-116	1,000
Antimony-117	1,000
Antimony-118m	1,000
Antimony-119	1,000
Antimony-120 (16 min.)	1,000
Antimony-120 (5.76 d)	100
Antimony-122	100
Antimony-124m	1,000
Antimony-124	10
Antimony-125	100
Antimony-126m	1,000
Antimony-126	100
Antimony-127	100
Antimony-128 (10.4 min.)	1,000
Antimony-128 (9.01 h)	100
Antimony-129	100
Antimony-130	1,000
Antimony-131	1,000
Tellurium-116	1,000
Tellurium-121m	10
Tellurium-121	100
Tellurium-123m	10
Tellurium-123	100
Tellurium-125m	10
Tellurium-127m	10
Tellurium-127	1,000
Tellurium-129m	10
Tellurium-129	1,000
Tellurium-131m	10
Tellurium-131	100
Tellurium-132	10
Tellurium-133m	100
Tellurium-133	1,000
Tellurium-134	1,000
Iodine-120m	1,000
Iodine-120	100

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Radionuclide	Quantity (μCi)
Iodine-121	1,000
Iodine-123	100
Iodine-124	10
Iodine-125	1
Iodine-126	1
Iodine-128	1,000
Iodine-129	1
Iodine-130	10
Iodine-131	1
Iodine-132m	100
Iodine-132	100
Iodine-133	10
Iodine-134	1,000
Iodine-135	100
Xenon-120	1,000
Xenon-121	1,000
Xenon-122	1,000
Xenon-123	1,000
Xenon-125	1,000
Xenon-127	1,000
Xenon-129m	1,000
Xenon-131m	1,000
Xenon-133m	1,000
Xenon-133	1,000
Xenon-135m	1,000
Xenon-135	1,000
Xenon-138	1,000
Cesium-125	1,000
Cesium-127	1,000
Cesium-129	1,000
Cesium-130	1,000
Cesium-131	1,000
Cesium-132	100
Cesium-134m	1,000
Cesium-134	10
Cesium-135m	1,000
Cesium-135	100
Cesium-136	10
Cesium-137	10
Cesium-138	1,000
Barium-126	1,000

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Radionuclide	Quantity (μCi)
Barium-128	100
Barium-131m	1,000
Barium-131	100
Barium-133m	100
Barium-133	100
Barium-135m	100
Barium-139	1,000
Barium-140	100
Barium-141	1,000
Barium-142	1,000
Lanthanum-131	1,000
Lanthanum-132	100
Lanthanum-135	1,000
Lanthanum-137	10
Lanthanum-138	100
Lanthanum-140	100
Lanthanum-141	100
Lanthanum-142	1,000
Lanthanum-143	1,000
Cerium-134	100
Cerium-135	100
Cerium-137m	100
Cerium-137	1,000
Cerium-139	100
Cerium-141	100
Cerium-143	100
Cerium-144	1
Praseodymium-136	1,000
Praseodymium-137	1,000
Praseodymium-138m	1,000
Praseodymium-139	1,000
Praseodymium-142m	1,000
Praseodymium-142	100
Praseodymium-143	100
Praseodymium-144	1,000
Praseodymium-145	100
Praseodymium-147	1,000
Neodymium-136	1,000
Neodymium-138	100
Neodymium-139m	1,000
Neodymium-139	1,000

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Radionuclide	Quantity (μCi)
Neodymium-141	1,000
Neodymium-147	100
Neodymium-149	1,000
Neodymium-151	1,000
Promethium-141	1,000
Promethium-143	100
Promethium-144	10
Promethium-145	10
Promethium-146	1
Promethium-147	10
Promethium-148m	10
Promethium-148	10
Promethium-149	100
Promethium-150	1,000
Promethium-151	100
Samarium-141m	1,000
Samarium-141	1,000
Samarium-142	1,000
Samarium-145	100
Samarium-146	1
Samarium-147	100
Samarium-151	10
Samarium-153	100
Samarium-155	1,000
Samarium-156	1,000
Europium-145	100
Europium-146	100
Europium-147	100
Europium-148	10
Europium-149	100
Europium-150 (12.62h)	100
Europium-150 (34.2y)	1
Europium-152m	100
Europium-152	1
Europium-154	1
Europium-155	10
Europium-156	100
Europium-157	100
Europium-158	1,000
Gadolinium-145	1,000
Gadolinium-146	10

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Radionuclide	Quantity (μCi)
Gadolinium-147	100
Gadolinium-148	0.001
Gadolinium-149	100
Gadolinium-151	10
Gadolinium-152	100
Gadolinium-153	10
Gadolinium-159	100
Terbium-147	1,000
Terbium-149	100
Terbium-150	1,000
Terbium-151	100
Terbium-153	1,000
Terbium-154	100
Terbium-155	1,000
Terbium-156m (5.0h)	1,000
Terbium-156m (24.4h)	1,000
Terbium-156	100
Terbium-157	10
Terbium-158	1
Terbium-160	10
Terbium-161	100
Dysprosium-155	1,000
Dysprosium-157	1,000
Dysprosium-159	100
Dysprosium-165	1,000
Dysprosium-166	100
Holmium-155	1,000
Holmium-157	1,000
Holmium-159	1,000
Holmium-161	1,000
Holmium-162m	1,000
Holmium-162	1,000
Holmium-164m	1,000
Holmium-164	1,000
Holmium-166m	1
Holmium-166	100
Holmium-167	1,000
Erbium-161	1,000
Erbium-165	1,000
Erbium-169	100
Erbium-171	100

Appendix C to §§ 20.1001-20.2401 Quantities[1] of Licensed Material Requiring Labeling

Radionuclide	Quantity (μCi)
Erbium-172	100
Thulium-162	1,000
Thulium-166	100
Thulium-167	100
Thulium-170	10
Thulium-171	10
Thulium-172	100
Thulium-173	100
Thulium-175	1,000
Ytterbium-162	1,000
Ytterbium-166	100
Ytterbium-167	1,000
Ytterbium-169	100
Ytterbium-175	100
Ytterbium-177	1,000
Ytterbium-178	1,000
Lutetium-169	100
Lutetium-170	100
Lutetium-171	100
Lutetium-172	100
Lutetium-173	10
Lutetium-174m	10
Lutetium-174	10
Lutetium-176m	1,000
Lutetium-176	100
Lutetium-177m	10
Lutetium-177	100
Lutetium-178m	1,000
Lutetium-178	1,000
Lutetium-179	1,000
Hafnium-170	100
Hafnium-172	1
Hafnium-173	1,000
Hafnium-175	100
Hafnium-177m	1,000
Hafnium-178m	0.1
Hafnium-179m	10
Hafnium-180m	1,000
Hafnium-181	10
Hafnium-182m	1,000
Hafnium-182	0.1

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Radionuclide	Quantity (μCi)
Hafnium-183	1,000
Hafnium-184	100
Tantalum-172	1,000
Tantalum-173	1,000
Tantalum-174	1,000
Tantalum-175	1,000
Tantalum-176	100
Tantalum-177	1,000
Tantalum-178	1,000
Tantalum-179	100
Tantalum-180m	1,000
Tantalum-180	100
Tantalum-182m	1,000
Tantalum-182	10
Tantalum-183	100
Tantalum-184	100
Tantalum-185	1,000
Tantalum-186	1,000
Tungsten-176	1,000
Tungsten-177	1,000
Tungsten-178	1,000
Tungsten-179	1,000
Tungsten-181	1,000
Tungsten-185	100
Tungsten-187	100
Tungsten-188	10
Rhenium-177	1,000
Rhenium-178	1,000
Rhenium-181	1,000
Rhenium-182 (12.7h)	1,000
Rhenium-182 (64.0h)	100
Rhenium-184m	10
Rhenium-184	100
Rhenium-186m	10
Rhenium-186	100
Rhenium-187	1,000
Rhenium-188m	1,000
Rhenium-188	100
Rhenium-189	100
Osmium-180	1,000
Osmium-181	1,000

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Radionuclide	Quantity (μCi)
Osmium-182	100
Osmium-185	100
Osmium-189m	1,000
Osmium-191m	1,000
Osmium-191	100
Osmium-193	100
Osmium-194	1
Iridium-182	1,000
Iridium-184	1,000
Iridium-185	1,000
Iridium-186	100
Iridium-187	1,000
Iridium-188	100
Iridium-189	100
Iridium-190m	1,000
Iridium-190	100
Iridium-192 (73.8 d)	1
Iridium-192m (1.4 min.)	10
Iridium-194m	10
Iridium-194	100
Iridium-195m	1,000
Iridium-195	1,000
Platinum-186	1,000
Platinum-188	100
Platinum-189	1,000
Platinum-191	100
Platinum-193m	100
Platinum-193	1,000
Platinum-195m	100
Platinum-197m	1,000
Platinum-197	100
Platinum-199	1,000
Platinum-200	100
Gold-193	1,000
Gold-194	100
Gold-195	10
Gold-198m	100
Gold-198	100
Gold-199	100
Gold-200m	100
Gold-200	1,000

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Radionuclide	Quantity (μCi)
Gold-201	1,000
Mercury-193m	100
Mercury-193	1,000
Mercury-194	1
Mercury-195m	100
Mercury-195	1,000
Mercury-197m	100
Mercury-197	1,000
Mercury-199m	1,000
Mercury-203	100
Thallium-194m	1,000
Thallium-194	1,000
Thallium-195	1,000
Thallium-197	1,000
Thallium-198m	1,000
Thallium-198	1,000
Thallium-199	1,000
Thallium-200	1,000
Thallium-201	1,000
Thallium-202	100
Thallium-204	100
Lead-195m	1,000
Lead-198	1,000
Lead-199	1,000
Lead-200	100
Lead-201	1,000
Lead-202m	1,000
Lead-202	10
Lead-203	1,000
Lead-205	100
Lead-209	1,000
Lead-210	0.01
Lead-211	100
Lead-212	1
Lead-214	100
Bismuth-200	1,000
Bismuth-201	1,000
Bismuth-202	1,000
Bismuth-203	100
Bismuth-205	100
Bismuth-206	100

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Radionuclide	Quantity (μCi)
Bismuth-207	10
Bismuth-210m	0.1
Bismuth-210	1
Bismuth-212	10
Bismuth-213	10
Bismuth-214	100
Polonium-203	1,000
Polonium-205	1,000
Polonium-207	1,000
Polonium-210	0.1
Astatine-207	100
Astatine-211	10
Radon-220	1
Radon-222	1
Francium-222	100
Francium-223	100
Radium-223	0.1
Radium-224	0.1
Radium-225	0.1
Radium-226	0.1
Radium-227	1,000
Radium-228	0.1
Actinium-224	1
Actinium-225	0.01
Actinium-226	0.1
Actinium-227	0.001
Actinium-228	1
Thorium-226	10
Thorium-227	0.01
Thorium-228	0.001
Thorium-229	0.001
Thorium-230	0.001
Thorium-231	100
Thorium-232	100
Thorium-234	10
Thorium-natural	100
Protactinium-227	10
Protactinium-228	1
Protactinium-230	0.1
Protactinium-231	0.001
Protactinium-232	1

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Radionuclide	Quantity (μCi)
Protactinium-233	100
Protactinium-234	100
Uranium-230	0.01
Uranium-231	100
Uranium-232	0.001
Uranium-233	0.001
Uranium-234	0.001
Uranium-235	0.001
Uranium-236	0.001
Uranium-237	100
Uranium-238	100
Uranium-239	1,000
Uranium-240	100
Uranium-natural	100
Neptunium-232	100
Neptunium-233	1,000
Neptunium-234	100
Neptunium-235	100
Neptunium-236 (1.15x105y)	0.001
Neptunium-236 (22.5h)	1
Neptunium-237	1.001
Neptunium-238	10
Neptunium-239	100
Neptunium-240	1,000
Plutonium-234	10
Plutonium-235	1,000
Plutonium-236	0.001
Plutonium-237	100
Plutonium-238	0.001
Plutonium-239	0.001
Plutonium-240	0.001
Plutonium-241	0.01
Plutonium-242	0.001
Plutonium-243	1,000
Plutonium-244	0.001
Plutonium-245	100
Americium-237	1,000
Americium-238	100
Americium-239	1,000
Americium-240	100
Americium-241	0.001

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Radionuclide	Quantity (μCi)
Americium-242m	0.001
Americium-242	10
Americium-243	0.001
Americium-244m	100
Americium-244	10
Americium-245	1,000
Americium-246m	1,000
Americium-246	1,000
Curium-238	100
Curium-240	0.1
Curium-241	1
Curium-242	0.01
Curium-243	0.001
Curium-244	0.001
Curium-245	0.001
Curium-246	0.001
Curium-247	0.001
Curium-248	0.001
Curium-249	1,000
Berkelium-245	100
Berkelium-246	100
Berkelium-247	0.001
Berkelium-249	0.1
Berkelium-250	10
Californium-244	100
Californium-246	1
Californium-248	0.01
Californium-249	0.001
Californium-250	0.001
Californium-251	0.001
Californium-252	0.001
Californium-253	0.1
Californium-254	0.001
Any alpha emitting radionuclide not listed above or mixtures of alpha emitters of unknown composition	0.001 E
Einsteinium-250	100
Einsteinium-251	100
Einsteinium-253	0.1
Einsteinium-254m	1

Appendix C to §§ 20.1001-20.2401 Quantities[1] of Licensed Material Requiring Labeling

Radionuclide	Quantity (μCi)
Einsteinium-254	0.01
Fermium-252	1
Fermium-253	1
Fermium-254	10
Fermium-255	1
Fermium-257	0.01
Mendelevium-257	10
Rendelevium-258	0.01
Any radionuclide other than alpha emitting radionuclides not listed above, or mixtures of beta emitters of unknown composition	0.01

[1]The quantities listed above were derived by taking 1/10 th of the most restrictive ALI listed in table 1, columns 1 and 2, of appendix B to §§ 20.1001-20.2401 of this part, rounding to the nearest factor of 10, and arbitrarily constraining the values listed between 0.001 and 1,000 μCi. Values of 100 μCi have been assigned for radionuclides having a radioactive half-life in excess of 10^9 years (except rhenium, 1000 μCi) to take into account their low specific activity.

Note: For purposes of §§ 20.1902(e), 20.1905(a), and 20.2201(a) where there is involved a combination of radionuclides in known amounts, the limit for the combination should be derived as follows: determine, for each radionuclide in the combination, the ratio between the quantity present in the combination and the limit otherwise established for the specific radionuclide when not in combination. The sum of such ratios for all radionuclides in the combination may not exceed "1" (i.e., "unity").

Appendix D to §§ 20.1001-20.2401—United States Nuclear Regulatory Commission Regional Offices

	Address	Telephone (24 hour)
Region I: Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode island, and Vermont	USNRC, Region I, 475 Allendale Road, King of Prussia, PA 19406	(215) 337-5000 (FTS)346-5000
Region II: Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, Puerto Rico, South Carolina, Tennessee, Virginia, Virgin Islands, and West Virginia	USNRC, Region II, 101 Marietta Street, NW., Suite 2900, Atlanta, GA 30323	(404)331-4503 (FTS)841-4503
Region III: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin	USNRC, Region III, 799 Roosevelt Road, Glen Ellyn, IL 60137	(708)790-5500 (FTS)388-5500
Region IV: Arkansas, Colorado, Idaho, Kansas, Louisiana, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah, and Wyoming	USNRC, Region IV, 611 Ryan Plaza Drive, Suite 1000, Arlington, TX 76011.	(817)860-8100 (FTS)728-8100
Region IV: Field Office	USNRC, Region IV	Uranium Recovery Field Office, 730 Simms Street, Suite 100a, Golden, CO 80401, Mail: P.O. Box 25325, Denver, CO 80225
Region V: Alaska, Arizona, California, Hawaii, Nevada, Oregon, Washington, and U.S. territories and possessions in the Pacific.	USNRC, Region V, 1450 Maria Lane, Suite 210, Walnut Creek, CA 94596.	(510)975-0200

Appendix E to §§ 20.1001-20.2401 [Reserved]

Appendix F to §§ 20.1001-20.2401—Requirements for Low-Level-Waste Transfer for Disposal at Land Disposal Facilities and Manifests

I. Manifest

The shipment manifest shall contain the name, address, and telephone number of the person generating the waste. The manifest shall also include the name, address, and telephone number or the name and EPA hazardous waste identification number of the person transporting the waste to the land disposal facility. The manifest must also indicate as completely as practicable: a physical description of the waste, the volume, radionuclide identity and quantity, the total radioactivity, and the principal chemical form. The solidification agent must be specified. Waste containing more than 0.1% chelating agents by weight must be identified and the weight percentage of the chelating agent estimated. Wastes classified as Class A, Class B, or Class C in § 61.55 of this chapter must be clearly identified as such in the manifest. The total quantity of the radionuclides ^{3}H, ^{14}C, ^{99}Tc, and ^{129}I must be shown. The manifest required by this paragraph may be shipping papers used to meet Department of Transportation or Environmental Protection Agency regulations or requirements of the receiver, provided all the required information is included. Copies of manifests required by this section may be legible carbon copies or legible photocopies.

II. Certification

The waste generator shall include in the shipment manifest a certification that the transported materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation and the Commission. An authorized representative of the waste generator shall sign and date the manifest.

III. Control and Tracking

A. Any generating licensee who transfers radioactive waste to a land disposal facility or a licensed waste collector shall comply with the requirements in paragraphs A.1 through 8 of this section. Any generating licensee who transfers waste to a licensed waste processor who treats or repackages waste shall comply with the requirements of paragraphs A.4 through 8 of this section. A licensee shall:

1. Prepare all wastes so that the waste is classified according to § 61.55 of this chapter and meets the waste characteristics requirements in § 61.56 of this chapter;

2. Label each package of waste to identify whether it is Class A waste, Class B waste, or Class C waste, in accordance with § 61.55 of this chapter;

3. Conduct a quality control program to ensure compliance with §§ 61.55 and 61.56 of this chapter; the program must include management evaluation of audits;

4. Prepare shipping manifests to meet the requirements of sections I and II of this appendix;

5. Forward a copy of the manifest to the intended recipient, at the time of shipment, or deliver to a collector at the time the waste is collected, obtaining acknowledgment of receipt in the form of a signed copy of the manifest or equivalent documentation from the collector;

6. Include one copy of the manifest with the shipment;

7. Retain a copy of the manifest and documentation of acknowledgment of receipt as the record of transfer of licensed material as required by parts 30, 40, and 70 of this chapter; and

8. For any shipments or any part of a shipment for which acknowledgment of receipt has not been received within the times set forth in this section, conduct an investigation in accordance with paragraph E of this appendix.

B. Any waste collector licensee who handles only prepackaged waste shall:

1. Acknowledge receipt of the waste from the generator within 1 week of receipt by returning a signed copy of the manifest or equivalent documentation;

2. Prepare a new manifest to reflect consolidated shipments; the new manifest shall serve as a listing or index for the detailed generator manifests. Copies of the generator manifests shall be a part of the new manifest. The waste collector may prepare a new manifest without attaching the generator manifests, provided the new manifest contains for each package the information specified in section I of this appendix. The collector licensee shall certify that nothing has been done to the waste that would invalidate the generator's certification;

3. Forward a copy of the new manifest to the land disposal facility operator at the time of shipment;

4. Include the new manifest with the shipment to the disposal site;

5. Retain a copy of the manifest and documentation of acknowledgment of receipt as the record of transfer of licensed material as required by parts 30, 40, and 70 of this chapter, and retain information from generator manifest until disposition is authorized by the Commission; and

6. For any shipments or any part of a shipment for which acknowledgment of receipt is not received within the times set forth in this section, conduct an investigation in accordance with section III, E of this appendix.

C. Any licensed waste processor who treats or repackages wastes shall:

1. Acknowledge receipt of the waste from the generator within 1 week of receipt by returning a signed copy of the manifest or equivalent documentation;

2. Prepare a new manifest that meets the requirements of sections I and II of this appendix. Preparation of the new manifest reflects that the processor is responsible for the waste;

3. Prepare all wastes so that the waste is classified according to § 61.55 of this chapter and meets the waste characteristics requirements in § 61.56 of this chapter;

4. Label each package of waste to identify whether it is Class A waste, Class B waste, or Class C waste, in accordance with §§ 61.55 and 61.57 of this chapter;

5. Conduct a quality control program to ensure compliance with §§ 61.55 and 61.56 of this chapter. The program shall include management evaluation of audits;

6. Forward a copy of the new manifest to the disposal site operator or waste collector at the time of shipment, or deliver to a collector at the time the waste is collected, obtaining acknowledgment of receipt in the form of a signed copy of the manifest or equivalent documentation by the collector;

7. Include the new manifest with the shipment;

8. Retain copies of original manifests and new manifests and documentation of acknowledgment of receipt as the record of transfer of licensed material required by parts 30, 40, and 70 of this chapter; and

9. For any shipment or part of a shipment for which acknowledgment is not received within the times set forth in this section, conduct an investigation in accordance with section III. E of this appendix.

D. The land disposal facility operator shall:

1. Acknowledge receipt of the waste within 1 week of receipt by returning a signed copy of the manifest or equivalent documentation to the shipper. The shipper to be notified is the licensee who last possessed the waste and transferred the waste to the operator. The returned copy of the manifest or equivalent documentation shall indicate any discrepancies between materials listed on the manifest and materials received;

2. Maintain copies of all completed manifests or equivalent documentation until the Commission authorizes their disposition; and

3. Notify the shipper (i.e., the generator, the collector, or processor) and the Administrator of the nearest Commission Regional Office listed in appendix D to this part when any shipment or part of a shipment has not arrived within 60 days after the advance manifest was received.

E. Any shipment or part of a shipment for which acknowledgment is not received within the times set forth in this section must:

1. Be investigated by the shipper if the shipper has not received notification or receipt within 20 days after transfer; and

2. Be traced and reported. The investigation shall include tracing the shipment and filing a report with the nearest Commission Regional Office listed in appendix D to this part. Each licensee who conducts a trace investigation shall file a written report with the appropriate NRC Regional Office within 2 weeks of completion of the investigation.

10 CFR 39

PART 39—LICENSES AND RADIATION SAFETY REQUIREMENTS FOR WELL LOGGING

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Authority: Secs. 53, 57, 62, 63, 65, 69, 81, 82, 161, 182, 183, 186, 68 Stat. 929, 930, 932, 933, 934, 935, 948, 953, 954, 955, as amended, sec. 234, 83 Stat. 444, as amended (42 U.S.C. 2073, 2077, 2092, 2093, 2095, 2099, 2111, 2112, 2201, 2232, 2233, 2236, 2282); secs. 201, as amended, 202,. 206, 88 Stat. 1242, as amended, 1244, 1246 (42 U.S.C. 5841, 5842, 5846).

For the purposes of sec. 223, 68 Stat. 958, as amended (42 U.S.C. 2273); §39.15, 39.17, 39.31-39.51, 39.61-39.77 are issued under sec. 161b, 68 Stat. 948, as amended (42 U.S.C. 2201(b); and §§39.15, 39.33-39.43, 39.61-39.67, 39.73-39.77 are issued under sec. 161o, 68 Stat. 950, as amended (42 U.S.C. 2201(o)).

Source: 52 FR 8234, Mar. 17, 1987, unless otherwise noted.

Subpart A—General Provisions

§39.1 Purpose and scope.

(a) This part prescribes requirements for the issuance of a license authorizing the use of licensed materials including sealed sources, radioactive tracers, radioactive markers, and uranium sinker bars in well logging in a single well. This part also prescribes radiation safety requirements for persons using licensed materials in these operations. The provisions and requirements of this part are in addition to, and not in substitution for, other requirements of this chapter. In particular, the provisions of Parts 19, 20, 21, 30, 40, 70, 71, and 150 of this chapter apply to applicants and licensees subject to this part.

(b) The requirements set out in this part do not apply to the issuance of a license authorizing the use of licensed material in tracer studies involving multiple wells, such as field flooding studies, or to the use of sealed sources auxiliary to well logging but not lowered into wells.

§39.2 Definitions.

"Field station" means a facility where licensed material may be stored or used and from which equipment is dispatched to temporary jobsites.

"Fresh water aquifer," for the purpose of this part, means a geologic formation that is capable of yielding fresh water to a well or spring.

"Injection tool" means a device used for controlled subsurface injection of radioactive tracer material.

"Irretrievable well logging source" means any sealed source containing licensed material that is pulled off or not connected to the wireline that suspends the source in the well and for which all reasonable effort at recovery has been expended.

"Licensed material" means byproduct, source, or special nuclear material received, processed, used, or transferred under a license issued by the Commission under the regulations in this chapter.

"Logging assistant" means any individual who, under the personal supervision of a logging supervisor, handles sealed sources or tracers that are not in logging tools or shipping containers or who performs surveys required by §39.67.

"Logging supervisor" means an individual who uses licensed material or provides personal supervision in the use of licensed material at a temporary jobsite and who is responsible to the licensee for assuring compliance with the requirements of the Commission's regulations and the conditions of the license.

"Logging tool" means a device used subsurface to perform well logging.

"Personal supervision" means guidance and instruction by a logging supervisor, who is physically present at a temporary jobsite, who is in personal contact with logging assistants, and who can give immediate assistance.

"Radioactive marker" means licensed material used for depth determination or direction orientation. For purposes of this part, this term includes radioactive collar markers and radioactive iron nails.

"Safety review" means a periodic review provided by the licensee for its employees on radiation safety aspects of well logging. The review may include, as appropriate, the results of internal inspections, new procedures or equipment, accidents or errors that have been observed, and opportunities for employees to ask safety questions.

"Sealed source" means any licensed material that is encased in a capsule designed to prevent leakage or escape of the licensed material.

"Source holder" means a housing or assembly into which a sealed source is placed to facilitate the handling and use of the source in well logging.

"Subsurface tracer study" means the release of unsealed license material or a substance labeled with licensed material in a single well for the purpose of tracing the movement or position of the material or substance in the well or adjacent formation.

"Surface casing for protecting fresh water aquifers" means a pipe or tube used as a lining in a well to isolate fresh water aquifers from the well.

"Temporary jobsite" means a place where licensed material are present for the purpose of performing well logging or subsurface tracer studies.

"Uranium sinker bar" means a weight containing depleted uranium used to pull a logging tool toward the bottom of a well.

"Well" means a drilled hole in which well logging may be performed. As used in this part, "well" includes drilled holes for the purpose of oil, gas, mineral, groundwater, or geological exploration.

"Well logging" means all operations involving the lowering and raising of measuring devices or tools which contain licensed material or are used to detect licensed materials in wells for the purpose of obtaining information about the well or adjacent formations which may be used in

oil, gas, mineral, groundwater, or geological exploration.

§39.5 Interpretations.

Except as specifically authorized by the Commission in writing, no interpretation of the meaning of the regulations in this part by any officer or employee of the Commission, other than a written interpretation by the General Counsel, will be recognized to be binding upon the Commission.

§39.8 Information collection requirements: OMB approval.

(a) The Nuclear Regulatory Commission has submitted the information collection requirements contained in this part to the Office of Management and Budget (OMB) for approval as required by the Paperwork Reduction Act of 1980 (44 U.S. 3501 et seq.) OMB has approved the information collection requirements contained in this part under control number 3150-0130.

(b) The approved information collection requirements contained in this part appear in §§39.11, 39.13, 39.15, 39.31, 39.33, 39.35, 39.37, 39.39, 39.43, 39.49, 39.51, 39.61, 39.65, 39.67, 39.73. 39.75, and 39.77.

(c) This part contains information collection requirements in addition to those approved under the control number specified in paragraph (a) of this section. These information collection requirements and the control numbers under which they are approved are as follows:

(1) In §39.11, Form NRC-313 is approved under control number 3150-0120.

Subpart B—Specific Licensing Requirements

§39.11 Application for a specific license.

A person, as defined in §30.4 of this chapter, shall file an application for a specific license authorizing the use of licensed material in well logging on Form NRC 313, "Application for Material License." Each application for a license, other than a license exempted from Part 170 of this chapter, must be accompanied by the fee prescribed in §170.31 of this chapter. The application must be sent to the appropriate NRC Regional Office listed in Appendix D of Part 20 of this chapter.

§39.13 Specific licenses for well logging.

The Commission will approve an application for a specific license for the use of licensed material in well logging if the applicant meets the following requirements:

(a) The applicant shall satisfy the general requirements specified in §30.33 of this chapter for byproduct material, in §40.32 of this chapter for source material, and in §70.33 of this chapter for special nuclear material, as appropriate, and any special requirements contained in this part.

(b) The applicant shall develop a program for training logging supervisors and logging assistants and submit to the Commission a description of this program which specifies the—

(1) Initial training;

(2) On-the-job training;

(3) Annual safety reviews provided by the licensee;

(4) Means the applicant will use to demonstrate the logging supervisor's knowledge and understanding of and ability to comply with the Commission's regulations and licensing requirements and the applicant's operating and emergency procedures; and

(5) Means the applicant will use to demonstrate the logging assistant's knowledge and understanding of and ability to comply with the applicant's operating and emergency procedures.

(c) The applicant shall submit to the Commission written operating and emergency procedures as described in §39.63 or an outline or summary of the procedures that includes the important radiation safety aspects of the procedures.

(d) The applicant shall establish and submit to the Commission its program for annual inspections of the job performance of each logging supervisor to ensure that the Commission's regulations, license requirements, and the applicant's operating and emergency procedures are followed. Inspection records must be retained for 3 years after each annual internal inspection.

(e) The applicant shall submit a description of its overall organizational structure as it applies to the radiation safety responsibilities in well logging, including specified delegations of authority and responsibility.

(f) If an applicant wants to perform leak testing of sealed sources, the applicant shall identify the manufacturers and the model numbers of the leak test kits to be used. If the applicant wants to analyze its own wipe samples, the applicant shall establish procedures to be followed and submit a description of these procedures to the Commission. The description must include the—

(1) Instruments to be used;

(2) Methods of performing the analysis; and

(3) Pertinent experience of the person who will analyze the wipe samples.

§39.15 Agreement with well owner or operator.

(a) A licensee may perform well logging with a sealed source only after the licensee has a written agreement with the employing well owner or operator. This written agreement must identify who will meet the following requirements:

(1) If a sealed source becomes lodged in the well, a reasonable effort will be made to recover it.

(2) A person may not attempt to recover a sealed source in a manner which, in the licensee's opinion, could result in its rupture.

(3) The radation monitoring required in §39.69(a) will be performed.

(4) If the environment, any equipment, or personnel are contaminated with licensed material, they must be decontaminated before release from the site or release for unrestricted use. And

(5) If the sealed source is classified as irretrievable after reasonable efforts at recovery have been expended, the following requirements must be implemented within 30 days:

(i) Each irretrievable well logging source must be immobilized and sealed in place with a cement plug.

(ii) A mechanical device to prevent inadvertent intrusion on the source must be set at some point in the well above the cement plug, unless the cement plug and source are not accessible to any subsequent drilling operations. And

(iii) A permanent identification plaque, constructed of long lasting material such as stainless steel, brass, bronze, or monel, must be mounted at the surface of the well, unless the mounting of the plaque is not practical. The size of the plaque must be at least 7 inches (17 cm) square and 1/8-inch (3 mm) thick. The plaque must contain—

(A) The word "CAUTION";

(B) The radiation symbol (the color requirement in §20.203 or, for licensees implementing the provisions of §§ 20.1001–20.2401, § 20.1901(a) of this chapter need not be met);

(C) The date the source was abandoned;

(D) The name of the well owner or well operator, as appropriate;

(E) The well name and well identification number(s) or other designation;

(F) An identification of the sealed source(s) by radionuclide and quantity;

(G) The depth of the source and depth to the top of the plug; and

(H) An appropriate warning, such as, "DO NOT RE-ENTER THIS WELL."

(b) The licensee shall retain a copy of the written agreement for 3 years after the completion of the well logging operation.

(c) A licensee may apply, pursuant to §39.91, for Commission approval, on a case-by-case basis, of proposed procedures to abandon an irretrievable well logging source in a manner not otherwise authorized in paragraph (a)(5) of this section.

(d) A written agreement between the licensee and the well owner or operator is not required if the licensee and the well owner or operator are part of the same corporate structure or otherwise similarly affiliated. However, the licensee shall still otherwise meet the requirements in paragraphs (a)(1) through (a)(5).

§39.17 Request for written statements.

Each license is issued with the condition that the licensee will, at any time before expiration of the license, upon the Commission's request, submit written statements, signed under oath or affirmation, to enable the Commission to

determine whether or not the license should be modified, suspended, or revoked.

Subpart C—Equipment

§39.31 Labels, security, and transportation precautions.

(a) *Labels.*

(1) The licensee may not use a source, source holder, or logging tool that contains licensed material unless the smallest component that is transported as a separate piece of equipment with the licensed material inside bears a durable, legible, and clearly visible marking or label. The marking or label must contain the radiation symbol specified in §20.203 or, for licensees implementing the provisions of §§ 20.1001–20.2401, § 20.1901(a) of this chapter, without the conventional color requirements, and the wording "DANGER (or CAUTION) RADIOACTIVE MATERIAL."

(2) The licensee may not use a container to store licensed material unless the container has securely attached to it a durable, legible, and clearly visible label. The label must contain the radiation symbol specified in §20.203 or, for licensees implementing the provisions of §§ 20.1001–20.2401, § 20.1901(a) of this chapter and the wording "CAUTION (or DANGER), RADIOACTIVE MATERIAL, NOTIFY CIVIL AUTHORITIES (or NAME OF COMPANY)."

(3) The licensee may not transport licensed material unless the material is packaged, labeled, marked, and accompanied with appropriate shipping papers in accordance with regulations set out in 10 CFR Part 71.

(b) *Security precautions during storage and transportation.*

(1) The licensee shall store each source containing licensed material in a storage container or transportation package. The container or package must be locked and physically secured to prevent tampering or removal of licensed material from storage by unauthorized personnel. The licensee shall store licensed material in a manner which will minimize danger from explosion or fire.

(2) The licensee shall lock and physically secure the transport package containing licensed material in the transporting vehicle to prevent accidental loss, tampering, or unauthorized removal of the licensed material from the vehicle.

§39.33 Radiation detection instruments.

(a) The licensee shall keep a calibrated and operable radiation survey instrument capable of detecting beta and gamma radiation at each field station and temporary jobsite to make the radiation surveys required by this part and by Part 20 of this chapter. To satisfy this requirement, the radiation survey instrument must be capable of measuring 0.1 milliroentgen 2.58×10^{-8} C/kg per hour through at least 50 milliroentgens 1.29×10^{-5} C/kg per hour. Survey instruments acquired before [the effective date] and capable of measuring 0.1 milliroentgen 2.58×10^{-8} C/kg) per hour through at least 20 milliroentgens (5.16×10^{-6} C/kg) per hour also satisfy this requirement until July 14,1992.

(b) The licensee shall have available additional calibrated and operable radiation detection instruments sensitive enough to detect the low radiation and contamination levels that could be encountered if a sealed source ruptured. The licensee may own the instruments or may have a procedure to obtain them quickly from a second party.

(c) The licensee shall have each radiation survey instrument required under paragraph (a) of this section calibrated—

(1) At intervals not to exceed 6 months and after instrument servicing;

(2) For linear scale instruments, at two points located approximately 1/3 and 2/3 of full-scale on each scale; for logarithmic scale instruments, at midrange of each decade, and at two points of at least one decade; and for digital instruments, at appropriate points; and

(3) So that an accuracy within plus or minus 20 percent of the calibration standard can be demonstrated on each scale.

(d) The licensee shall retain calibration records for a period of 3 years after the date of calibration for inspection by the Commission.

§39.35 Leak testing of sealed sources.

(a) *Testing and recordkeeping requirements.* Each licensee who uses a sealed source shall have the source tested for leakage periodically. The licensee shall keep a record of leak test results in units of microcuries and retain the record for inspection by the Commission for 3 years after the leak test is performed.

(b) *Method of testing.* The wipe of a sealed source must be performed using a leak test kit or method approved by the Commission or an Agreement State. The wipe sample must be taken from the nearest accessible point to the sealed source where contamination might accumulate. The wipe sample must be analyzed for radioactive contamination. The analysis must be capable of detecting the presence of 0.005 microcurie (185 Bq) of radioactive material on the test sample and must be performed by a person approved by the Commission or an Agreement State to perform the analysis.

(c) *Test frequency.* Each sealed source must be tested at intervals not to exceed 6 months. In the absence of a certificate from a transferor that a test has been made within the 6 months before the transfer, the sealed source may not be used until tested.

(d) *Removal of leaking source from service.*

(1) If the test conducted pursuant to paragraphs (a) and (b) of this section reveals the presence of 0.005 microcurie (185 Bq) or more of removable radioactive material, the licensee shall remove the sealed source from service immediately and have it decontaminated, repaired, or disposed of by an NRC or Agreement State licensee that is authorized to perform these functions. The licensee shall check the equipment associated with the leaking source for radioactive contamination and, if contaminated, have it decontaminated or disposed of by an NRC or Agreement State licensee that is authorized to perform these functions.

(2) The licensee shall submit a report to the appropriate NRC Regional Office listed in Appendix D of Part 20 of this chapter, within 5 days of receiving the test results. The report must describe the equipment involved in the leak, the test results, any contamination which resulted from the leaking source, and the corrective actions taken up to the time the report is made.

(e) *Exemptions from testing requirements.* The following sealed sources are exempt from the periodic leak test requirements set out in paragraphs (a) through (d) of this section:

(1) Hydrogen-3 sources;

(2) Sources containing licensed material with a half-life of 30 days or less;

(3) Sealed sources containing licensed material in gaseous form;

(4) Sources of beta- or gamma-emitting radioactive material with an activity of 100 microcuries (3,700,000 Bq) or less; and

(5) Sources of alpha- or neutron-emitting radioactive material with an activity of 10 microcuries (370,000 Bq) or less.

§39.37 Physical inventory.

Each licensee shall conduct a semi-annual physical inventory to account for all licensed material received and possessed under the license. The licensee shall retain records of the inventory for 3 years from the date of the inventory for inspection by the Commission. The inventory must indicate the quantity and kind of licensed material, the location of the licensed material, the date of the inventory, and the name of the individual conducting the inventory. Physical inventory records may be combined with leak test records.

§39.39 Records of material use.

(a) Each licensee shall maintain records for each use of licensed material showing—

(1) The make, model number, and a serial number or a description of each sealed source used;

(2) In the case of unsealed licensed material used for subsurface tracer studies, the radionuclide and quantity of activity used in a particular well and the disposition of any unused tracer materials;

(3) The identity of the logging supervisor who is responsible for the licensed material and the identity of logging assistants present; and

(4) The location and date of use of the licensed material.

(b) The licensee shall make the records required by paragraph (a) of this section available for inspection by the Commission. The licensee shall retain the records for 3 years from the date of the recorded event.

§39.41 Design and performance criteria for sealed sources.

(a) After July 14, 1989, a licensee may not use a sealed source in well logging unless the sealed source—

(1) Is doubly encapsulated;

(2) Contains licensed material whose chemical and physical forms are as insoluble and nondispersible as practical; and

(3) The sealed source's prototype has been tested and found to maintain its integrity after each of the following tests:

(i) Temperature. The test source must be held at—40$C for 20 minutes, 600$C for 1 hour, and then be subject to a thermal shock test with a temperature drop from 600$C to 20$C within 15 seconds.

(ii) *Impact Test.* A 5 kg steel hammer, 2.5 cm in diameter, must be dropped from a height of 1 m onto the test source.

(iii) *Vibration test.* The test source must be subject to a vibration from 25 Hz to 500 Hz at 5 g amplitude for 30 minutes.

(iv) Puncture test. A 1 gram hammer and pin, 0.3 cm pin diameter, must be dropped from a height of 1 m onto the test source.

(v) Pressure test. The test source must be subjected to an external pressure of 24,600 pounds per square inch absolute (1.695×10^7 pascals).

(b) The requirements in paragraph (a) of this section do not apply to sealed sources that contain licensed material in gaseous form.

§39.43 Inspection, maintenance, and opening of a source or source holder.

(a) Each licensee shall visually check source holders, logging tools, and source handling tools, for defects before each use to ensure that the equipment is in good working condition and that required labeling is present. If defects are found, the equipment must be removed from service until repaired, and a record must be made listing: the date of check, name of inspector, equipment involved, defects found, and repairs made. These records must be retained for 3 years after the defect is found.

(b) Each licensee shall have a program for semiannual visual inspection and routine maintenance of source holders, logging tools, injection tools, source handling tools, storage containers, transport containers, and uranium sinker bars to ensure that the required labeling is legible and that no physical damage is visible. If defects are found, the equipment must be removed from service until repaired, and a record must be made listing: date, equipment involved, inspection and maintenance operations performed, any defects found, and any actions taken to correct the defects. These records must be retained for 3 years after the defect is found.

(c) Removal of a sealed source from a source holder or logging tool, and maintenance on sealed sources or holders in which sealed sources are contained may not be performed by the licensee unless a written procedure developed pursuant to §39.63 has been approved either by the Commission pursuant to §39.13(c) or by an Agreement State.

(d) If a sealed source is stuck in the source holder, the licensee may not perform any operation, such as drilling, cutting, or chiseling, on the source holder unless the licensee is specifically approved by the Commission or an Agreement State to perform this operation.

(e) The opening, repair, or modification of any sealed source must be performed by persons specifically approved to do so by the Commission or an Agreement State.

§39.45 Subsurface tracer studies.

(a) The licensee shall require all personnel handling radioactive tracer material to use protective gloves and, if required by the license, other protective clothing and equipment. The licensee shall take precautions to avoid ingestion or inhalation of radioactive tracer material and to avoid contamination of field stations and temporary jobsites.

(b) A licensee may not knowingly inject licensed material into fresh water aquifers unless specifically authorized to do so by the Commission.

§39.47 Radioactive markers.

The licensee may use radioactive markers in wells only if the individual markers contain quantities of licensed material not exceeding the quantities specified in §30.71 of this chapter. The use of markers is subject only to the requirements of §39.37.

39.49 Uranium sinker bars.

The licensee may use a uranium sinker bar in well logging after July 14, 1988, only if it is legibly impressed with the words "CAUTION—RADIOACTIVE-DEPLETED URANIUM" and "NOTIFY CIVIL AUTHORITIES (or COMPANY NAME) IF FOUND."

§39.51 Use of a sealed source in a well without a surface casing.

The licensee may use a sealed source in a well without a surface casing for protecting fresh water aquifers only if the licensee follows a procedure for reducing the probability of the source becoming lodged in the well. The procedure must be approved by the Commission pursuant to §39.13(c) or by an Agreement State.

Subpart D—Radiation Safety Requirements

§39.61 Training.

(a) The licensee may not permit an individual to act as a logging supervisor until that person—

(1) Has completed training in the subjects outlined in paragraph (e) of this section;

(2) Has received copies of, and instruction in—

(i) The NRC regulations contained in the applicable sections of Parts 19, 20, and 39 of this chapter;

(ii) The NRC license under which the logging supervisor will perform well logging; and

(iii) The licensee's operating and emergency procedures required by §39.63;

(3) Has completed on-the-job training and demonstrated competence in the use of licensed materials, remote handling tools, and radiation survey instruments by a field evaluation; and

(4) Has demonstrated understanding of the requirements in paragraphs (a) (1) and (2) of this section by successfully completing a written test.

(b) The licensee may not permit an individual to act as a logging assistant until that person—

(1) Has received instruction in applicable sections of Parts 19 and 20 of this chapter;

(2) Has received copies of, and instruction in, the licensee's operating and emergency procedures required by §39.63;

(3) Has demonstrated understanding of the materials listed in paragraphs (b) (1) and (2) of this section by successfully completing a written or oral test; and

(4) Has received instruction in the use of licensed materials, remote handling tools, and radiation survey instruments, as appropriate for the logging assistant's intended job responsibilities.

(c) The licensee shall provide safety reviews for logging supervisors and logging assistants at least once during each calendar year.

(d) The licensee shall maintain a record on each logging supervisor's and logging assistant's training and annual safety review. The training records must include copies of written tests and dates of oral tests given after July 14, 1987. The training records must be retained until 3 years following the termination of employment. Records of annual safety reviews must list the topics discussed and be retained for 3 years.

(e) The licensee shall include the following subjects in the training required in paragraph (a)(1) of this section:

(1) Fundamentals of radiation safety including—

(i) Characteristics of radiation;

(ii) Units of radiation dose and quantity of radioactivity;

(iii) Hazards of exposure to radiation;

(iv) Levels of radiation from licensed material;

(v) Methods of controlling radiation dose (time, distance, and shielding); and

(vi) Radiation safety practices, including prevention of contamination, and methods of decontamination.

(2) Radiation detection instruments including—

(i) Use, operation, calibration, and limitations of radiation survey instruments;

(ii) Survey techniques; and

(iii) Use of personnel monitoring equipment;

(3) Equipment to be used including—

(i) Operation of equipment, including source handling equipment and remote handling tools;

(ii) Storage, control, and disposal of licensed material; and

(iii) Maintenance of equipment.

(4) The requirements of pertinent Federal regulations, and

(5) Case histories of accidents in well logging.

§39.63 Operating and emergency procedures.

Each licensee shall develop and follow written operating and emergency procedures that cover—

(a) The handling and use of licensed materials including the use of sealed sources in wells without surface casing for protecting fresh water aquifers, if appropriate;

(b) The use of remote handling tools for handling sealed sources and radioactive tracer material except low-activity calibration sources;

(c) Methods and occasions for conducting radiation surveys, including surveys for detecting contamination, as required by §39.67(c)-(e);

(d) Minimizing personnel exposure including exposures from inhalation and ingestion of licensed tracer materials;

(e) Methods and occasions for locking and securing stored licensed materials;

(f) Personnel monitoring and the use of personnel monitoring equipment;

(g) Transportation of licensed materials to field stations or temporary jobsites, packaging of licensed materials for transport in vehicles, placarding of vehicles when needed, and physically securing licensed materials in transport vehicles during transportation to prevent accidental loss, tampering, or unauthorized removal;

(h) Picking up, receiving, and opening packages containing licensed materials, in accordance with §20.205 of this chapter;

(i) For the use of tracers, decontamination of the environment, equipment, and personnel;

(j) Maintenance of records generated by logging personnel at temporary jobsites;

(k) The inspection and maintenance of sealed sources, source holders, logging tools, injection tools, source handling tools, storage containers, transport containers, and uranium sinker bars as required by §39.43;

(l) Identifying and reporting to NRC defects and noncompliance as required by Part 21 of this chapter;

(m) Actions to be taken if a sealed source is lodged in a well;

(n) Notifying proper persons in the event of an accident; and

(o) Actions to be taken if a sealed source is ruptured including actions to prevent the spread of contamination and minimize inhalation and ingestion of licensed materials and actions to obtain suitable radiation survey instruments as required by §39 33(b).

§39.65 Personnel monitoring.

(a) The licensee may not permit an individual to act as a logging supervisor or logging assistant unless that person wears, at all times during the handling of licensed radioactive materials, either a film badge or a thermoluminescent dosimeter (TLD). Each film badge or TLD must be assigned to and worn by only one individual. Film badges must be replaced at least monthly and TLDs replaced at least quarterly. After replacement, each film badge or TLD must be promptly processed.

(b) The licensee shall provide bioassay services to individuals using licensed materials in subsurface tracer studies if required by the license.

(c) The licensee shall retain records of film badge, TLD and bioassay results for inspection until the Commission authorizes disposition of the records.

§39.67 Radiation surveys.

(a) The licensee shall make radiation surveys, including but not limited to the surveys required under paragraphs (b) through (e) of this section, of each area where licensed materials are used and stored.

(b) Before transporting licensed materials, the licensee shall make a radiation survey of the position occupied by each individual in the vehicle and of the exterior of each vehicle used to transport the licensed materials.

(c) If the sealed source assembly is removed from the logging tool before departure from the temporary jobsite, the licensee shall confirm that the logging tool is free of contamination by energizing the logging tool detector or by using a survey meter.

(d) If the licensee has reason to believe that, as a result of any operation involving a sealed source, the encapsulation of the sealed source could be damaged by the operation, the licensee shall conduct a radiation survey, including a contamination survey, during and after the operation.

(e) The licensee shall make a radiation survey at the temporary jobsite before and after each subsurface tracer study to confirm the absence of contamination.

(f) The results of surveys required under paragraphs (a) through (e) of this section mut be recorded and must include the date of the survey, the name of the individual making the survey, the identification of the survey, instrument used, and the location of the survey. The licensee shall retain records of surveys for inspection by the Commission for 3 years after they are made.

§39.69 Radioactive contamination control.

(a) If the licensee detects evidence that a sealed source has ruptured or licensed materials have caused contamination, the licensee shall initiate immediately the emergency procedures required by §39.63.

(b) If contamination results from the use of licensed material in well logging, the licensee shall decontaminate all work areas, equipment, and unrestricted areas.

(c) During efforts to recover a sealed source lodged in the well, the licensee shall continuously monitor, with an appropriate radiation detection instrument or a logging tool with a radiation detector, the circulating fluids from the well, if any, to check for contamination resulting from damage to the sealed source.

Subpart E—Security, Records, Notifications

§39.71 Security.

(a) A logging supervisor must be physically present at a temporary jobsite whenever licensed material are being handled or are not stored and locked in a vehicle or storage place. The logging supervisor may leave the jobsite in order to obtain assistance if a source becomes lodged in a well.

(b) During well logging, except when radiation sources are below ground or in shipping or storage containers, the logging supervisor or other individual designated by the logging supervisor shall maintain direct surveillance of the operation to prevent unauthorized entry into a restricted area, as defined in §20.3 of this chapter.

§39.73 Documents and records required at field stations.

Each licensee shall maintain the following documents and records at the field station:

(a) A copy of Parts 19, 20, and 39 of NRC regulations;

(b) The license authorizing the use of licensed material;

(c) Operating and emergency procedures required by §39.63;

(d) The record of radiation survey instrument calibrations required by §39.33;

(e) The record of leak test results required by §39.35;

(f) Physical inventory records required by §39.37;

(g) Utilization records required by §39.39;

(h) Records of inspection and maintenance required by §39.43;

(i) Training records required by §39.61(d); and

(j) Survey records required by §39.67.

§39.75 Documents and records required at temporary jobsites.

Each licensee conducting operations at a temporary jobsite shall maintain the following documents and records at the temporary jobsite until the well logging operation is completed:

(a) Operating and emergency procedures required by §39.63.

(b) Evidence of latest calibration of the radiation survey instruments in use at the site required by §39.33.

(c) Latest survey records required by §§39.67 (b), (c), and (e).

(d) The shipping papers for the transportation of radioactive materials required by §71.5 of this chapter; and

(e) When operating under reciprocity pursuant to §150.20 of this chapter, a copy of the

Agreement State license authorizing use of licensed materials.

§39.77 Notification of incidents and lost sources; abandonment procedures for irretrievable sources.

(a) The licensee shall immediately notify the appropriate NRC Regional Office by telephone and subsequently, within 30 days, by confirmatory letter if the licensee knows or has reason to believe that a sealed source has been ruptured. The letter must designate the well or other location, describe the magnitude and extent of the escape of licensed materials, assess the consequences of the rupture, and explain efforts planned or being taken to mitigate these consequences.

(b) The licensee shall notify the Commission of the theft or loss of radioactive materials, radiation overexposures, excessive levels and concentrations of radiation, and certain other accidents as required by §§20.402, 20.403, 20.405 and 30.50 or, for licensees implementing the provisions of §§ 20.1001–20.2201, § 20.2201, 20.2202, 20.2203 and § 30.50 of this chapter.

(c) If a sealed source becomes lodged in a well, and when it becomes apparent that efforts to recover the sealed source will not be successful, the licensee shall—

(1) Notify the appropriate NRC Regional Office by telephone of the circumstances that resulted in the inability to retrieve the source and obtain approval to implement abandonment procedures; and

(2) Advise the well owner or operator, as appropriate, of the abandonment procedures under §39.15 (a) or (c); and

(3) Either ensure that abandonment procedures are implemented within 30 days after the sealed source has been classified as irretrievable or request an extension of time if unable to complete the abandonment procedures.

(d) The licensee shall, within 30 days after a sealed source has been classified as irretrievable, make a report in writing to the appropriate NRC Regional Office. The licensee shall send a copy of the report to each appropriate State or Federal agency that issued permits or otherwise approved of the drilling operation. The report must contain the following information:

(1) Date of occurrence;

(2) A description of the irretrievable well logging source involved including the radionuclide and its quantity, chemical, and physical form;

(3) Surface location and identification of the well;

(4) Results of efforts to immobilize and seal the source in place;

(5) A brief description of the attempted recovery effort;

(6) Depth of the source;

(7) Depth of the top of the cement plug;

(8) Depth of the well;

(9) Any other information, such as a warning statement, contained on the permanent identification plaque; and

(10) State and Federal agencies receiving copy of this report.

Subpart F—Exemptions

§39.91 Applications for exemptions.

The Commission may, upon application of any interested person or upon its own initiative, grant such exemptions from the requirements of the regulations in this part as it determines are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest.

Subpart G—Enforcement

§39.101 Violations.

(a) An injunction or other court order may be obtained to prohibit a violation of any provision of this part.

(b) A court order may be obtained for the payment of a civil penalty imposed for violation of this part.

(c) Any person who willfully violates any provision of this part issued under section 161 b., i., or o. of the Atomic Energy Act of 1954, as amended, or the provisions cited in the authority citation at the beginning of this part may be guilty of a crime and, upon conviction, may be punished by fine or imprisonment, or both, as provided by law.

10 CFR 53

PART 53—CRITERIA AND PROCEDURES FOR DETERMINING THE ADEQUACY OF AVAILABLE SPENT NUCLEAR FUEL STORAGE CAPACITY

Subpart A—General Provisions

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Authority: Secs. 53, 57, 62, 63, 65, 69, 81, 103, 104, 161, 68 Stat. 930, 932, 933, 934, 935, 936, 937, 948, as amended (42 U.S.C. 2073, 2077, 2092, 2093, 2095, 2099, 2111, 2133, 2134, 2201); secs. 201, 209, as amended, 88 Stat. 1242, 1248, as amended (42 U.S.C. 5841, 5849); secs. 132, 135, 96 Stat. 2230, 2232 (42 U.S.C. 10152, 10155).

For the purposes of sec. 223, 68 Stat. 958, as amended (42 U.S.C. 2273); §§53.11, 53.12, 53.13, 53.14, and 53.16 are issued under sec. 161(o), 68 Stat. 950, as amended (42 U.S.C. 2201(o)).

Source: 50 FR 5563, Feb. 11, 1985, unless otherwise noted.

Subpart A—General Provisions

§53.1 Purpose and scope.

(a) The regulations in this part establish procedures and criteria for making the determination required by section 135(b) of the Nuclear Waste Policy Act of 1982 (96 Stat. 2201 and 2233) that a person owning or operating a civilian nuclear power reactor cannot reasonably provide adequate spent nuclear fuel storage capacity at the reactor site, or at the site of any other reactor operated by that person, when needed to ensure the continued orderly operation of the reactor, and that such person is diligently pursuing licensed alternatives to the use of Federal storage capacity for the storage of spent nuclear fuel expected to be generated by such person in the future.

(b) The regulations in this part apply to any person owning or operating a civilian nuclear power reactor who requests a Commission determination.

§53.2 Definitions.

As used in this part:

"Civilian nuclear power reactor" means—a civilian nuclear power plant required to be licensed as a utilization facility under Sections 103 or 104(b) of the Atomic Energy Act of 1954.

"Commission" means—the Nuclear Regulatory Commission or its duly authorized representatives.

"Full core reserve" means—the capability to store all of the fuel in a single reactor core at one time at an on-site storage facility.

"Spent nuclear fuel means"—fuel that has been withdrawn from a nuclear power reactor following irradiation, the constituent elements of which have not been separated by reprocessing.

§53.3 Communications.

Except where otherwise specified, each communication and report concerning the regulations in this part should be addressed to the Document Control Desk, U.S. Nuclear Regulatory Commission, Attention: Executive Director for Operations, Washington, DC 20555, or may be delivered in person to the Commission's Document Control Desk between the hours of 8:15 a.m. and 4:00 p.m. Eastern Time at 11555 Rockville Pike, Rockville, Maryland.

§53.4 Interpretations.

Except as specifically authorized by the Commission in writing, no interpretation of the meaning of the regulations in this part by any officer or employee of the Commission other than written interpretation by the General Counsel will be considered binding on the Commission.

§53.5 Information collection requirements.

(a) The Nuclear Regulatory Commission has submitted the information collection requirements contained in this part to the Office of Management and Budget (OMB) for approval as required by the Paperwork Reduction Act of 1980 (42 U.S.C. 3501 et seq.). OMB has approved the information collection requirements contained in this part under control number 3150-0126.

(b) The approved information collection requirements in this part appear in §§53.11, 53.12, 53.13, and 53.14.

§53.6 Specific exemptions.

The Commission may, upon application of any interested person or upon its own initiative, grant such exemption from the requirements of the regulations in this part as it determines are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest.

Subpart B—Request for a Commission Determination

§53.11 Filing and distribution of a determination request.

(a) The person submitting a request for a Commission determination must file a signed original and 9 copies of the request with the Commission at the address specified in §53.3, with a copy also provided to the appropriate Regional Administrator at the address specified in Appendix D to Part 20 of this chapter. The request must be signed by the person requesting the determination or the person's authorized representative under oath or affirmation.

(b) Any request for a Commission determination under this part, must be filed no later than June 30, 1989. An exception to this requirement may be granted if the Commission determines that:

(1) The request is likely to be processed and the determination made prior to January 1, 1990; and

(2) The person requesting the determination has shown good cause for the failure to file on time.

(c) Upon receipt of a request for a determination, the Secretary of the Commission will cause to be published in the Federal Register a notice of receipt of the request and the opportunity for a 30-day public comment period on the request. A copy of the request will be made available for public inspection in the Commission's Public Document Room, 2120 L Street NW., Washington, DC, and in the Local Public Document Room for the reactor site. The Secretary of the Commission will also transmit a copy of the request to the Office of Civilian Radioactive Waste Management of the U.S. Department of Energy.

(d) Fees applicable to a request for a Commission determination under this part will be determined in accordance with the procedures set forth for special projects under category 12 of §170.31 of this chapter.

(e) In the event that the Department of Energy has entered into contracts for the full amount of spent fuel authorized for Federal interim storage under section 135(a) of the Nuclear Waste Policy Act, the Commission may suspend the processing

or acceptance of requests for determinations until additional interim Federal storage capacity is authorized.

[50 FR 5563, Feb. 11, 1985; 50 FR 8606, Mar. 4, 1985]

§53.12 Contents of request: General information.

A request for a Commission determination under this part must include the following general information:

(a) Name and address of the person owning or generating the spent nuclear fuel for which the determination is sought,

(b) The civilian nuclear power reactor or reactor site for which the request is being made,

(c) Explanation of why the determination described in §53.1(a) is needed, including—

(1) A complete history of fueling/refueling cycles for each reactor at the reactor site from beginning of operation to date of request;

(2) Projected refueling cycles for each reactor from date of request through operating life of plant, including anticipated maintenance schedules;

(3) A schedule of all actions taken to provide storage for spent nuclear fuel generated by each reactor from the beginning of operation to date of request, with a projection of the amount of capacity still available in terms of number of assemblies and metric tons of uranium (MTU) of spent nuclear fuel and time remaining until loss of full core reserve discharge capability;

(4) A schedule of all actions planned or currently underway to provide additional storage, with the projected amount of additional capacity to be provided by these actions;

(5) The amount and geographical location of any spent nuclear fuel stored offsite, and the anticipated duration of offsite storage;

(6) The anticipated date of loss of full core reserve;

(7) An estimate of the amount of spent nuclear fuel and the schedule for its storage for which Federal interim storage would be necessary to prevent the loss of full core reserve;

(8) For a request related to a multi-reactor site, the necessity of maintaining reserve storage capability of more than one full core reserve; and

(9) Any other information which the Commission should consider in making its determination.

[50 FR 5563, Feb. 11, 1985; 50 FR 8606, Mar. 4, 1985]

§53.13 Contents of a request: Alternatives.

(a) The request must include, for each alternative spent nuclear fuel storage technology listed in paragraph (c) of this section, an analysis of any substantial technical, economic, regulatory, or public health and safety constraints that would make the implementation of any of the alternatives unreasonable, including factors such as:

(1) Structural limitations;

(2) The extent to which implementation would disrupt operation of the reactor;

(3) Unavailability of necessary materials or equipment;

(4) Inability to meet the Commission's regulatory requirements due to factors beyond the licensee's control and despite the licensee's good faith efforts;

(5) Local or State laws and regulatory actions, including preexisting agreements, that limit or prevent the timely expansion or addition of storage capacity or transshipment;

(6) Unusual licensing delays;

(7) The time required for licensing, design, and construction;

(8) Extraordinary costs of implementation, including the costs of providing the necessary additional capacity, and the time for which the capacity is needed; and

(9) Radiation exposure considerations.

(b) The request must include, for each alternative spent nuclear fuel storage technology listed in paragraph (c) of this section, detailed information on the actions that the person requesting the determination has taken to date to avoid or reduce the need for Federal interim storage, including—

(1) The timing and description of each license application and study done by or for the person; and

(2) The amount of time that the person estimates would be required to develop, have approved, and implement any alternatives that are still under consideration.

(c) For the purposes of this part, spent nuclear fuel storage alternatives include—

(1) Expansion of existing storage facilities, including high-density fuel storage racks or fuel rod compaction;

(2) Construction of new or additional spent nuclear fuel storage facilities at the site of any civilian nuclear power reactor operated by such person;

(3) Acquisition of modular or mobile spent nuclear fuel storage equipment, including spent nuclear fuel storage casks, for use at the site of any civilian nuclear power reactor operated by such person;

(4) Transshipment of spent nuclear fuel to the site of another civilian nuclear power reactor within the same utility system; and

(5) Such other technologies for spent nuclear fuel storage as may be approved by the Commission for use at the sites of civilian nuclear power reactors.

[50 FR 5563, Feb. 11, 1985; 50 FR 8606, Mar. 4, 1985]

§53.14 Additional information.

(a) The Commission, the EDO, or designee, as appropriate, may require additional information from a person making a request for Commission determination under this part concerning any portion of the request.

(b) The Commission, the EDO, or designee, may deny a request for a Commission determination under this part if the person making the request fails to respond to a request for additional information under paragraph (a) of this section within thirty (30) days from the date of the request for additional information, or such other time as the Commission, Executive Director, or designee, may specify. This denial shall be without prejudice to the right of the person making the request to file another request for a Commission determination under this part.

§53.15 Withdrawal of a determination request.

(a) A person may withdraw a request for a Commission determination under this part without prejudice at any time prior to the issuance of an initial determination under §53.27.

(b) The Secretary of the Commission will cause to be published in the Federal Register a notice of the withdrawal of a request for a Commission determination under this part.

§53.16 Elimination of repetition.

In any request under this part, the person making the request may incorporate by reference information contained in a previous application, statement, or report filed with the Commission provided that these references are clear and specific.

Subpart C—Issuance of a Commission Determination

§53.27 Initial determination.

(a) Not later than four (4) months after the receipt of a request for a Commission determination under this part from a person generating or owning spent nuclear fuel, the Executive Director for Operations, or designee, shall make an initial determination of whether—

(1) Adequate storage capacity to ensure the continued orderly operation of the civilian nuclear power reactor at which the spent nuclear fuel is generated cannot reasonably be provided by the person owning or operating the reactor at that site, or at the site of any other civilian nuclear power reactor operated by the person, and that the capacity cannot be made available in a timely manner through any method described in §53.13(c) despite the licensee's diligent and good faith efforts to pursue such methods; and

(2) That person is diligently pursuing licensed alternatives to the use of Federal storage capacity for the storage of spent nuclear fuel expected to be generated by the person in the future, so as to ensure the availability of additional storage capacity as soon as possible by means of the spent fuel storage alternatives listed in §53.13(c).

(b) In making an initial determination under this section, the Executive Director for Operations, or designee, shall be guided by the criteria set forth in §53.30.

(c) An initial determination under this section shall be in writing and shall contain a full explanation of the facts upon which the determination is based and the reasons for granting or denying the request. An affirmative determination shall specify the amount of spent nuclear fuel that cannot reasonably be stored on

site and the schedule for when Federal storage is needed, and may contain conditions on which the determination is dependent. A copy of the initial determination shall be sent to the person who filed the request.

(d) If a request for a determination is based on circumstances that are too remote and speculative to allow an informed determination, the Commission, the EDO, or designee, may deny the request.

§53.28 Final determination.

(a) An initial determination under §53.27 shall be filed with the Office of the Secretary of the Commission. Such initial determination shall constitute the final determination of the Commission thirty (30) days after its issuance, unless the Commission decides to review the initial determination under paragraph (b) of this section.

(b) Within thirty days after the Executive Director for Operations, or designee, makes an initial determination, the Commission may, on its own motion, review the determination.

(c) The Commission may, at its discretion, extend the time for review of an initial determination under paragraph (b) of this section; provided, however, that if the Commission has not completed its review or issued a final determination within six (6) months of the filing of a request under this part, the initial determination of the Executive Director for Operations, or his or her designee, shall constitute the final determination of the Commission.

(d) No petition or other request for Commission review of an initial determination under §53.27 will be entertained by the Commission.

§53.29 Notice of issuance of a final determination.

(a) Upon the issuance of a final Commission determination or after the expiration of the time for Commission review of an initial determination under §53.28, which constitutes a final determination, the Secretary of the Commission will notify, in writing, the person making the request, and the Office of Civilian Radioactive Waste Management of the Department of Energy of the final determination.

(b) The Secretary of the Commission will cause to be published in the Federal Register a notice of the issuance of the final determination.

(c) The Secretary of the Commission will make a copy of the final determination available for public inspection in the Commission's Public Document Room, 2120 L Street NW., Washington, DC, and in the Local Public Document Room for the reactor site.

§53.30 Criteria for a Commission determination.

(a) In making the determination required by §53.27(a)(1), the Commission shall consider the existence of technical, economic, regulatory, or health and safety factors that would make the implementation of any alternative to Federal interim storage of spent nuclear fuel set forth in §53.13(c) unreasonable, such as—

(1) Suitability of the reactor site for implementation of an alternative, including consideration of structural integrity.

(2) Inability to meet the Commission's regulatory requirements for implementation and licensing of an alternative due to factors beyond the licensee's control and despite the licensee's diligent and good faith efforts.

(3) Inability to obtain necessary materials or equipment in a timely manner.

(4) Modifications that would result in the excessive reduction of code design margins.

(5) Extraordinary costs of implementation that are clearly unreasonable in view of such factors as the amount of additional storage capacity needed, the time for which additional storage capacity is needed, or the cost of Federal interim storage.

(6) Unforeseen or unavoidable delays in the licensing or implementation of an alternative due to factors beyond the licensee's control and despite the licensee's diligent and good faith efforts.

(7) Legal impediments to the implementation of an alternative, such as State or local laws or regulatory actions, including preexisting agreements, pertaining to matters within the jurisdiction of those levels of government, which are valid and enforceable or, though not valid, cannot reasonably be invalidated or enforcement enjoined in a timely manner.

(8) Occupational or off-site radiation exposures or on-site construction hazards that are clearly unreasonable in view of the amount of additional storage capacity needed or the time for which additional storage capacity is needed.

(b) Solely for the purpose of making the determination required by §53.27(a)(1), the Commission shall ensure the maintenance of a full core reserve at the site of the civilian nuclear power reactor for which the request is being made.

(c) If the person requesting the determination demonstrates, and the Commission finds, that the maintenance of a single full core reserve at the reactor site is either inadequate or not necessary for continued orderly operation of the reactor, the Commission may make an exception to the provision of paragraph (b) of this section.

(d) In making the determination required by §53.27(a)(2), the Commission will consider whether the person submitting the request has demonstrated diligent and timely efforts to initiate activities reasonably calculated to implement alternatives to Federal interim storage of spent fuel on a schedule commensurate with the need to support the continued orderly operation of the reactor, including—

(1) Diligent and good faith efforts to prepare and file existing license application(s) for spent nuclear fuel storage alternative(s) as early as possible so as to provide sufficient time to allow for design, licensing, and implementation; and

(2) Subsequent developments beyond the control of the person submitting the request that

(i) Have changed the original estimate of when and how much additional storage capacity will be needed or

(ii) Would prevent the timely implementation of one or more alternatives; and

(3) The timely preparation and implementation of a spent nuclear fuel storage program or plan that evaluates the feasibility of alternatives to Federal storage of spent nuclear fuel, taking into account technical, economic, regulatory, and public health and safety factors and that includes the prompt development of feasible alternatives to Federal storage.

[50 FR 5563, Feb. 11, 1985; 50 FR 8606, Mar. 4, 1985]

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10 CFR 60

PART 60—DISPOSAL OF HIGH-LEVEL RADIOACTIVE WASTES IN GEOLOGIC REPOSITORIES

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Authority: Secs. 51, 53, 62, 63, 65, 81, 161, 182, 183, 68 Stat. 929, 930, 932, 933, 935, 948, 953, 954, as amended (42 U.S.C. 2071, 2073, 2092, 2093, 2095, 2111, 2201, 2232, 2233); secs. 202, 206, 88 Stat. 1244, 1246 (42 U.S.C. 5842, 5846); secs. 10 and 14, Pub. L. 95-601, 92 Stat. 2951 (42 U.S.C. 2021a and 5851); sec. 102, Pub. L. 91-190, 83 Stat. 853 (42 U.S.C. 4332); secs. 114, 121, Pub. L. 97-425, 96 Stat. 2213g, 2228, as amended (42 U.S.C. 10134, 10141).

For the purposes of sec. 223, 68 Stat. 958, as amended (42 U.S.C. 2273); Secs. 60.9(f), 60.10, 60.71 are issued under secs. 161i and 161o, 68 Stat. 949 and 950, as amended (42 U.S.C. 2201(i) and 2201(o)).

Source: 46 FR 13980, Feb. 25, 1981, unless otherwise noted.

Subpart A—General Provisions

§60.1 Purpose and scope.

This part prescribes rules governing the licensing of the U.S. Department of Energy to receive and possess source, special nuclear, and byproduct material at a geologic repository operations area sited, constructed, or operated in accordance with the Nuclear Waste Policy Act of 1982. This part does not apply to any activity licensed under another part of this chapter. This part also gives notice to all persons who knowingly provide to any licensee, contractor, or subcontractor, components, equipment, materials, or other goods or services, that relate to a licensee's activities subject to this part, that they may be individually subject to NRC enforcement action for violation of §60.11.

[51 FR 27162, July 30, 1986]

§60.2 Definitions.

As used in this part:

"Accessible environment" means:

(1) The atmosphere,

(2) the land surface,

(3) surface water,

(4) oceans, and

(5) the portion of the lithosphere that is outside the controlled area.

"Affected Indian Tribe" means any Indian Tribe (1) within whose reservation boundaries a repository for high-level radioactive waste or spent fuel is proposed to be located; or (2) whose Federally defined possessory or usage rights to other lands outside of the reservation's boundaries arising out of Congressionally ratified treaties or other Federal law may be substantially and adversely affected by the locating of such a facility; *Provided*, That the Secretary of the Interior finds, upon the petition of the appropriate governmental officials of the Tribe, that such effects are both substantial and adverse to the Tribe.

"Anticipated processes and events" means those natural processes and events that are reasonably likely to occur during the period the intended performance objective must be achieved. To the extent reasonable in the light of the geologic record, it shall be assumed that those processes operating in the geologic setting during the Quaternary Period continue to operate but with the perturbations caused by the presence of emplaced radioactive waste superimposed thereon.

"Barrier" means any material or structure that prevents or substantially delays movement of water or radionuclides.

"Candidate area" means a geologic and hydrologic system within which a geologic repository may be located

"Commencement of construction" means clearing of land, surface or subsurface excavation, or other substantial action that would adversely affect the environment of a site, but does not include changes desirable for the temporary use of the land for public recreational uses, site characterization activities, other preconstruction monitoring and investigation necessary to establish background information related to the suitability of a site or to the protection of environmental values, or procurement or manufacture of components of the geologic repository operations area.

"Commission" means the Nuclear Regulatory Commission or its duly authorized representatives.

"Containment" means the confinement of radioactive waste within a designated boundary.

"Controlled area" means a surface location, to be marked by suitable monuments, extending horizontally no more than 10 kilometers in any direction from the outer boundary of the underground facility, and the underlying subsurface, which area has been committed to use as a geologic repository and from which incompatible activities would be restricted following permanent closure.

"Director" means the Director of the Nuclear Regulatory Commission's Office of Nuclear Material Safety and Safeguards.

"Disposal" means the isolation of radioactive wastes from the accessible environment.

"Disturbed zone" means that portion of the controlled area the physical or chemical properties of which have changed as a result of underground facility construction or as a result of heat generated by the emplaced radioactive wastes such that the resultant change of properties may have a significant effect on the performance of the geologic repository.

"DOE" means the U.S. Department of Energy or its duly authorized representatives.

"Engineered barrier system" means the waste packages and the underground facility.

"Geologic repository" means a system which is intended to be used for, or may be used for, the disposal of radioactive wastes in excavated geologic media. A geologic repository includes:

(1) The geologic repository operations area, and

(2) the portion of the geologic setting that provides isolation of the radioactive waste.

"Geologic repository operations area" means a high-level radioactive waste facility that is part of a geologic repository, including both surface and subsurface areas, where waste handling activities are conducted.

"Geologic setting" means the geologic, hydrologic, and geochemical systems of the region in which a geologic repository operations area is or may be located.

"Groundwater" means all water which occurs below the land surface.

"High-level radioactive waste" or "HLW" means:

(1) Irradiated reactor fuel,

(2) liquid wastes resulting from the operation of the first cycle solvent extraction system, or equivalent, and the concentrated wastes from subsequent extraction cycles, or equivalent, in a facility for reprocessing irradiated reactor fuel, and

(3) solids into which such liquid wastes have been converted.

"HLW facility" means a facility subject to the licensing and related regulatory authority of the Commission pursuant to Sections 202(3) and 202(4) of the Energy Reorganization Act of 1974 (88 Stat 1244).[1]

"Host rock" means the geologic medium in which the waste is emplaced.

"Important to safety," with reference to structures, systems, and components means those engineered structures, systems, and components essential to the prevention or mitigation of an accident that could result in a radiation dose to the whole body, or any organ, of 0.5 rem or greater at or beyond the nearest boundary of the unrestricted area at any time until the completion of permanent closure.

"Isolation" means inhibiting the transport of radioactive material so that amounts and concentrations of this material entering the accessible environment will be kept within prescribed limits.

"Permanent closure" means final backfilling of the underground facility and the sealing of shafts and boreholes.

"Performance confirmation" means the program of tests, experiments, and analyses which is conducted to evaluate the accuracy and adequacy of the information used to determine with reasonable assurance that the performance objectives for the period after permanent closure will be met.

"Public Document Room" means the place at 2120 L Street NW., Washington, D.C., at which records of the Commission will ordinarily be made available for public inspection and any other place, the location of which has been published in the Federal Register, at which public records of the Commission pertaining to a particular geologic repository are made available for public inspection.

"Radioactive waste" or "waste" means HLW and other radioactive materials other than HLW that are received for emplacement in a geologic repository.

"Restricted area" means any area access to which is controlled by the licensee for purposes of protection of individuals from exposure to radiation and radioactive materials. "Restricted area" shall not include any areas used as residential quarters, although a separate room or rooms in a residential building may be set apart as a restricted area.

"Retrieval" means the act of intentionally removing radioactive waste from the underground location at which the waste had been previously emplaced for disposal.

"Saturated zone" means that part of the earth's crust beneath the regional water table in which all voids, large and small, are ideally filled with water under pressure greater than atmospheric.

"Site" means the location of the controlled area.

"Site characterization" means the program of exploration and research, both in the laboratory and in the field, undertaken to establish the geologic conditions and the ranges of those parameters of a particular site relevant to the procedures under this part. Site characterization includes borings, surface excavations, excavation of exploratory shafts, limited subsurface lateral excavations and borings, and in situ testing at depth needed to determine the suitability of the site for a geologic repository, but does not include preliminary borings and geophysical testing needed to decide whether site characterization should be undertaken.

"Unanticipated processes and events" means those processes and events affecting the geologic setting that are judged not to be reasonably likely

[1] These are DOE "facilities used primarily for the receipt and storage of high-level radioactive wastes resulting from activities licensed under such Act [the Atomic Energy Act]" and "Retrievable Surface Storage Facilities and other facilities authorized for the express purpose of subsequent long-term storage of high-level radioactive wastes generated by [DOE] which are not used for, or part of, research and development activities."

to occur during the period the intended performance objective must be achieved, but which are nevertheless sufficiently credible to warrant consideration. Unanticipated processes and events may be either natural processes or events or processes and events initiated by human activities other than those activities licensed under this part. Processes and events initiated by human activities may only be found to be sufficiently credible to warrant consideration if it is assumed that:

(1) The monuments provided for by this part are sufficiently permanent to serve their intended purpose;

(2) the value to future generations of potential resources within the site can be assessed adequately under the applicable provisions of this part;

(3) an understanding of the nature of radioactivity, and an appreciation of its hazards, have been retained in some functioning institutions;

(4) institutions are able to assess risk and to take remedial action at a level of social organization and technological competence equivalent to, or superior to, that which was applied in initiating the processes or events concerned; and

(5) relevant records are preserved, and remain accessible, for several hundred years after permanent closure.

"Underground facility" means the underground structure, including openings and backfill materials, but excluding shafts, boreholes, and their seals.

"Unrestricted area" means any area, access to which is not controlled by the licensee for purposes of protection of individuals from exposure to radiation and radioactive materials, and any area used for residential quarters.

"Unsaturated zone" means the zone between the land surface and the regional water table. Generally, fluid pressure in this zone is less than atmospheric pressure, and some of the voids may contain air or other gases at atmospheric pressure. Beneath flooded areas or in perched water bodies the fluid pressure locally may be greater than atmospheric.

"Waste form" means the radioactive waste materials and any encapsulating or stabilizing matrix.

"Waste package" means the waste form and any containers, shielding, packing and other absorbent materials immediately surrounding an individual waste container.

"Water table" means that surface in a groundwater body at which the water pressure is atmospheric.

[48 FR 28217, June 21, 1983, as amended at 50 FR 29647, July 22, 1985; 51 FR 27162, July 30, 1986]

§60.3 License required.

(a) DOE shall not receive or possess source, special nuclear, or byproduct material at a geologic repository operations area except as authorized by a license issued by the Commission pursuant to this part.

(b) DOE shall not commence construction of a geologic repository operations area unless it has filed an application with the Commission and has obtained construction authorization as provided in this part. Failure to comply with this requirement shall be grounds for denial of a license.

§60.4 Communications and records.

(a) Except where otherwise specified, all communications and reports concerning the regulations in this part and applications filed under them should be addressed to the Director, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555. Communications, reports, and applications may be delivered at the Commission's offices at 2120 L Street NW., Washington, DC, or 11555 Rockville Pike, Rockville, Maryland.

(b) Each record required by this part must be legible throughout the retention period specified by each Commission regulation. The record may be the original or a reproduced copy or a microform provided that the copy or microform is authenticated by authorized personnel and that the microform is capable of producing a clear copy throughout the required retention period. The record may also be stored in electronic media with the capability for producing legible, accurate, and complete records during the required retention period. Records such as letters, drawings, specifications, must include all pertinent information such as stamps, initials, and signatures. The licensee shall maintain adequate safeguards against tampering with and loss of records.

§60.5 Interpretations.

Except as specifically authorized by the Commission, in writing, no interpretation of the meaning of the regulations in this part by any officer or employee of the Commission other than a written interpretation by the General Counsel will be considered binding upon the Commission.

§60.6 Exemptions.

The Commission may, upon application by DOE, any interested person, or upon its own initiative, grant such exemptions from the requirements of the regulations in this part as it determines are authorized by law, will not endanger life or property or the common defense and security, and are otherwise in the public interest.

§60.7 License not required for certain preliminary activities.

The requirement for a license set forth in §60.3(a) of this part is not applicable to the extent that DOE receives and possesses source, special nuclear, and byproduct material at a geologic repository:

(a) For purposes of site characterization; or

(b) For use, during site characterization or construction, as components of radiographic, radiation monitoring, or similar equipment or instrumentation.

§60.8 Reporting, recordkeeping, and application requirements: OMB approval not required.

The information collection requirements contained in this part affect fewer than ten persons. Therefore, under section 3506(c)(5) of the Paperwork Reduction Act of 1980 (Pub. L. 96-511), OMB clearance is not required for these information collection requirements.

[47 FR 13774, Apr. 1, 1982]

§60.9 Employee protection.

(a) Discrimination by a Commission licensee, an applicant for a Commission license, or a contractor or subcontractor of a Commission licensee or applicant against an employee for engaging in certain protected activities is prohibited. Discrimination includes discharge and other actions that relate to compensation, terms, conditions, and privileges of employment. The protected activities are established in section 210 of the Energy Reorganization Act of 1974, as amended, and in general are related to the administration or enforcement of a requirement imposed under the Atomic Energy Act or the Energy Reorganization Act.

(1) The protected activities include but are not limited to:

(i) Providing the Commission information about possible violations of requirements imposed under either of the above statutes;

(ii) Requesting the Commission to institute action against his or her employer for the administration or enforcement of these requirements; or

(iii) Testifying in any Commission proceeding.

(2) These activities are protected even if no formal proceeding is actually initiated as a result of the employee assistance or participation.

(3) This section has no application to any employee alleging discrimination prohibited by this section who, acting without direction from his or her employer (or the employer's agent), deliberately causes a violation of any requirement of the Energy Reorganization Act of 1974, as amended, or the Atomic Energy Act of 1954, as amended.

(b) Any employee who believes that he or she has been discharged or otherwise discriminated against by any person for engaging in the protected activities specified in paragraph (a)(1) of this section may seek a remedy for the discharge or discrimination through an administrative proceeding in the Department of Labor. The administrative proceeding must be initiated within 30 days after an alleged violation occurs by filing a complaint alleging the violation with the Department of Labor, Employment Standards Administration, Wage and Hour Division. The Department of Labor may order

reinstatement, back pay, and compensatory damages.

(c) A violation of paragraph (a) or paragraph (f) of this section by a Commission licensee, an applicant for a Commission license, or a contractor or subcontractor of a Commission licensee or applicant may be grounds for—

(1) Denial, revocation, or suspension of the license.

(2) Imposition of a civil penalty on the licensee or applicant.

(3) Other enforcement action.

(d) Actions taken by an employer, or others, which adversely affect an employee may be predicated upon nondiscriminatory grounds. The prohibition applies when the adverse action occurs because the employee has engaged in protected activities. An employee's engagement in protected activities does not automatically render him or her immune from discharge or discipline for legitimate reasons or from adverse action dictated by nonprohibited considerations.

(e) Each licensee and each applicant shall post Form NRC-3, "Notice to Employees," on its premises. Posting must be at locations sufficient to permit employees protected by this section to observe a copy on the way to or from their place of work. Premises must be posted not later than 30 days after an application is docketed and remain posted while the application is pending before the Commission, during the term of the license, and for 30 days following license termination.

(f) No agreement affecting the compensation, terms, conditions and privileges of employment, including an agreement to settle a complaint filed by an employee with the Department of Labor pursuant to section 210 of the Energy Reorganization Act of 1974, may contain any provision which would prohibit, restrict, or otherwise discourage, an employee from participating in protected activity as defined in paragraph (a)(1) of this section, including, but not limited to, providing information to the NRC on potential violations or other matters within NRC's regulatory responsibilities.

Note: Copies of Form NRC-3 may be obtained by writing to the Regional Administrator of the appropriate U.S. Nuclear Regulatory Commission Regional Office listed in Appendix D, Part 20 of this chapter.

[47 FR 30456, July 14, 1982, as amended at 52 FR 31612, Aug. 21, 1987]

§60.10 Completeness and accuracy of information.

(a) Information provided to the Commission by an applicant for a license or by a licensee or information required by statute or by the Commission's regulations, orders, or license conditions to be maintained by the applicant or the licensee shall be complete and accurate in all material respects.

(b) Each applicant or licensee shall notify the Commission of information identified by the applicant or licensee as having for the regulated activity a significant implication for public health and safety or common defense and security. An applicant or licensee violates this paragraph only if the applicant or licensee fails to notify the Commission of information that the applicant or licensee has identified as having a significant implication for public health and safety or common defense and security. Notification shall be provided to the Administrator of the appropriate Regional Office within two working days of identifying the information. This requirement is not applicable to information which is already required to be provided to the Commission by other reporting or updating requirements.

[52 FR 49373, Dec. 31, 1987]

§60.11 Deliberate misconduct

(a) Any licensee or any employee of a licensee; and any contractor (including a supplier or consultant), subcontractor, or any employee of a contractor or subcontractor, of any licensee, who knowingly provides to any licensee, contractor, or subcontractor, components, equipment, materials, or other goods or services, that relate to a licensee's activities subject to this part; may not:

(1) Engage in deliberate misconduct that causes or, but for detection, would have caused, a licensee to be in violation of any rule regulation, or order, or any term, condition, or limitation of any license, issued by the Commission, or

(2) Deliberately submit to the NRC, a licensee, or a licensee's contractor or subcontractor, information that the person submitting the information knows to be incomplete or inaccurate in some respect material to the NRC.

(b) A person who violates paragraph (a)(1) or (a)(2) of this section may be subject to enforcement action in accordance with the procedures in 10 CFR part 2, subpart B.

(c) For purposes of paragraph (a)(1) of this section, deliberate misconduct by a person means an intentional act or omission that the person knows:

(1) Would cause a licensee to be in violation of any rule, regulation, or order, or any term, condition, or limitation, of any license issued by the Commission, or

(2) Constitutes a violation of a requirement, procedure, instruction, contract, purchase order or policy of a licensee, contractor, or subcontractor.

Subpart B—Licenses

Preapplication Review

§60.15 Site characterization.

(a) Prior to submittal or an application for a license to be issued under this part DOE shall conduct a program of site characterization with respect to the site to be described in such application.

(b) Unless the Commission determines with respect to the site described in the application that it is not necessary, site characterization shall include a program of in situ exploration and testing at the depths that wastes would be emplaced.

(c) The program of site characterization shall be conducted in accordance with the following:

(1) Investigations to obtain the required information shall be conducted in such a manner as to limit adverse effects on the long-term performance of the geologic repository to the extent practical.

(2) The number of exploratory boreholes and shafts shall be limited to the extent practical consistent with obtaining the information needed for site characterization.

(3) To the extent practical, exploratory boreholes and shafts in the geologic repository operations area shall be located where shafts are planned for underground facility construction and operation or where large unexcavated pillars are planned.

(4) Subsurface exploratory drilling, excavation, and in situ testing before and during construction shall be planned and coordinated with geologic repository operations area design and construction.

[46 FR 13980, Feb. 25, 1981, as amended at 48 FR 28219, June 21, 1983. Redesignated and amended at 51 FR 27162, July 30, 1986]

§60.16 Site characterization plan required.

Before proceeding to sink shafts at any area which has been approved by the President for site characterization, DOE shall submit to the Director, for review and comment, a site characterization plan for such area. DOE shall defer the sinking of such shafts until such time as there has been an opportunity for Commission comments thereon to have been solicited and considered by DOE.

[51 FR 27162, July 30, 1986]

§60.17 Contents of site characterization plan.

The site characterization plan shall contain—

(a) A general plan for site characterization activities to be conducted at the area to be characterized, which general plan shall include:

(1) A description of such area, including information on quality assurance programs that have been applied to the collection, recording, and retention of information used in preparing such description.

(2) A description of such site characterization activities, including the following—

(i) The extent of planned excavations;

(ii) Plans for any onsite testing with radioactive material, including radioactive tracers, or nonradioactive material;

(iii) Plans for any investigation activities that may affect the capability of such area to isolate high-level radioactive waste;

(iv) Plans to control any adverse impacts from such site characterization activities that are important to safety or that are important to waste isolation; and

(v) Plans to apply quality assurance to data collection, recording, and retention.

(3) Plans for the decontamination and decommissioning of such area, and for the mitigation of any significant adverse environmental impacts caused by site characterization activities, if such area is determined unsuitable for application for a construction authorization for a geologic repository operations area;

(4) Criteria, developed pursuant to section 112(a) of the Nuclear Waste Policy Act of 1982, to be used to determine the suitability of such area for the location of a geologic repository; and

(5) Any other information which the Commission, by rule or order, requires.

(b) A description of the possible waste form or waste package for the high-level radioactive waste to be emplaced in such geologic repository, a description (to the extent practicable) of the relationship between such waste form or waste package and the host rock at such area, and a description of the activities being conducted by DOE with respect to such possible waste form or waste package or their relationship; and

(c) A conceptual design for the geologic repository operations area that takes into account likely site-specific requirements.

[51 FR 27163, July 30, 1986]

§60.18 Review of site characterization activities.[2]

(a) The Director shall cause to be published in the Federal Register a notice that a site characterization plan has been received from DOE and that a staff review of such plan has begun. The notice shall identify the area to be characterized and the NRC staff members to be consulted for further information.

(b) The Director shall make a copy of the site characterization plan available at the Public Document Room. The Director shall also transmit copies of the published notice of receipt to the Governor and legislature of the State in which the area to be characterized is located and to the governing body of any affected Indian Tribe. The Director shall provide an opportunity, with respect to any area to be characterized, for the State in which such area is located and for affected Indian Tribes to present their views on the site characterization plan and their suggestions with respect to comments thereon which may be made by NRC. In addition, the Director shall make NRC staff available to consult with States and affected Indian Tribes as provided in Subpart C of this part.

(c) The Director shall review the site characterization plan and prepare a site characterization analysis with respect to such plan. In the preparation of such site characterization analysis, the Director may invite and consider the views of interested persons on DOE's site characterization plan and may review and consider comments made in connection with public hearings held by DOE.

(d) The Director shall provide to DOE the site characterization analysis together with such additional comments as may be warranted. These comments shall include either a statement that the Director has no objection to the DOE's site characterization program, if such a statement is appropriate, or specific objections with respect to DOE's program for characterization of the area concerned. In addition, the Director may make specific recommendations pertinent to DOE's site characterization program.

(e) If DOE's planned site characterization activities include onsite testing with radioactive material, including radioactive tracers, the Director's comments shall include a determination regarding whether or not the Commission concurs that the proposed use of such radioactive material is necessary to provide data for the preparation of the environmental reports required by law and for an application to be submitted under §60.22 of this part.

(f) The Director shall publish in the Federal Register a notice of availability of the site characterization analysis and a request for public comment. A reasonable period, not less than 90 days, shall be allowed for comment. Copies of the site characterization analysis and of the comments received shall be made available at the Public Document Room.

(g) During the conduct of site characterization activities, DOE shall report not less than once every six months to the Commission on the nature and extent of such activities and the information that has been developed, and on the progress of waste form and waste package research and development. The semiannual reports shall include the results of site characterization studies, the identification of new issues, plans for additional studies to resolve new issues, elimination of planned studies no longer necessary, identification of decision points reached and modifications to schedules where appropriate. DOE shall also report its progress in developing the design of a geologic repository operations area appropriate for the area being characterized, noting when key design parameters or features which depend upon the results of site characterization will be established. Other topics related to site characterization shall also be covered if requested by the Director.

(h) During the conduct of site characterization activities, NRC staff shall be permitted to visit and inspect the locations at which such activities are carried out and to observe excavations, borings, and in situ tests as they are done.

(i) The Director may comment at any time in writing to DOE, expressing current views on any aspect of site characterization. In particular, such comments shall be made whenever the Director, upon review of comments invited on the site characterization analysis or upon review of DOE's semiannual reports, determines that there are substantial new grounds for making recommendations or stating objections to DOE's site characterization program. The Director shall invite public comment on any comments which the Director makes to DOE upon review of the DOE semiannual reports or on any other comments which the Director makes to DOE on site characterization.

(j) The Director shall transmit copies of the site characterization analysis and all comments to DOE made by the Director under this section to the Governor and legislature of the State in which the area to be characterized is located and to the governing body of any affected Indian Tribe. When transmitting the site characterization analysis under this paragraph, the Director shall invite the addressees to review and comment thereon.

(k) All correspondence between DOE and the NRC under this section, including the reports described in paragraph (g), shall be placed in the Public Document Room.

(l) The activities described in paragraphs (a) through (k) of this section constitute informal conference between a prospective applicant and the staff, as described in §2.101(a)(1) of this chapter, and are not part of a proceeding under the Atomic Energy Act of 1954, as amended. Accordingly, neither the issuance of a site characterization analysis nor any other comments of the Director made under this section constitutes a commitment to issue any authorization or license or in any way affect the authority of the Commission, the Atomic Safety and Licensing Appeal Board, Atomic Safety and Licensing Boards, other presiding officers, or the Director, in any such proceeding.

[51 FR 27163, July 30, 1986]

License Applications

§60.21 Content of application.

(a) An application shall consist of general information and a Safety Analysis Report. An environmental impact statement shall be prepared in accordance with the Nuclear Waste Policy Act of 1982, as amended, and shall accompany the application. Any Restricted Data or National Security Information shall be separated from unclassified information.

(b) The general information shall include:

(1) A general description of the proposed geologic repository identifying the location of the geologic repository operations area, the general character of the proposed activities, and the basis for the exercise of licensing authority by the Commission.

(2) Proposed schedules for construction, receipt of waste, and emplacement of wastes at the proposed geologic repository operations area.

(3) A certification that DOE will provide at the geologic repository operations area such safeguards as it requires at comparable surface facilities (of DOE) to promote the common defense and security.

(4) A description of the physical security plan for protection against radiological sabotage. Since the radiation hazards associated with high-level

[2] In addition to the review of site characterization activities specified in this section, the Commission contemplates an ongoing review of other information on site investigation and site characterization, in order to allow early identification of potential licensing issues for timely resolution. This activity will include, for example, a review of the environmental assessments prepared by DOE at the time of site nomination, and review of issues related to long lead time exploratory shaft planning and procurement actions by DOE prior to issuance of site characterization plans.

wastes make them inherently unattractive as a target for theft or diversion, no detailed information need be submitted on protection against theft or diversion.

(5) A description of site characterization work actually conducted by DOE at all sites considered in the application and, as appropriate, explanations of why such work differed from the description of the site characterization program described in the Site Characterization Report for each site.

(c) The Safety Analysis Report shall include:

(1) A description and assessment of the site at which the proposed geologic repository operations area is to be located with appropriate attention to those features of the site that might affect geologic repository operations area design and performance. The description of the site shall identify the location of the geologic repository operations area with respect to the boundary of the accessible environment.

(i) The description of the site shall also include the following information regarding subsurface conditions. This description shall, in all cases, include such information with respect to the controlled area. In addition, where subsurface conditions outside the controlled area may affect isolation within the controlled area, the description shall include such information with respect to subsurface conditions outside the controlled area to the extent such information is relevant and material. The detailed information referred to in this paragraph shall include:

(A) The orientation, distribution, aperture in-filling and origin of fractures, discontinuities, and heterogeneities;

(B) The presence and characteristics of other potential pathways such as solution features, breccia pipes, or other potentially permeable features;

(C) The geomechanical properties and conditions, including pore pressure and ambient stress conditions;

(D) The hydrogeologic properties and conditions;

(E) The geochemical properties; and

(F) The anticipated response of the geomechanical, hydrogeologic, and geochemical systems to the maximum design thermal loading, given the pattern of fractures and other discontinuities and the heat transfer properties of the rock mass and groundwater.

(ii) The assessment shall contain:

(A) An analysis of the geology, geophysics, hydrogeology, geochemistry, climatology, and meteorology of the site,

(B) Analyses to determine the degree to which each of the favorable and potentially adverse conditions, if present, has been characterized, and the extent to which it contributes to or detracts from isolation. For the purpose of determining the presence of the potentially adverse conditions, investigations shall extend from the surface to a depth sufficient to determine critical pathways for radionuclide migration from the underground facility to the accessible environment. Potentially adverse conditions shall be investigated outside of the controlled area if they affect isolation within the controlled area.

(C) An evaluation of the performance of the proposed geologic repository for the period after permanent closure, assuming anticipated processes and events, giving the rates and quantities of releases of radionuclides to the accessible environment as a function of time; and a similar evaluation which assumes the occurrence of unanticipated processes and events.

(D) The effectiveness of engineered and natural barriers, including barriers that may not be themselves a part of the geologic repository operations area, against the release of radioactive material to the environment. The analysis shall also include a comparative evaluation of alternatives to the major design features that are important to waste isolation, with particular attention to the alternatives that would provide longer radionuclide containment and isolation.

(E) An analysis of the performance of the major design structures, systems, and components, both surface and subsurface, to identify those that are important to safety. For the purposes of this analysis, it shall be assumed that operations at the geologic repository operations area will be carried out at the maximum capacity and rate of receipt of radioactive waste stated in the application.

(F) An explanation of measures used to support the models used to perform the assessments required in paragraphs (A) through (D). Analyses and models that will be used to predict future conditions and changes in the geologic setting shall be supported by using an appropriate combination of such methods as field tests, in situ tests, laboratory tests which are representative of field conditions, monitoring data, and natural analog studies.

(2) A description and discussion of the design, both surface and subsurface, of the geologic repository operations area including:

(i) the principal design criteria and their relationship to any general performance objectives promulgated by the Commission,

(ii) the design bases and the relation of the design bases to the principal design criteria,

(iii) information relative to materials of construction (including geologic media, general arrangement, and approximate dimensions), and

(iv) codes and standards that DOE proposes to apply to the design and construction of the geologic repository operations area.

(3) A description and analysis of the design and performance requirements for structures, systems, and components of the geologic repository which are important to safety. This analysis shall consider—

(i) The margins of safety under normal conditions and under conditions that may result from anticipated operational occurrences, including those of natural origin; and

(ii) the adequacy of structures, systems, and components provided for the prevention of accidents and mitigation of the consequences of accidents, including those caused by natural phenomena.

(4) A description of the quality assurance program to be applied to the structures, systems, and components important to safety and to the engineered and natural barriers important to waste isolation.

(5) A description of the kind, amount, and specifications of the radioactive material proposed to be received and possessed at the geologic repository operations area.

(6) An identification and justification for the selection of those variables, conditions, or other items which are determined to be probable subjects of license specifications. Special attention shall be given to those items that may significantly influence the final design.

(7) A description of the program for control and monitoring of radioactive effluents and occupational radiation exposures to maintain such effluents and exposures in accordance with the requirements of Part 20 of this chapter.

(8) A description of the controls that the applicant will apply to restrict access and to regulate land use at the site and adjacent areas, including a conceptual design of monuments which would be used to identify the controlled area after permanent closure.

(9) Plans for coping with radiological emergencies at any time prior to permanent closure and decontamination or dismantlement of surface facilities.

(10) A description of the nuclear material control and accounting program.

(11) A description of design considerations that are intended to facilitate permanent closure and decontamination or dismantlement of surface facilities.

(12) A description of plans for retrieval and alternate storage of the radioactive wastes should the geologic repository prove to be unsuitable for disposal of radioactive wastes.

(13) An identification and evaluation of the natural resources of the geologic setting, including estimates as to undiscovered deposits, the exploitation of which could affect the ability of the geologic repository to isolate radioactive wastes. Undiscovered deposits of resources characteristic of the area shall be estimated by reasonable inference based on geological and geophysical evidence. This evaluation of resources, including undiscovered deposits, shall be conducted for the site and for areas of similar size that are representative of and are within the geologic setting. For natural resources with current markets the resources shall be assessed, with estimates provided of both gross and net value. The estimate of net value shall take into account current development, extraction and marketing costs. For natural resources without current markets, but which would be marketable given credible projected changes in economic or technological factors, the resources shall be described by physical factors such as tonnage or other amount, grade, and quality.

(14) An identification of those structures, systems, and components of the geologic repository, both surface and subsurface, which require research and development to confirm the adequacy of design. For structures, systems, and components important to safety and for the

engineered and natural barriers important to waste isolation, DOE shall provide a detailed description of the programs designed to resolve safety questions, including a schedule indicating when these questions would be resolved.

(15) The following information concerning activities at the geologic repository operations area:

(i) The organizational structure of DOE as it pertains to construction and operation of the geologic repository operations area including a description of any delegations of authority and assignments of responsibilities, whether in the form of regulations, administrative directives, contract provisions, or otherwise.

(ii) Identification of key positions which are assigned responsibility for safety at and operation of the geologic repository operations area.

(iii) Personnel qualifications and training requirements.

(iv) Plans for startup activities and startup testing.

(v) Plans for conduct of normal activities, including maintenance, surveillance, and periodic testing of structures, systems, and components of the geologic repository operation area.

(vi) Plans for permanent closure and plans for the decontamination or dismantlement of surface facilities.

(vii) Plans for any uses of the geologic repository operations area for purposes other than disposal of radioactive wastes, with an analysis of the effects, if any, that such uses may have upon the operation of the structures, systems, and components important to safety and the engineered and natural barriers important to waste isolation.

[46 FR 13980, Feb. 25, 1981, as amended at 48 FR 28219, June 21, 1983]

§60.22 Filing and distribution of application.

(a) An application for a license to receive and possess source, special nuclear, or byproduct material at a geologic repository operations area at a site which has been characterized, and any amendments thereto, and an accompanying environmental impact statement and any supplements, shall be signed by the Secretary of Energy or the Secretary's authorized representative and shall be filed in triplicate with the Director.

(b) Each portion of such application and any amendments, and each environmental impact statement and any supplements, shall be accompanied by 30 additional copies. Another 120 copies shall be retained by DOE for distribution in accordance with written instructions from the Director or the Director's designee.

(c) DOE shall, upon notification of the appointment of an Atomic Safety and Licensing Board, update the application, eliminating all superseded information, and supplement the environmental impact statement if necessary, and serve the updated application and environmental impact statement (as it may have been supplemented) as directed by the Board. At that time DOE shall also serve one such copy of the application and environmental impact statement on the Atomic Safety and Licensing Appeal Panel. Any subsequent amendments to the application or supplements to the environmental impact statement shall be served in the same manner.

(d) At the time of filing of an application and any amendments thereto, one copy shall be made available in an appropriate location near the proposed geologic repository operations area (which shall be a public document room, if one has been established) for inspection by the public and updated as amendments to the application are made. The environmental impact statement and any supplements thereto shall be made available in the same manner. An updated copy of the application, and the environmental impact statement and supplements, shall be produced at any public hearing held by the Commission on the application, for use by any party to the proceeding.

(e) The DOE shall certify that the updated copies of the application, and the environmental impact statement as it may have been supplemented, as referred to in paragraphs (c) and (d) of this section, contain the current contents of such documents submitted in accordance with the requirements of this part.

[46 FR 13980, Feb. 25, 1981, as amended at 48 FR 28220, June 21, 1983, as amended 54 FR 27871, July 3, 1989]

§60.23 Elimination of repetition.

In its application, environmental report, or Site Characterization Report, the DOE may incorporate by reference information contained in previous applications, statements, or reports filed with the Commission: *Provided*, That such references are clear and specific and that copies of the information so incorporated are available in the public document room located near the site of the proposed geologic repository.

§60.24 Updating of application and environmental impact statement.

(a) The application shall be as complete as possible in the light of information that is reasonably available at the time of docketing.

(b) The DOE shall update its application in a timely manner so as to permit the Commission to review, prior to issuance of a license:

(1) Additional geologic, geophysical, geochemical, hydrologic, meteorologic and other data obtained during construction.

(2) Conformance of construction of structures, systems, and components with the design.

(3) Results of research programs carried out to confirm the adequacy of designs.

(4) Other information bearing on the Commission's issuance of a license that was not available at the time a construction authorization was issued.

(c) The DOE shall supplement its environmental impact statement in a timely manner so as to take into account the environmental impacts of any substantial changes in its proposed actions or any significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts.

Construction Authorization

§60.31 Construction authorization.

Upon review and consideration of an application and environmental impact statement submitted under this part, the Commission may authorize construction if it determines:

(a) *Safety.* That there is reasonable assurance that the types and amounts of radioactive materials described in the application can be received, possessed, and disposed of in a geologic repository operations area of the design proposed without unreasonable risk to the health and safety of the public. In arriving at this determination, the Commission shall consider whether:

(1) DOE has described the proposed geologic repository including but not limited to:

(i) The geologic, geophysical, geochemical and hydrologic characteristics of the site;

(ii) the kinds and quantities of radioactive waste to be received, possessed, stored, and disposed of in the geologic repository operations area;

(iii) the principal architectural and engineering criteria for the design of the geologic repository operations area;

(iv) construction procedures which may affect the capability of the geologic repository to serve its intended function; and

(v) features or components incorporated in the design for the protection of the health and safety of the public.

(2) The site and design comply with the performance objectives and criteria contained in Subpart E of this part.

(3) The DOE's quality assurance program complies with the requirements of Subpart G of this part.

(4) The DOE's personnel training program complies with the criteria contained in Subpart H of this part.

(5) The DOE's emergency plan complies with the criteria contained in Subpart I of this part.

(6) The DOE's proposed operating procedures to protect health and to minimize danger to life or property are adequate.

(b) *Common defense and security.* That there is reasonable assurance that the activities proposed in the application will not be inimical to the common defense and security. A DOE certification that it will provide at the geologic repository operations area such safeguards as it requires at comparable DOE surface facilities to promote the common defense and security will constitute a rebuttable presumption of noninimicality to the common defense and security.

(c) *Environmental.* That, after weighing the environmental, economic, technical and other benefits against environmental costs and considering available alternatives, the action called for is issuance of the construction authorization, with any appropriate conditions to protect environmental values.

[46 FR 13980, Feb. 25, 1981, as amended at 48 FR 28220, June 21, 1983]

§60.32 Conditions of construction authorization.

(a) A construction authorization shall include such conditions as the Commission finds to be necessary to protect the health and safety of the public, the common defense and security, or environmental values.

(b) The Commission will incorporate in the construction authorization provisions requiring DOE to furnish periodic or special reports regarding:

(1) Progress of construction,

(2) any data about the site obtained during construction which are not within the predicted limits upon which the facility design was based,

(3) any deficiencies in design and construction which, if uncorrected, could adversely affect safety at any future time, and

(4) results of research and development programs being conducted to resolve safety questions.

(c) The construction authorization will include restrictions on subsequent changes to the features of the geologic repository and the procedures authorized. The restrictions that may be imposed under this paragraph can include measures to prevent adverse effects on the geologic setting as well as measures related to the design and construction of the geologic repository operations area. These restrictions will fall into three categories of descending importance to public health and safety as follows:

(1) Those features and procedures which may not be changed without:

(i) 60 days prior notice to the Commission

(ii) 30 days notice of opportunity for a prior hearing, and

(iii) prior Commission approval;

(2) those features and procedures which may not be changed without (i) 60 days prior notice to the Commission, and (ii) prior Commission approval; and

(3) those features and procedures which may not be changed without 60 days notice to the Commission. Features and procedures falling in paragraph (c)(3) of this section may not be changed without prior Commission approval if the Commission, after having received the required notice, so orders.

(d) A construction authorization shall be subject to the limitation that a license to receive and possess source, special nuclear, or byproduct material at the geologic repository operations area shall not be issued by the Commission until (1) the DOE has updated its application as specified in §60.24, and (2) the Commission has made the findings stated in §60.41.

[46 FR 13980, Feb. 25, 1981, as amended at 48 FR 28221, June 21, 1983]

§60.33 Amendment of construction authorization.

(a) An application for amendment of a construction authorization shall be filed with the Commission fully describing any changes desired and following as far as applicable the format prescribed in §60.21.

(b) In determining whether an amendment of a construction authorization will be approved, the Commission will be guided by the considerations which govern the issuance of the initial construction authorization, to the extent applicable.

License Issuance and Amendment

§60.41 Standards for issuance of a license.

A license to receive and possess source, special nuclear, or byproduct material at a geologic repository operations area may be issued by the Commission upon finding that:

(a) Construction of the geologic repository operations area has been substantially completed in conformity with the application as amended, the provisions of the Atomic Energy Act, and the rules and regulations of the Commission. Construction may be deemed to be substantially complete for the purposes of this paragraph if the construction of (1) surface and interconnecting structures, systems, and components, and (2) any underground storage space required for initial operation are substantially complete.

(b) The activities to be conducted at the geologic repository operations area will be in conformity with the application as amended, the provisions of the Atomic Energy Act and the Energy Reorganization Act, and the rules and regulations of the Commission.

(c) The issuance of the license will not be inimical to the common defense and security and will not constitute an unreasonable risk to the health and safety of the public. A DOE certification that it will provide at the geologic repository operations area such safeguards as it requires at comparable DOE facilities to promote the common defense and security, will constitute a rebuttable presumption of noninimicality to the common defense and security.

(d) All applicable requirements of Part 51 have been satisfied.

§60.42 Conditions of license.

(a) A license issued pursuant to this part shall include such conditions, including license specifications, as the Commission finds to be necessary to protect the health and safety of the public, the common defense and security, and environmental values.

(b) Whether stated therein or not, the following shall be deemed conditions in every license issued:

(1) The license shall be subject to revocation, suspension, modification, or amendment for cause as provided by the Atomic Energy Act and the Commission's regulations.

(2) The DOE shall at any time while the license is in effect, upon written request of the Commission, submit written statements to enable the Commission to determine whether or not the license should be modified, suspended or revoked.

(3) The license shall be subject to the provisions of the Atomic Energy Act now or hereafter in effect and to all rules, regulations, and orders of the Commission. The terms and conditions of the license shall be subject to amendment, revision, or modification, by reason of amendments to or by reason of rules, regulations, and orders issued in accordance with the terms of the Atomic Energy Act.

(c) Each license shall be deemed to contain the provisions set forth in Section 183 b-d, inclusive, of the Atomic Energy Act, whether or not these provisions are expressly set forth in the license.

§60.43 License specification.

(a) A license issued under this part shall include license conditions derived from the analyses and evaluations included in the application, including amendments made before a license is issued, together with such additional conditions as the Commission finds appropriate.

(b) License conditions shall include items in the following categories:

(1) Restrictions as to the physical and chemical form and radioisotopic content of radioactive waste.

(2) Restrictions as to size, shape, and materials and methods of construction of radioactive waste packaging.

(3) Restrictions as to the amount of waste permitted per unit volume of storage space considering the physical characteristics of both the waste and the host rock.

(4) Requirements relating to test, calibration, or inspection to assure that the foregoing restrictions are observed.

(5) Controls to be applied to restricted access and to avoid disturbance to the controlled area and to areas outside the controlled area where conditions may affect isolation within the controlled area.

(6) Administrative controls, which are the provisions relating to organization and management, procedures, recordkeeping, review and audit, and reporting necessary to assure that activities at the facility are conducted in a safe manner and in conformity with the other license specifications.

[46 FR 13980, Feb. 25, 1981, as amended at 48 FR 28221, June 21, 1983]

§60.44 Changes, tests, and experiments.

(a)(1) Following authorization to receive and possess source, special nuclear, or byproduct material at a geologic repository operations area, the DOE may (i) make changes in the geologic

repository operations area as described in the application, (ii) make changes in the procedures as described in the application, and (iii) conduct tests or experiments not described in the application, without prior Commission approval, provided the change, test, or experiment involves neither a change in the license conditions incorporated in the license nor an unreviewed safety question.

(2) A proposed change, test, or experiment shall be deemed to involve an unreviewed safety question if (i) the likelihood of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the application is increased, (ii) the possibility of an accident or malfunction of a different type than any previously evaluated in the application is created, or (iii) the margin of safety as defined in the basis for any license condition is reduced.

(b) The DOE shall maintain records of changes in the geologic repository operations area and of changes in procedures made pursuant to this section, to the extent that such changes constitute changes in the geologic repository operations area or procedures as described in the application. Records of tests and experiments carried out pursuant to paragraph (a) of this section shall also be maintained. These records shall include a written safety evaluation which provides the basis for the determination that the change, test, or experiment does not involve an unreviewed safety question. The DOE shall prepare annually, or at such shorter intervals as may be specified in the license, a report containing a brief description of such changes, tests, and experiments, including a summary of the safety evaluation of each. The DOE shall furnish the report to the appropriate NRC Regional Office shown in Appendix D of Part 20 of this chapter with a copy to the Director, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555. Any report submitted pursuant to this paragraph shall be made a part of the public record of the licensing proceedings.

[46 FR 13980, Feb. 25, 1981, as amended at 52 FR 31612, Aug. 21, 1987]

§60.45 Amendment of license.

(a) An application for amendment of a license may be filed with the Commission fully describing the changes desired and following as far as applicable the format prescribed for license applications.

(b) In determining whether an amendment of a license will be approved, the Commission will be guided by the considerations that govern the issuance of the initial license, to the extent applicable.

§60.46 Particular activities requiring license amendment.

(a) Unless expressly authorized in the license, an amendment of the license shall be required with respect to any of the following activities:

(1) Any action which would make emplaced high-level radioactive waste irretrievable or which would substantially increase the difficulty of retrieving such emplaced waste.

(2) Dismantling of structures.

(3) Removal or reduction of controls applied to restrict access to or avoid disturbance of the controlled area and to areas outside the controlled area where conditions may affect isolation within the controlled area.

(4) Destruction or disposal of records required to be maintained under the provisions of this part.

(5) Any substantial change to the design or operating procedures from that specified in the license.

(6) Permanent closure.

(7) Any other activity involving an unreviewed safety question.

(b) An application for such an amendment shall be filed, and shall be reviewed, in accordance with the provisions of §60.45.

[46 FR 13980, Feb. 25, 1981, as amended at 48 FR 28221, June 21, 1983]

Permanent Closure

§60.51 License amendment for permanent closure.

(a) DOE shall submit an application to amend the license prior to permanent closure. The submission shall consist of an update of the license application submitted under §§60.21 and 60.22, including:

(1) A description of the program for post-permanent closure monitoring of the geologic repository.

(2) A detailed description of the measures to be employed—such as land use controls, construction of monuments, and preservation of records—to regulate or prevent activities that could impair the long-term isolation of emplaced waste within the geologic repository and to assure that relevant information will be preserved for the use of future generations. As a minimum, such measures shall include:

(i) Identification of the controlled area and geologic repository operations area by monuments that have been designed, fabricated, and emplaced to be as permanent as is practicable; and

(ii) Placement of records in the archives and land record systems of local State, and Federal government agencies, and archives elsewhere in the world, that would be likely to be consulted by potential human intruders—such records to identify the location of the geologic repository operations area, including the underground facility, boreholes and shafts, and the boundaries of the controlled area, and the nature and hazard of the waste.

(3) Geologic, geophysical, geochemical, hydrologic, and other site data that are obtained during the operational period pertinent to the long-term isolation of emplaced radioactive wastes.

(4) The results of tests, experiments, and any other analyses relating to backfill of excavated areas, shaft sealing, waste interaction with the host rock, and any other tests, experiments, or analyses pertinent to the long-term isolation of emplaced wastes within the geologic repository.

(5) Any substantial revision of plans for permanent closure.

(6) Other information bearing upon permanent closure that was not available at the time a license was issued.

(b) If necessary, so as to take into account the environmental impact of any substantial changes in the permanent closure activities proposed to be carried out or any significant new information regarding the environmental impacts of such closure, DOE shall also supplement its environmental impact statement and submit such statement, as supplemented, with the application for license amendment.

[46 FR 13980, Feb. 25, 1981, as amended at 48 FR 28221, June 21, 1983]

§60.52 Termination of license.

(a) Following permanent closure and the decontamination or dismantlement of surface facilities, DOE may apply for an amendment to terminate the license.

(b) Such application shall be filed, and will be reviewed, in accordance with the provisions of §60.45 and this section.

(c) A license shall be terminated only when the Commission finds with respect to the geologic repository:

(1) That the final disposition of radioactive wastes has been made in conformance with the DOE's plan, as amended and approved as part of the license.

(2) That the final state of the geologic repository operations area conforms to DOE's plans for permanent closure and DOE's plans for the decontamination or dismantlement of surface facilities, as amended and approved as part of the license.

(3) That the termination of the license is authorized by law, including sections 57, 62, and 81 of the Atomic Energy Act, as amended.

[46 FR 13980, Feb. 25, 1981, as amended at 48 FR 28222, June 21, 1983]

Subpart C—Participation by State Governments and Affected Indian Tribes

Source: 51 FR 27164, July 30, 1986, unless otherwise noted.

§60.61 Provision of information.

(a) The Director shall provide to the Governor and legislature of any State in which a geologic repository operations area is or may be located, and to the governing body of any affected Indian Tribe, timely and complete information regarding determinations or plans made by the Commission with respect to the site characterization, siting, development, design, licensing, construction,

operation, regulation, permanent closure, or decontamination and dismantlement of surface facilities, of such geologic repository operations area.

(b) For purposes of this section, a geologic repository operations area shall be considered to be one which "may be located" in a State if the location thereof in such State has been described in a site characterization plan submitted to the Commission under this part.

(c) Notwithstanding paragraph (a) of this section, the Director is not required to distribute any document to any entity if, with respect to such document, that entity or its counsel is included on a service list prepared pursuant to Part 2 of this chapter.

(d) Copies of all communications by the Director under this section shall be placed in the Public Document Room, and copies thereof shall be furnished to DOE.

§60.62 Site review.

(a) Whenever an area has been approved by the President for site characterization, and upon request of a State or an affected Indian Tribe, the Director shall make NRC staff available to consult with representatives of such States and Tribes.

(b) Requests for consultation shall be made in writing to the Director.

(c) Consultation under this section may include:

(1) Keeping the parties informed of the Director's views on the progress of site characterization.

(2) Review of applicable NRC regulations, licensing procedures, schedules, and opportunities for State and Tribe participation in the Commission's regulatory activities.

(3) Cooperation in development of proposals for State and Tribe participation in license reviews.

§60.63 Participation in license reviews.

(a) State and local governments and affected Indian Tribes may participate in license reviews as provided in Subpart G of Part 2 of this chapter. A State in which a repository for high-level radioactive waste is proposed to be located and any affected Indian Tribe shall have an unquestionable legal right to participate as a party in such proceedings.

(b) In addition, whenever an area has been approved by the President for site characterization, a State or an affected Indian Tribe may submit to the Director a proposal to facilitate its participation in the review of a site characterization plan and/or license application. The proposal may be submitted at any time and shall contain a description and schedule of how the State or affected Indian Tribe wishes to participate in the review, or what services or activities the State or affected Indian Tribe wishes NRC to carry out, and how the services or activities proposed to be carried out by NRC would contribute to such participation. The proposal may include educational or information services (seminars, public meetings) or other actions on the part of NRC, such as establishing additional public document rooms or employment or exchange of State personnel under the Intergovernmental Personnel Act.

(c) The Director shall arrange for a meeting between the representatives of the State or affected Indian Tribe and the NRC staff to discuss any proposal submitted under paragraph (b) of this section, with a view to identifying any modifications that may contribute to the effective participation by such State or Tribe.

(d) Subject to the availability of funds, the Director shall approve all or any part of a proposal, as it may be modified through the meeting described above, if it is determined that:

(1) The proposed activities are suitable in light of the type and magnitude of impacts which the State or affected Indian Tribe may bear;

(2) The proposed activities:

(i) Will enhance communications between NRC and the State or affected Indian Tribe;

(ii) Will make a productive and timely contribution to the review; and

(iii) Are authorized by law.

(e) The Director will advise the State or affected Indian Tribe whether its proposal has been accepted or denied, and if all or any part of proposal is denied, the Director shall state the reason for the denial.

(f) Proposals submitted under this section, and responses thereto, shall be made available at the Public Document Room.

§60.64 Notice to States.

If the Governor and legislature of a State have jointly designated on their behalf a single person or entity to receive notice and information from the Commission under this part, the Commission will provide such notice and information to the jointly designated person or entity instead of the Governor and legislature separately.

§60.65 Representation.

Any person who acts under this subpart as a representative for a State (or for the Governor or legislature thereof) or for an affected Indian Tribe shall include in the request or other submission, or at the request of the Commission, a statement of the basis of his or her authority to act in such representative capacity.

Subpart D—Records, Reports, Tests, and Inspections

Source: 48 FR 28222, June 21, 1983, unless otherwise noted.

§60.71 Records and reports.

(a) DOE shall maintain such records and make such reports in connection with the licensed activity as may be required by the conditions of the license or by rules, regulations, and orders of the Commission as authorized by the Atomic Energy Act and the Energy Reorganization Act.

(b) Records of the receipt, handling, and disposition of radioactive waste at a geologic repository operations area shall contain sufficient information to provide a complete history of the movement of the waste from the shipper through all phases of storage and disposal. DOE shall retain these records in a manner that ensures their useability for future generations in accordance with §60.51(a)(2).

§60.72 Construction records.

(a) DOE shall maintain records of construction of the geologic repository operations area in a manner that ensures their useability for future generations in accordance with §60.51(a)(2).

(b) The records required under paragraph (a) shall include at least the following:

(1) Surveys of the underground facility excavations, shafts, and boreholes referenced to readily identifiable surface features or monuments;

(2) A description of the materials encountered;

(3) Geologic maps and geologic cross sections;

(4) Locations and amount of seepage;

(5) Details of equipment, methods, progress, and sequence of work;

(6) Construction problems;

(7) Anomalous conditions encountered;

(8) Instrument locations, readings, and analysis;

(9) Location and description of structural support systems;

(10) Location and description of dewatering systems; and

(11) Details, methods of emplacement, and location of seals used.

§60.73 Reports of deficiencies.

DOE shall promptly notify the Commission of each deficiency found in the characteristics of the site, and design and construction of the geologic repository operations area which, were it to remain uncorrected, could:

(a) Be a substantial safety hazard,

(b) represent a significant deviation from the design criteria and design bases stated in the application, or

(c) represent a deviation from the conditions stated in the terms of a construction authorization or the license, including license specifications.

The notification shall be in the form of a written report, copies of which shall be sent to the Director and to the appropriate Nuclear Regulatory Commission Regional Office listed in Appendix D of Part 20 of this chapter.

§60.74 Tests.

(a) DOE shall perform, or permit the Commission to perform, such tests as the Commission deems appropriate or necessary for the administration of the regulations in this part. These may include tests of:

(1) Radioactive waste,

(2) The geologic repository including its structures, systems, and components,

(3) Radiation detection and monitoring instruments, and

(4) Other equipment and devices used in connection with the receipt, handling, or storage of radioactive waste.

(b) The tests required under this section shall include a performance confirmation program carried out in accordance with Subpart F of this part.

§60.75 Inspections.

(a) DOE shall allow the Commission to inspect the premises of the geologic repository operations area and adjacent areas to which DOE has rights of access.

(b) DOE shall make available to the Commission for inspection, upon reasonable notice, records kept by DOE pertaining to activities under this part.

(c)(1) DOE shall upon requests by the Director, Office of Nuclear Material Safety and Safeguards, provide rent-free office space for the exclusive use of the Commission inspection personnel. Heat, air-conditioning, light, electrical outlets and janitorial services shall be furnished by DOE. The office shall be convenient to and have full access to the facility and shall provide the inspector both visual and acoustic privacy.

(2) The space provided shall be adequate to accommodate a full-time inspector, a part-time secretary and transient NRC personnel and will be generally commensurate with other office facilities at the geologic repository operations area. A space of 250 square feet either within the geologic repository operations area's office complex or in an office trailer or other onsite space at the geologic repository operations area is suggested as a guide. For locations at which activities are carried out under licenses issued under other parts of this chapter, additional space may be requested to accommodate additional full-time inspectors. The Office space that is provided shall be subject to the approval of the Director, Office of Nuclear Material Safety and Safeguards. All furniture, supplies and communication equipment will be furnished by the Commission.

(3) DOE shall afford any NRC resident inspector assigned to that location, or other NRC inspectors identified by the Regional Administrator as likely to inspect the facility, immediate unfettered access, equivalent to access provided regular employees, following proper identification and compliance with applicable access control measures for security, radiological protection and personal safety.

[48 FR 28222, June 21, 1983, as amended at 52 FR 31612, Aug. 21, 1987]

Subpart E—Technical Criteria

Source: 48 FR 28222, June 21, 1983, unless otherwise noted.

§60.101 Purpose and nature of findings.

(a)(1) Subpart B of this part prescribes the standards for issuance of a license to receive and possess source, special nuclear, or byproduct material at a geologic repository operations area. In particular, §60.41(c) requires a finding that the issuance of a license will not constitute an unreasonable risk to the health and safety of the public. The purpose of this subpart is to set out performance objectives and site and design criteria which, if satisfied, will support such a finding of no unreasonable risk.

(2) While these performance objectives and criteria are generally stated in unqualified terms, it is not expected that complete assurance that they will be met can be presented. A reasonable assurance, on the basis of the record before the Commission, that the objectives and criteria will be met is the general standard that is required. For §60.112, and other portions of this subpart that impose objectives and criteria for repository performance over long times into the future, there will inevitably be greater uncertainties. Proof of the future performance of engineered barrier systems and the geologic setting over time periods of many hundreds or many thousands of years is not to be had in the ordinary sense of the word. For such long-term objectives and criteria, what is required is reasonable assurance, making allowance for the time period, hazards, and uncertainties involved, that the outcome will be in conformance with those objectives and criteria. Demonstration of compliance with such objectives and criteria will involve the use of data from accelerated tests and predictive models that are supported by such measures as field and laboratory tests, monitoring data and natural analog studies.

(b) Subpart B of this part also lists findings that must be made in support of an authorization to construct a geologic repository operations area. In particular, §60.31(a) requires a finding that there is reasonable assurance that the types and amounts of radioactive materials described in the application can be received, possessed, and disposed of in a geologic repository operations area of the design proposed without unreasonable risk to the health and safety of the public. As stated in that paragraph, in arriving at this determination, the Commission will consider whether the site and design comply with the criteria contained in this subpart. Once again, while the criteria may be written in unqualified terms, the demonstration of compliance may take uncertainties and gaps in knowledge into account, provided that the Commission can make the specified finding of reasonable assurance as specified in paragraph (a) of this section.

§60.102 Concepts.

This section provides a functional overview of Subpart E. In the event of any inconsistency with definitions found in §60.2, those definitions shall prevail.

(a) *The HLW facility.* NRC exercises licensing and related regulatory authority over those facilities described in section 202 (3) and (4) of the Energy Reorganization Act of 1974. Any of these facilities is designated a *HLW facility.*

(b) *The geologic repository operations area.* (1) This part deals with the exercise of authority with respect to a particular class of HLW facility—namely a *geologic repository operations area.*

(2) *A geologic repository operations area* consists of those surface and subsurface areas that are part of a geologic repository where radioactive waste handling activities are conducted. The underground structure, including openings and backfill materials, but excluding shafts, boreholes, and their seals, is designated the *underground facility.*

(3) The exercise of Commission authority requires that the geologic repository operations area be used for *storage* (which includes *disposal*) of *high-level radioactive wastes (HLW).*

(4) HLW includes irradiated reactor fuel as well as reprocessing wastes. However, if DOE proposes to use the geologic repository operations area for storage of *radioactive waste* other than HLW, the storage of this radioactive waste is subject to the requirements of this part.

(c) *Areas related to isolation.* Although the activities subject to regulation under this part are those to be carried out at the geologic repository operations area, the licensing process also considers characteristics of adjacent areas that are defined in other ways. There is to be an area surrounding the underground facility referred to above, which is designated the *controlled area,* within which DOE is to exercise specified controls to prevent adverse human actions following permanent closure. The location of the controlled area is the *site.* The *accessible environment* is the atmosphere, land surface, surface water, oceans, and the portion of the lithosphere that is outside the controlled area. There is an area, designated the *geologic setting,* which includes the geologic, hydrologic, and geochemical systems of the region in which a geologic repository operations area is or may be located. The geologic repository operations area plus the portion of the geologic setting that provides isolation of the radioactive waste make up the *geologic repository.*

(d) *Stages in the licensing process.* There are several stages in the licensing process. The *site characterization* stage, though begun before submission of a license application, may result in consequences requiring evaluation in the license review. The *construction stage* would follow, after issuance of a construction authorization. A *period of operations* follows the issuance of a license by the Commission. The period of operations includes the time during which *emplacement* of wastes occurs; any subsequent period before permanent closure during which the emplaced wastes are *retrievable;* and *permanent closure,* which includes sealing of shafts. Permanent closure represents the end of active human intervention with respect to the engineered barrier system.

(e) *Isolation of waste.*

(1) During the first several hundred years following permanent closure of a geologic repository, when radiation and thermal levels are high and the uncertainties in assessing repository performance are large, special emphasis is placed upon the ability to contain the wastes by waste packages within an *engineered barrier system.*

This is known as the *containment period*. The *engineered barrier system* includes the waste packages and the underground facility. A *waste package* is composed of the waste form and any containers, shielding, packing, and absorbent materials immediately surrounding an individual waste container. The *underground facility* means the underground structure, including openings and backfill materials, but excluding, shafts, boreholes, and their seals.

(2) Following the containment period special emphasis is placed upon the ability to achieve isolation of the wastes by virtue of the characteristics of the geologic repository. The engineered barrier system works to control the release of radioactive material to the geologic setting and the geologic setting works to control the release of radioactive material to the accessible environment. *Isolation* means inhibiting the transport of radioactive material so that amounts and concentrations of the materials entering the accessible environment will be kept within prescribed limits.

Performance Objectives

§60.111 Performance of the geologic repository operations area through permanent closure.

(a) *Protection against radiation exposures and releases of radioactive material.* The geologic repository operations area shall be designed so that until permanent closure has been completed, radiation exposures and radiation levels, and releases of radioactive materials to unrestricted areas, will at all times be maintained within the limits specified in Part 20 of this chapter and such generally applicable environmental standards for radioactivity as may have been established by the Environmental Protection Agency.

(b) *Retrievability of waste.*

(1) The geologic repository operations area shall be designed to preserve the option of waste retrieval throughout the period during which wastes are being emplaced and, thereafter, until the completion of a performance confirmation program and Commission review of the information obtained from such a program. To satisfy this objective, the geologic repository operations area shall be designed so that any or all of the emplaced waste could be retrieved on a reasonable schedule starting at any time up to 50 years after waste emplacement operations are initiated, unless a different time period is approved or specified by the Commission. This different time period may be established on a case-by-case basis consistent with the emplacement schedule and the planned performance confirmation program.

(2) This requirement shall not preclude decisions by the Commission to allow backfilling part or all of, or permanent closure of, the geologic repository operations area prior to the end of the period of design for retrievability.

(3) For purposes of this paragraph, a reasonable schedule for retrieval is one that would permit retrieval in about the same time as that devoted to construction of the geologic repository operations area and the emplacement of wastes.

§60.112 Overall system performance objective for the geologic repository after permanent closure.

The geologic setting shall be selected and the engineered barrier system and the shafts, boreholes and their seals shall be designed to assure that releases of radioactive materials to the accessible environment following permanent closure conform to such generally applicable environmental standards for radioactivity as may have been established by the Environmental Protection Agency with respect to both anticipated processes and events and unanticipated processes and events.

§60.113 Performance of particular barriers after permanent closure.

(a) *General provisions—*

(1) *Engineered barrier system.*

(i) The engineered barrier system shall be designed so that assuming anticipated processes and events:

(A) Containment of HLW will be substantially complete during the period when radiation and thermal conditions in the engineered barrier system are dominated by fission product decay; and

(B) any release of radionuclides from the engineered barrier system shall be a gradual process which results in small fractional releases to the geologic setting over long times. For disposal in the saturated zone, both the partial and complete filling with groundwater of available void spaces in the underground facility shall be appropriately considered and analyzed among the anticipated processes and events in designing the engineered barrier system.

(ii) In satisfying the preceding requirement, the engineered barrier system shall be designed, assuming anticipated processes and events, so that:

(A) Containment of HLW within the waste packages will be substantially complete for a period to be determined by the Commission taking into account the factors specified in §60.113(b) provided, that such period shall be not less than 300 years nor more than 1,000 years after permanent closure of the geologic repository; and

(B) The release rate of any radionuclide from the engineered barrier system following the containment period shall not exceed one part in 100,000 per year of the inventory of that radionuclide calculated to be present at 1,000 years following permanent closure, or such other fraction of the inventory as may be approved or specified by the Commission; provided, that this requirement does not apply to any radionuclide which is released at a rate less than 0.1% of the calculated total release rate limit. The calculated total release rate limit shall be taken to be one part in 100,000 per year of the inventory of radioactive waste, originally emplaced in the underground facility, that remains after 1,000 years of radioactive decay.

(2) *Geologic setting.* The geologic repository shall be located so that pre-waste-emplacement groundwater travel time along the fastest path of likely radionuclide travel from the disturbed zone to the accessible environment shall be at least 1,000 years or such other travel time as may be approved or specified by the Commission.

(b) On a case-by-case basis, the Commission may approve or specify some other radionuclide release rate, designed containment period or pre-waste-emplacement groundwater travel time, provided that the overall system performance objective, as it relates to anticipated processes and events, is satisfied. Among the factors that the Commission may take into account are:

(1) Any generally applicable environmental standard for radioactivity established by the Environmental Protection Agency;

(2) The age and nature of the waste, and the design of the underground facility, particularly as these factors bear upon the time during which the thermal pulse is dominated by the decay heat from the fission products;

(3) The geochemical characteristics of the host rock, surrounding strata and groundwater; and

(4) Particular sources of uncertainty in predicting the performance of the geologic repository.

(c) Additional requirements may be found to be necessary to satisfy the overall system performance objective as it relates to unanticipated processes and events.

Land Ownership and Control

§60.121 Requirements for ownership and control of interests in land.

(a) *Ownership of land.*

(1) Both the geologic repository operations area and the controlled area shall be located in and on lands that are either acquired lands under the jurisdiction and control of DOE, or lands permanently withdrawn and reserved for its use.

(2) These lands shall be held free and clear of all encumbrances, if significant, such as:

(i) Rights arising under the general mining laws;

(ii) easements for right-of-way; and

(iii) all other rights arising under lease, rights of entry, deed, patent, mortgage, appropriation, prescription, or otherwise.

(b) *Additional controls.* Appropriate controls shall be established outside of the controlled area. DOE shall exercise any jurisdiction and control over surface and subsurface estates necessary to prevent adverse human actions that could significantly reduce the geologic repository's ability to achieve isolation. The rights of DOE may take the form of appropriate possessory

interests, servitudes, or withdrawals from location or patent under the general mining laws.

(c) *Water rights.*

(1) DOE shall also have obtained such water rights as may be needed to accomplish the purpose of the geologic repository operations area.

(2) Water rights are included in the additional controls to be established under paragraph (b) of this section.

Siting Criteria

§60.122 Siting criteria.

(a)(1) A geologic setting shall exhibit an appropriate combination of the conditions specified in paragraph (b) of this section so that, together with the engineered barriers system, the favorable conditions present are sufficient to provide reasonable assurance that the performance objectives relating to isolation of the waste will be met.

(2) If any of the potentially adverse conditions specified in paragraph (c) of this section is present, it may compromise the ability of the geologic repository to meet the performance objectives relating to isolation of the waste. In order to show that a potentially adverse condition does not so compromise the performance of the geologic repository the following must be demonstrated:

(i) The potentially adverse human activity or natural condition has been adequately investigated, including the extent to which the condition may be present and still be undetected taking into account the degree of resolution achieved by the investigations; and

(ii) The effect of the potentially adverse human activity or natural condition on the site has been adequately evaluated using analyses which are sensitive to the potentially adverse human activity or natural condition and assumptions which are not likely to underestimate its effect; and

(iii)(A) The potentially adverse human activity or natural condition is shown by analysis pursuant to paragraph (a)(2)(ii) of this section not to affect significantly the ability of the geologic repository to meet the performance objectives relating to isolation of the waste, or

(B) The effect of the potentially adverse human activity or natural condition is compensated by the presence of a combination of the favorable characteristics so that the performance objectives relating to isolation of the waste are met, or

(C) The potentially adverse human activity or natural condition can be remedied.

(b) *Favorable conditions.*

(1) The nature and rates of tectonic, hydrogeologic, geochemical, and geomorphic processes (or any of such processes) operating within the geologic setting during the Quaternary Period, when projected, would not affect or would favorably affect the ability of the geologic repository to isolate the waste.

(2) For disposal in the saturated zone, hydrogeologic conditions that provide:

(i) A host rock with low horizontal and vertical permeability;

(ii) Downward or dominantly horizontal hydraulic gradient in the host rock and immediately surrounding hydrogeologic units; and

(iii) Low vertical permeability and low hydraulic gradient between the host rock and the surrounding hydrogeologic units.

(3) Geochemical conditions that:

(i) Promote precipitation or sorption of radionuclides;

(ii) Inhibit the formation of particulates, colloids, and inorganic and organic complexes that increase the mobility of radionuclides; or

(iii) Inhibit the transport of radionuclides by particulates, colloids, and complexes.

(4) Mineral assemblages that, when subjected to anticipated thermal loading, will remain unaltered or alter to mineral assemblages having equal or increased capacity to inhibit radionuclide migration.

(5) Conditions that permit the emplacement of waste at a minimum depth of 300 meters from the ground surface. (The ground surface shall be deemed to be the elevation of the lowest point on the surface above the disturbed zone.)

(6) A low population density within the geologic setting and a controlled area that is remote from population centers.

(7) Pre-waste-emplacement ground- water travel time along the fastest path of likely radionuclide travel from the disturbed zone to the accessible environment that substantially exceeds 1,000 years.

(8) For disposal in the unsaturated zone, hydrogeologic conditions that provide—

(i) Low moisture flux in the host rock and in the overlying and underlying hydrogeologic units;

(ii) A water table sufficiently below the underground facility such that fully saturated voids contiguous with the water table do not encounter the underground facility;

(iii) A laterally extensive low-permeability hydrogeologic unit above the host rock that would inhibit the downward movement of water or divert downward moving water to a location beyond the limits of the underground facility;

(iv) A host rock that provides for free drainage; or

(v) A climatic regime in which the average annual historic precipitation is a small percentage of the average annual potential evapotranspiration.

(c) *Potentially adverse conditions.* The following conditions are potentially adverse conditions if they are characteristic of the controlled area or may affect isolation within the controlled area.

(1) Potential for flooding of the underground facility, whether resulting from the occupancy and modification of floodplains or from the failure of existing or planned man-made surface water impoundments.

(2) Potential for foreseeable human activity to adversely affect the groundwater flow system, such as groundwater withdrawal, extensive irrigation, subsurface injection of fluids, underground pumped storage, military activity or construction of large scale surface water impoundments.

(3) Potential for natural phenomena such as landslides, subsidence, or volcanic activity of such a magnitude that large-scale surface water impoundments could be created that could change the regional groundwater flow system and thereby adversely affect the performance of the geologic repository.

(4) Structural deformation, such as uplift, subsidence, folding, or faulting that may adversely affect the regional groundwater flow system.

(5) Potential for changes in hydrologic conditions that would affect the migration of radionuclides to the accessible environment, such as changes in hydraulic gradient, average interstitial velocity, storage coefficient, hydraulic conductivity, natural recharge, potentiometric levels, and discharge points.

(6) Potential for changes in hydrologic conditions resulting from reasonably foreseeable climatic changes.

(7) Groundwater conditions in the host rock, including chemical composition, high ionic strength or ranges of Eh-pH, that could increase the solubility or chemical reactivity of the engineered barrier system.

(8) Geochemical processes that would reduce sorption of radionuclides, result in degradation of the rock strength, or adversely affect the performance of the engineered barrier system.

(9) Groundwater conditions in the host rock that are not reducing.

(10) Evidence of dissolutioning such as breccia pipes, dissolution cavities, or brine pockets.

(11) Structural deformation such as uplift, subsidence, folding, and faulting during the Quaternary Period.

(12) Earthquakes which have occurred historically that if they were to be repeated could affect the site significantly.

(13) Indications, based on correlations of earthquakes with tectonic processes and features, that either the frequency of occurrence or magnitude of earthquakes may increase.

(14) More frequent occurrence of earthquakes or earthquakes of higher magnitude than is typical of the area in which the geologic setting is located.

(15) Evidence of igneous activity since the start of the Quaternary Period.

(16) Evidence of extreme erosion during the Quaternary Period.

(17) The presence of naturally occurring materials, whether identified or undiscovered, within the site, in such form that:

(i) Economic extraction is currently feasible or potentially feasible during the foreseeable future; or

(ii) Such materials have greater gross value or net value than the average for other areas of similar size that are representative of and located within the geologic setting.

(18) Evidence of subsurface mining for resources within the site.

(19) Evidence of drilling for any purpose within the site.

(20) Rock or groundwater conditions that would require complex engineering measures in the design and construction of the underground facility or in the sealing of boreholes and shafts.

(21) Geomechanical properties that do not permit design of underground opening that will remain stable through permanent closure.

(22) Potential for the water table to rise sufficiently so as to cause saturation of an underground facility located in the unsaturated zone.

(23) Potential for existing or future perched water bodies that may saturate portions of the underground facility or provide a faster flow path from an underground facility located in the unsaturated zone to the accessible environment.

(24) Potential for the movement of radionuclides in a gaseous state through air-filled pore spaces of an unsaturated geologic medium to the accessible environment.

[48 FR 28222, June 21, 1983, as amended at 50 FR 29647, July 22, 1985]

Design Criteria for the Geologic Repository Operations Area

§60.130 Scope of design criteria for the geologic repository operations area.

Sections 60.131 through 60.134 specify minimum criteria for the design of the geologic repository operations area. These design criteria are not intended to be exhaustive, however. Omissions in §§60.131 through 60.134 do not relieve DOE from any obligation to provide such safety features in a specific facility needed to achieve the performance objectives. All design bases must be consistent with the results of site characterization activities.

§60.131 General design criteria for the geologic repository operations area.

(a) *Radiological protection.* The geologic repository operations area shall be designed to maintain radiation doses, levels, and concentrations of radioactive material in air in restricted areas within the limits specified in Part 20 of this chapter. Design shall include:

(1) Means to limit concentrations of radioactive material in air;

(2) Means to limit the time required to perform work in the vicinity of radioactive materials, including, as appropriate, designing equipment for ease of repair and replacement and providing adequate space for ease of operation;

(3) Suitable shielding;

(4) Means to monitor and control the dispersal of radioactive contamination;

(5) Means to control access to high radiation areas or airborne radioactivity areas; and

(6) A radiation alarm system to warn of significant increases in radiation levels, concentrations of radioactive material in air, and of increased radioactivity released in effluents. The alarm system shall be designed with provisions for calibration and for testing its operability.

(b) *Structures, systems, and components important to safety*—

(1) *Protection against natural phenomena and environmental conditions.* The structures, systems, and components important to safety shall be designed so that natural phenomena and environmental conditions anticipated at the geologic repository operations area will not interfere with necessary safety functions.

(2) *Protection against dynamic effects of equipment failure and similar events.* The structures, systems, and components important to safety shall be designed to withstand dynamic effects such as missile impacts, that could result from equipment failure, and similar events and conditions that could lead to loss of their safety functions.

(3) *Protection against fires and explosions.*

(i) The structures, systems, and components important to safety shall be designed to perform their safety functions during and after credible fires or explosions in the geologic repository operations area.

(ii) To the extent practicable, the geologic repository operations area shall be designed to incorporate the use of noncombustible and heat resistant materials.

(iii) The geologic repository operations area shall be designed to include explosion and fire detection alarm systems and appropriate suppression systems with sufficient capacity and capability to reduce the adverse effects of fires and explosions on structures, systems, and components important to safety.

(iv) The geologic repository operations area shall be designed to include means to protect systems, structures, and components important to safety against the adverse effects of either the operation or failure of the fire suppression systems.

(4) *Emergency capability.*

(i) The structures, systems, and components important to safety shall be designed to maintain control of radioactive waste and radioactive effluents, and permit prompt termination of operations and evacuation of personnel during an emergency.

(ii) The geologic repository operations area shall be designed to include onsite facilities and services that ensure a safe and timely response to emergency conditions and that facilitate the use of available offsite services (such as fire, police, medical and ambulance service) that may aid in recovery from emergencies.

(5) *Utility services.*

(i) Each utility service system that is important to safety shall be designed so that essential safety functions can be performed under both normal and accident conditions.

(ii) The utility services important to safety shall include redundant systems to the extent necessary to maintain, with adequate capacity, the ability to perform their safety functions.

(iii) Provisions shall be made so that, if there is a loss of the primary electric power source or circuit, reliable and timely emergency power can be provided to instruments, utility service systems, and operating systems, including alarm systems, important to safety.

(6) *Inspection, testing, and maintenance.* The structures, systems, and components important to safety shall be designed to permit periodic inspection, testing, and maintenance, as necessary, to ensure their continued functioning and readiness.

(7) *Criticality control.* All systems for processing, transporting, handling, storage, retrieval, emplacement, and isolation of radioactive waste shall be designed to ensure that a nuclear criticality accident is not possible unless at least two unlikely, independent, and concurrent or sequential changes have occurred in the conditions essential to nuclear criticality safety. Each system shall be designed for criticality safety under normal and accident conditions. The calculated effective multiplication factor (k_{eff}) must be sufficiently below unity to show at least a 5% margin, after allowance for the bias in the method of calculation and the uncertainty in the experiments used to validate the method of calculation.

(8) *Instrumentation and control systems.* The design shall include provisions for instrumentation and control systems to monitor and control the behavior of systems important to safety over anticipated ranges for normal operation and for accident conditions.

(9) *Compliance with mining regulations.* To the extent that DOE is not subject to the Federal Mine Safety and Health Act of 1977, as to the construction and operation of the geologic repository operations area, the design of the geologic repository operations area shall nevertheless include such provisions for worker protection as may be necessary to provide reasonable assurance that all structures, systems, and components important to safety can perform their intended functions. Any deviation from relevant design requirements in 30 CFR, Chapter I, Subchapters D, E, and N will give rise to a rebuttable presumption that this requirement has not been met.

(10) *Shaft conveyances used in radioactive waste handling.*

(i) Hoists important to safety shall be designed to preclude cage free fall.

(ii) Hoists important to safety shall be designed with a reliable cage location system.

(iii) Loading and unloading systems for hoists important to safety shall be designed with a reliable system of interlocks that will fail safely upon malfunction.

(iv) Hoists important to safety shall be designed to include two independent indicators to indicate when waste packages are in place and ready for transfer.

§60.132 Additional design criteria for surface facilities in the geologic repository operations area.

(a) *Facilities for receipt and retrieval of waste.* Surface facilities in the geologic repository

operations area shall be designed to allow safe handling and storage of wastes at the geologic repository operations area, whether these wastes are on the surface before emplacement or as a result of retrieval from the underground facility.

(b) *Surface facility ventilation.* Surface facility ventilation systems supporting waste transfer, inspection, decontamination, processing, or packaging shall be designed to provide protection against radiation exposures and offsite releases as provided in §60.111(a).

(c) *Radiation control and monitoring*—

(1)Effluent control. The surface facilities shall be designed to control the release of radioactive materials in effluents during normal operations so as to meet the performance objections of §60.111(a).

(2) *Effluent monitoring.* The effluent monitoring systems shall be designed to measure the amount and concentration of radionuclides in any effluent with sufficient precision to determine whether releases conform to the design requirement for effluent control. The monitoring systems shall be designed to include alarms that can be periodically tested.

(d) *Waste treatment.* Radioactive waste treatment facilities shall be designed to process any radioactive wastes generated at the geologic repository operations area into a form suitable to permit safe disposal at the geologic repository operations area or to permit safe transportation and conversion to a form suitable for disposal at an alternative site in accordance with any regulations that are applicable.

(e) *Consideration of decommissioning.* The surface facility shall be designed to facilitate decontamination or dismantlement to the same extent as would be required, under other parts of this chapter, with respect to equivalent activities licensed thereunder.

§60.133 Additional design criteria for the underground facility.

(a) *General criteria for the underground facility.*

(1) The orientation, geometry, layout, and depth of the underground facility, and the design of any engineered barriers that are part of the underground facility shall contribute to the containment and isolation of radionuclides.

(2) The underground facility shall be designed so that the effects of credible disruptive events during the period of operations, such as flooding, fires and explosions, will not spread through the facility.

(b) *Flexibility of design.* The underground facility shall be designed with sufficient flexibility to allow adjustments where necessary to accommodate specific site conditions identified through in situ monitoring, testing, or excavation.

(c) *Retrieval of waste.* The underground facility shall be designed to permit retrieval of waste in accordance with the performance objectives of §60.111.

(d) *Control of water and gas.* The design of the underground facility shall provide for control of water or gas intrusion.

(e) *Underground openings.*

(1) Openings in the underground facility shall be designed so that operations can be carried out safely and the retrievability option maintained.

(2) Openings in the underground facility shall be designed to reduce the potential for deleterious rock movement or fracturing of overlying or surrounding rock.

(f) *Rock excavation.* The design of the underground facility shall incorporate excavation methods that will limit the potential for creating a preferential pathway for groundwater to contact the waste packages or radionuclide migration to the accessible environment.

(g) *Underground facility ventilation.* The ventilation system shall be designed to:

(1) Control the transport of radioactive particulates and gases within and releases from the underground facility in accordance with the performance objectives of §60.111(a),

(2) Assure continued function during normal operations and under accident conditions; and

(3) Separate the ventilation of excavation and waste emplacement areas.

(h) *Engineered barriers.* Engineered barriers shall be designed to assist the geologic setting in meeting the performance objectives for the period following permanent closure.

(i) *Thermal loads.* The underground facility shall be designed so that the performance objectives will be met taking into account the predicted thermal and thermomechanical response of the host rock, and surrounding strata, groundwater system.

[48 FR 28222, June 21, 1983, as amended at 50 FR 29648, July 22, 1985]

§60.134 Design of seals for shafts and boreholes.

(a) *General design criterion.* Seals for shafts and boreholes shall be designed so that following permanent closure they do not become pathways that compromise the geologic repository's ability to meet the performance objectives or the period following permanent closure.

(b) *Selection of materials and placement methods.* Materials and placement methods for seals shall be selected to reduce, to the extent practicable:

(1) The potential for creating a preferential pathway for groundwater to contact the waste packages or

(2) For radionuclide migration through existing pathways.

[48 FR 28222, June 21, 1983, as amended at 50 FR 29648, July 22, 1985]

Design Criteria for the Waste Package

§60.135 Criteria for the waste package and its components.

(a) *High-level-waste package design in general.*

(1) Packages for HLW shall be designed so that the in situ chemical, physical, and nuclear properties of the waste package and its interactions with the emplacement environment do not compromise the function of the waste packages or the performance of the underground facility or the geologic setting.

(2) The design shall include but not be limited to consideration of the following factors: solubility, oxidation/reduction reactions, corrosion, hydriding, gas generation, thermal effects, mechanical strength, mechanical stress, radiolysis, radiation damage, radionuclide retardation, leaching, fire and explosion hazards, thermal loads, and synergistic interactions.

(b) Specific criteria for HLW package design —

(1) Explosive, pyrophoric, and chemically reactive materials. The waste package shall not contain explosive or pyrophoric materials or chemically reactive materials in an amount that could compromise the ability of the underground facility to contribute to waste isolation or the ability of the geologic repository to satisfy the performance objectives.

(2) *Free liquids.* The waste package shall not contain free liquids in an amount that could compromise the ability of the waste packages to achieve the performance objectives relating to containment of HLW (because of chemical interactions or formation of pressurized vapor) or result in spillage and spread of contamination in the event of waste package perforation during the period through permanent closure.

(3) *Handling.* Waste packages shall be designed to maintain waste containment during transportation, emplacement, and retrieval.

(4) *Unique identification.* A label or other means of identification shall be provided for each waste package. The identification shall not impair the integrity of the waste package and shall be applied in such a way that the information shall be legible at least to the end of the period of retrievability. Each waste package identification shall be consistent with the waste package's permanent written records.

(c) Waste form criteria for HLW. High-level radioactive waste that is emplaced in the underground facility shall be designed to meet the following criteria:

(1) *Solidification.* All such radioactive wastes shall be in solid form and placed in sealed containers.

(2) *Consolidation.* Particulate waste forms shall be consolidated (for example, by incorporation into an encapsulating matrix) to limit the availability and generation of particulates.

(3) *Combustibles.* All combustible radioactive wastes shall be reduced to a noncombustible form unless it can be demonstrated that a fire involving the waste packages containing combustibles will not compromise the integrity of other waste packages,

adversely affect any structures, systems, or components important to safety, or compromise the ability of the underground facility to contribute to waste isolation.

(d) *Design criteria for other radioactive wastes.* Design criteria for waste types other than HLW will be addressed on an individual basis if and when they are proposed for disposal in a geologic repository.

Performance Confirmation Requirements

§60.137 General requirements for performance confirmation.

The geologic repository operations area shall be designed so as to permit implementation of a performance confirmation program that meets the requirements of Subpart F of this part.

Subpart F—Performance Confirmation Program

Source: 48 FR 28228, June 21, 1983, unless otherwise noted.

§60.140 General requirements.

(a) The performance confirmation program shall provide data which indicates, where practicable, whether:

(1) Actual subsurface conditions encountered and changes in those conditions during construction and waste emplacement operations are within the limits assumed in the licensing review; and

(2) Natural and engineered systems and components required for repository operation, or which are designed or assumed to operate as barriers after permanent closure, are functioning as intended and anticipated.

(b) The program shall have been started during site characterization and it will continue until permanent closure.

(c) The program shall include in situ monitoring, laboratory and field testing, and in situ experiments, as may be appropriate to accomplish the objective as stated above.

(d) The program shall be implemented so that:

(1) It does not adversely affect the ability of the natural and engineered elements of the geologic repository to meet the performance objectives.

(2) It provides baseline information and analysis of that information on those parameters and natural processes pertaining to the geologic setting that may be changed by site characterization, construction, and operational activities.

(3) It monitors and analyzes changes from the baseline condition of parameters that could affect the performance of a geologic repository.

(4) It provides an established plan for feedback and analysis of data, and implementation of appropriate action.

§60.141 Confirmation of geotechnical and design parameters.

(a) During repository construction and operation, a continuing program of surveillance, measurement, testing, and geologic mapping shall be conducted to ensure that geotechnical and design parameters are confirmed and to ensure that appropriate action is taken to inform the Commission of changes needed in design to accommodate actual field conditions encountered.

(b) Subsurface conditions shall be monitored and evaluated against design assumptions.

(c) As a minimum, measurements shall be made of rock deformations and displacement, changes in rock stress and strain, rate and location of water inflow into subsurface areas, changes in groundwater conditions, rock pore water pressures including those along fractures and joints, and the thermal and thermomechanical response of the rock mass as a result of development and operations of the geologic repository.

(d) These measurements and observations shall be compared with the original design bases and assumpxions. If significant differences exist between the measurements and observations and the original design bases and assumptions, the need for modifications to the design or in construction methods shall be determined and these differences and the recommended changes reported to the Commission.

(e) In situ monitoring of the thermomechanical response of the underground facility shall be conducted until permanent closure to ensure that the performance of the natural and engineering features are within design limits.

§60.142 Design testing.

(a) During the early or developmental stages of construction, a program for in situ testing of such features as borehole and shaft seals, backfill, and the thermal interaction effects of the waste packages, backfill, rock, and groundwater shall be conducted.

(b) The testing shall be initiated as early as is practicable.

(c) A backfill test section shall be constructed to test the effectiveness of backfill placement and compaction procedures against design requirements before permanent backfill placement is begun.

(d) Test sections shall be established to test the effectiveness of borehole and shaft seals before full-scale operation proceeds to seal boreholes and shafts.

§60.143 Monitoring and testing waste packages.

(a) A program shall be established at the geologic repository operations area for monitoring the condition of the waste packages. Waste packages chosen for the program shall be representative of those to be emplaced in the underground facility.

(b) Consistent with safe operation at the geologic repository operations area, the environment of the waste packages selected for the waste package monitoring program shall be representative of the environment in which the wastes are to be emplaced.

(c) The waste package monitoring program shall include laboratory experiments which focus on the internal condition of the waste packages. To the extent practical, the environment experienced by the emplaced waste packages within the underground facility during the waste package monitoring program shall be duplicated in the laboratory experiments.

(d) The waste package monitoring program shall continue as long as practical up to the time of permanent closure.

Subpart G—Quality Assurance

Source: 48 FR 28228, June 21, 1983, unless otherwise noted.

§60.150 Scope.

As used in this part, "quality assurance" comprises all those planned and systematic actions necessary to provide adequate confidence that the geologic repository and its subsystems or components will perform satisfactorily in service. Quality assurance includes quality control, which comprises those quality assurance actions related to the physical characteristics of a material, structure, component, or system which provide a means to control the quality of the material, structure, component, or system to predetermined requirements.

§60.151 Applicability.

The quality assurance program applies to all systems, structures and components important to safety, to design and characterization of barriers important to waste isolation and to activities related thereto. These activities include: site characterization, facility and equipment construction, facility operation, performance confirmation, permanent closure, and decontamination and dismantling of surface facilities.

§60.152 Implementation.

DOE shall implement a quality assurance program based on the criteria of Appendix B of 10 CFR Part 50 as applicable, and appropriately supplemented by additional criteria as required by §60.151.

Subpart H—Training and Certification of Personnel

Source: 48 FR 28229, June 21, 1983, unless otherwise noted.

§60.160 General requirements.

Operations of systems and components that have been identified as important to safety in the Safety Analysis Report and in the license shall be performed only by trained and certified personnel or by personnel under the direct visual supervision of an individual with training and certification in such operation. Supervisory personnel who direct

operations that are important to safety must also be certified in such operations.

§60.161 Training and certification program.

DOE shall establish a program for training, proficiency testing, certification and requalification of operating and supervisory personnel.

§60.162 Physical requirements.

The physical condition and the general health of personnel certified for operations that are important to safety shall not be such as might cause operational errors that could endanger the public health and safety. Any condition which might cause impaired judgment or motor coordination must be considered in the selection of personnel for activities that are important to safety. These conditions need not categorically disqualify a person, so long as appropriate provisions are made to accommodate such conditions.

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10 CFR 61

PART 61—LICENSING REQUIREMENTS FOR LAND DISPOSAL OF RADIOACTIVE WASTE

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Authority: Secs. 53, 57, 62, 63, 65, 81, 161, 182, 68 Stat. 930, 932, 933, 935, 948, 953, 954, as amended (42 U.S.C. 2073, 2077, 2092, 2093, 2095, 2111, 2201, 2232, 2233); secs. 202, 206, 88 Stat. 1244, 1246 (42 U.S.C. 5842, 5846); secs. 10 and 14, Pub. L. 95-601, 92 Stat. 2951 (42 U.S.C. 2021a and 5851).

For the purposes of sec. 223, 68 Stat. 958, as amended (42 U.S.C. 2273; Tables 1 and 2, Secs. 61.3, 61.9(f), 61.24, 61.25, 61.27(a), 61.41 through 61.43, 61.52, 61.53, 61.55, 61.56, and 61.61 through 61.63 are issued under secs. 161b. 161i and 161o, 68 Stat. 948, 949, and 950 as amended (42 U.S.C. 2201(b), 2201(i) and 2201(o)); Secs. 61.9a, 61.10 through 61.16, 61.24 and 61.80 are issued under sec. 161o, 68 Stat. 950, as amended (42 U.S.C. 2201(o)).

Source: 47 FR 57463, Dec. 27, 1982, unless otherwise noted.

Subpart A—General Provisions

§61.1 Purpose and scope.

(a) The regulations in this part establish, for land disposal of radioactive waste, the procedures, criteria, and terms and conditions upon which the Commission issues licenses for the disposal of radioactive wastes containing byproduct, source and special nuclear material received from other persons. Disposal of waste by an individual licensee is set forth in Part 20 of this chapter. Applicability of the requirements in this Part to Commission licenses for waste disposal facilities in effect on the effective date of this rule will be determined on a case-by-case basis and implemented through terms and conditions of the license or by orders issued by the Commission.

(b) Except as provided in Part 150 of this chapter, which addresses assumption of certain regulatory authority by Agreement States, and §61.6 "Exemptions," the regulations in this part apply to all persons in the United States. The regulations in this part do not apply to (1) disposal of high-level waste as provided for in Part 60 of this chapter; (2) disposal of uranium or thorium tailings or wastes (byproduct material as defined in §40.4(a-1)) as provided for in Part 40 of this chapter in quantities greater than 10,000 kilograms and containing more than five (5) millicuries of radium-226; or (3) disposal of licensed material as provided for in Part 20 of this chapter.

(c) This part also gives notice to all persons who knowingly provide to any licensee, contractor, subcontractor, components, equipment materials, or other goods or services, that relate to a licensee's activities subject to this part, that they may be individually subject to NRC enforcement action for violation of §61.9b.

§61.2 Definitions.

As used in this part:

"Active maintenance" means any significant remedial activity needed during the period of institutional control to maintain a reasonable assurance that the performance objectives in §§61.41 and 61.42 are met. Such active maintenance includes ongoing activities such as the pumping and treatment of water from a disposal unit or one-time measures such as replacement of a disposal unit cover. Active maintenance does not include custodial activities such as repair of fencing, repair or replacement of monitoring equipment, revegetation, minor additions to soil cover, minor repair of disposal unit covers, and general disposal site upkeep such as mowing grass.

"Buffer zone" is a portion of the disposal site that is controlled by the licensee and that lies under the disposal units and between the disposal units and the boundary of the site.

"Chelating agent" means amine polycarboxylic acids (e.g., EDTA, DTPA), hydroxy-carboxylic acids, and polycarboxylic acids (e.g., citric acid, carbolic acid, and gluconic acid).

"Commencement of construction" means any clearing of land, excavation, or other substantial action that would adversely affect the

environment of a land disposal facility. The term does not mean disposal site exploration, necessary roads for disposal site exploration, borings to determine foundation conditions, or other preconstruction monitoring or testing to establish background information related to the suitability of the disposal site or the protection of environmental values.

"Commission" means the Nuclear Regulatory Commission or its duly authorized representatives.

"Custodial Agency" means an agency of the government designated to act on behalf of the government owner of the disposal site.

"Director" means the Director, Office of Nuclear Material Safety and Safeguards, U. S. Nuclear Regulatory Commission.

"Disposal" means the isolation of radioactive wastes from the biosphere inhabited by man and containing his food chains by emplacement in a land disposal facility.

"Disposal site" means that portion of a land disposal facility which is used for disposal of waste. It consists of disposal units and a buffer zone.

"Disposal unit" means a discrete portion of the disposal site into which waste is placed for disposal. For near-surface disposal the unit is usually a trench.

"Engineered barrier" means a man-made structure or device that is intended to improve the land disposal facility's ability to meet the performance objectives in Subpart C.

"Explosive material" means any chemical compound, mixture, or device, which produces a substantial instantaneous release of gas and heat spontaneously or by contact with sparks or flame.

"Government agency" means any executive department, commission, independent establishment, or corporation, wholly or partly owned by the United States of America which is an instrumentality of the United States; or any board, bureau, division, service, office, officer, authority, administration, or other establishment in the executive branch of the government.

"Hazardous waste" means those wastes designated as hazardous by Environmental Protection Agency regulations in 40 CFR Part 261.

"Hydrogeologic unit" means any soil or rock unit or zone which by virtue of its porosity or permeability, or lack thereof, has a distinct influence on the storage or movement of groundwater.

"Inadvertent intruder" means a person who might occupy the disposal site after closure and engage in normal activities, such as agriculture, dwelling construction, or other pursuits in which the person might be unknowingly exposed to radiation from the waste.

"Indian Tribe" means an Indian tribe as defined in the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450).

"Intruder barrier" means a sufficient depth of cover over the waste that inhibits contact with waste and helps to ensure that radiation exposures to an inadvertent intruder will meet the performance objectives set forth in this part, or engineered structures that provide equivalent protection to the inadvertent intruder.

"Land disposal facility" means the land, buildings, and equipment which is intended to be used for the disposal of radioactive wastes into the subsurface of the land. For purposes of this chapter, a geologic repository as defined in Part 60 is not considered a land disposal facility.

"License" means a license issued under the regulations in Part 61 of this chapter.

"Licensee" means the holder of such a license.

"Monitoring" means observing and making measurements to provide data to evaluate the performance and characteristics of the disposal site.

"Near-surface disposal facility" means a land disposal facility in which radioactive waste is disposed of in or within the upper 30 meters of the earth's surface.

"Person" means (1) any individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, government agency other than the Commission or the Department of Energy, (except that the Department of Energy is considered a person within the meaning of the regulations in this part to the extent that its facilities and activities are subject to the licensing and related regulatory authority of the Commission pursuant to law) any State or any political subdivision of or any political entity within a State, any foreign government or nation or any political subdivision of any such government or nation, or other entity; and (2) any legal successor, representative, agent, or agency of the foregoing.

"Pyrophoric liquid" means any liquid that ignites spontaneously in dry or moist air at or below 130°F (54.5°C). A pyrophoric solid is any solid material, other than one classed as an explosive, which under normal conditions is liable to cause fires through friction, retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious transportation, handling, or disposal hazard. Included are spontaneously combustible and water-reactive materials.

"Site closure and stablization" means those actions that are taken upon completion of operations that prepare the disposal site for custodial care and that assure that the disposal site will remain stable and will not need ongoing active maintenance.

"State" means any State, Territory, or possession of the United States, Puerto Rico, and the District of Columbia.

"Stability" means structural stability.

"Surveillance" means observation of the disposal site for purposes of visual detection of need for maintenance, custodial care, evidence of intrusion, and compliance with other license and regulatory requirements.

"Tribal Governing Body" means a Tribal organization as defined in the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450).

"Waste" means those low-level radioactive wastes containing source, special nuclear, or byproduct material that are acceptable for disposal in a land disposal facility. For the purposes of this definition, low-level waste has the same meaning as in the Low-Level Waste Policy Act, that is, radioactive waste not classified as high-level radioactive waste, transuranic waste, spent nuclear fuel, or byproduct material as defined in section 11e.(2) of the Atomic Energy Act (uranium or thorium tailings and waste).

§61.3 License required.

(a) No person may receive, possess, and dispose of radioactive waste containing source, special nuclear, or byproduct material at a land disposal facility unless authorized by a license issued by the Commission pursuant to this part, or unless exemption has been granted by the Commission under §61.6 of this part.

(b) Each person shall file an application with the Commission and obtain a license as provided in this part before commencing construction of a land disposal facility. Failure to comply with this requirement may be grounds for denial of a license.

§61.4 Communications.

Except where otherwise specified, all communications and reports concerning the regulations in this part and applications filed under them should be addressed to the Director, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555. Communications, reports, and applications may be delivered in person at the Commission's Offices at 2120 L Street NW., Washington, DC, or 11555 Rockville Pike, Rockville, Maryland.

§61.5 Interpretations.

Except as specifically authorized by the Commission in writing, no interpretation of the meaning of the regulations in this part by any officer or employee of the Commission other than a written interpretation by the General Counsel will be considered binding upon the Commission.

§61.6 Exemptions.

The Commission may, upon application by any interested person, or upon its own initiative, grant any exemption from the requirements of the regulations in this part as it determines is authorized by law, will not endanger life or property or the common defense and security, and is otherwise in the public interest.

§61.7 Concepts.

(a) *The disposal facility.*

(1) Part 61 is intended to apply to land disposal of radioactive waste and not to other methods such as sea or extraterrestrial disposal. Part 61 contains procedural requirements and performance objectives applicable to any method of land disposal. It contains specific technical requirements for near-surface disposal of radioactive waste which involves disposal in the uppermost portion of the earth, approximately 30

meters. Burial deeper than 30 meters may also be satisfactory. Technical requirements for alternative methods will be added in the future.

(2) Near-surface disposal of radioactive waste takes place at a near-surface disposal facility, which includes all of the land and buildings necessary to carry out the disposal. The disposal site is that portion of the facility which is used for disposal of waste and consists of disposal units and a buffer zone. A disposal unit is a discrete portion of the disposal site into which waste is placed for disposal. For near-surface disposal, the disposal unit is usually a trench. A buffer zone is a portion of the disposal site that is controlled by the licensee and that lies under the site and between the boundary of the disposal site and any disposal unit. It provides controlled space to establish monitoring locations which are intended to provide an early warning of radionuclide movement, and to take mitigative measures if needed. In choosing a disposal site, site characteristics should be considered in terms of the indefinite future and evaluated for at least a 500 year time frame.

(b) *Waste classification and near-surface disposal.*

(1) Disposal of radioactive waste in near-surface disposal facilities has the following safety objectives: protection of the general population from releases of radioactivity, protection of individuals from inadvertent intrusion, and protection of individuals during operations. A fourth objective is to ensure stability of the site after closure.

(2) A cornerstone of the system is stability—stability of the waste and the disposal site so that once emplaced and covered, the access of water to the waste can be minimized. Migration of radionuclides is thus minimized, long-term active maintenance can be avoided, and potential exposures to intruders reduced. While stability is a desirable characteristic for all waste much radioactive waste does not contain sufficient amounts of radionuclides to be of great concern from these standpoints; this waste, however, tends to be unstable, such as ordinary trash type wastes. If mixed with the higher activity waste, their deterioration could lead to failure of the system and permit water to penetrate the disposal unit and cause problems with the higher activity waste. Therefore, in order to avoid placing requirements for a stable waste form on relatively innocuous waste, these wastes have been classed as Class A waste. The Class A waste will be disposed of in separate disposal units at the disposal site. However, Class A waste that is stable may be mixed with other classes of waste. Those higher activity wastes that should be stable for proper disposal are classed as Class B and C waste. To the extent that it is practicable, Class B and C waste forms or containers should be designed to be stable, i.e., maintain gross physical properties and identity, over 300 years. For certain radionuclides prone to migration, a maximum disposal site inventory based on the characteristics of the disposal site may be established to limit potential exposure.

(3) It is possible but unlikely that persons might occupy the site in the future and engage in normal pursuits without knowing that they were receiving radiation exposure. These persons are referred to as inadvertent intruders. Protection of such intruders can involve two principal controls: institutional control over the site after operations by the site owner to ensure that no such occupation or improper use of the site occurs; or, designating which waste could present an unacceptable risk to an intruder, and disposing of this waste in a manner that provides some form of intruder barrier that is intended to prevent contact with the waste. This regulation incorporates both types of protective controls.

(4) Institutional control of access to the site is required for up to 100 years. This permits the disposal of Class A and Class B waste without special provisions for intrusion protection, since these classes of waste contain types and quantities of radioisotopes that will decay during the 100-year period and will present an acceptable hazard to an intruder. The government landowner administering the active institutional control program has flexibility in controlling site access which may include allowing productive uses of the land provided the integrity and long-term performance of the site are not affected.

(5) Waste that will not decay to levels which present an acceptable hazard to an intruder within 100 years is designated as Class C waste. This waste is disposed of at a greater depth than the other classes of waste so that subsequent surface activities by an intruder will not disturb the waste. Where site conditions prevent deeper disposal, intruder barriers such as concrete covers may be used. The effective life of these intruder barriers should be 500 years. A maximum concentration of radionuclides is specified for all wastes so that at the end of the 500 year period, remaining radioactivity will be at a level that does not pose an unacceptable hazard to an intruder or public health and safety. Waste with concentrations above these limits is generally unacceptable for near-surface disposal. There may be some instances where waste with concentrations greater than permitted for Class C would be acceptable for near-surface disposal with special processing or design. These will be evaluated on a case-by-case basis. Class C waste must also be stable.

(c) *The licensing process.*

(1) During the preoperational phase, the potential applicant goes through a process of disposal site selection by selecting a region of interest, examining a number of possible disposal sites within the area of interest and narrowing the choice to the proposed site. Through a detailed investigation of the disposal site characteristics the potential applicant obtains data on which to base an analysis of the disposal site's suitability. Along with these data and analyses, the applicant submits other more general information to the Commission in the form of an application for a license for land disposal. The Commission's review of the application is in accordance with administrative procedures established by rule and may involve participation by affected State governments or Indian tribes. While the proposed disposal site must be owned by a State or the Federal government before the Commission will issue a license, it may be privately owned during the preoperational phase if suitable arrangements have been made with a State or the Federal government to take ownership in fee of the land before the license is issued.

(2) During the operational phase, the licensee carries out disposal activities in accordance with the requirements of this regulation and any conditions on the license. Periodically, the authority to conduct the above ground operations and dispose of waste will be subject to a license renewal, at which time the operating history will be reviewed and a decision made to permit or deny continued operation. When disposal operations are to cease, the licensee applies for an amendment to his license to permit site closure. After final review of the licensee's site closure and stabilization plan, the Commission may approve the final activities necessary to prepare the disposal site so that ongoing active maintenance of the site is not required during the period of institutional control.

(3) During the period when the final site closure and stabilization activities are being carried out, the licensee is in a disposal site closure phase. Following that, for a period of 5 years, the licensee must remain at the disposal site for a period of post-closure observation and maintenance to assure that the disposal site is stable and ready for institutional control. The Commission may approve shorter or require longer periods if conditions warrant. At the end of this period, the licensee applies for a license transfer to the disposal site owner.

(4) After a finding of satisfactory disposal site closure, the Commission will transfer the license to the State or Federal government that owns the disposal site. If the Department of Energy is the Federal agency administering the land on behalf of the Federal government the license will be terminated because the Commission lacks regulatory authority over the Department for this activity. Under the conditions of the transferred license, the owner will carry out a program of monitoring to assure continued satisfactory disposal site performance, physical surveillance to restrict access to the site and carry out minor custodial activities. During this period, productive uses of the land might be permitted if those uses do not affect the stability of the site and its ability to meet the performance objectives. At the end of the prescribed period of institutional control, the license will be terminated by the Commission.

§61.8 Reporting, recordkeeping, and application requirements: OMB approval not required.

The information collection requirements contained in this part affect fewer than ten persons. Therefore, under section 3506(c)(5) of the Paperwork Reduction Act of 1980 (Pub. L. 96-511), OMB clearance is not required for these information collection requirements.

§61.9 Employee protection.

(a) Discrimination by a Commission licensee, an applicant for a Commission licensee, or a contractor or subcontractor of a Commission licensee or applicant against an employee for engaging in certain protected activities is prohibited. Discrimination includes discharge and other actions that relate to compensation, terms, conditions, and privileges of employment. The protected activities are established in section 210 of the Energy Reorganization Act of 1974, as amended, and in general are related to the administration or enforcement of a requirement imposed under the Atomic Energy Act or the Energy Reorganization Act.

(1) The protected activities include but are not limited to:

(i) Providing the Commission information about possible violations of requirements imposed under either of the above statutes;

(ii) Requesting the Commission to institute action against his or her employer for the administration or enforcement of these requirements; or

(iii) Testifying in any Commission proceeding.

(2) These activities are protected even if no formal proceeding is actually initiated as a result of the employee assistance or participation.

(3) This section has no application to any employee alleging discrimination prohibited by this section who, acting without direction from his or her employer (or the employer's agent), deliberately causes a violation of any requirement of the Energy Reorganization Act of 1974, as amended, or the Atomic Energy Act of 1954, as amended.

(b) Any employee who believes that he or she has been discharged or otherwise discriminated against by any person for engaging in the protected activities specified in paragraph (a)(1) of this section may seek a remedy for the discharge or discrimination through an administrative proceeding in the Department of Labor. The administrative proceeding must be initiated within 30 days after an alleged violation occurs by filing a complaint alleging the violation with the Department of Labor, Employment Standards Administration, Wage and Hour Division. The Department of Labor may order reinstatement, back pay, and compensatory damages.

(c) A violation of paragraph (a) or paragraph (f) of this section by a Commission licensee, an applicant for a Commission license, or a contractor or subcontractor of a Commission licensee or applicant may be grounds for—

(1) Denial, revocation, or suspension of the license.

(2) Imposition of a civil penalty on the licensee or applicant.

(3) Other enforcement action.

(d) Actions taken by an employer, or others, which adversely affect an employee may be predicated upon nondiscriminatory grounds. The prohibition applies when the adverse action occurs because the employee has engaged in protected activities. An employee's engagement in protected activities does not automatically render him or her immune from discharge or discipline for legitimate reasons or from adverse action dictated by non-prohibited considerations.

(e) Each licensee and each applicant shall post Form NRC-3, "Notice to Employees," on its premises. Posting must be at locations sufficient to permit employees protected by this section to observe a copy on the way to or from their place of work. Premises must be posted not later than 30 days after an application is docketed and remain posted while the application is pending before the Commission, during the term of the license, and for 30 days following license termination.

(f) No agreement affecting the compensation, terms, conditions and privileges of employment, including an agreement to settle a complaint filed by an employee with the Department of Labor pursuant to section 210 of the Energy Reorganization Act of 1974, may contain any provision which would prohibit, restrict, or otherwise discourage, an employee from participating in protected activity as defined in paragraph (a)(1) of this section, including, but not limited to, providing information to the NRC on potential violations or other matters within NRC's regulatory responsibilities.

Note: Copies of Form NRC-3 may be obtained by writing to the Regional Administrator of the appropriate U.S. Nuclear Regulatory Commission Regional Office listed in Appendix D, Part 20 of this chapter.

[47 FR 57463, Dec. 27, 1982, as amended at 52 FR 31612, Aug. 21, 1987]

§61.9a Completeness and accuracy of information.

(a) Information provided to the Commission by an applicant for a license or by a licensee or information required by statute or by the Commission's regulations, orders, or license conditions to be maintained by the applicant or the licensee shall be complete and accurate in all material respects.

(b) Each applicant or licensee shall notify the Commission of information identified by the applicant or licensee as having for the regulated activity a significant implication for public health and safety or common defense and security. An applicant or licensee violates this paragraph only if the applicant or licensee fails to notify the Commission of information that the applicant or licensee has identified as having a significant implication for public health and safety or common defense and security. Notification shall be provided to the Administrator of the appropriate Regional Office within two working days of identifying the information. This requirement is not applicable to information which is already required to be provided to the Commission by other reporting or updating requirements.

[52 FR 49372, Dec. 31, 1987]

§61.9b Deliberate misconduct

(a) Any license or any employee of a licensee; and any contractor (including a supplier or consultant), subcontractor, or any employee of a contractor or subcontractor, of any licensee, who knowingly provides to any licensee, contractor, or subcontractor, components, equipment, materials, or other goods or services, that relate to a licensee's activities subject to this part; may not:

(1)Engage in deliberate misconduct that causes or, but for detection, would have caused, a licensee to be in violation of any rule, regulation, or order, or any term, condition, or limitation of any license, issued by the Commission, or

(2) Deliberately submit to the NRC, a licensee, or a licensee's contractor or subcontractor, information that the person submitting the information knows to be incomplete or inaccurate in some respect material to the NRC.

(b) A person who violates paragraph (a)(1) or (a)(2) of this section may be subject to enforcement action in accordance with the procedures in 10 CFR part 2, subpart B.

(c) For purposes of paragraph (a)(1)of this section, deliberate misconduct by a person means an intentional act or omission that the person knows:

(1) Would cause a licensee to be in violation of any rule, regulation, or order, or any term, condition, or limitation, of any license issued by the Commission, or

(2) Constitutes a violation of a requirement, procedure, instruction, contract, purchase order or poli cy of a licensee, contractor, or subcontractor.

Subpart B—Licenses

§61.10 Content of application.

An application to receive from others, possess and dispose of wastes containing or contaminated with source, byproduct or special nuclear material by land disposal must consist of general information, specific technical information, institutional information, and financial information as set forth in §§61.11 through 61.16. An environmental report prepared in accordance with Subpart A of Part 51 of this chapter must accompany the application.

[49 FR 9405, Mar. 12, 1984]

§61.11 General information.

The general information must include each of the following:

(a) Identity of the applicant including:

(1) The full name, address, telephone number and description of the business or occupation of the applicant;

(2) If the applicant is a partnership, the name, and address of each partner and the principal location where the partnership does business;

(3) If the applicant is a corporation or an unincorporated association, (i) the state where it is incorporated or organized and the principal location where it does business, and (ii) the names and addresses of its directors and principal officers; and

(4) If the applicant is acting as an agent or representative of another person in filing the application, all information required under this paragraph must be supplied with respect to the other person.

(b) Qualifications of the applicant:

(1) The organizational structure of the applicant, both offsite and onsite, including a description of lines of authority and assignments of responsibilities, whether in the form of administrative directives, contract provisions, or otherwise;

(2) The technical qualifications, including training and experience, of the applicant and members of the applicant's staff to engage in the proposed activities. Minimum training and experience requirements for personnel filling key positions described in paragraph (b)(1) of this section must be provided;

(3) A description of the applicant's personnel training program; and

(4) The plan to maintain an adequate complement of trained personnel to carry out waste receipt, handling, and disposal operations in a safe manner.

(c) A description of:

(1) The location of the proposed disposal site;

(2) The general character of the proposed activities;

(3) The types and quantities of radioactive waste to be received, possessed, and disposed of;

(4) Plans for use of the land disposal facility for purposes other than disposal of radioactive wastes; and

(5) The proposed facilities and equipment.

(d) Proposed schedules for construction, receipt of waste, and first emplacement of waste at the proposed land disposal facility.

§61.12 Specific technical information.

The specific technical information must include the following information needed for demonstration that the performance objectives of Subpart C of this part and the applicable technical requirements of Subpart D of this part will be met:

(a) A description of the natural and demographic disposal site characteristics as determined by disposal site selection and characterization activities. The description must include geologic, geotechnical, hydrologic, meteorologic, climatologic, and biotic features of the disposal site and vicinity.

(b) A description of the design features of the land disposal facility and the disposal units. For near-surface disposal, the description must include those design features related to infiltration of water; integrity of covers for disposal units; structural stability of backfill, wastes, and covers; contact of wastes with standing water; disposal site drainage; disposal site closure and stabilization; elimination to the extent practicable of long-term disposal site maintenance; inadvertent intrusion; occupational exposures; disposal site monitoring; and adequacy of the size of the buffer zone for monitoring and potential mitigative measures.

(c) A description of the principal design criteria and their relationship to the performance objectives.

(d) A description of the design basis natural events or phenomena and their relationship to the principal design criteria.

(e) A description of codes and standards which the applicant has applied to the design and which will apply to construction of the land disposal facilities.

(f) A description of the construction and operation of the land disposal facility. The description must include as a minimum the methods of construction of disposal units; waste emplacement; the procedures for and areas of waste segregation; types of intruder barriers; onsite traffic and drainage systems; survey control program; methods and areas of waste storage; and methods to control surface water and groundwater access to the wastes. The description must also include a description of the methods to be employed in the handling and disposal of wastes containing chelating agents or other non-radiological substances that might affect meeting the performance objectives in Subpart C of this part.

(g) A description of the disposal site closure plan, including those design features which are intended to facilitate disposal site closure and to eliminate the need for ongoing active maintenance.

(h) An identification of the known natural resources at the disposal site, the exploitation of which could result in inadvertent intrusion into the low-level wastes after removal of active institutional control.

(i) A description of the kind, amount, classification and specifications of the radioactive material proposed to be received, possessed, and disposed of at the land disposal facility.

(j) A description of the quality control program for the determination of natural disposal site characteristics and for quality control during the design, construction, operation and closure of the land disposal facility and the receipt, handling, and emplacement of waste. Audits and managerial controls must be included.

(k) A description of the radiation safety program for control and monitoring of radioactive effluents to ensure compliance with the performance objective in §61.41 of this part and occupational radiation exposure to ensure compliance with the requirements of Part 20 of this chapter and to control contamination of personnel, vehicles, equipment, buildings, and the disposal site. Both routine operations and accidents must be addressed. The program description must include procedures, instrumentation, facilities, and equipment.

(l) A description of the environmental monitoring program to provide data to evaluate potential health and environmental impacts and the plan for taking corrective measures if migration of radionuclides is indicated.

(m) A description of the administrative procedures that the applicant will apply to control activities at the land disposal facility.

§61.13 Technical analyses.

The specific technical information must also include the following analyses needed to demonstrate that the performance objectives of Subpart C of this part will be met:

(a) Pathways analyzed in demonstrating protection of the general population from releases of radioactivity must include air, soil, groundwater, surface water, plant uptake, and exhumation by burrowing animals. The analyses must clearly identify and differentiate between the roles performed by the natural disposal site characteristics and design features in isolating and segregating the wastes. The analyses must clearly demonstrate that there is reasonable assurance that the exposure to humans from the release of radioactivity will not exceed the limits set forth in §61.41.

(b) Analyses of the protection of individuals from inadvertent intrusion must include demonstration that there is reasonable assurance the waste classification and segregation requirements will be met and that adequate barriers to inadvertent intrusion will be provided.

(c) Analyses of the protection of individuals during operations must include assessments of expected exposures due to routine operations and likely accidents during handling, storage, and disposal of waste. The analyses must provide reasonable assurance that exposures will be controlled to meet the requirements of Part 20 of this chapter.

(d) Analyses of the long-term stability of the disposal site and the need for ongoing active maintenance after closure must be based upon analyses of active natural processes such as erosion, mass wasting, slope failure, settlement of wastes and backfill, infiltration through covers over disposal areas and adjacent soils, and surface drainage of the disposal site. The analyses must provide reasonable assurance that there will not be a need for ongoing active maintenance of the disposal site following closure.

§61.14 Institutional information.

The institutional information must include:

(a) A certification by the Federal or State government which owns the disposal site that the Federal or State government is prepared to accept transfer of the license when the provisions of §61.30 are met, and will assume responsibility for custodial care after site closure and postclosure observation and maintenance.

(b) Where the proposed disposal site is on land not owned by the Federal or a State government, the applicant must submit evidence that arrangements have been made for assumption of ownership in fee by the Federal or a State government before the Commission issues a license.

§61.15 Financial information.

The financial information must be sufficient to demonstrate that the financial qualifications of the applicant are adequate to carry out the activities for which the license is sought and meet

other financial assurance requirements as specified in Subpart E of this part.

§61.16 Other information.

Depending upon the nature of the wastes to be disposed of, and the design and proposed operation of the land disposal facility, additional information may be requested by the Commission including the following:

(a) Physical security measures, if appropriate. Any application to receive and possess special nuclear material in quantities subject to the requirements of Part 73 of this chapter shall demonstrate how the physical security requirements of Part 73 will be met. In determining whether receipt and possession will be subject to the requirements of Part 73, the applicant shall not consider the quantity of special nuclear material that has been disposed of.

(b) Safety information concerning criticality, if appropriate.

(1) Any application to receive and possess special nuclear material in quantities that would be subject to the requirements of §70.24, "Criticality accident requirements" of Part 70 of this chapter shall demonstrate how the requirements of that section will be met, unless the applicant requests an exemption pursuant to §70.24(d). In determining whether receipt and possession would be subject to the requirements of §70.24, the applicant shall not consider the quantity of special nuclear material that has been disposed of.

(2) Any application to receive and possess special nuclear material shall describe proposed procedures for avoiding accidental criticality, which address both storage of special nuclear material prior to disposal and waste emplacement for disposal.

§61.20 Filing and distribution of application.

(a) An application for a license under this part, and any amendments thereto, shall be filed with the Director, must be signed by the applicant or the applicant's authorized representative under oath, and must consist of 1 signed original and 2 copies.

(b) Another 85 copies of the application must be retained by the applicant for distribution in accordance with written instructions from the Director or designee.

(c) *Fees.* Application, amendment, and inspection fees applicable to a license covering the receipt and disposal of radioactive wastes in a land disposal facility are required by Part 170 of this chapter.

[47 FR 57463, Dec. 27, 1982, as amended at 49 FR 9405, Mar. 12, 1984]

§61.21 Elimination of repetition.

In its application, the applicant may incorporate by reference information contained in previous applications, statements, or reports filed with the Commission if these references are clear and specific.

[49 FR 9405, Mar. 12, 1984]

§61.22 Updating of application.

(a) The application must be as complete as possible in the light of information that is available at the time of submittal.

(b) The applicant shall supplement its application in a timely manner, as necessary, to permit the Commission to review, prior to issuance of a license, any changes in the activities proposed to be carried out or new information regarding the proposed activities.

[49 FR 9405, Mar. 12, 1984]

§61.23 Standards for issuance of a license.

A license for the receipt, possession, and disposal of waste containing or contaminated with source, special nuclear, or byproduct material will be issued by the Commission upon finding that the issuance of the license will not be inimical to the common defense and security and will not constitute an unreasonable risk to the health and safety of the public, and:

(a) The applicant is qualified by reason of training and experience to carry out the disposal operations requested in a manner that protects health and minimizes danger to life or property.

(b) The applicant's proposed disposal site, disposal design, land disposal facility operations (including equipment, facilities, and procedures), disposal site closure, and postclosure institutional control are adequate to protect the public health and safety in that they provide reasonable assurance that the general population will be protected from releases of radioactivity as specified in the performance objective in §61.41, Protection of the general population from releases of radioactivity.

(c) The applicant's proposed disposal site, disposal site design, land disposal facility operations (including equipment, facilities, and procedures), disposal site closure, and postclosure institutional control are adequate to protect the public health and safety in that they will provide reasonable assurance that individual inadvertent intruders are protected in accordance with the performance objective in §61.42, Protection of individuals from inadvertent intrusion.

(d) The applicant's proposed land disposal facility operations, including equipment, facilities, and procedures, are adequate to protect the public health and safety in that they will provide reasonable assurance that the standards for radiation protection set out in Part 20 of this chapter will be met.

(e) The applicant's proposed disposal site, disposal site design, land disposal facility operations, disposal site closure, and postclosure institutional control are adequate to protect the public health and safety in that they will provide reasonable assurance that long-term stability of the disposed waste and the disposal site will be achieved and will eliminate to the extent practicable the need for ongoing active maintenance of the disposal site following closure.

(f) The applicant's demonstration provides reasonable assurance that the applicable technical requirements of Subpart D of this part will be met.

(g) The applicant's proposal for institutional control provides reasonable assurance that institutional control will be provided for the length of time found necessary to ensure the findings in paragraphs (b) through (e) of this section and that the institutional control meets the requirements of §61.59, Institutional requirements.

(h) The information on financial assurances meets the requirements of Subpart E of this part.

(i) The applicant's physical security information provides reasonable assurance that the requirements of Part 73 of this chapter will be met, insofar as they are applicable to special nuclear material to be possessed before disposal under the license.

(j) The applicant's criticality safety procedures are adequate to protect the public health and safety and provide reasonable assurance that the requirements of §70.24, Criticality accident requirements, of Part 70 of this chapter will be met, insofar as they are applicable to special nuclear material to be possessed before disposal under the license.

(k) Any additional information submitted as requested by the Commission pursuant to §61.16, Other information, is adequate.

(l) The requirements of Subpart A of Part 51 of this chapter have been met.

[47 FR 57463, Dec. 27, 1982, as amended at 49 FR 9405, Mar. 12, 1984]

§61.24 Conditions of licenses.

(a) A license issued under this part, or any right thereunder, may be transferred, assigned, or in any manner disposed of, either voluntarily or involuntarily, directly or indirectly, through transfer of control of the license to any person, only if the Commission finds, after securing full information, that the transfer is in accordance with the provisions of the Atomic Energy Act and gives its consent in writing in the form of a license amendment.

(b) The licensee shall submit written statements under oath upon request of the Commission, at any time before termination of the license, to enable the Commission to determine whether or not the license should be modified, suspended, or revoked.

(c) The license will be transferred to the site owner only on the full implementation of the final closure plan as approved by the Commission, including post-closure observation and maintenance.

(d) The licensee shall be subject to the provisions of the Atomic Energy Act now or hereafter in effect, and to all rules, regulations, and orders of the Commission. The terms and conditions of the license are subject to amendment, revision, or modification, by reason of amendments to, or by reason of rules, regulations, and orders issued in accordance with the terms of the Atomic Energy Act.

(e) Any license may be revoked, suspended or modified in whole or in part for any material false statement in the application or any statement of fact required under Section 182 of the Act, or because of conditions revealed by any application or statement of fact or any report, record, or inspection or other means which would warrant the Commission to refuse to grant a license to the original application, or for failure to operate the facility in accordance with the terms of the license, or for any violation of, or failure to observe any of the terms and conditions of the Act, or any rule, regulation, license or order of the Commission.

(f) Each person licensed by the Commission pursuant to the regulations in this part shall confine possession and use of materials to the locations and purposes authorized in the license.

(g) No radioactive waste may be disposed of until the Commission has inspected the land disposal facility and has found it to be in conformance with the description, design, and construction described in the application for a license.

(h) The Commission may incorporate in any license at the time of issuance, or thereafter, by appropriate rule, regulation or order, additional requirements and conditions with respect to the licensee's receipt, possession, and disposal of source, special nuclear or byproduct material as it deems appropriate or necessary in order to:

(1) Promote the common defense and security;

(2) Protect health or to minimize danger to life or property;

(3) Require reports and the keeping of records, and to provide for inspections of activities under the license that may be necessary or appropriate to effectuate the purposes of the Act and regulations thereunder.

(i) Any licensee who receives and possesses special nuclear material under this part in quantities that would be subject to the requirements of §70.24 of Part 70 of this chapter shall comply with the requirements of that section. The licensee shall not consider the quantity of special nuclear material that has been disposed of.

(j) The authority to dispose of wastes expires on the date stated in the license except as provided in §61.27(a) of this part.

(k)(1) Each licensee shall notify the appropriate NRC Regional Administrator, in writing, immediately following the filing of a voluntary or involuntary petition for bankruptcy under any Chapter of Title 11 (Bankruptcy) of the United States Code by or against:

(i) The licensee;

(ii) An entity (as that term is defined in 11 U.S.C. 101(14)) controlling the licensee or listing the license or licensee as property of the estate; or

(iii) An affiliate (as that term is defined in 11 U.S.C. 101(2)) of the licensee.

(2) This notification must indicate:

(i) The bankruptcy court in which the petition for bankruptcy was filed; and

(ii) The date of the filing of the petition.

[47 FR 57463, Dec. 27, 1982, as amended at 52 FR 1295, Jan. 12, 1987]

§61.25 Changes.

(a) Except as provided for in specific license conditions, the licensee shall not make changes in the land disposal facility or procedures described in the license application. The license will include conditions restricting subsequent changes to the facility and the procedures authorized which are important to public health and safety. These license restrictions will fall into three categories of descending importance to public health and safety as follows:

(1) those features and procedures which may not be changed without (i) 60 days prior notice to the Commission, (ii) 30 days notice of opportunity for a prior hearing, and (iii) prior Commission approval;

(2) those features and procedures which may not be changed without (i) 60 days prior notice to the Commission, and (ii) prior Commission approval; and

(3) those features and procedures which may not be changed without 60 days prior notice to the Commission. Features and procedures falling in paragraph (a)(3) of this section may not be changed without prior Commission approval if the Commission, after having received the required notice, so orders.

(b) Amendments authorizing site closure, license transfer, or license termination shall be included in paragraph (a)(1) of this section.

(c) The Commission shall provide a copy of the notice for opportunity for hearings provided in paragraph (a)(1) of this section to State and local officials or tribal governing bodies specified in §2.104(e) of Part 2 of this chapter.

§61.26 Amendment of license.

(a) An application for amendment of a license must be filed in accordance with §61.20 and shall fully describe the changes desired.

(b) In determining whether an amendment to a license will be approved, the Commission will apply the criteria set forth in §61.23.

§61.27 Application for renewal or closure.

(a) Any expiration date on a license applies only to the above ground activities and to the authority to dispose of waste. Failure to renew the license shall not relieve the licensee of responsibility for carrying out site closure, postclosure observation and transfer of the license to the site owner. An application for renewal or an application for closure under §61.28 must be filed at least 30 days prior to license expiration.

(b) Applications for renewal of a license must be filed in accordance with §§61.10 through 61.16 and §61.20. Applications for closure must be filed in accordance with §§61.20 and 61.28. Information contained in previous applications, statements or reports filed with the Commission under the license may be incorporated by reference if the references are clear and specific.

(c) In any case in which a licensee has timely filed an application for renewal of a license, the license for continued receipt and disposal of licensed materials does not expire until the Commission has taken final action on the application for renewal.

(d) In determining whether a license will be renewed, the Commission will apply the criteria set forth in §61.23.

§61.28 Contents of application for closure.

(a) Prior to final closure of the disposal site, or as otherwise directed by the Commission, the applicant shall submit an application to amend the license for closure. This closure application must include a final revision and specific details of the disposal site closure plan included as part of the license application submitted under §61.12(g) that includes each of the following:

(1) Any additional geologic, hydrologic, or other disposal site data pertinent to the long-term containment of emplaced radioactive wastes obtained during the operational period.

(2) The results of tests, experiments, or any other analyses relating to backfill of excavated areas, closure and sealing, waste migration and interaction with emplacement media, or any other tests, experiments, or analysis pertinent to the long-term containment of emplaced waste within the disposal site.

(3) Any proposed revision of plans for:

(i) Decontamination and/or dismantlement of surface facilities;

(ii) Backfilling of excavated areas; or

(iii) Stabilization of the disposal site for post-closure care.

(b) An environmental report or a supplement to an environmental report prepared in accordance with Subpart A of Part 51 of this chapter must accompany the application.

(c) Upon review and consideration of an application to amend the license for closure submitted in accordance with paragraph (a) of this section, the Commission shall issue an amendment authorizing closure if there is reasonable assurance that the long-term performance objectives of Subpart C of this part will be met.

[47 FR 57463, Dec. 27, 1982, as amended at 49 FR 9406, Mar. 12, 1984]

§61.29 Post-closure observation and maintenance.

Following completion of closure authorized in §61.28, the licensee shall observe, monitor, and carry out necessary maintenance and repairs at the disposal site until the license is transferred by the Commission in accordance with §61.30. Responsibility for the disposal site must be maintained by the licensee for 5 years. A shorter or longer time period for post-closure observation and maintenance may be established and approved as part of the site closure plan, based on site-specific conditions.

§61.30 Transfer of license.

(a) Following closure and the period of post-closure observation and maintenance, the licensee may apply for an amendment to transfer the license to the disposal site owner. The license shall be transferred when the Commission finds:

(1) That the closure of the disposal site has been made in conformance with the licensee's disposal site closure plan, as amended and approved as part of the license;

(2) That reasonable assurance has been provided by the licensee that the performance objectives of Subpart C of this part are met;

(3) That any funds and necessary records for care will be transferred to the disposal site owner;

(4) That the post-closure monitoring program is operational for implementation by the disposal site owner; and

(5) That the Federal or State government agency which will assume responsibility for institutional control of the disposal site is prepared to assume responsibility and ensure that the institutional requirements found necessary under §61.23(g) will be met.

§61.31 Termination of license.

(a) Following any period of institutional control needed to meet the requirements found necessary under §61.23, the licensee may apply for an amendment to terminate the license.

(b) This application must be filed, and will be reviewed, in accordance with the provision of §61.20 and of this section.

(c) A license is terminated only when the Commission finds:

(1) That the institutional control requirements found necessary under §61.23(g) have been met; and

(2) That any additional requirements resulting from new information developed during the institutional control period have been met, and that permanent monuments or markers warning against intrusion have been installed.

Subpart C—Performance Objectives

§61.40 General requirement.

Land disposal facilities must be sited, designed, operated, closed, and controlled after closure so that reasonable assurance exists that exposures to humans are within the limits established in the performance objectives in §§61.41 through 61.44.

§61.41 Protection of the general population from releases of radioactivity.

Concentrations of radioactive material which may be released to the general environment in ground water, surface water, air, soil, plants, or animals must not result in an annual dose exceeding an equivalent of 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public. Reasonable effort should be made to maintain releases of radioactivity in effluents to the general environment as low as is reasonably achievable.

§61.42 Protection of individuals from inadvertent intrusion.

Design, operation, and closure of the land disposal facility must ensure protection of any individual inadvertently intruding into the disposal site and occupying the site or contacting the waste at any time after active institutional controls over the disposal site are removed.

§61.43 Protection of individuals during operations.

Operations at the land disposal facility must be conducted in compliance with the standards for radiation protection set out in Part 20 of this chapter, except for releases of radioactivity in effluents from the land disposal facility, which shall be governed by §61.41 of this part. Every reasonable effort shall be made to maintain radiation exposures as low as is reasonably achievable.

§61.44 Stability of the disposal site after closure.

The disposal facility must be sited, designed, used, operated, and closed to achieve long-term stability of the disposal site and to eliminate to the extent practicable the need for ongoing active maintenance of the disposal site following closure so that only surveillance, monitoring, or minor custodial care are required.

Subpart D—Technical Requirements for Land Disposal Facilities

§61.50 Disposal site suitability requirements for land disposal.

(a) Disposal site suitability for near-surface disposal.

(1) The purpose of this section is to specify the minimum characteristics a disposal site must have to be acceptable for use as a near-surface disposal facility. The primary emphasis in disposal site suitability is given to isolation of wastes, a matter having long-term impacts, and to disposal site features that ensure that the long-term performance objectives of Subpart C of this part are met, as opposed to short-term convenience or benefits.

(2) The disposal site shall be capable of being characterized, modeled, analyzed and monitored.

(3) Within the region or state where the facility is to be located, a disposal site should be selected so that projected population growth and future developments are not likely to affect the ability of the disposal facility to meet the performance objectives of Subpart C of this part.

(4) Areas must be avoided having known natural resources which, if exploited, would result in failure to meet the performance objectives of Subpart C of this part.

(5) The disposal site must be generally well drained and free of areas of flooding or frequent ponding. Waste disposal shall not take place in a 100-year flood plain, coastal high-hazard area or wetland, as defined in Executive Order 11988, "Floodplain Management Guidelines."

(6) Upstream drainage areas must be minimized to decrease the amount of runoff which could erode or inundate waste disposal units.

(7) The disposal site must provide sufficient depth to the water table that ground water intrusion, perennial or otherwise, into the waste will not occur. The Commission will consider an exception to this requirement to allow disposal below the water table if it can be conclusively shown that disposal site characteristics will result in molecular diffusion being the predominant means of radionuclide movement and the rate of movement will result in the performance objectives of Subpart C of this part being met. In no case will waste disposal be permitted in the zone of fluctuation of the water table.

(8) The hydrogeologic unit used for disposal shall not discharge ground water to the surface within the disposal site.

(9) Areas must be avoided where tectonic processes such as faulting, folding, seismic activity, or vulcanism may occur with such frequency and extent to significantly affect the ability of the disposal site to meet the performance objectives of Subpart C of this part, or may preclude defensible modeling and prediction of long-term impacts.

(10) Areas must be avoided where surface geologic processes such as mass wasting, erosion, slumping, landsliding, or weathering occur with such frequency and extent to significantly affect the ability of the disposal site to meet the performance objectives of Subpart C of this part, or may preclude defensible modeling and prediction of long-term impacts.

(11) The disposal site must not be located where nearby facilities or activities could adversely impact the ability of the site to meet the performance objectives of Subpart C of this part or significantly mask the environmental monitoring program.

(b) Disposal site suitability requirements for land disposal other than near-surface (reserved).

§61.51 Disposal site design for land disposal.

(a) Disposal site design for near-surface disposal.

(1) Site design features must be directed toward long-term isolation and avoidance of the

need for continuing active maintenance after site closure.

(2) The disposal site design and operation must be compatible with the disposal site closure and stabilization plan and lead to disposal site closure that provides reasonable assurance that the performance objectives of Subpart C of this part will be met.

(3) The disposal site must be designed to complement and improve, where appropriate, the ability of the disposal site's natural characteristics to assure that the performance objectives of Subpart C of this part will be met.

(4) Covers must be designed to minimize to the extent practicable water infiltration, to direct percolating or surface water away from the disposed waste, and to resist degradation by surface geologic processes and biotic activity.

(5) Surface features must direct surface water drainage away from disposal units at velocities and gradients which will not result in erosion that will require ongoing active maintenance in the future.

(6) The disposal site must be designed to minimize to the extent practicable the contact of water with waste during storage, the contact of standing water with waste during disposal, and the contact of percolating or standing water with wastes after disposal.

(b) Disposal site design for other than near-surface disposal (reserved).

§61.52 Land disposal facility operation and disposal site closure.

(a) Near-surface disposal facility operation and disposal site closure.

(1) Wastes designated as Class A pursuant to §61.55, must be segregated from other wastes by placing in disposal units which are sufficiently separated from disposal units for the other waste classes so that any interaction between Class A wastes and other wastes will not result in the failure to meet the performance objectives in Subpart C of this Part. This segregation is not necessary for Class A wastes if they meet the stability requirements in §61.56(b) of this part.

(2) Wastes designated as Class C pursuant to §61.55, must be disposed of so that the top of the waste is a minimum of 5 meters below the top surface of the cover or must be disposed of with intruder barriers that are designed to protect against an inadvertent intrusion for a least 500 years.

(3) All wastes shall be disposed of in accordance with the requirements of paragraphs (a)(4) through (11) of this section.

(4) Wastes must be emplaced in a manner that maintains the package integrity during emplacement, minimizes the void spaces between packages, and permits the void spaces to be filled.

(5) Void spaces between waste packages must be filled with earth or other material to reduce future subsidence within the fill.

(6) Waste must be placed and covered in a manner that limits the radiation dose rate at the surface of the cover to levels that at a minimum will permit the licensee to comply with all provisions of §20.105, or, for licensees implementing the provisions of §§20.1001–20.2401, §§ 20.301 AND 20.302 of this chapter at the time the license is transferred pursuant to §61.30 of this part.

(7) The boundaries and locations of each disposal unit (e.g., trenches) must be accurately located and mapped by means of a land survey. Near-surface disposal units must be marked in such a way that the boundaries of each unit can be easily defined. Three permanent survey marker control points, referenced to United States Geological Survey (USGS) or National Geodetic Survey (NGS) survey control stations, must be established on the site to facilitate surveys. The USGS or NGS control stations must provide horizontal and vertical controls as checked against USGS or NGS record files.

(8) A buffer zone of land must be maintained between any buried waste and the disposal site boundary and beneath the disposed waste. The buffer zone shall be of adequate dimensions to carry out environmental monitoring activities specified in §61.53(d) of this part and take mitigative measures if needed.

(9) Closure and stabilization measures as set forth in the approved site closure plan must be carried out as each disposal unit (e.g., each trench) is filled and covered.

(10) Active waste disposal operations must not have an adverse effect on completed closure and stabilization measures.

(11) Only wastes containing or contaminated with radioactive materials shall be disposed of at the disposal site.

(b) Facility operation and disposal site closure for land disposal facilities other than near-surface (reserved).

§61.53 Environmental monitoring.

(a) At the time a license application is submitted, the applicant shall have conducted a preoperational monitoring program to provide basic environmental data on the disposal site characteristics. The applicant shall obtain information about the ecology, meteorology, climate, hydrology, geology, geochemistry, and seismology of the disposal site. For those characteristics that are subject to seasonal variation, data must cover at least a twelve month period.

(b) The licensee must have plans for taking corrective measures if migration of radionuclides would indicate that the performance objectives of Subpart C may not be met.

(c) During the land disposal facility site construction and operation, the licensee shall maintain a monitoring program. Measurements and observations must be made and recorded to provide data to evaluate the potential health and environmental impacts during both the construction and the operation of the facility and to enable the evaluation of long-term effects and the need for mitigative measures. The monitoring system must be capable of providing early warning of releases of radionuclides from the disposal site before they leave the site boundary.

(d) After the disposal site is closed, the licensee responsible for post-operational surveillance of the disposal site shall maintain a monitoring system based on the operating history and the closure and stabilization of the disposal site. The monitoring system must be capable of providing early warning of releases of radionuclides from the disposal site before they leave the site boundary.

§61.54 Alternative requirements for design and operations.

The Commission may, upon request or on its own initiative, authorize provisions other than those set forth in §§61.51 through 61.53 for the segregation and disposal of waste and for the design and operation of a land disposal facility on a specific basis, if it finds reasonable assurance of compliance with the performance objectives of Subpart C of this part.

§61.55 Waste classification.

(a) Classification of waste for near surface disposal.

(1) *Considerations.* Determination of the classification of radioactive waste involves two considerations. First, consideration must be given to the concentration of long-lived radionuclides (and their shorter-lived precursors) whose potential hazard will persist long after such precautions as institutional controls, improved waste form, and deeper disposal have ceased to be effective. These precautions delay the time when long-lived radionuclides could cause exposures. In addition, the magnitude of the potential dose is limited by the concentration and availability of the radionuclide at the time of exposure. Second, consideration must be given to the concentration of shorter-lived radionuclides for which requirements on institutional controls, waste form, and disposal methods are effective.

(2) *Classes of waste.*

(i) Class A waste is waste that is usually segregated from other waste classes at the disposal site. The physical form and characteristics of Class A waste must meet the minimum requirements set forth in §61.56(a). If Class A waste also meets the stability requirements set forth in §61.56(b), it is not necessary to segregate the waste for disposal.

(ii) Class B waste is waste that must meet more rigorous requirements on waste form to ensure stability after disposal. The physical form and characteristics of Class B waste must meet both the minimum and stability requirements set forth in §61.56.

(iii) Class C waste is waste that not only must meet more rigorous requirements on waste form to ensure stability but also requires additional measures at the disposal facility to protect against inadvertent intrusion. The physical form and characteristics of Class C waste must meet both the minimum and stability requirements set forth in §61.56.

(iv) Waste that is not generally acceptable for near-surface disposal is waste for which waste

form and disposal methods must be different, and in general more stringent, than those specified for Class C waste. In the absence of specific requirements in this part, such waste must be disposed of in a geologic repository as defined in Part 60 of this chapter unless proposal for disposal of such waste in a disposal site licensed pursuant to this part are approved by the Commission.

(3) Classification determined by long-lived radionuclides. If radioactive waste contains only radionuclides listed in Table 1, classification shall be determined as follows:

(i) If the concentration does not exceed 0.1 times the value in Table 1, the waste is Class A.

(ii) If the concentration exceeds 0.1 times the value in Table 1 but does not exceed the value in Table 1, the waste is Class C.

(iii) If the concentration exceeds the value in Table 1, the waste is not generally acceptable for near-surface disposal.

(iv) For wastes containing mixtures of radionuclides listed in Table 1, the total concentration shall be determined by the sum of fractions rule described in paragraph (a)(7) of this section.

Table 1

Radionuclide	Concentration curies per cubic meter
C-14	8
C-14 in activated metal	80
Ni-59 in activated metal	220
Nb-94 in activated metal	0.2
Tc-99	3
I-129	0.08
Alpha emitting transuranic nuclides with half-life greater than five years	[1] 100
Pu-241	[1] 3,500
Cm-242	[1] 20,000

(4) Classification determined by short-lived radionuclides. If radioactive waste does not contain any of the radionuclides listed in Table 1, classification shall be determined based on the concentrations shown in Table 2. However, as specified in paragraph (a)(6) of this section, if radioactive waste does not contain any nuclides listed in either Table 1 or 2, it is Class A.

(i) If the concentration does not exceed the value in Column 1, the waste is Class A.

(ii) If the concentration exceeds the value in Column 1, but does not exceed the value in Column 2, the waste is Class B.

(iii) If the concentration exceeds the value in Column 2, but does not exceed the value in Column 3, the waste is Class C.

(iv) If the concentration exceeds the value in Column 3, the waste is not generally acceptable for near-surface disposal.

(v) For wastes containing mixtures of the nuclides listed in Table 2, the total concentration shall be determined by the sum of fractions rule described in paragraph (a)(7) of this section.

(5) Classification determined by both long- and short-lived radionuclides. If radioactive waste contains a mixture of radionuclides, some of which are listed in Table 1, and some of which are listed in Table 2, classification shall be determined as follows:

(i) If the concentration of a nuclide listed in Table 1 does not exceed 0.1 times the value listed in Table 1, the class shall be that determined by the concentration of nuclides listed in Table 2.

(ii) If the concentration of a nuclide listed in Table 1 exceeds 0.1 times the value listed in Table 1 but does not exceed the value in Table 1, the waste shall be Class C, provided the concentration of nuclides listed in Table 2 does not exceed the value shown in Column 3 of Table 2.

(6) Classification of wastes with radionuclides other than those listed in Tables 1 and 2. If radioactive waste does not contain any nuclides listed in either Table 1 or 2, it is Class A.

(7) The sum of the fractions rule for mixtures of radionuclides. For determining classification for waste that contains a mixture of radionuclides, it is necessary to determine the sum of fractions by dividing each nuclide's concentration by the appropriate limit and adding the resulting values. The appropriate limits must all be taken from the same column of the same table. The sum of the fractions for the column must be less than 1.0 if the waste class is to be determined by that column. Example: A waste contains Sr-90 in a concentration of 50 Ci/m^3 and Cs-137 in a concentration of 22 Ci/m^3. Since the concentrations both exceed the values in Column 1, Table 2, they must be compared to Column 2 values. For Sr-90 fraction 50/150=0.33; for Cs-137 fraction, 22/44=0.5; the sum of the fractions=0.83. Since the sum is less than 1.0, the waste is Class B.

Table 2

Radionuclide	Concentration, curies per cubic meter		
	Col. 1	Col. 2	Col. 3
Total of all nuclides with less than 5 year half life	700	(1)	(1)
H-3	40	(1)	(1)
Co-60	700	(1)	(1)
Ni-63	3.5	70	700
Ni-63 in activated metal	35	700	7000
Sr-90	0.04	150	7000
Cs-137	1	44	4600

[1] There are no limits established for these radionuclides in Class B or C wastes. Practical consideration such as the effects of external radiation and internal heat generation on transportation, handling, and disposal will limit the concentrations for these wastes. These wastes shall be Class B unless the concentrations of other nuclides in Table 2 determine the waste to the Class C independent of these nuclides.

(8) *Determination of concentrations in wastes.* The concentration of a radionuclide may be determined by indirect methods such as use of scaling factors which relate the inferred concentration of one radionuclide to another that is measured, or radionuclide material accountability, if there is reasonable assurance that the indirect methods can be correlated with actual measurements. The concentration of a radionuclide may be averaged over the volume of the waste, or weight of the waste if the units are expressed as nanocuries per gram.

§61.56 Waste characteristics.

(a) The following requirements are minimum requirements for all classes of waste and are intended to facilitate handling at the disposal site and provide protection of health and safety of personnel at the disposal site.

(1) Waste must not be packaged for disposal in cardboard or fiberboard boxes.

(2) Liquid waste must be solidified or packaged in sufficient absorbent material to absorb twice the volume of the liquid.

(3) Solid waste containing liquid shall contain as little free standing and noncorrosive liquid as is reasonably achievable, but in no case shall the liquid exceed 1% of the volume.

(4) Waste must not be readily capable of detonation or of explosive decomposition or reaction at normal pressures and temperatures, or of explosive reaction with water.

(5) Waste must not contain, or be capable of generating, quantities of toxic gases, vapors, or fumes harmful to persons transporting, handling, or disposing of the waste. This does not apply to radioactive gaseous waste packaged in accordance with paragraph (a)(7) of this section.

(6) Waste must not be pyrophoric. Pyrophoric materials contained in waste shall be treated, prepared, and packaged to be nonflammable.

(7) Waste in a gaseous form must be packaged at a pressure that does not exceed 1.5 atmospheres at 20°C. Total activity must not exceed 100 curies per container.

(8) Waste containing hazardous, biological, pathogenic, or infectious material must be treated to reduce to the maximum extent practicable the potential hazard from the non-radiological materials.

(b) The requirements in this section are intended to provide stability of the waste. Stability is intended to ensure that the waste does not structurally degrade and affect overall stability of the site through slumping, collapse, or other failure of the disposal unit and thereby lead to water infiltration. Stability is also a factor in limiting exposure to an inadvertent intruder, since it provides a recognizable and nondispersible waste.

(1) Waste must have structural stability. A structurally stable waste form will generally maintain its physical dimensions and its form, under the expected disposal conditions such as weight of overburden and compaction equipment, the presence of moisture, and microbial activity, and internal factors such as radiation effects and chemical changes. Structural stability can be provided by the waste form itself, processing the waste to a stable form, or placing the waste in a disposal container or structure that provides stability after disposal.

(2) Notwithstanding the provisions in §61.56(a) (2) and (3), liquid wastes, or wastes containing liquid, must be converted into a form that contains as little free standing and noncorrosive liquid as is reasonably achievable, but in no case shall the liquid exceed 1% of the volume of the waste when the waste is in a disposal container designed to ensure stability, or 0.5% of the volume of the waste for waste processed to a stable form.

(3) Void spaces within the waste and between the waste and its package must be reduced to the extent practicable.

§61.57 Labeling.

Each package of waste must be clearly labeled to identify whether it is Class A waste, Class B waste, or class C waste, in accordance with §61.55.

§61.58 Alternative requirements for waste classification and characteristics.

The Commission may, upon request or on its own initiative, authorize other provisions for the classification and characteristics of waste on a specific basis, if, after evaluation, of the specific characteristics of the waste, disposal site, and method of disposal, it finds reasonable assurance of compliance with the performance objectives in Subpart C of this part.

§61.59 Institutional requirements.

(a) *Land ownership.* Disposal of radioactive waste received from other persons may be permitted only on land owned in fee by the Federal or a State government.

(b) *Institutional control.* The land owner or custodial agency shall carry out an institutional control program to physically control access to the disposal site following transfer of control of the disposal site from the disposal site operator. The institutional control program must also include, but not be limited to, carrying out an environmental monitoring program at the disposal site, periodic surveillance, minor custodial care, and other requirements as determined by the Commission; and administration of funds to cover the costs for these activities. The period of institutional controls will be determined by the Commission, but institutional controls may not be relied upon for more than 100 years following transfer of control of the disposal site to the owner.

Subpart E—Financial Assurances

§61.61 Applicant qualifications and assurances.

Each applicant shall show that it either possesses the necessary funds or has reasonable assurance of obtaining the necessary funds, or by a combination of the two, to cover the estimated costs of conducting all licensed activities over the planned operating life of the project, including costs of construction and disposal.

§61.62 Funding for disposal site closure and stabilization.

(a) The applicant shall provide assurance that sufficient funds will be available to carry out disposal site closure and stabilization, including:

(1) Decontamination or dismantlement of land disposal facility structures; and

(2) closure and stabilization of the disposal site so that following transfer of the disposal site to the site owner, the need for ongoing active maintenance is eliminated to the extent practicable and only minor custodial care, surveillance, and monitoring are required. These assurances shall be based on Commission-approved cost estimates reflecting the Commission-approved plan for disposal site closure and stabilization. The applicant's cost estimates must take into account total capital costs that would be incurred if an independent contractor were hired to perform the closure and stabilization work.

(b) In order to avoid unnecessary duplication and expense, the Commission will accept financial sureties that have been consolidated with earmarked financial or surety arrangements established to meet requirements of other Federal or State agencies and/or local governing bodies for such decontamination, closure and stabilization. The Commission will accept this arrangement only if they are considered adequate to satisfy these requirements and that the portion of the surety which covers the closure of the disposal site is clearly identified and committed for use in accomplishing these activities.

(c) The licensee's surety mechanism will be annually reviewed by the Commission to assure that sufficient funds are available for completion of the closure plan, assuming that the work has to be performed by an independent contractor.

(d) The amount of surety liability should change in accordance with the predicted cost of future closure and stabilization. Factors affecting closure and stabilization cost estimates include: inflation; increases in the amount of disturbed land; changes in engineering plans; closure and stabilization that has already been accomplished and any other conditions affecting costs. This will yield a surety that is at least sufficient at all times to cover the costs of closure of the disposal units that are expected to be used before the next license renewal.

(e) The term of the surety mechanism must be open ended unless it can be demonstrated that another arrangement would provide an equivalent level of assurance. This assurance could be provided with a surety mechanism which is written for a specified period of time (e.g., five years) yet which must be automatically renewed unless the party who issues the surety notifies the Commission and the beneficiary (the site owner) and the principal (the licensee) not less than 90 days prior to the renewal date of its intention not to renew. In such a situation the licensee must submit a replacement surety within 30 days after notification of cancellation. If the licensee fails to provide a replacement surety acceptable to the Commission, the site owner may collect on the original surety.

(f) Proof of forfeiture must not be necessary to collect the surety so that in the event that the licensee could not provide an acceptable replacement surety within the required time, the surety shall be automatically collected prior to its expiration. The conditions described above would have to be clearly stated on any surety instrument which is not open-ended, and must be agreed to by all parties. Liability under the surety mechanism must remain in effect until the closure and stabilization program has been completed and approved by the Commission and the license has been transferred to the site owner.

(g) Financial surety arrangements generally acceptable to the Commission include: surety bonds, cash deposits, certificates of deposits, deposits of government securities, escrow accounts, irrevocable letters or lines of credit, trust funds, and combinations of the above or such other types of arrangements as may be approved by the Commission. However, self-insurance, or any arrangement which essentially constitutes pledging the assets of the licensee, will not satisfy the surety requirement for private sector applicants since this provides no additional assurance other than that which already exists through license requirements.

§61.63 Financial assurances for institutional controls.

(a) Prior to the issuance of the license, the applicant shall provide for Commission review and approval a copy of a binding arrangement, such as a lease, between the applicant and the disposal site owner that ensures that sufficient funds will be available to cover the costs of monitoring and any required maintenance during the institutional control period. The binding arrangement will be reviewed periodically by the Commission to ensure that changes in inflation, technology and disposal facility operations are reflected in the arrangements.

(b) Subsequent changes to the binding arrangement specified in paragraph (a) of this section relevant to institutional control shall be submitted to the Commission for approval.

Subpart F—Participation by State Governments and Indian Tribes

§61.70 Scope.

This subpart describes mechanisms through which the Commission will implement a formal request from a State or tribal government to participate in the review of a license application for a land disposal facility. Nothing in this subpart may be construed to bar the State or tribal governing body from participating in subsequent Commission proceedings concerning the license application as provided under Federal law and regulations.

§61.71 State and Tribal government consultation.

Upon request of a State or tribal governing body, the Director shall make available Commission staff to discuss with representatives of the State or tribal governing body information submitted by the applicant, applicable Commission regulations, licensing procedures, potential schedules, and the type and scope of State activities in the license review permitted by law. In addition, staff shall be made available to consult and cooperate with the State or tribal governing body in developing proposals for participation in the license review.

§61.72 Filing of proposals for State and Tribal participation.

(a) A State or tribal governing body whose interest is affected by a near-surface disposal facility at the proposed site may submit to the Director a proposal for participation in the review of a license application. Proposals must be submitted within the following time periods:

(1) For the State in which the disposal facility will be located, or any State that is member of an interstate compact that includes the State in which the disposal facility is located, no later than 45 days following publication in the Federal Register of the notice of tendering of an application submitted under §61.20.

(2) For any other State, or for a tribal governing body, no later than 120 days following publication in the Federal Register of the notice of tendering of an application submitted under §61.20.

(b) Proposals for participation in the licensing process must be made in writing and must be signed by the Governor of the State or the official otherwise provided for by State or tribal law.

(c) At a minimum, proposals must contain each of the following items of information:

(1) A general description of how the State or tribe wishes to participate in the licensing process specifically identifying those issues it wishes to review.

(2) A description of material and information which the State or tribe plans to submit to the Commission for consideration in the licensing process. A tentative schedule referencing steps in the review and calendar dates for planned submittals should be included.

(3) A description of any work that the State or tribe proposes to perform for the Commission in support of the licensing process.

(4) A description of State or tribal plans to facilitate local government and citizen participation.

(5) A preliminary estimate of the types and extent of impacts which the State expects, should a disposal facility be located as proposed.

(6) If desired, any requests for educational or information services (seminars, public meetings) or other actions from the Commission such as establishment of additional Public Document Rooms or exchange of State personnel under the Intergovernmental Personnel Act.

§61.73 Commission approval of proposals.

(a) Upon receipt of a proposal submitted in accordance with §61.72, the Director shall arrange for a meeting between the representatives of the State or tribal governing body and the Commission staff to discuss the proposal and to ensure full and effective participation by the State or tribe in the Commission's license review.

(b) If requested by a State or tribal governing body, the Director may approve all or any part of a proposal if the Director determines that:

(1) The proposed activities are within the scope of Commission statutory responsibility and the type and magnitude of impacts which the State or tribe may bear are sufficient to justify their participation; and

(2) The proposed activities will contribute productively to the licensing review.

(c) The decision of the Director will be transmitted in writing to the governor or the designated official of the tribal governing body.

(d) Participation by a State or Indian tribe shall not affect their rights to participate in an adjudicatory hearing as provided by Part 2 of this chapter.

Subpart G—Records, Reports, Tests, and Inspections

§61.80 Maintenance of records, reports, and transfers.

(a) Each licensee shall maintain any records and make any reports in connection with the licensed activities as may be required by the conditions of the license or by the rules, regulations, and orders of the Commission.

(b) Records which are required by the regulations in this part or by license conditions must be maintained for a period specified by the appropriate regulations in this chapter or by license condition. If a retention period is not otherwise specified, these records must be maintained and transferred to the officials specified in paragraph (e) of this section as a condition of license termination unless the Commission otherwise authorizes their disposition.

(c) Records which must be maintained pursuant to this part may be the original or a reproduced copy or a microfilm if this reproduced copy or microfilm is capable of producing copy that is clear and legible at the end of the required retention period. The record may also be stored in electronic media with the capability for producing legible, accurate, and complete records during the required retention period. Records such as letters, drawings, specifications, must include all pertinent information such as stamps, initials, and signatures. The licensee shall maintain adequate safeguards against tampering with and loss of records.

(d) If there is a conflict between the Commission's regulations in this part, license condition, or other written Commission approval or authorization pertaining to the retention period for the same type of record, the longest retention period specified takes precedence.

(e) Notwithstanding paragraphs (a) through (d) of this section, the licensee shall record the location and the quantity of radioactive wastes contained in the disposal site and transfer these records upon license termination to the chief executive of the nearest municipality, the chief executive of the county in which the facility is located, the county zoning board or land development and planning agency, the State governor and other State, local, and Federal governmental agencies as designated by the Commission at the time of license termination.

(f) Following receipt and acceptance of a shipment of radioactive waste, the licensee shall record the date of disposal of the waste, the location in the disposal site, the condition of the waste packages as received, any discrepancies between materials listed on the manifest and those received, and any evidence of leaking or damaged packages or radiation or contamination levels in excess of limits specified in Department of Transportation and Commission regulations. The licensee shall briefly describe any repackaging operations of any of the waste packages included in the shipment, plus any other information required by the Commission as a license condition.The licensee shall retain these records until the Commission transfers or terminates the license that authorizes the activities described in this section.

(g) Each licensee shall comply with the safeguards reporting requirements of §§30.55, 40.64, 70.53 and 70.54 of this chapter if the quantities or activities of materials received or transferred exceed the limits of these sections. Inventory reports required by these sections are not required for materials after disposal.

(h) Each licensee authorized to dispose of radioactive waste received from other persons shall file a copy of its financial report or a certified financial statement annually with the Commission in order to update the information base for determining financial qualifications.

(i)(1) Each licensee authorized to dispose of waste materials received from other persons, pursuant to this part, shall submit annual reports to the appropriate Commission regional office shown in Appendix D of Part 20 of this chapter, with copies to the Director, Division of

High-Level Waste Management, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, D.C., 20555. Reports shall be submitted by the end of the first calendar quarter of each year for the preceding year;

(2) The reports shall include (i) specification of the quantity of each of the principal radionuclides released to unrestricted areas in liquid and in airborne effluents during the preceding year, (ii) the results of the environmental monitoring program, (iii) a summary of licensee disposal unit survey and maintenance activities, (iv) a summary, by waste class, of activities and quantities of radionuclides disposed of, (v) any instances in which observed site characteristics were significantly different from those described in the application for a license; and (vi) any other information the Commission may require. If the quantities of radioactive materials released during the reporting period, monitoring results, or maintenance performed are significantly different from those expected in the materials previously reviewed as part of the licensing action, the report must cover this specifically.

(j) Each licensee shall report in accordance with the requirements of §70.52 of this chapter.

(k) Any transfer of byproduct, source, and special nuclear materials by the licensee is subject to the requirements in §§30.41, 40.51, and 70.42 of this chapter. Byproduct, source and special nuclear material means materials as defined in these parts, respectively.

[47 FR 57463, Dec. 27, 1982, as amended at 52 FR 31612, Aug. 21, 1987]

§61.81 Tests at land disposal facilities.

(a) Each licensee shall perform, or permit the Commission to perform, any tests as the Commission deems appropriate or necessary for the administration of the regulations in this part, including tests of:

(1) Radioactive wastes and facilities used for the receipt, storage, treatment, handling and disposal of radioactive wastes.

(2) Radiation detection and monitoring instruments; and

(3) Other equipment and devices used in connection with the receipt, possession, handling, treatment, storage, or disposal of radioactive waste.

§61.82 Commission inspections of land disposal facilities.

(a) Each licensee shall afford to the Commission at all reasonable times opportunity to inspect radioactive waste not yet disposed of, and the premises, equipment, operations, and facilities in which radioactive wastes are received, possessed, handled, treated, stored, or disposed of.

(b) Each licensee shall make available to the Commission for inspection, upon reasonable notice, records kept by it pursuant to the regulations in this chapter. Authorized representatives of the Commission may copy and take away copies of, for the Commission's use, any record required to be kept pursuant to this part.

§61.83 Violations.

An injunction or other court order may be obtained prohibiting any violation of any provision of the Atomic Energy Act of 1954, as amended, or any regulation or order issued thereunder. A court order may be obtained for the payment of a civil penalty imposed pursuant to section 234 of the Act for violation of section 53, 57, 62, 63, 81, 82, 101, 103, 104, 107, or 109 of the Act, or section 206 of the Energy Reorganization Act of 1974, or any rule.

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10 CFR 71

Nuclear Regulatory Commission

PART 71—PACKAGING AND TRANSPORTATION OF RADIOACTIVE MATERIAL

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Appendix A—Determination of A_1 and A_2

Authority: Secs. 53, 57, 62, 63, 81, 161, 182, 183, 68 Stat. 930, 932, 933, 935, 948, 953, 954, as amended (42 U.S.C. 2073, 2077, 2092, 2093, 2111, 2201, 2232, 2233); secs. 201, as amended, 202, 206, 88 Stat. 1242, as amended, 1244, 1246 (42 U.S.C. 5841, 5842, 5846).

Section 71.97 also issued under sec. 301, Pub. L. 96-295, 94 Stat. 789-790.

For the purposes of sec. 223, 68 Stat. 958, as amended (42 U.S.C. 2273); §§71.3, 71.43, 71.45, 71.55, 71.63(a) and (b), 71.83, 71.85, 71.87, 71.89, and 71.97 are issued under sec. 161b, 68 Stat. 948, as amended (42 U.S.C. 2201(b)); and §§71.5(b), 71.6a, 71.91, 71.93, 71.95, and 71.101(a) are issued under sec. 161o, 68 Stat. 950, as amended (42 U.S.C. 2201(o)).

Source: 48 FR 35607, Aug. 5, 1983, unless otherwise noted.

Subpart A—General Provisions

§71.0 Purpose and scope.

(a) This part establishes:

(1) requirements for packaging, preparation for shipment, and transportation of licensed material; and

(2) procedures and standards for NRC approval of packaging and shipping procedures for fissile material and for a quantity of other licensed material in excess of a Type A quantity.

(b) The packaging and transport of licensed material are also subject to other parts of this chapter (e.g., Parts 20, 21, 30, 39, 40, 70, and 73) and to the regulations of other agencies [e.g., the U.S. Department of Transportation (DOT) and the U.S. Postal Service (USPS)[1]] having jurisdiction over means of transport. The requirements of this part are in addition to, and not in substitution for, other requirements.

(c) The regulations in this part apply to any licensee authorized by specific license issued by the Commission to receive, possess, use or transfer licensed material if the licensee or certificate holder delivers that material to a common or contract carrier for transport or transports the material outside the confines of the licensee's certificate holder's facility, plant, or other authorized place of use. No provision of this part authorized possession of licensed material.

(d) Exemptions from the requirement for license in §71.3 are specified in §71.10. General licenses for which no NRC package approval is required are issued in §§71.14 through 71.24. The general license in §71.12 requires that an NRC certificate of compliance or other package approval be issued for the package to be used under the general license. Application for package approval must be completed in accordance with Subpart D of this part, demonstrating that the

[1] Postal Service Manual (Domestic Mail Manual), section 124.3 which is incorporated by reference at 39 CFR 111.1 (1974).

design of the package to be used satisfies the package approval standards contained in Subpart E of this part as related to the tests of Subpart F of this part. The transport of licensed material or delivery of licensed material to a carrier for transport is subject to the operating controls and procedures requirements of Subpart G of this part, to the quality assurance requirements of Subpart H of this part, and to the general provisions of Subpart A of this part, including DOT regulations referenced in §71.5.

[48 FR 35607, Aug. 5, 1983; 48 FR 38449, Aug. 24, 1983, as amended at 52 FR 8241, Mar. 17, 1987]

§71.1 Communications and records.

(a)All communications concerning the regulations in this part should be addressed to the Director, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555, or may be delivered in person at the Commission Office at 2120 L Street, NW., Washington, DC, or its Offices at 11555 Rockville Pike, Rockville, Maryland.

(b)Each record required by this part must be legible throughout the retention period specified by each Commission regulation. The record may be original or a reproduced copy or a microform provided that the copy or microform is authenticated by authorized personnel and that the microform is capable of producing a clear copy throughout the required retention period. The record may also be stored in electronic media with the capability for producing legible, accurate, and complete records during the required retention period. Records such as letters, drawings, specifications, must include all pertinent information such as stamps, initials, and signatures. The licensee shall maintain adequate safeguards against tampering with and loss of records.

§71.2 Interpretations.

Only written interpretations of the regulations in this part by the Commission's General Counsel are binding upon the Commission.

§71.3 Requirement for license.

A licensee subject to the regulations in this part may not (a) deliver any licensed material to a carrier for transport or (b) transport licensed material except as authorized in a general license or a specific license issued by the Commission, or as exempted in this part.

§71.4 Definitions.

The following terms are as defined here for the purpose of this part. Throughout this part, the standards are expressed in metric units; the approximate English equivalents presented in parentheses are for information only.

A_1 means the maximum activity of special form radioactive material permitted in a Type A package. A_2 means the maximum activity of radioactive material, other than special form radioactive material, permitted in a Type A package. These values are either listed in Appendix A of this part, Table A-1, or may be derived in accordance with the procedure prescribed in Appendix A of this part.

"Carrier" means a person engaged in the transportation of passengers or property by land or water as a common, contract, or private carrier, or by civil aircraft.

"Certificate holder" means a person who holds a certificate of compliance, or other package approval issued by the Commission.

"Close reflection by water" means immediate contact by water of sufficient thickness for maximum reflection of neutrons.

"Containment system" means the components of the packaging intended to retain the radioactive material during transport.

"Conveyance" means any vehicle, aircraft, vessel, freight container, or hold, compartment, or defined deck area of an inland waterway craft or seagoing vessel.

"Exclusive use" (also referred to in other regulations as "sole use" or "full load") means the sole use of a conveyance by a single consignor and for which all initial, intermediate, and final loading and unloading are carried out in accordance with the direction of the consignor or consignee.

"Fissile classification" means the categorization of fissile material packages into one of the following three classes according to the controls needed to provide nuclear criticality safety during transportation:

(1) Fissile Class I: A package which may be transported in unlimited numbers and in any arrangement, and which requires no nuclear criticality safety controls during transportation. A transport index is not assigned for purposes of nuclear criticality safety but may be required because of external radiation levels.

(2) Fissile Class II: A package which may be transported together with other packages in any arrangement but, for criticality control, in numbers which do not exceed an aggregate transport index of 50. These shipments require no other nuclear criticality safety control during transportation. Individual packages may have a transport index not less than 0.1 and not more than 10.

(3) Fissile Class III: A shipment of packages which is controlled in transportation by specific arrangements between the shipper and the carrier to provide nuclear criticality safety.

"Fissile material fissile radionuclides:" "Fissile material" means any material consisting of or containing one or more fissile radionuclides. Fissile radionuclides are plutonium-238, plutonium-239, plutonium-241, uranium-233, and uranium-235. Neither natural nor depleted uranium is fissile material. Fissile materials are classified in this section according to the controls needed to provide nuclear criticality safety during transportation. Certain exclusions are provided in §71.53.

"Low specific activity material" means any of the following:

(1) Uranium or thorium ores and physical or chemical concentrates of those ores;

(2) Unirradiated natural or depleted uranium or unirradiated natural thorium;

(3) Tritium oxide in aqueous solutions provided the concentration does not exceed 5.0 millicuries per milliliter;

(4) Material in which the radioactivity is essentially uniformly distributed and in which the estimated average concentration per gram of contents does not exceed:

(i) 0.0001 millicurie of radionuclides for which the A_2 quantity in Appendix A of this part is not more than 0.05 curie;

(ii) 0.005 millicurie of radionuclides for which the A_2 quantity in Appendix A of this part is more than 0.05 curie, but not more than 1 curie; or

(iii) 0.3 millicurie of radionuclides for which the A_2 quantity in Appendix A of this part is more than 1 curie.

(5) Objects of nonradioactive material externally contaminated with radioactive material, provided that the radioactive material is not readily dispersible and the surface contamination, when averaged over an area of 1 square meter, does not exceed 0.0001 millicurie (220,000 disintegrations per minute) per square centimeter of radionuclides for which the A_2 quantity in Appendix A of Part 71 is not more than 0.05 curie, or 0.001 millicurie (2,200,000 disintegrations per minute) per square centimeter for other radionuclides.

"Maximum normal operating pressure" means the maximum gauge pressure that would develop in the containment system in a period of one year under the heat test specified in §71.71(c)(1), in the absence of venting, external cooling by an ancillary system, or operational controls during transport.

"Natural thorium" means thorium with the naturally occurring distribution of thorium isotopes (essentially 100 weight percent thorium-232).

"Normal form radioactive material" means radioactive material which has not been demonstrated to qualify as "special form radioactive material."

"Optimum interspersed hydrogenous moderation" means the presence of hydrogenous material between packages to such an extent that the maximum nuclear reactivity results.

"Package" means the packaging together with its radioactive contents as presented for transport.

(1) "Fissile material package" means a fissile material packaging together with its fissile contents.

(2) "Type B package" means a Type B package together with its radioactive contents. On approval, a Type B package design is designated by NRC as B(U) unless the package has a maximum normal operating pressure of more than 700 kilopascal (100 lb/in^2) gauge or a pressure relief device which would allow the release of radioactive material to the environment under the tests specified in §71.73 (hypothetical accident conditions), in which case it will receive a

designation B(M). B(U) refers to the need for unilateral approval of international shipments; B(M) refers to the need for multilateral approval. There is no distinction made in how packages with these designations may be used in domestic transportation. To determine their distinction for international transportation, see DOT regulations in 49 CFR Part 173. A Type B package approved prior to September 6, 1983, was designated only as Type B. Limitations on its use are specified in §71.13.

"Packaging" means the assembly of components necessary to ensure compliance with the packaging requirements of this part. It may consist of one or more receptacles, absorbent materials, spacing structures, thermal insulation, radiation shielding, and devices for cooling or absorbing mechanical shocks. The vehicle, tie-down system, and auxiliary equipment may be designated as part of the packaging.

"Special form radioactive material" means radioactive material which satisfies the following conditions:

(1) It is either a single solid piece or is contained in a sealed capsule that can be opened only by destroying the capsule;

(2) The piece or capsule has at least one dimension not less than 5 millimeters (0.197 inch); and

(3) It satisfies the test requirements of §71.75.

A special form encapsulation designed in accordance with the requirements of §71.4(o) of this part in effect on June 30, 1983, and constructed prior to July 1, 1985 may continue to be used. A special form encapsulation either designed or constructed after June 30, 1985 must meet requirements of this paragraph applicable at the time of its design or construction.

"Specific activity" of a radionuclide means the radioactivity of the radionuclide per unit mass of that nuclide. The specific activity of a material in which the radionuclide is essentially uniformly distributed is the radioactivity per unit mass of the material.

"State" means the several States of the Union, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the trust Territory of the Pacific Islands, and the Commonwealth of the Northern Mariana Islands.

"Transport index" means the dimensionless number (rounded up to the first decimal place) placed on the label of a package to designate the degree of control to be exercised by the carrier during transportation. The transport index is determined as follows:

(1) The number expressing the maximum radiation level in millirem per hour at 1 meter from the external surface of the package; or

(2) For Fissile Class II packages, the number expressing the maximum radiation level in millirem per hour at 1 meter from the external surface of the package, or the number obtained by dividing 50 by the allowable number of the packages which may be transported together as determined under §71.59, whichever number is larger.

"Type A quantity" means a quantity of radioactive material, the aggregate radioactivity of which does not exceed A_1 for special form radioactive material or A_2 for normal form radioactive material, where A_1 and A_2 are given in Appendix A of this part or may be determined by procedures described in Appendix A of this part.

"Type B quantity" means a quantity of radioactive material greater than a Type A quantity.

"Uranium—natural depleted enriched"

(1) "Natural uranium" means uranium with the naturally occurring distribution of uranium isotopes (approximately 0.711 weight percent uranium-235, and the remainder essentially uranium-238).

(2) "Depleted uranium" means uranium containing less uranium-235 than the naturally occurring distribution of uranium isotopes.

(3) "Enriched uranium" means uranium containing more uranium-235 than the naturally occurring distribution of uranium isotopes.

[48 FR 35607, Aug. 5, 1983; 48 FR 38449, Aug. 24, 1983]

§71.5 Transportation of licensed material.

(a) Each licensee who transports licensed material outside of the confines of its plant or other place of use, or who delivers licensed material to a carrier for transport, shall comply with the applicable requirements of the regulations appropriate to the mode of transport of DOT in 49 CFR Parts 170 through 189.

(1) The licensee shall particularly note DOT regulations in the following areas:

(i) Packaging—49 CFR Part 173, Subparts A and B and §§173.401 through 173.478.

(ii) Marking and labeling—49 CFR Part 172, Subpart D and §§172.400 through 172.407; 172.436 through 172.440.

(iii) Placarding—49 CFR Part 172.500 through 172.519, 172.556 and Appendices B and C.

(iv) Monitoring—49 CFR Part 172, Subpart C.

(v) Accident reporting—49 CFR Part 171.15 and 171.16.

(vi) Shipping papers—49 CFR Part 172, Subpart C.

(2) The licensee shall also note DOT regulations pertaining to the following modes of transportation:

(i) Rail—49 CFR Part 174, Subparts A-D and K.

(ii) Air—49 CFR Part 176, Subparts A-D and M.

(iii) Vessel—49 CFR Part 176, Subparts A-D and M.

(iv) Public Highway—49 CFR Part 177.

(b) If DOT regulations are not applicable to a shipment of licensed material by rail, highway, or water because the shipment or the transportation of the shipment is not in interstate or foreign commerce, or to a shipment of licensed material by air because the shipment is not transported in civil aircraft, the licensee shall conform to the standards and requirements of the DOT specified in paragraph (a) of this section to the same extent as if the shipment or transportation were in interstate or foreign commerce or in civil aircraft. A request for modification, waiver, or exemption from those requirements, and any notification referred to in those requirements, must be filed with or made to the Director, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

§71.6 Information collection requirements: OMB approval.

(a) The Nuclear Regulatory Commission has submitted the information collection requirements contained in this part to the Office of Management and Budget (OMB) for approval as required by the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et seq.). OMB has approved the information collection requirements contained in this part under control number 3150-0008.

(b) The approved information collection requirements contained in this part appear in §§71.5, 71.12, 71.31, 71.33, 71.35, 71.37, 71.85, 71.87, 71.89, 71.91, 71.93, 71.95, 71.97, 71.101, 71.103, 71.105, 71.107, 71.109, 71.111, 71.113, 71.115, 71.117, 71.119, 71.121, 71.123, 71.125, 71.127, 71.129, 71.131, 71.133, 71.135, and 71.137.

[49 FR 19628, May 9, 1984]

§71.6a Completeness and accuracy of information.

(a) Information provided to the Commission by an applicant for a license or by a licensee or information required by statute or by the Commission's regulations, orders, or license conditions to be maintained by the applicant or the licensee shall be complete and accurate in all material respects.

(b) Each applicant or licensee shall notify the Commission of information identified by the applicant or licensee as having for the regulated activity a significant implication for public health and safety or common defense and security. An applicant or licensee violates this paragraph only if the applicant or licensee fails to notify the Commission of information that the applicant or licensee has identified as having a significant implication for public health and safety or common defense and security. Notification shall be provided to the Administrator of the appropriate Regional Office within two working days of identifying the information. This requirement is not applicable to information which is already required to be provided to the Commission by other reporting or updating requirements.

[52 FR 49373, Dec. 31, 1987]

Subpart B—Exemptions

§71.7 Specific exemptions.

On application of any interested person or on its own initiative, the Commission may grant any exemption from the requirements of the regulations in this part that it determines is authorized by law and will not endanger life or property or the common defense and security.

§71.9 Exemption of physicians.

Any physician licensed by a State of the United States to dispense drugs in the practice of medicine is exempt from §71.5 with respect to transport by the physician of licensed material for use in the practice of medicine. However, any physician operating under this exemption must be licensed under 10 CFR Part 35.

§71.10 Exemption for low level materials.

(a) A licensee is exempt from all requirements of this part with respect to shipment or carriage of a package containing radioactive material having a specific activity not greater than 0.002 microcurie/gram.

(b) A licensee is exempt from all requirements of this part, other than §71.5 and §71.88, with respect to shipment or carriage of the following packages:

(1) A package containing no more than a Type A quantity of radioactive material if the package contains no fissile material or if the fissile material exemption standards of §71.53 are satisfied; or

(2) A package transported between locations within the United States which contains only americium or plutonium in special form with an aggregate radioactivity not to exceed 20 curies, if the package contains no fissile material or if the fissile material exemption standards of §71.53 are satisfied.

Subpart C—General Licenses

§71.12 General license: NRC approved package.

(a) A general license is hereby issued to any licensee of the Commission to transport, or to deliver to a carrier for transport, licensed material in a package for which a license, certificate of compliance, or other approval has been issued by the NRC.

(b) This general license applies only to a licensee who has a quality assurance program approved by the Commission as satisfying the provisions of Subpart H of this part.

(c) This general license applies only to a licensee who:

(1) Has a copy of the specific license, certificate of compliance, or other approval of the package and has the drawings and other documents referenced in the approval relating to the use and maintenance of the packaging and to the actions to be taken prior to shipment;

(2) Complies with the terms and conditions of the license, certificate, or other approval, as applicable, and the applicable requirements of Subparts A, G, and H of this part; and

(3) Submits in writing to the Director, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555, prior to the licensee's first use of the package, the licensee's name and license number and the package identification number specified in the package approval.

(d) This general license applies only when the package approval authorizes use of the package under this general license.

(e) For previously approved Type B packages which are not designated as either B(U) or B(M) in the NRC Certificate of Compliance, this general license is subject to the additional restrictions of §71.13.

[48 FR 35607, Aug. 5, 1983; 48 FR 38449, Aug. 24, 1983]

§71.13 Previously approved Type B package.

(a) A Type B package previously approved by the NRC, but not designated as B(U) or B(M) in the NRC Certificate of Compliance, may be used under the general license of §71.12 with the following additional limitations:

(1) Fabrication of the packaging was satisfactorily completed before August 31, 1986, as demonstrated by application of its model number in accordance with §71.85(c); and

(2) The package may not be used for a shipment to a location outside the United States after August 31, 1986, except under special arrangement approved by DOT in accordance with 49 CFR 173.471.

(b) The NRC will approve modifications to the design and authorized contents of a Type B package previously approved by the NRC, but not designated as B(U) or B(M) in the NRC Certificate of Compliance, provided:

(1) The modifications are not significant with respect to the design, operating characteristics, or safe performance of the containment system when the package is subjected to the tests specified in §§71.71 and 71.73; and

(2) The modification to the package satisfies the requirements of this part.

(c) The NRC will revise the package identification number to designate previously approved Type B package designs as B(U) or B(M) after receipt of an application demonstrating that the design meets the requirements of this part.

§71.14 General license: DOT specification container.

(a) A general license is issued to any licensee of the Commission to transport or to deliver to a carrier for transport licensed material in a specification container for fissile material or for a Type B quantity of radioactive material as specified in the regulations of DOT in 49 CFR Parts 173 and 178.

(b) This general license applies only to a licensee who has a quality assurance program approved by the Commission as satisfying the provisions of Subpart H of this part.

(c) This general license applies only to a licensee who:

(1) Has a copy of the specification; and

(2) Complies with the terms and conditions of the specification and the applicable requirements of Subparts A, G, and H of this part.

(d) This general license is subject to the limitation that the specification container may not be used for a shipment to a location outside the United States after August 31, 1986, except under special arrangements approved by DOT in accordance with 49 CFR 173.472.

§71.16 General License: Use of foreign approved package.

(a) A general license is issued to any licensee of the Commission to transport or to deliver to a carrier for transport licensed material in a package the design of which has been approved in a foreign national competent authority certificate which has been revalidated by DOT as meeting the applicable requirements of 49 CFR 171.12.

(b) This general license applies only to shipments made to or from locations outside the United States.

(c) This general license applies only to a licensee who:

(1) Has a copy of the applicable certificate, the revalidation, and the drawings and other documents referenced in the certificate relating to the use and maintenance of the packaging and to the actions to be taken prior to shipment; and

(2) Complies with the terms and conditions of the certificate and revalidation and with the applicable requirements of Subparts A, G, and H of this part. With respect to the quality assurance provisions of Subpart H of this part, the licensee is exempt from design, construction, and fabrication considerations.

[48 FR 35607, Aug. 5, 1983; 48 FR 38449, Aug. 24, 1983]

§71.18 General license: Type A, Fissile Class II package.

(a) A general license is issued to any licensee of the Commission to transport fissile material, or to deliver fissile material to a carrier for transport, without complying with the package standards of Subparts E and F of this part if the material is shipped as a Fissile Class II package.

(b) This general license applies only when a package contains no more than a Type A quantity of radioactive material, including only one of the following:

(1) Up to 40 grams of uranium-235; or

(2) Up to 30 grams of uranium-233; or

(3) Up to 25 grams of the fissile radionuclides of plutonium, except that for encapsulated plutonium-beryllium neutron sources in special

form, an A_1 quantity of plutonium may be present; or

(4) A combination of fissile radionuclides in which the sum of the ratios of the amount of each radionuclide to the corresponding maximum amounts in paragraphs (b) (1), (2), and (3) of this section does not exceed unity.

(c) This general license applies only when, except as specified below for encapsulated plutonium-beryllium sources, a package containing more than 15 grams of fissile radionuclides is labeled with a transport index not less than the number given by the following equation, where the package contains x grams of uranium-235, y grams of uranium-233 and z grams of the fissile radionuclides of plutonium:

For a package in which the only fissile material is in the form of encapsulated plutonium-beryllium neutron sources in special form, the transport index based on criticality considerations may be taken as 0.026 times the number of grams of the fissile radionuclides of plutonium in excess of 15 grams. In all cases, the transport index must be rounded up to one decimal place, and may not exceed 10.0.

[48 FR 35607, Aug. 5, 1983; 48 FR 38449, Aug. 24, 1983; 48 FR 51903, Nov. 15, 1983]

§71.20 General license: Restricted, Fissile Class II package.

(a) A general license is issued to any licensee of the Commission to transport fissile material, or to deliver fissile material to a carrier for transport, without complying with the package standards of Subparts E and F of this part if the material is shipped as a Fissile Class II package.

(b) This general license applies only when:

(1) The package contains no more than a Type A quantity of radioactive material; and

(2) Neither beryllium nor hydrogenous material enriched in deuterium is present; and

(3) The total mass of graphite present does not exceed 150 times the total mass of uranium-235 plus plutonium; and

(4) Substances having a higher hydrogen density than water, e.g., certain hydrocarbon oils, are not present, except that polyethylene may be used for packing or wrapping; and

(5) Uranium-233 is not present, and the amount of plutonium does not exceed 1% of the amount of uranium-235; and

(6) The amount of uranium-235 is limited as follows:

(i) If the fissile radionuclides are not uniformly distributed, the maximum amount of uranium-235 per package may not exceed the value given in Table I of this part; or

$$\textit{Minimum Transport Index} = 0.40x + 0.67y + z \quad 1 - \frac{15}{x+y+z}$$

TABLE I—PERMISSIBLE MASS OF URANIUM-235 PER FISSILE CLASS II PACKAGE APPLICABLE TO §71.20(b)(6)(i)

[Non-uniform distribution]

Uranium enrichment in weight percent of uranium-235 not exceeding	Permissible maxium grams of uranium-235 per package
24	40
20	42
15	45
11	48
10	51
9.5	52
9	54
8.5	55
8	57
7.5	59
7	60
6.5	62
6	65
5.5	68
5	72
4.5	76
4	80
3.5	88
3	100
2.5	120
2	164
1.5	272
1.35	320
1	680
0.92	1,200

(ii) If the fissile radionuclides are distributed uniformly (i.e., cannot form a lattice arrangement within the packaging) the maximum amount of uranium-235 per package may not exceed the value given in Table II of this part; and

(7) The transport index of each package based on criticality considerations is taken as 10 times the number of grams of uranium-235 in the package divided by the maximum allowable number of grams per package in accordance with Table I or Table II of this part as applicable.

TABLE II—PERMISSIBLE MASS OF URANIUM-235 PER FISSILE CLASS II PACKAGE APPLICABLE TO §71.20(b)(6)(ii)

[uniform distribution]

Uranium enrichment in weight percent of uranium-235 not exceeding	Permissible maxium grams of uranium-235 per package
4	84
3.5	92
3	112
2.5	148
2	240
1.5	560
1.35	800

[48 FR 35607, Aug. 5, 1983; 48 FR 38449, Aug. 24, 1983]

§71.22 General license: Type A package, Fissile Class III shipment.

(a) A general license is issued to any licensee of the Commission to transport fissile material, or to deliver fissile material to a carrier for transport, without complying with the package standards of Subparts E and F of this part if limited material is shipped as a Fissile Class III shipment.

(b) This general license applies only when a package contains no more than a Type A quantity of radioactive material and no more than 400 grams total of the fissile radionuclides of plutonium encapsulated as plutonium-beryllium neutron sources in special form.

(c) This general license applies only when the fissile radionuclides in the Fissile Class III shipment exceeds none of the following:

(1) 500 grams of uranium-235; or

(2) 300 grams total of uranium-233, and the fissile radionuclides of plutonium; or

(3) A total quantity of uranium-233, uranium-235, and the fissile radionuclides of plutonium such that the sum of the ratios of the quantity of each radionuclide to the quantity specified in paragraphs (c)(1) and (c)(2) of this section exceeds unity; or

(4) 2500 grams total of the fissile radionuclides of plutonium encapsulated as plutonium-beryllium neutron sources in special form.

(d) This general license applies only when shipment of these packages is made under procedures specifically authorized by DOT in accordance with 49 CFR Part 173 of its regulations to prevent loading, transport or storage of these packages with other Fissile Class II packages or Fissile Class III shipments.

§71.24 General license: Restricted, Fissile Class III shipment.

(a) A general license is issued to any licensee of the Commission to transport fissile material, or to deliver fissile material to a carrier for transport, without complying with the package standards of Subparts E and F of this part if limited material is shipped as a Fissile Class III shipment.

(b) This general license applies only when:

(1) No package contains more than a Type A quantity of radioactive material; and

(2) The packaging does not incorporate lead shielding exceeding 5 cm in thickness, tungsten shielding, or uranium shielding; and

(3) Neither beryllium nor hydrogenous material enriched in deuterium is present; and

(4) The total mass of graphite present does not exceed 150 times the total mass of uranium-235 and plutonium; and

(5) Substances having a higher hydrogen density than water, e.g., certain hydrocarbon oils, are not present, except that polyethylene may be used for packing or wrapping; and

(6) For fissile contents containing no uranium-233 and less than 1% total plutonium:

(i) If the fissile radionuclides are not uniformly distributed, the maximum amount of uranium-235 per consignment does not exceed the value given in Table III of this part; or

(ii) If the fissile radionuclides are distributed uniformly and cannot form a lattice arrangement within the packaging, the maximum amount of uranium-235 per shipment does not exceed the value given in Table IV of this part; and

(7) For fissile contents containing uranium-233 or more than 1% plutonium, the total mass of fissile material per shipment is limited so that the sum of the number of grams of uranium-235 divided by 400, the number of grams of plutonium divided by 225, and the number of grams of uranium-233 divided by 250 does not exceed unity as expressed in the formula

$$\frac{grams\ uranium\ 235}{400\ grams} + \frac{grams\ plutonium}{225\ grams} + \frac{grams\ uranium\ 233}{250\ grams} \leq 1;\ \text{and}$$

TABLE III—PERMISSIBLE MASS OF URANIUM-235 PER FISSILE CLASS II PACKAGE APPLICABLE TO §71.24(b)(6)(i)

[Non-uniform distribution]

Uranium enrichment in weight percent of uranium-235 not exceeding	Permissible maxium grams of uranium-235 per package
20	520
15	560
11	600
10	640
9.5	655
9	675
8.5	690
8	710
7.5	710
7	730
6.5	750
6	780
5.5	810
5	850
4.5	900
4	1,000
3.5	1,100
3	1,250
2.5	1,500
2	2,050
1.5	3,400
1.35	4,000
1	8,500
0.92	15,000

TABLE IV—PERMISSIBLE MASS OF URANIUM-235 PER FISSILE CLASS II PACKAGE APPLICABLE TO §71.24(b)(6)(ii)

[uniform distribution]

Uranium enrichment in weight percent of uranium-235 not exceeding	Permissible maxium grams of uranium-235 per package
4	1,050
3.5	1,150
3	1,400
2.5	1,800
2	3,000
1.5	7,000
1.35	10,000

(8) The transport must be direct to the consignee without any intermediate transit storage; and

(9) Shipment of these packages is made under procedures specifically authorized by DOT in accordance with 49 CFR Part 173 of its regulations to prevent loading, transport or storage of these packages with other Fissile Class II packages or Fissile Class III shipments.

[48 FR 35607, Aug. 5, 1983; 48 FR 38449, Aug. 24, 1983]

Subpart D—Application for Package Approval

§71.31 Contents of application.

(a) An application for an approval under this part must include, for each proposed packaging design, the following information:

(1) A package description as required by §71.33;

(2) A package evaluation as required by §71.35;

(3) A quality assurance program description as required by §71.37;

(4) In the case of fissile material, an identification of the proposed fissile class.

(b) Except as provided in §71.13, an application for modification of a package design, whether for modification of the packaging or authorized contents, must include sufficient information to demonstrate that the proposed design satisfies the package standards in effect at the time the application is filed.

[48 FR 35607, Aug. 5, 1983; 48 FR 38449, Aug. 24, 1983]

§71.33 Package description.

The application must include a description of the proposed package in sufficient detail to identify the package accurately and provide a sufficient basis for evaluation of the package. The description must include:

(a) With respect to the packaging:

(1) Classification as Type B(U), Type B(M), or fissile material packaging;

(2) Gross weight;

(3) Model number;

(4) Identification of the containment system;

(5) Specific materials of construction, weights, dimensions, and fabrication methods of:

(i) Receptacles;

(ii) Materials specifically used as nonfissile neutron absorbers or moderators;

(iii) Internal and external structures supporting or protecting receptacles:

(iv) Valves, sampling ports, lifting devices, and tie-down devices;

(v) Structural and mechanical means for the transfer and dissipation of heat; and

(6) Identification and volumes of any receptacles containing coolant.

(b) With respect to the contents of the package:

(1) Identification and maximum radioactivity of radioactive constituents;

(2) Identification and maximum quantities of fissile constituents;

(3) Chemical and physical form;

(4) Extent of reflection, the amount and identity of nonfissile materials used as neutron absorbers or moderators, and the atomic ratio of moderator to fissile constituents;

(5) Maximum normal operating pressure;

(6) Maximum weight;

(7) Maximum amount of decay heat; and

(8) Identification and volumes of any coolants.

[48 FR 35607, Aug. 5, 1983; 48 FR 38449, Aug. 24, 1983]

§71.35 Package evaluation.

The application must include:

(a) A demonstration that the package satisfies the standards specified in Subparts E and F of this part;

(b) For a Fissile Class II package, the allowable number of packages which may be transported in the same vehicle in accordance with §71.59; and

(c) For a Fissile Class III shipment, any proposed special controls and precautions for transport, loading, unloading, and handling, and any proposed special controls in the event of accident or delay.

§71.37 Quality assurance.

(a) The applicant shall describe the quality assurance program (see Subpart H of this part) for the design, fabrication, assembly, testing, maintenance, repair, modification, and use of the proposed package.

(b) The applicant shall identify any established codes and standards proposed for use in package design, fabrication, assembly, testing, maintenance, and use. In the absence of any codes and standards, the applicant shall describe the basis and rationale used to formulate the package quality assurance program.

(c) The applicant shall identify any specific provisions of the quality assurance program which are applicable to the particular package design under consideration, including a description of the leak testing procedures.

§71.39 Requirement for additional information.

The Commission may at any time require additional information in order to enable it to determine whether a license, certificate of compliance, or other approval should be granted, denied, modified, suspended, or revoked.

Subpart E—Package Approval Standards

§71.41 Demonstration of compliance.

(a) The effects on a package of the tests specified in §71.71 (Normal Conditions of Transport) and the tests specified in §71.73 (Hypothetical Accident Conditions) must be evaluated by subjecting a sample package or scale model to test, or by other method of demonstration acceptable to the Commission, as appropriate for the particular feature being considered.

(b) Taking into account the type of vehicle, the method of securing or attaching the package, and the controls to be exercised by the shipper, the Commission may permit the shipment to be evaluated together with the transporting vehicle.

(c) Environmental and test conditions different from those specified in §§71.71 and 71.73 may be approved by the Commission if the controls proposed to be exercised by the shipper are demonstrated to be adequate to assure the safety of the shipment.

§71.43 General standards for all packages.

(a) The smallest overall dimension of a package must not be less than 10 cm (four in.).

(b) The outside of a package must incorporate a feature, such as a seal, which is not readily breakable, and which, while intact, would be evidence that the package has not been opened by unauthorized persons.

(c) Each package must include a containment system securely closed by a positive fastening device which cannot be opened unintentionally.

(d) A package must be of materials and construction which assure that there will be no significant chemical, galvanic, or other reaction among the packaging components or between the packaging components and the package contents, including possible reaction resulting from inleakage of water to the maximum credible extent.

(e) A package valve or other device, the failure of which would allow radioactive contents to escape, must be protected against unauthorized operation and, except for a pressure relief device, must be provided with an enclosure to retain any leakage.

(f) A package must be designed, constructed, and prepared for shipment so that under the tests specified in §71.71 (Normal Conditions of Transport) there would be no loss or dispersal of radioactive contents, no significant increase in external radiation levels, and no substantial reduction in the effectiveness of the packaging.

(g) A package must be designed, constructed, and prepared for transport so that in still air at 38°C (100°F) and in the shade, no accessible surface of a package would have a temperature exceeding 50°C (122°F) in a non-exclusive use shipment or 82°C (180°F) in an exclusive use shipment.

(h) A package must not incorporate a feature which is intended to allow continuous venting during transport.

§71.45 Lifting and tie-down standards for all packages.

(a) Any lifting attachment that is a structural part of a package must be designed with a minimum safety factor of three against yielding when used to lift the package in the intended manner, and must be designed so that failure of any lifting device under excessive load would not impair the ability of the package to meet other requirements of this subpart. Any other structural part of the package which could be used to lift the package must be capable of being rendered inoperable for lifting the package during transport or must be designed with strength equivalent to that required for lifting attachments.

(b) Tie-down devices:

(1) If there is a system of tie-down devices which is a structural part of the package, the system must be capable of withstanding, without generating stress in any material of the package in excess of its yield strength, a static force applied to the center of gravity of the package having a vertical component of two times the weight of the package with its contents, a horizontal component along the direction in which the vehicle travels of 10 times the weight of the package with its contents, and a horizontal component in the transverse direction of five times the weight of the package with its contents.

(2) Any other structural part of the package which could be used to tie down the package must

be capable of being rendered inoperable for tying down the package during transport, or must be designed with strength equivalent to that required for tie-down devices.

(3) Each tie-down device which is a structural part of a package must be designed so that failure of the device under excessive load would not impair the ability of the package to meet other requirements of this part.

[48 FR 35607, Aug. 5, 1983; 48 FR 38449, Aug. 24, 1983]

§71.47 External radiation standards for all packages.

A package must be designed and prepared for shipment so that the radiation level does not exceed 200 millirem per hour at any point on the external surface of the package and the transport index does not exceed 10 (See §71.4 "Definitions"). For a package transported as exclusive use by rail, highway, or water, radiation levels external to the package may exceed those limits, but must not exceed any of the following:

(a) 200 millirem/hour on the accessible external surface of the package unless the following conditions are met, in which case the limit is 1000 millirem per hour:

(1) The shipment is made in a closed transport vehicle;

(2) Provisions are made to secure the package so that its position within the vehicle remains fixed during transportation; and

(3) There are no loading or unloading operations between the beginning and end of the transportation;

(b) 200 millirem/hour at any point on the outer surface of the vehicle, including the upper and lower surfaces, or, in the case of an open vehicle, at any point on the vertical planes projected from the outer edges of the vehicle, on the upper surface of the load, and on the lower external surface of the vehicle;

(c) 10 millirem/hour at any point two meters from the vertical planes represented by the outer lateral surfaces of the vehicle, or, in the case of an open vehicle, at any point two meters from the vertical planes projected from the outer edges of the conveyance; and

(d) Two millirem/hour in any normally occupied positions of the vehicle, except that this provision does not apply to private motor carriers when persons occupying these positions are provided with special health supervision, personnel radiation exposure monitoring devices, and training in accordance with §19.12 of this chapter.

§71.51 Additional requirements for Type B packages.

(a) A Type B package, in addition to satisfying the requirements of §§71.41 through 71.47 must be designed, constructed, and prepared for shipment so that under the tests specified in:

(1) Section 71.71 (Normal Conditions of Transport), there would be no loss or dispersal of radioactive contents, as demonstrated to a sensitivity of $10^{-6}A_2$ per hour, no significant increase in external radiation levels, and no substantial reduction in the effectiveness of the packaging; and

(2) Section 71.73 (Hypothetical Accident Conditions), there would be no escape of krypton-85 exceeding 10,000 curies in one week, no escape of other radioactive material exceeding a total amount A_2 in one week, and no external radiation dose rate exceeding one rem per hour at one meter from the external surface of the package.

(b) Compliance with the permitted activity release limits of paragraph (a) of this section must not depend upon filters or upon a mechanical cooling system.

§71.52 Exemption for low specific activity (LSA) packages.

A package need not satisfy the requirements of §71.51 if it contains only low specific activity material and is transported as exclusive use, but is subject to §§71.41 through 71.47 of this part, including §71.43(f).

§71.53 Fissile material exemptions.

The following packages are exempt from fissile material classification and from the fissile material standards of §§71.55 through 71.61, but are subject to all other requirements of this part:

(a) A package containing not more than 15 grams of fissile radionuclides. If material is transported in bulk, the quantity limitation applies to the conveyance; or

(b) A package containing irradiated natural or depleted uranium including the products of irradiation if the irradiation has taken place only in a thermal reactor; or

(c) A package containing homogenous hydrogenous solutions or mixtures where:

(1) The minimum ratio of the number of hydrogen atoms to the number of atoms of fissile radionuclides(H/X) is 5200;

(2) The maximum concentration of fissile radionuclides is five grams/liter; and

(3) The maximum mass of fissile radionuclides in the package is 800 grams, except for a mixture where the total mass of plutonium and uranium-233 exceeds one percent of the mass of uranium-235 the limit is 500 grams. If the material is transported in bulk, the quantity limitations apply to the vehicle, to a hold or compartment of an inland waterway craft, or to a hold, compartment, or defined deck area of a seagoing vessel; or

(d) A package containing uranium enriched in uranium-235 to a maximum of one percent by weight, and with a total plutonium and uranium-233 content of up to one percent of the mass of uranium-235, if the fissile radionuclides are distributed homogeneously throughout the package contents, and do not form a lattice arrangement within the package; or

(e) A package containing any fissile material if it does not contain more than five grams of fissile radionuclides in any 10-liter volume, and if the material is packaged so as to maintain this limit of fissile radionuclide concentration during normal transport; or

(f) A package containing not more than one kilogram of plutonium of which not more than 20% by mass may consist of plutonium-239, plutonium-241, or any combination of those radionuclides; or

(g) A package containing liquid solutions of uranyl nitrate enriched in uranium-235 to a maximum of two percent by weight, with total plutonium and uranium-233 not more than one-tenth percent of the mass of uranium-235.

§71.55 General requirements for all fissile material packages.

(a) A package used for the shipment of fissile material must be designed and constructed in accordance with §§71.41 through 71.47. When required by the total amount of radioactive material, a package used for the shipment of fissile material must also be designed and constructed in accordance with §71.51.

(b) Except as provided in paragraph (c) of this section, a package used for the shipment of fissile material must be so designed and constructed and its contents so limited that it would be subcritical if water were to leak into the containment system or liquid contents were to leak out of the containment system so that, under the following conditions, maximum reactivity of the fissile material would be attained:

(1) The most reactive credible configuration consistent with the chemical and physical form of the material;

(2) Moderation by water to the most reactive credible extent; and

(3) Close reflection by water on all sides.

(c) The Commission may approve exceptions to the requirements of paragraph (b) of this section if the package incorporates special design features that ensure that no single packaging error would permit leakage, and if appropriate measures are taken before each shipment to ensure the containment system does not leak.

(d) A package used for the shipment of fissile material must be so designed and constructed and its contents so limited that under the tests specified in §71.71 (Normal Conditions of Transport):

(1) The contents would be subcritical;

(2) The geometric form of the package contents would not be substantially altered;

(3) There would be no leakage of water into the containment system unless, in the evaluation of undamaged packages under §§71.57(a), 71.59(b)(1), and 71.61(a), it has been assumed that moderation is present to such an extent as to cause maximum reactivity consistent with the chemical and physical form of the material; and

(4) There will be no substantial reduction in the effectiveness of the packaging, including:

(i) No more than five percent reduction in the total effective volume of the packaging on which nuclear safety is assessed;

(ii) No more than five percent reduction in the effective spacing between the fissile contents and the outer surface of the packaging; and

(iii) No occurrence of an aperture in the outer surface of the packaging large enough to permit the entry of a 10 cm (four in.) cube.

(e) A package used for the shipment of fissile material must be so designed and constructed and its contents so limited that under the tests specified in §71.73 (Hypothetical Accident Conditions), the package would be subcritical. For this determination, it must be assumed that:

(1) The fissile material is in the most reactive credible configuration consistent with the damaged condition of the package and the chemical and physical form of the contents;

(2) Water moderation occurs to the most reactive credible extent consistent with the damaged condition of the package and the chemical and physical form of the contents; and

(3) There is reflection by water on all sides, as close as is consistent with the damaged condition of the package.

§71.57 Specific standards for a Fissile Class I package.

A Fissile Class I package must be so designed and constructed and its contents so limited that:

(a) Any number of undamaged packages would be subcritical in any arrangement and with optimum interspersed hydrogenous moderation unless there is a greater amount of interspersed moderation in the packaging, in which case the greater amount may be assumed for this determination; and

(b) Two hundred fifty (250) packages, if each package were subjected to the tests specified in §71.73 (Hypothetical Accident Conditions), would be subcritical if stacked together in any arrangement, closely reflected on all sides of the stack by water, and with optimum interspersed hydrogenous moderation.

§71.59 Specific standards for a Fissile Class II package.

(a) A Fissile Class II package must be controlled by the carrier during transport. To provide this control, the designer of a Fissile Class II package must determine the allowable number of packages of that design which can be safely transported in a vehicle under the conditions specified in this section. This allowable number of packages determines the minimum transport index which the shipper of the package marks on the package label when the package is shipped. By limiting to 50 the total number of transport indexes in a vehicle or storage area, the carrier provides adequate criticality control.

(b) A Fissile Class II package must be designed and constructed and its contents so limited, and the allowable number of these packages in a Fissile Class II shipment so determined, that:

(1) Five times the allowable number of undamaged packages would be subcritical if stacked together in any arrangement and closely reflected on all sides of the stack by water; and

(2) Twice the allowable number of packages, if each package were subjected to the tests specified in §71.73 (Hypothetical Accident Conditions), would be subcritical if stacked together in any arrangement, closely reflected on all sides of the stack by water, and with optimum interspersed hydrogenous moderation.

(c) The transport index with respect to criticality control for each Fissile Class II package must be calculated by dividing the number 50 by the allowable number of Fissile Class II packages which may be transported together as determined under the limitations of paragraph (b) of this section. The transport index so determined must not exceed 10 and must be rounded up to the first decimal place.

§71.61 Specific standards for a Fissile Class III shipment.

A package for Fissile Class III shipment must be so designed and constructed and its contents so limited, and the number of packages in a Fissile Class III shipment must be so limited, that:

(a) Twice this number of undamaged packages would be subcritical if stacked together in any arrangement, assuming close reflection on all sides of the stack by water; and

(b) This number of packages would be subcritical if stacked together in any arrangement, closely reflected on all sides of the stack by water, and with optimum interspersed hydrogenous moderation. Except as permitted under §71.41, each package must be considered to have been subjected to the tests specified in §71.73 (Hypothetical Accident Conditions).

§71.63 Special requirements for plutonium shipments.

(a) Plutonium in excess of 20 curies per package must be shipped as a solid.

(b) Plutonium in excess of 20 curies per package must be packaged in a separate inner container placed within outer packaging that meets the requirements of Subparts E and F for packaging of material in normal form. If the entire package is subjected to the tests specified in §71.71 (Normal Conditions of Transport), the separate inner container must not release plutonium, as demonstrated to a sensitivity of 10^{-6} A_2 per hour. If the entire package is subjected to the tests specified in §71.73 (Hypothetical Accident Conditions), the separate inner container must restrict the loss of plutonium to not more than A_2 in one week. Solid plutonium in the following forms is exempt from the requirements of this paragraph:

(1) Reactor fuel elements;

(2) Metal or metal alloy; and

(3) Other plutonium bearing solids that the Commission determines should be exempt from the requirements of this section.

§71.65 Additional requirements.

The Commission may, by rule, regulation, or order, impose requirements upon any licensee in addition to those established in this part as it deems necessary or appropriate to protect health or to minimize danger to life or property.

Subpart F—Package and Special Form Tests[2]

§71.71 Normal conditions of transport.

(a) *Evaluation.* Evaluation of each package design under normal conditions of transport must include a determination of the effect on that design of the conditions and tests specified in this section. Separate specimens may be used for the free drop test, the compression test, and the penetration test if each specimen is subjected to the water spray test before being subjected to any of the other tests.

(b) *Initial conditions.* With respect to the initial conditions for the tests in this section, the demonstration of compliance with the requirements of this Part must be based on the ambient temperature preceding and following the tests remaining constant at that value between −29°C (−20°F) and +38°C (100°F) which is most unfavorable for the feature under consideration. The initial internal pressure within the containment system must be considered to be the maximum normal operating pressure, unless a lower internal pressure consistent with the ambient temperature considered to precede and follow the tests is more unfavorable.

(c) *Conditions and tests*—

(1) *Heat.* An ambient temperature of 38°C (100°F) in still air, and insolation according to the following table:

(2) *Cold.* An ambient temperature of −40°C (−40°F) in still air and shade.

(3) *Reduced external pressure.* An external pressure of 24.5 kilopascal (3.5 psi) absolute.

(4) *Increased external pressure.* An external pressure of 140 kilopascal (20 psi) absolute.

ISOLATION DATA

Form and location of surface	Total isolation for a 12-hour period (g cal/cm2)
Flat surfaces transported horizontally:	
—Base	None.
—Other surfaces	800.
Flat surfaces not transported horizontally	200.
Curved surfaces	400.

[2]The package standards related to the tests in this subpart are contained in Subpart E.

(5) *Vibration.* Vibration normally incident to transport.

(6) *Water spray.* A water spray that simulates exposure to rainfall of approximately five cm (two in.) per hour for at least one hour.

(7) *Free drop.* Between $1^1/_2$ and $2^1/_2$ hours after the conclusion of the water spray test, a free drop through the distance specified below onto a flat, essentially unyielding, horizontal surface, striking the surface in a position for which maximum damage is expected. For Fissile Class II packages, this free drop must be preceded by a free drop from a height of 0.3 m (one ft.) on each corner or, in the case of a cylindrical Fissile Class II package, onto each of the quarters of each rim.

CRITERIA FOR FREE DROP TEST(WEIGHT/DISTANCE)

Package weight		Free drop distance	
Kilograms	Pounds	Meters	Feet
5,000 or less	(11,000)	1.2	(4)
5,000 to 10,000	(11,000 to 22,000)	0.9	(3)
10,000 to 15,000	(22,000 to 33,000)	0.6	(2)
More than 15,000	(More than 33,000)	0.3	(1)

(8) *Corner drop.* A free drop onto each corner of the package in succession, or in the case of a cylindrical package onto each quarter of each rim, from a height of 0.3 m (one ft.) onto a flat, essentially unyielding, horizontal surface. This test applies only to fiberboard or wood rectangular packages not exceeding 50 kg (110 pounds) and fiberboard or wood cylindrical packages not exceeding 100 kg (220 pounds).

(9) *Compression.* For packages weighing up to 5000 kg, the package must be subjected, for a period of 24 hours, to a compressive load applied uniformly to the top and bottom of the package in the position in which the package would normally be transported. The compressive load must be the greater of the following:

(i) The equivalent of five times the weight of the package; or

(ii) The equivalent of 12.75 kilopascal (1.85 lb/in^2) multiplied by the vertically projected area of the package.

(10) *Penetration.* Impact of the hemispherical end of a vertical steel cylinder of 3.2 cm ($1^1/_4$ in) diameter and six kg (13 lb) mass, dropped from a height of one m (40 in) onto the exposed surface of the package which is expected to be most vulnerable to puncture. The long axis of the cylinder must be perpendicular to the package surface.

§71.73 Hypothetical accident conditions.

(a) *Test procedures.* Evaluation for hypothetical accident conditions is to be based on sequential application of the tests specified in this section, in the order indicated, to determine their cumulative effect on a package or array of packages. An undamaged specimen must be used for the water immersion test specified in paragraph (c)(5) of this section.

(b) *Test conditions.* With respect to the initial conditions for the tests, except for the water immersion tests, to demonstrate compliance with the requirements of this part during testing, the ambient air temperature before and after the tests must remain constant at that value between −29°C (−20°F) and +38°C (100°F) which is most unfavorable for the feature under consideration. The initial internal pressure within the containment system must be the maximum normal operating pressure unless a lower internal pressure consistent with the ambient temperature assumed to precede and follow the tests is more unfavorable.

(c) *Tests.* Tests for hypothetical accident conditions must be conducted as follows:

(1) *Free Drop.* A free drop of the specimen through a distance of nine m (30 ft) onto a flat, essentially unyielding, horizontal surface, striking the surface in a position for which maximum damage is expected.

(2) *Puncture.* A free drop of the specimen through a distance of one m (40 in) in a position for which maximum damage is expected, onto the upper end of a solid, vertical, cylindrical, mild steel bar mounted on an essentially unyielding, horizontal surface. The bar must be 15 cm (six in) in diameter, with the top horizontal and its edge rounded to a radius of not more than six mm ($^1/_4$ in) and of a length as to cause maximum damage to the package, but not less than 20 cm (eight in) long. The long axis of the bar must be vertical.

(3) *Thermal.* Exposure of the whole specimen for not less than 30 minutes to a heat flux not less than that of a radiation environment of 800°C (1475°F) with an emissivity coefficient of at least 0.9. For purposes of calculation, the surface absorptivity must be either that value which the package may be expected to possess if exposed to a fire or 0.8, whichever is greater. In addition, when significant, convective heat input must be included on the basis of still, ambient air at 800°C (1475°F). Artificial cooling must not be applied after cessation of external heat input and any combustion of materials of construction must be allowed to proceed until it terminates naturally. The effects of solar radiation may be neglected prior to, during, and following the test.

(4) *Immersion—fissile material.* For fissile material, in those cases where water inleakage has not been assumed for criticality analysis, the specimen must be immersed under a head of water of at least 0.9 m (three ft) for a period of not less than eight hours and in the attitude for which maximum leakage is expected.

(5) *Immersion—all packages.* A separate, undamaged specimen must be subjected to water pressure equivalent to immersion under a head of water of at least 15 m (50 ft) for a period of not less than eight hours. For test purposes, an external pressure of water of 147 kilopascal (21 psi) gauge is considered to meet these conditions.

§71.75 Qualification of special form radioactive material.

(a) Evaluation of the contents of a single package for qualification as special form must include a determination of the effect on a specimen of those contents of the tests specified in §71.77.

(1) Specimens (solid radioactive material or capsules) to be tested must be as normally prepared for loading in a single package, with the radioactive material duplicated as closely as practicable.

(2) A different specimen may be used for each of the tests.

(b) The specimen must not break or shatter when subjected to the impact, percussion, or bending tests.

(c) The specimen must not melt or disperse when subjected to the heat test.

(d) After each test, leak-tightness or indispersibility of the specimen must be determined by a method no less sensitive than the following leaching assessment procedure. For a capsule resistant to corrosion by water, and which has an internal void volume greater than 0.1 milliliters, an alternative to the leaching assessment is a demonstration of leak-tightness of 10^{-4} torr-l/s (1.3×10^{-4} atm cm^3/s) (based on air at 25°C and one atmosphere differential pressure) for solid radioactive content, or 10^{-6} torr-l/s (1.3×10^{-6} atm cm^3/s) for liquid or gaseous radioactive content.

(1) The specimen must be immersed for seven days in water at ambient temperature. The water must have a pH of 6-8 and a maximum conductivity of 10 μmho/cm at 20°C (68°F). Encapsulated material is not subject to the seven-day requirement.

(2) The water with specimen must then be heated to a temperature of 50°±5°C (122°±9°F) and maintained at this temperature for four hours.

(3) The activity of the water must be determined at that time.

(4) The specimen must then be stored for at least seven days in still air of humidity not less than 90± and a temperature not less than 30°C (86°F).

(5) The specimen must then be immersed in water having a pH of 6-8 and a maximum conductivity of 10 μmho/cm at 20°C, and the water with specimen heated to 50°±5°C (122°±9°F) and maintained at this temperature for four hours.

(6) The activity of the water must be determined at that time.

(7) The activities determined in paragraphs (c)(3) and (6) of this section must not exceed 0.05 μCi.

[48 FR 35607, Aug. 5, 1983; 48 FR 38449, Aug. 24, 1983; 48 FR 51903, Nov. 15, 1983]

§71.77 Tests for special form radioactive material.

(a) *Impact test.* The specimen must fall onto a flat, horizontal, essentially unyielding surface from a height of not less than nine m (30 ft).

(b) *Percussion test.* The specimen must be placed on a sheet of lead which is supported by a smooth solid surface and struck by the flat face of a steel billet so as to produce an impact equivalent to that resulting from a free fall of 1.4 kg (three lb.) through one m (40 in.). The flat face of the billet must be 25 mm (one in.) in diameter with the edges rounded to a radius of three mm (0.12 in.) ±0.3 mm (0.012 in.). The lead, of hardness number 3.5 to 4.5 on the Vickers scale and not more than 25 mm (one in.) thick, must cover an area greater than that covered by the specimen. A fresh surface of lead must be used for each impact. The billet must strike the specimen so as to cause maximum damage.

(c) *Bending test.* The test is applicable only to long, slender sources with both a minimum length of 10 cm (four in.) and a length to minimum width ratio not less than 10. The specimen must be rigidly clamped in a horizontal position so that one-half of its length protrudes from the face of the clamp. The orientation of the specimen must be such that the specimen will suffer maximum damage when its free end is struck by the flat face of a steel billet. The billet must strike the specimen so as to produce an impact equivalent to that resulting from a free vertical fall of 1.4 kg (three lb.) through one m (40 in.). The flat face of the billet must be 25 mm (one in.) in diameter with the edges rounded off to a radius of three mm (0.12 in.) ±0.3 mm (0.012 in.).

(d) *Heat test.* The specimen must be heated to a temperature of not less than 800°C (1475°F) in an atmosphere which is essentially air, and held at that temperature for a period of 10 minutes and must then be allowed to cool.

[48 FR 35607, Aug. 5, 1983; 48 FR 38450, Aug. 24, 1983]

Subpart G—Operating Controls and Procedures

§71.81 Applicability of operating controls and procedures.

A licensee subject to this part, who under a general or specific license transports licensed material or delivers licensed material to a carrier for transport, shall comply with the requirements of this Subpart G, with the quality assurance requirements of Subpart H of this part, and with the general provisions of Subpart A of this part.

§71.83 Assumptions as to unknown properties.

When the isotopic abundance, mass, concentration, degree of irradiation, degree of moderation, or other pertinent property of fissile material in any package is not known, the licensee shall package the fissile material as if the unknown properties have credible values that will cause the maximum nuclear reactivity.

§71.85 Preliminary determinations.

Prior to the first use of any packaging for the shipment of licensed material:

(a) The licensee shall ascertain that there are no cracks, pinholes, uncontrolled voids, or other defects which could significantly reduce the effectiveness of the packaging;

(b) Where the maximum normal operating pressure will exceed 34.3 kilopascal (5 psi) gauge, the licensee shall test the containment system at an internal pressure at least 50% higher than the maximum normal operating pressure to verify the capability of that system to maintain its structural integrity at that pressure.

(c) The licensee shall conspicuously and durably mark the packaging with its model number, gross weight, and a package identification number assigned by the Nuclear Regulatory Commission. Prior to applying the model number, the licensee shall determine that the packaging has been fabricated in accordance with the design approved by the Commission.

§71.87 Routine determinations.

Prior to each shipment of licensed material, the licensee shall ensure that the package with its contents satisfies the applicable requirements of this part and of the license. The licensee shall determine that:

(a) The package is proper for the contents to be shipped;

(b) The package is in unimpaired physical condition except for superficial defects such as marks or dents;

(c) Each closure device of the packaging, including any required gasket, is properly installed and secured and free of defects;

(d) Any system for containing liquid is adequately sealed and has adequate space or other specified provision for expansion of the liquid;

(e) Any pressure relief device is operable and set in accordance with written procedures;

(f) The package has been loaded and closed in accordance with written procedures;

(g) For fissile material, any moderator or neutron absorber, if required, is present and in proper condition;

(h) Any structural part of the package which could be used to lift or tie down the package during transport is rendered inoperable for that purpose unless it satisfies the design requirements of §71.45;

(i)(1) The level of non-fixed (removable) radioactive contamination on the external surfaces of each package offered for shipment is as low as reasonably achievable. The level of non-fixed radioactive contamination may be determined by wiping an area of 300 square centimeters of the surface concerned with an absorbent material, using moderate pressure, and measuring the activity on the wiping material. Sufficient measurements must be taken in the most appropriate locations to yield a representative assessment of the non-fixed contamination levels. Except as provided under paragraph (i)(2) of this section, the amount of radioactivity measured on any single wiping material when averaged over the surface wiped, must not exceed the limits given in Table V of this part at any time during transport. Other methods of assessment of equal or greater efficiency may be used. When other methods are used, the detection efficiency of the method used must be taken into account and in no case may the non-fixed contamination on the external surfaces of the package exceed ten times the limits listed in Table V.

TABLE V—REMOVABLE EXTERNAL RADIOACTIVE CONTAMINATION WIPE LIMITS

Containiment	Maximum permissible limits	
	mCi/cm^2	dpm/cm^2
Beta-gamma emitting radionuclides; all radionuclides with half-lives less than ten days; natural uranium; natural thorium; uranium-235; uranium-238; thorium-232; thorium-228 and thorium-230 when contained in ores or physical contentrates	10^{-5}	22
All other alpha emitting radionuclides.	10^{-6}	2.2

(2) In the case of packages transported as exclusive use shipments by rail or highway only, the non-fixed radioactive contamination at any time during transport must not exceed ten times the levels prescribed in paragraph (i)(1) of this section. The levels at the beginning of transport must not exceed the levels prescribed in paragraph (i)(1) of this section;

(j) External radiation levels around the package and around the vehicle, if applicable, will not exceed the limits specified in §71.47 at any time during transportation; and

(k) Accessible package surface temperatures will not exceed the limits specified in §71.43(g) at any time during transportation.

[48 FR 35607, Aug. 5, 1983; 48 FR 38450, Aug. 24, 1983]

§71.88 Air transport of plutonium.

(a) Notwithstanding the provisions of any general licenses and notwithstanding any exemptions stated directly in this part or included indirectly by citation of 49 CFR Chapter 1, as may be applicable, the licensee shall assure that plutonium in any form, whether for import, export, or domestic shipment, is not transported by air or delivered to a carrier for air transport unless:

(1) The plutonium is contained in a medical device designed for individual human application; or

(2) The plutonium is contained in a material in which the specific activity is not greater than 0.002 microcuries per gram of material and in which the radioactivity is essentially uniformly distributed; or

(3) The plutonium is shipped in a single package containing no more than an A_2 quantity of plutonium in any isotope or form and is shipped in accordance with §71.5 of this part; or

(4) The plutonium is shipped in a package specifically authorized for the shipment of plutonium by air in the Certificate of Compliance for that package issued by the Commission.

(b) Nothing in paragraph (a) of this section is to be interpreted as removing or diminishing the requirements of §73.24 of this chapter.

(c) There have been two orders issued by the NRC restricting the air shipment of plutonium in accordance with Pub. L. 94-79. The first order, issued on August 15, 1975 was superseded by the second order dated September 1, 1978, which has remained in effect since that time. As of the effective date of this rule, the outstanding order dated September 1, 1978 is revoked.

§71.89 Opening instructions.

Prior to delivery of a package to a carrier for transport, the licensee shall ensure that any special instructions needed to safely open the package have been sent to or otherwise made available to the consignee for the consignee's use in accordance with §20.205 of this chapter.

§71.91 Records.

(a) Each licensee shall maintain for a period of three years after shipment a record of each shipment of licensed material not exempt under §71.10, showing, where applicable:

(1) Identification of the packaging by model number;

(2) Verification that there are no significant defects in the packaging, as shipped;

(3) Volume and identification of coolant;

(4) Type and quantity of licensed material in each package, and the total quantity of each shipment;

(5) For each item of irradiated fissile material:

(i) Identification by model number and/or serial number;

(ii) Irradiation and decay history to the extent appropriate to demonstrate that its nuclear and thermal characteristics comply with license conditions; and

(iii) Any abnormal or unusual condition relevant to radiation safety.

(6) Date of the shipment;

(7) For Fissile Class III and for Type B packages, any special controls exercised;

(8) Name and address of the transferee;

(9) Address to which the shipment was made; and

(10) Results of the determinations required by §71.87 and by the conditions of the package approval.

(b) The licensee shall make available to the Commission for inspection, upon reasonable notice, all records required by this part. Records are valid only if stamped, initialed, or signed and dated by authorized personnel or otherwise authenticated.

(c) Each licensee shall maintain sufficient written records to furnish evidence of the quality of packaging. The records to be maintained include results of the determinations required by §71.85; design, fabrication, and assembly records; results of reviews, inspections, tests, and audits; results monitoring work performance and materials analyses; and results of maintenance, modification, and repair activities. Inspection, test, and audit records must identify the inspector or data recorder, the type of observation, the results, the acceptability and the action taken in connection with any deficiencies noted. The records must be retained for three years after the life of the packaging to which they apply.

§71.93 Inspection and tests.

(a) The licensee or certificate holder shall permit the Commission at all reasonable times to inspect the licensed material, packaging, premises, and facilities in which the licensed material or packaging is used, provided, constructed, fabricated, tested, stored, or shipped.

(b) The licensee shall perform, and permit the Commission to perform, tests as the Commission deems necessary or appropriate for the administration of the regulations in this chapter.

(c) The licensee shall notify the Regional Administrator of the appropriate Nuclear Regulatory Commission Regional Office listed in Appendix A of Part 73 of this chapter at least 45 days prior to fabrication of a package to be used for the shipment of licensed material having a decay heat load in excess of five kilowatts or with a maximum normal operating pressure in excess of 103 kilopascal (15 psi) gauge.

[48 FR 35607, Aug. 5, 1983, as amended at 52 FR 31612, Aug. 21, 1987]

§71.95 Reports.

The licensee shall report to the Director, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555, within 30 days:

(a) Any instance in which there is significant reduction in the effectiveness of any authorized packaging during use; and

(b) Details of any defects with safety significance in the packaging after first use, with the means employed to repair the defects and prevent their recurrence.

§71.97 Advance notification of shipment of nuclear waste.

(a) Except as specified in paragraph (b) of this section, prior to the transport or delivery to a carrier for transport of licensed material outside the confines of the licensee's plant or other place of use or storage, each licensee shall provide advance notification to the governor of a state, or the governor's designee, of the shipment to, through, or across the boundary of the state.

(b) Advance notification is required only when:

(1) The licensed material is required by this part to be in Type B packaging for transportation;

(2) The licensed material other than irradiated fuel is being transported to, through, or across state boundaries to a disposal site or to a collection point for transport to a disposal site;

(3) The quantity of licensed material in a single package exceeds:

(i) 5,000 curies of special form radionuclides;

(ii) 5,000 curies of uncompressed gases of Argon-41, Krypton-85m, Krypton-87, Xenon-131m, or Xenon-135;

(iii) 50,000 curies of Argon-37, or of uncompressed gases of Krypton-85 or Xenon-133, or of Hydrogen-3 as a gas, as luminous paint, or adsorbed on solid material;

(iv) 20 curies of other non-special form radionuclides for which A^2 is less than or equal to four curies; or

(v) 200 curies of other non-special form radionuclides for which A^2 is greater than four curies; and

(4) The quantity of irradiated fuel is less than that subject to advance notification requirements of 10 CFR Part 73.

(c) *Procedures for submitting advance notification.*

(1) The notification must be made in writing to the office of each appropriate governor or governor's designee and to the Regional Administrator of the appropriate Nuclear Regulatory Commission Regional Office listed in Appendix A of Part 73 of this chapter.

(2) A notification delivered by mail must be postmarked at least seven days before the beginning of the seven-day period during which departure of the shipment is estimated to occur.

(3) A notification delivered by messenger must reach the office of the governor or of the governor's designee at least four days before the beginning of the seven-day period during which departure of the shipment is estimated to occur.

(i) A list of the names and mailing addresses of the governors' designees receiving advance notification of transportation of nuclear waste was published in the Federal Register on June 30, 1983 (48 FR 30221).

(ii) The list will be published annually in the Federal Register on or about June 30 to reflect any changes in information.

(iii) A list of the names and mailing addresses of the governors' designees is available upon request from the Director, Office of Governmental and Public Affairs, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

(4) The licensee shall retain a copy of the notification as a record for three years.

(d) *Information to be furnished in advance notification of shipment.* Each advance notification of shipment of nuclear waste must contain the following information:

(1) The name, address, and telephone number of the shipper, carrier, and receiver of the nuclear waste shipment;

(2) A description of the nuclear waste contained in the shipment, as required by the regulations of DOT in 49 CFR 172.202 and 172.203(d);

(3) The point of origin of the shipment and the seven-day period during which departure of the shipment is estimated to occur;

(4) The seven-day period during which arrival of the shipment at state boundaries is estimated to occur;

(5) The destination of the shipment, and the seven-day period during which arrival of the shipment is estimated to occur; and

(6) A point of contact with a telephone number for current shipment information.

(e) *Revision notice.* A licensee who finds that schedule information previously furnished to a governor or governor's designee in accordance with this section will not be met, shall telephone a responsible individual in the office of the governor of the State or of the governor's designee and inform that individual of the extent of the delay beyond the schedule originally reported. The licensee shall maintain a record of the name of the individual contacted for three years.

(f) *Cancellation notice.*

(1) Each licensee who cancels a nuclear waste shipment for which advance notification has been sent, shall send a cancellation notice to the governor of each state or the governor's designee previously notified and to the Regional Administrator of the appropriate Nuclear Regulatory Commission Regional Office listed in Appendix A of Part 73 of this chapter.

(2) The licensee shall state in the notice that it is a cancellation and shall identify the advance notification which is being cancelled. The licensee shall retain a copy of the notice as a record for three years.

[48 FR 35607, Aug. 5, 1983, as amended at 52 FR 31612, Aug. 21, 1987]

§71.99 Violations.

An injunction or other court order may be obtained prohibiting any violation of any provision of the Atomic Energy Act of 1954, as amended, (the Act) or Title II of the Energy Reorganization Act of 1974, as amended, or any regulation or order issued under the Acts. A court order may be obtained for the payment of a civil penalty imposed under section 234 of the Act for violation of sections 53, 57, 62, 63, 81, 82, 101, 103, 104, 107, or 109 of the Act, or section 206 of the Energy Reorganization Act of 1974, as amended; or any rule, regulation, or order issued under the Acts, or any term, condition, or limitation of any license issued under the Acts, or for any violation for which a license may be revoked under section 186 of the Act. Any person who willfully violates any provision of the Act or any regulation or order issued under the Acts may be guilty of a crime and, upon conviction, may be punished by fine or imprisonment or both, as provided by law.

Subpart H—Quality Assurance

§71.101 Quality assurance requirements.

(a) *Purpose.* This subpart describes quality assurance requirements applying to design, purchase, fabrication, handling, shipping, storing, cleaning, assembly, inspection, testing, operation, maintenance, repair, and modification of components of packaging which are important to safety. As used in this subpart, "quality assurance" comprises all those planned and systematic actions necessary to provide adequate confidence that a system or component will perform satisfactorily in service. Quality assurance includes quality control, which comprises those quality assurance actions related to control of the physical characteristics and quality of the material or component to predetermined requirements.

(b) *Establishment of program.* Each licensee shall establish, maintain, and execute a quality assurance program satisfying each of the applicable criteria of §§77.101 through 71.137 of this subpart and satisfying any specific provisions that are applicable to the licensee's activities, including procurement of packaging. The licensee shall apply each of the applicable criteria in a graded approach, i.e., to an extent that is consistent with its importance to safety.

(c) *Approval of program.* Prior to the use of any package for the shipment of licensed material subject to this subpart, each licensee shall obtain Commission approval of its quality assurance program. Each licensee shall file a description of its quality assurance program, including a discussion of which requirements of this subpart are applicable and how they will be satisfied, with the Director, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

(d) *Existing package designs.* The provisions of this paragraph deal with packages which have been approved for use in accordance with this part prior to January 1, 1979, and which have been designed in accordance with the provisions of this part in effect at the time of application for package approval. Those packages will be accepted as having been designed in accordance with a quality assurance program which satisfies the provisions of paragraph (b) of this section.

(e) *Existing packages.* The provisions of this paragraph deal with packages which have been approved for use in accordance with this part prior to January 1, 1979, have been at least partially fabricated prior to that date, and for which the fabrication is in accordance with the provisions of this part in effect at the time of application for approval of package design. These packages will be accepted as having been fabricated and assembled in accordance with a quality assurance program which satisfies the provisions of paragraph (b) of this section.

(f) *Previously approved programs.* A Commission-approved quality assurance program which satisfies the applicable criteria of Appendix B of Part 50 of this chapter and which is established, maintained, and executed with regard to transport packages will be accepted as satisfying the requirements of paragraph (b) of this section. Prior to first use, the licensee shall notify the Director, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555, of its intent to apply its previously approved Appendix B program to transportation activities. The licensee shall identify the program by date of submittal to the Commission, Docket Number, and date of Commission approval.

§71.103 Quality assurance organization.

The licensee[3] shall be responsible for the establishment and execution of the quality assurance program. The licensee may delegate to others, such as contractors, agents, or consultants, the work of establishing and executing the quality assurance program, or any part of the quality assurance program, but shall retain responsibility for the program. The licensee shall clearly establish and delineate in writing the authority and duties of persons and organizations performing activities affecting the safety-related functions of structures, systems and components. These activities include performing the functions associated with attaining quality objectives and the quality assurance functions. The quality assurance functions are (a) assuring that an appropriate quality assurance program is established and effectively executed and (b) verifying, by procedures such as checking, auditing, and inspection, that activities affecting the safety-related functions have been correctly performed. The persons and organizations performing quality assurance functions must have sufficient authority and organizational freedom to identify quality problems; to initiate, recommend, or provide solutions; and to verify implementation of solutions. The persons and organizations performing quality assurance functions shall report to a management level which assures that the required authority and organizational freedom, including sufficient independence from

[3] While the term "licensee" is used in these criteria, the requirements are applicable to whatever design, fabrication, assembly, and testing of the package is accomplished with respect to a package prior to the time a package approval is issued.

cost and schedule when opposed to safety considerations, are provided. Because of the many variables involved, such as the number of personnel, the type of activity being performed, and the location or locations where activities are performed, the organizational structure for executing the quality assurance program may take various forms provided that the persons and organizations assigned the quality assurance functions have the required authority and organizational freedom. Irrespective of the organizational structure, the individual(s) assigned the responsibility for assuring effective execution of any portion of the quality assurance program at any location where activities subject to this section are being performed must have direct access to the levels of management necessary to perform this function.

§71.105 Quality assurance program.

(a) The licensee shall establish, at the earliest practicable time, consistent with the schedule for accomplishing the activities, a quality assurance program that complies with the requirements of §§71.101 through 71.137 of this subpart. The licensee shall document the quality assurance program by written procedures or instructions and shall carry out the program in accordance with those procedures throughout the period during which packaging is used. The licensee shall identify the material and components to be covered by the quality assurance program, the major organizations participating in the program, and the designated functions of these organizations.

(b) The licensee, through its quality assurance program, shall provide control over activities affecting the quality of the identified materials and components to an extent consistent with their importance to safety, and as necessary to assure conformance to the approved design of each individual package used for the shipment of radioactive material. The licensee shall assure that activities affecting quality are accomplished under suitably controlled conditions. Controlled conditions include the use of appropriate equipment; suitable environmental conditions for accomplishing the activity, such as adequate cleanliness; and assurance that all prerequisites for the given activity have been satisfied. The licensee shall take into account the need for special controls, processes, test equipment, tools and skills to attain the required quality, and the need for verification of quality by inspection and test.

(c) The licensee shall base the requirements and procedures of its quality assurance program on the following considerations concerning the complexity and proposed use of the package and its components:

(1) The impact of malfunction or failure of the item to safety;

(2) The design and fabrication complexity or uniqueness of the item;

(3) The need for special controls and surveillance over processes and equipment;

(4) The degree to which functional compliance can be demonstrated by inspection or test; and

(5) The quality history and degree of standardization of the item.

(d) The licensee shall provide for indoctrination and training of personnel performing activities affecting quality as necessary to assure that suitable proficiency is achieved and maintained. The licensee shall review the status and adequacy of the quality assurance program at established intervals. Management of other organizations participating in the quality assurance program shall regularly review the status and adequacy of that part of the quality assurance program which they are executing.

§71.107 Package design control.

(a) The licensee shall establish measures to assure that applicable regulatory requirements and the package design, as specified in the license for those materials and components to which this section applies, are correctly translated into specifications, drawings, procedures, and instructions. These measures must include provisions to assure that appropriate quality standards are specified and included in design documents and that deviations from standards are controlled. Measures must be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the materials, parts, and components of the packaging.

(b) The licensee shall establish measures for the identification and control of design interfaces and for coordination among participating design organizations. These measures must include the establishment of written procedures among participating design organizations for the review, approval, release, distribution, and revision of documents involving design interfaces. The design control measures must provide for verifying or checking the adequacy of design, by methods such as design reviews, alternate or simplified calculational methods, or by a suitable testing program. For the verifying or checking process, the licensee shall designate individuals or groups other than those who were responsible for the original design, but who may be from the same organization. Where a test program is used to verify the adequacy of a specific design feature in lieu of other verifying or checking processes, the licensee shall include suitable qualification testing of a prototype or sample unit under the most adverse design conditions. The licensee shall apply design control measures to items such as the following: criticality physics, radiation shielding, stress, thermal, hydraulic, and accident analyses; compatibility of materials; accessibility for inservice inspection, maintenance, and repair; features to facilitate decontamination; and delineation of acceptance criteria for inspections tests.

(c) The licensee shall subject design changes, including field changes, to design control measures commensurate with those applied to the original design. Changes in the conditions specified in the package approval require NRC approval.

[48 FR 35607, Aug. 5, 1983; 48 FR 38450, Aug. 24, 1983]

§71.109 Procurement document control.

The licensee shall establish measures to assure adequate quality is required in the documents for procurement of material, equipment, and services, whether purchased by the licensee or by its contractors or subcontractors. To the extent necessary, the licensee shall require contractors or subcontractors to provide a quality assurance program consistent with the applicable provisions of this part.

§71.111 Instructions, procedures, and drawings.

The licensee shall prescribe activities affecting quality by documented instructions, procedures, or drawings of a type appropriate to the circumstances and shall require that these instructions, procedures, and drawings be followed. The instructions, procedures, and drawings must include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

§71.113 Document control.

The licensee shall establish measures to control the issuance of documents such as instructions, procedures, and drawings, including changes, which prescribe all activities affecting quality. These measures must assure that documents, including changes, are reviewed for adequacy, approved for release by authorized personnel, and distributed and used at the location where the prescribed activity is performed. These measures must assure that changes to documents are reviewed and approved.

§71.115 Control of purchased material, equipment, and services.

(a) The licensee shall establish measures to assure that purchased material, equipment, and services, whether purchased directly or through contractors and subcontractors, conform to the procurement documents. These measures must include provisions, as appropriate, for source evaluation and selection, objective evidence of quality furnished by the contractor or subcontractor, inspection at the contractor or subcontractor source, and examination of products upon delivery.

(b) The licensee shall have available documentary evidence that material and equipment conform to the procurement specifications prior to installation or use of the material and equipment. The licensee shall retain or have available this documentary evidence for the life of the package to which it applies. The licensee shall assure that the evidence is sufficient

to identify the specific requirements met by the purchased material and equipment.

(c) The licensee or designee shall assess the effectiveness of the control of quality by contractors and subcontractors at intervals consistent with the importance, complexity, and quantity of the product or services.

§71.117 Identification and control of materials, parts, and components.

The licensee shall establish measures for the identification and control of materials, parts, and components. These measures must assure that identification of the item is maintained by heat number, part number, or other appropriate means, either on the item or on records traceable to the item, as required throughout fabrication, installation, and use of the item. These identification and control measures must be designed to prevent the use of incorrect or defective materials, parts, and components.

§71.119 Control of special processes.

The licensee shall establish measures to assure that special processes, including welding, heat treating, and nondestructive testing, are controlled and accomplished by qualified personnel using qualified procedures in accordance with applicable codes, standards, specifications, criteria, and other special requirements.

§71.121 Internal inspection.

The licensee shall establish and execute a program for inspection of activities affecting quality by or for the organization performing the activity to verify conformance with the documented instructions, procedures, and drawings for accomplishing the activity. The inspection must be performed by individuals other than those who performed the activity being inspected. Examination, measurements, or tests of material or products processed must be performed for each work operation where necessary to assure quality. If direct inspection of processed material or products is not carried out, indirect control by monitoring processing methods, equipment, and personnel must be provided. Both inspection and process monitoring must be provided when quality control is inadequate without both. If mandatory inspection hold points, which require witnessing or inspecting by the licensee's designated representative and beyond which work should not proceed without the consent of its designated representative, are required, the specific hold points must be indicated in appropriate documents.

§71.123 Test control.

The licensee shall establish a test program to assure that all testing required to demonstrate that the packaging components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements of this part and the requirements and acceptance limits contained in the package approval. The test procedures must include provisions for assuring that all prerequisites for the given test are met, that adequate test instrumentation is available and used, and that the test is performed under suitable environmental conditions. The licensee shall document and evaluate the test results to assure that test requirements have been satisfied.

§71.125 Control of measuring and test equipment.

The licensee shall establish measures to assure that tools, gages, instruments, and other measuring and testing devices used in activities affecting quality are properly controlled, calibrated, and adjusted at specified times to maintain accuracy within necessary limits.

§71.127 Handling, storage, and shipping control.

The licensee shall establish measures to control, in accordance with instructions, the handling, storage, shipping, cleaning, and preservation of materials and equipment to be used in packaging to prevent damage or deterioration. When necessary for particular products, special protective environments, such as inert gas atmosphere, and specific moisture content and temperature levels must be specified and provided.

§71.129 Inspection, test, and operating status.

(a) The licensee shall establish measures to indicate, by the use of markings such as stamps, tags, labels, routing cards, or other suitable means, the status of inspections and tests performed upon individual items of the packaging. These measures must provide for the identification of items which have satisfactorily passed required inspections and tests where necessary to preclude inadvertent by-passing of the inspections and tests.

(b) The licensee shall establish measures to identify the operating status of components of the packaging, such as tagging valves and switches, to prevent inadvertent operation.

§71.131 Nonconforming materials, parts, or components.

The licensee shall establish measures to control materials, parts, or components which do not conform to the licensee's requirements in order to prevent their inadvertent use or installation. These measures must include, as appropriate, procedures for identification, documentation, segregation, disposition, and notification to affected organizations. Nonconforming items must be reviewed and accepted, rejected, repaired, or reworked in accordance with documented procedures.

§71.133 Corrective action.

The licensee shall establish measures to assure that conditions adverse to quality, such as deficiencies, deviations, defective material and equipment, and nonconformances, are promptly identified and corrected. In the case of a significant condition adverse to quality, the measures must assure that the cause of the condition is determined and corrective action taken to preclude repetition. The identification of the significant condition adverse to quality, the cause of the condition, and the corrective action taken must be documented and reported to appropriate levels of management.

§71.135 Quality assurance records.

The licensee shall maintain sufficient written records to describe the activities affecting quality. The records must include the instructions, procedures, and drawings required by §71.111 to prescribe quality assurance activities and must include closely related specifications such as required qualifications of personnel, procedures, and equipment. The records must include the instructions or procedures which establish a records retention program that is consistent with applicable regulations and designates factors such as duration, location, and assigned responsibility. The licensee shall retain these records for three years beyond the date when the licensee last engages in the activity for which the quality assurance program was developed. If any portion of the written procedures or instructions is superseded, the licensee shall retain the superseded material for three years after it is superseded.

§71.137 Audits.

The licensee shall carry out a comprehensive system of planned and periodic audits to verify compliance with all aspects of the quality assurance program and to determine the effectiveness of the program. The audits must be performed in accordance with written procedures or checklists by appropriately trained personnel not having direct responsibilities in the areas being audited. Audited results must be documented and reviewed by management having responsibility in the area audited. Follow-up action, including re-audit of deficient areas, must be taken where indicated.

Appendix A—Determination of A_1 and A_2

I. SINGLE RADIONUCLIDES

(1) For a single radionuclide of known identity, the values of A_1 and A_2 are taken from Table A-1 if listed there. The values A_1 and A_2 in Table A-1 are also applicable for radionuclides contained in (α, n) or (γ, n) neutron sources.

(2) For any single radionuclide whose identity is known but which is not listed in Table A-1, the values of A_1 and A_2 are determined according to the following procedure:

(a) If the radionuclide emits only one type of radiation, A_1 is determined according to the rules in paragraphs (i), (ii), (iii) and (iv) of this

paragraph. For radionuclides emitting different kinds of radiation, A_1 is the most restrictive value of those determined for each kind of radiation. However, in both cases, A_1 is restricted to a maximum of 1000 Ci. If a parent nuclide decays into a shorter lived daughter with a half-life not greater than 10 days, A_1 is calculated for both the parent and the daughter, and the more limiting of the two values is assigned to the parent nuclide.

(i) For gamma emitters, A_1 is determined by the expression:

$$A_1 = \frac{9}{\Gamma} \text{ curies}$$

where Γ is the gamma-ray constant, corresponding to the dose in R/h at 1 m per Ci; the number 9 results from the choice of 1 rem/h at a distance of 3 m as the reference dose-equivalent rate.

(ii) For X-ray emitters, A_1 is determined by the atomic number of the nuclide:

for $Z \leq 55$—A_1=1000 Ci

for $Z > 55$—A_1=200 Ci

where Z is the atomic number of the nuclide.

(iii) For beta emitters, A_1 is determined by the maximum beta energy (E_{max}) according to Table A-2;

(iv) For alpha emitters, A_1 is determined by the expression:

A_1=1000 A_3

where A_3 is the value listed in Table A-3;

(b) A_2 is the more restrictive of the following two values:

(i) The corresponding A_1; and

(ii) The value A_3 obtained from Table A-3.

(3) For any single radionuclide whose identity is unknown, the value of A_1 is taken to be two Ci and the value of A_2 is taken to be 0.002 Ci. However, if the atomic number of the radionuclide is known to be less than 82, the value of A_1 is taken to be 10 Ci and the value of A_2 is taken to be 0.4 Ci.

II. MIXTURES OF RADIONUCLIDES, INCLUDING RADIOACTIVE DECAY CHAINS

(1) For mixed fission products the following activity limits may be assumed if a detailed analysis of the mixture is not carried out:

A_1=10 Ci

A_2=0.4 Ci

(2) A single radioactive decay chain is considered to be a single radionuclide when the radionuclides are present in their naturally occurring proportions and no daughter nuclide has a half-life either longer than 10 days or longer than that of the parent nuclide. The activity to be taken into account and the A_1 or A_2 value from Table A-1 to be applied are those corresponding to the parent nuclide of that chain. When calculating A_1 or A_2 values, radiation emitted by daughters must be considered. However, in the case of radioactive decay chains in which any daughter nuclide has a half-life either longer than 10 days or greater than that of the parent nuclide, the parent and daughter nuclides are considered to be mixtures of different nuclides.

(3) In the case of a mixture of different radionuclides, where the identity and activity of each radionuclide are known, the permissible activity of each radionuclide $R_1, R_2 \ldots R_n$ K is such that $F_1 + F_2 + \ldots F_n$ is not greater than unity, where

$$F_1 = \frac{\text{Total activity of } R_1}{A_1(R_1)}$$

$$F_2 = \frac{\text{Total activity of } R_2}{A_1(R_2)}$$

$$F_n = \frac{\text{Total activity of } R_n}{A_1(R_n)}$$

$A_1(R_1, R_2 \ldots R_n)$ is the value of A_1 or A_2 as appropriate for the nuclide $R_1, R_2 \ldots R_n$.

(4) When the identity of each radionuclide is known but the individual activities of some of the radionuclides are not known, the formula given in paragraph (3) is applied to establish the values of A_1 or A_2 as appropriate. All the radionuclides whose individual activities are not known (their total activity will, however, be known) are classed in a single group and the most restrictive value of A_1 and A_2 applicable to any one of them is used as the value of A_1 or A_2 in the denominator of the fraction.

(5) Where the identity of each radionuclide is known but the individual activity of none of the radionuclides is known, the most restrictive value of A_1 or A_2 applicable to any one of the radionuclides present is adopted as the applicable value.

(6) When the identity of none of the nuclides is known, the value of A_1 is taken to be two Ci and the value of A_2 is taken to be 0.002 Ci. However, if alpha emitters are known to be absent, the value of A_2 is taken to be 0.4 Ci.

TABLE A-1-A_1 AND A_2 VALUES FOR RADIONUCLIDES

(See footnotes at end of Table A-1)

Symbol of radionuclide	Element and atomic number	A_1(Ci)	A_2(Ci)	Specific activity (Ci/g)
.....	.....			
^{227}Ac	Actinium (89)	1000	0.003	7.2×10
^{228}Ac	.....	10	4	2.2×10^{5}
^{105}Ag	Silver (47)	40	40	3.1×10^{4}
^{110m}Ag	.....	7	7	4.7×10^{3}
^{111}Ag	.....	100	20	1.6×10^{4}
^{241}Am	Americium (95)	8	0.008	3.2
^{243}Am	.....	8	0.008	1.9×10^{-1}
^{37}Ar (comproessed or uncompressed)*	Argon (18)	1000	1000	1.0×10^{3}
^{41}Ar (uncompressed)*	.....	20	20	4.3×10^{7}
^{41}Ar (compressed)*	.....	1	1	4.3×10^{7}
^{73}As	Arsenic (33)	1000	400	2.4×10^{4}
^{74}As	.....	20	20	1.0×10^{3}
^{76}As	.....	10	10	1.6×10^{4}
^{77}As	.....	300	20	1.1×10^{4}
^{211}At	Astatine (85)	200	7	2.1×10^{4}
^{193}Au	Gold (79)	200	200	9.3×10^{3}
^{196}Au	.....	30	30	1.2×10^{3}
^{198}Au	.....	40	20	2.5×10^{5}
^{199}Au	.....	200	25	2.1×10^{5}
^{131}Ba	Barium (56)	40	40	8.7×10^{4}
^{133}Ba	.....	40	10	4.0×10^{2}
^{140}Ba	.....	20	20	7.3×10^{4}
^{7}Be	Beryllium (4)	300	300	3.5×10^{3}
^{206}Bi	Bismouth (83)	5	5	9.9×10^{4}
^{207}Bi	.....	10	25	2.2×10^{2}
^{210}Bi (RaE)	.....	100	4	1.2×10^{3}
^{212}Bi	.....	6	6	1.5×10^{7}
^{249}Bk	Berkelium (97)	1000	1	1.8×10^{3}
^{77}Br	Bromine (35)	70	25	7.1×10^{3}
^{82}Br	.....	6	6	1.1×10^{4}
^{11}C	Carbon (6)	20	20	8.4×10^{3}
^{14}C	.....	1000	60	4.6
^{45}Ca	Calcium (20)	1000	25	1.9×10^{4}
^{47}Ca	.....	20	20	5.9×10^{3}
^{109}Cd	Cadmium (48)	1000	70	2.6×10^{3}

TABLE A-1-A_1 AND A_2 VALUES FOR RADIONUCLIDES

(See footnotes at end of Table A-1)

Symbol of radionuclide	Element and atomic number	A_1(Ci)	A_2(Ci)	Specific activity (Ci/g)
.....	.....			
^{115m}Cd	.....	30	30	2.6×10^{4}
^{115}Cd	.....	80	20	5.1×10^{3}
^{139}Ce	Cerium (58)	100	100	6.5×10^{3}
^{141}Ce	.....	300	25	2.8×10^{4}
^{143}Ce	.....	60	20	6.6×10^{3}
^{144}Ce	.....	10	7	3.2×10^{3}
^{249}Cf	Californium (98)	2	0.002	3.1
^{250}Cf	.....	7	0.007	1.3×10^{2}
^{252}Cf	.....	2	0.009	6.5×10^{2}
^{36}Cl	Chlorine (17)	300	10	3.2×10^{-2}
^{38}Cl	.....	10	10	1.3×10^{8}
^{242}Cm	Curium (96)	200	0.2	3.3×10^{3}
^{243}Cm	.....	9	0.009	4.2×10
^{244}Cm	.....	10	0.01	8.2×10
^{245}Cm	.....	6	0.006	1.0×10^{-1}
^{246}Cm	.....	6	0.006	3.6×10^{-1}
^{56}Co	Cobalt (27)	5	5	3.0×10^{4}
^{57}Co	.....	90	90	8.5×10^{3}
^{58m}Co	.....	1000	1000	5.9×10^{6}
^{58}Co	.....	20	20	3.1×10^{4}
^{60}Co	.....	7	7	1.1×10^{3}
^{51}Cr	Chromium (24)	600	600	9.2×10^{4}
^{129}Cs	Cesium (55)	40	40	7.6×10^{5}
^{131}Cs	.....	1000	1000	1.0×10^{5}
^{134m}Cs	.....	1000	10	7.4×10^{6}
^{134}Cs	.....	10	10	1.2×10^{3}
^{135}Cs	.....	1000	25	8.8×10^{-4}
^{136}Cs	.....	7	7	7.4×10^{4}
^{137}Cs	.....	30	10	9.8×10
^{64}Cu	Copper (29)	80	25	3.8×10^{6}
^{67}Cu	.....	200	25	7.9×10^{5}
^{165}Dy	Dysprosium (66)	100	20	8.2×10^{6}
^{166}Dy	.....	1000	200	2.3×10^{5}
^{169}Er	Erbium (68)	1000	25	8.2×10^{4}
^{171}Er	.....	50	20	2.4×10^{6}
^{152m}Eu	Europium (63)	30	30	2.2×10^{6}
^{152}Eu	.....	20	10	1.9×10^{2}
^{154}Eu	.....	10	5	1.5×10^{2}
^{155}Eu	.....	400	60	1.4×10^{3}
^{18}F	Fluorine (9)	20	20	9.3×10^{7}
^{52}Fe	Iron (26)	5	5	7.3×10^{6}

TABLE A-1-A_1 AND A_2 VALUES FOR RADIONUCLIDES

(See footnotes at end of Table A-1)

Symbol of radionuclide	Element and atomic number	A_1(Ci)	A_2(Ci)	Specific activity (Ci/g)
.....	.....			
^{55}Fe	.....	1000	1000	2.2×10^{3}
^{59}Fe	.....	10	10	4.9×10^{4}
^{67}Ga	Gallium (31)	100	100	6.0×10^{5}
^{68}Ga	.....	20	20	4.0×10^{7}
^{72}Ga	.....	7	7	3.1×10^{6}
^{153}Gd	Gadolinium (64)	200	100	3.6×10^{3}
^{159}Gd	.....	300	20	1.1×10^{6}
^{68}Ge	Germanium (32)	20	10	7.0×10^{3}
^{71}Ge	.....	1000	1000	1.6×10^{5}
^{3}H	Hydrogen (1) see T-Tritum			
^{181}Hf	Hafnium (72)	30	25	1.6×10^{4}
^{197m}Hg	Mercury (80)	200	200	6.6×10^{5}
^{197}Hg	.....	200	200	2.5×10^{5}
^{203}Hg	.....	80	25	1.4×10^{4}
^{166}Ho	Holmium (67)	30	30	6.9×10^{5}
^{123}I	Iodine (53)	50	50	1.9×10^{6}
^{125}I	.....	1000	70	1.7×10^{4}
^{126}I	.....	40	10	7.8×10^{4}
^{129}I	.....	1000	2	1.6×10^{-4}
^{131}I	.....	40	10	1.2×10^{5}
^{132}I	.....	7	7	1.1×10^{7}
^{133}I	.....	30	10	1.1×10^{6}
^{134}I	.....	8	8	2.7×10^{7}
^{135}I	.....	10	10	3.5×10^{6}
^{111}In	Indium (49)	30	25	4.2×10^{5}
^{113m}In	.....	60	60	1.6×10^{7}
^{114m}In	.....	30	20	2.3×10^{4}
^{115m}In	.....	100	20	6.1×10^{6}
^{190}Ir	Iridium (77)	10	10	6.2×10^{4}
^{192}Ir	.....	20	10	9.1×10^{3}
^{194}Ir	.....	10	10	8.5×10^{5}
^{42}K	Potassium (19)	10	10	6.0×10^{6}
^{43}K	.....	20	10	3.3×10^{6}
^{85m}Kr (uncompressed)*	Krypton (36)	100	100	8.4×10^{6}
^{85m}Kr (compressed)*	.....	3	3	8.4×10^{6}
^{85}Kr (uncompressed)*	.....	1000	1000	4.0×10^{2}
^{85}Kr (compressed)*	.....	5	5	4.0×10^{2}
^{87}Kr (uncompressed)*	.....	20	20	2.8×10^{7}
^{87}Kr (compressed)*	.....	0.6	0.6	2.8×10^{7}
^{140}La	Lanthanum (57)	30	30	5.6×10^{5}

TABLE A-1-A_1 AND A_2 VALUES FOR RADIONUCLIDES

(See footnotes at end of Table A-1)

Symbol of radionuclide	Element and atomic number	A_1(Ci)	A_2(Ci)	Specific activity (Ci/g)
.....	.....			
LSA	Low specific activity material—see Sec. 71.4			
^{177}Lu	Lutetium (71)	300	25	1.1×10^{5}
MFP	Mixed fission products	10	0.4	
^{28}Mg	Magnesium (12)	6	6	5.2×10^{6}
^{52}Mn	Manganese (25)	5	5	4.4×10^{5}
^{54}Mn		20	20	8.3×10^{3}
^{56}Mn		5	5	2.2×10^{7}
^{99}Mo	Molybdenum (42)	100	20	4.7×10^{5}
^{13}N	Nitrogen (7)	20	10	1.5×10^{9}
^{22}Na	Sodium (11)	8	8	6.3×10^{3}
^{24}Na		5	5	8.7×10^{6}
^{93m}Nb	Niobium (41)	1000	200	1.1×10^{3}
^{95}Nb		20	20	3.9×10^{4}
^{97}Nb		20	20	2.6×10^{7}
^{147}Nd	Neodymium (60)	100	20	8.0×10^{4}
^{149}Nd		30	20	1.1×10^{7}
^{59}Ni	Nickel (28)	1000	900	8.1×10^{-2}
^{63}Ni		1000	100	4.6×10
^{65}Ni		10	10	1.9×10^{7}
^{237}Np	Neptunium (93)	5	0.005	6.9×10^{-4}
^{239}Np		200	25	2.3×10^{5}
^{185}Os	Osmium (76)	20	20	7.3×10^{3}
^{191}Os		600	200	4.6×10^{4}
^{191m}Os		200	200	1.2×10^{6}
^{193}Os		100	20	5.3×10^{5}
^{32}P	Phosphorous (15)	30	30	2.9×10^{5}
^{230}Pa	Protactinium (91)	20	0.8	3.2×10^{4}
^{231}Pa		2	0.002	4.5×10^{-2}
^{233}Pa		100	100	2.1×10^{4}
^{201}Pb	Lead (82)	20	20	1.7×10^{6}
^{210}Pb		100	0.2	8.0×10
^{212}Pb		6	5	1.4×10^{6}
^{103}Pd	Palladium (46)	1000	700	7.5×10^{4}
^{109}Pd		100	20	2.1×10^{6}
^{147}Pm	Promethium (61)	1000	25	9.4×10^{2}
^{149}Pm		100	20	4.2×10^{5}
^{210}Po	Polonium (84)	200	0.2	4.5×10^{3}
^{142}Pr	Praseodymium (59)	10	10	1.2×10^{4}
^{143}Pr		300	20	6.6×10^{4}
^{191}Pt	Platinum (78)	100	100	2.3×10^{5}

TABLE A-1-A_1 AND A_2 VALUES FOR RADIONUCLIDES

(See footnotes at end of Table A-1)

Symbol of radionuclide	Element and atomic number	A_1(Ci)	A_2(Ci)	Specific activity (Ci/g)
.....	.....			
^{193m}Pt		200	200	2.0×10^{5}
^{197m}Pt		300	20	1.2×10^{7}
^{197}Pt		300	20	8.8×10^{5}
^{238}Pu	Plutonium (94)	3	0.003	1.7×10
^{239}Pu		2	0.002	6.2×10^{-2}
^{240}Pu		2	0.002	2.3×10^{-1}
^{241}Pu		1000	0.1	1.1×10^{2}
^{242}Pu		3	0.003	3.9×10^{-3}
^{223}Ra	Radium (88)	50	0.2	5.0×10^{4}
^{224}Ra		6	0.5	1.6×10^{5}
^{226}Ra		10	0.05	1.0
^{228}Ra		10	0.05	2.3×10^{2}
^{81}Rb	Rubidium (37)	30	25	8.2×10^{6}
^{86}Rb		30	30	8.1×10^{4}
^{87}Rb		Unlimited	Unlimited	6.6×10^{-8}
Rb natural		Unlimited	Unlimited	1.8×10^{-8}
^{186}Re	Rhenium (75)	100	20	1.9×10^{5}
^{187}Re		Unlimited	Unlimited	3.8×10^{-8}
^{188}Re		10	10	1.0×10^{6}
Re(natural)		Unlimited	Unlimited	2.4×10^{-8}
^{103m}Rh	Rhodium (45)	1000	1000	3.2×10^{7}
^{105}Rh		200	25	8.2×10^{5}
^{222}Rn	Radon (86)	10	2	1.5×10^{5}
^{97}Ru	Ruthenium (44)	80	80	5.5×10^{5}
^{103}Ru		30	25	3.2×10^{4}
^{105}Ru		20	20	6.6×10^{6}
^{106}Ru		10	7	3.4×10^{3}
^{35}S	Sulphur (16)	1000	60	4.3×10^{4}
^{122}Sb	Antimony (51)	30	30	3.9×10^{5}
^{124}Sb		5	5	1.8×10^{4}
^{125}Sb		40	25	1.4×10^{3}
^{46}Sc	Scandium (21)	8	8	3.4×10^{4}
^{47}Sc		200	20	8.2×10^{5}
^{48}Sc		5	5	1.5×10^{6}
^{75}Se	Selenium (34)	40	40	1.4×10^{4}
^{31}Si	Silicon (14)	100	20	3.9×10^{7}
^{147}Sm	Samarium (62)	Unlimited	Unlimited	2.0×10^{-8}
^{151}Sm		1000	90	2.6×10
^{153}Sm		300	20	4.4×10^{5}
^{113}Sn	Tin (50)	60	60	1.0×10^{4}
^{119m}Sn		100	100	4.4×10^{3}

TABLE A-1-A_1 AND A_2 VALUES FOR RADIONUCLIDES

(See footnotes at end of Table A-1)

Symbol of radionuclide	Element and atomic number	A_1(Ci)	A_2(Ci)	Specific activity (Ci/g)
...	...			
^{125}Sn	...	10	10	1.1×10^{3}
^{85m}Sr	Strontium (38)	80	80	3.2×10^{7}
^{85}Sr	...	30	30	2.4×10^{4}
^{87m}Sr	...	50	50	1.2×10^{7}
^{89}Sr	...	100	10	2.9×10^{4}
^{90}Sr	...	10	0.4	1.5×10^{2}
^{91}Sr	...	10	10	3.6×10^{4}
^{92}Sr	...	10	10	1.3×10^{7}
T(uncompressed)*	Tritium (1)	1000	1000	9.7×10^{3}
T(compressed)*	...	1000	1000	9.7×10^{3}
T(activated luminous paint)	...	1000	1000	9.7×10^{3}
T(absorbed on solid carrier)	...	1000	1000	9.7×10^{3}
T(tritiated water)	...	1000	1000	9.7×10^{3}
T(other forms)	...	20	20	9.7×10^{3}
^{182}Ta	Tantalum (73)	20	20	6.2×10^{3}
^{160}Tb	Terbium (65)	20	10	1.1×10^{4}
^{96m}Tc	Technetium (43)	1000	1000	3.8×10^{7}
^{96}Tc	...	6	6	3.2×10^{5}
^{97m}Tc	...	1000	200	1.5×10^{4}
^{97}Tc	...	1000	400	1.4×10^{-3}
^{99m}Tc	...	100	100	5.2×10^{6}
^{99}Tc	...	1000	25	1.7×10^{-2}
^{125m}Te	Tellurium (52)	1000	100	1.8×10^{4}
^{127M}Te	...	300	20	4.0×10^{4}
^{127}Te	...	300	20	2.6×10^{6}
^{129M}Te	...	30	10	2.5×10^{4}
^{129}Te	...	100	20	2.0×10^{7}
^{131m}Te	...	10	10	8.0×10^{5}
^{132}Te	...	7	7	3.1×10^{5}
^{227}Th	Thorium (90)	200	0.2	3.2×10^{4}
^{228}Th	...	6	0.008	8.3×10^{2}
^{230}Th	...	3	0.003	1.9×10^{-2}
^{231}Th	...	1000	25	5.3×10^{5}
^{232}Th	...	Unlimited	Unlimited	1.1×10^{-7}
^{234}Th	...	10	10	2.3×10^{4}
Th(natural)	...	Unlimited	Unlimited	2.2×10^{-7}
Th(irradiated)**	...			
^{200}Tl	Thallium (81)	20	20	5.8×10^{5}
^{201}Tl	...	200	200	2.2×10^{5}

TABLE A-1-A_1 AND A_2 VALUES FOR RADIONUCLIDES

(See footnotes at end of Table A-1)

Symbol of radionuclide	Element and atomic number	A_1(Ci)	A_2(Ci)	Specific activity (Ci/g)
...	...			
^{202}Tl	...	40	40	5.4×10^{4}
^{204}Tl	...	300	10	4.3×10^{2}
^{170}Tm	Thulium (69)	300	10	6.0×10^{3}
^{171}Tm	...	1000	100	1.1×10^{3}
^{230}U	Uranium (92)	100	0.1	2.7×10^{4}
^{232}U	...	30	0.03	2.1×10
^{233}U	...	100	0.1	9.5×10^{-3}
^{234}U	...	100	0.1	6.2×10^{-3}
^{235}U	...	100	0.2	2.1×10^{-6}
^{236}U	...	200	0.2	6.3×10^{-5}
^{238}U	...	Unlimited	Unlimited	3.3×10^{-7}
U(natural)	...	Unlimited	Unlimited	(See Table A-4)
U (enriched): percent	...	Unlimited	Unlimited	(See Table A-4)
20 percent or greater	...	100	0.1	(See Table A-4)
U(depleted)	...	Unlimited	Unlimited	(See Table A-4)
U(irridiated)***	...			
^{48}V	Vanadium (23)	6	6	1.7×10^{5}
^{181}W	Tungsten (74)	200	100	5.0×10^{3}
^{185}W	...	1000	25	9.7×10^{-3}
^{187}W	...	40	20	7.0×10^{5}
^{127}Xe (uncompressed)*	Xenon (54)	70	70	2.8×10^{4}
^{127}Xe (compressed)*	...	5	5	2.8×10^{4}
^{131m}Xe (compressed)*	...	10	10	1.0×10^{5}
^{131m}Xe (uncompressed)*	...	100	100	1.0×10^{5}
^{133}Xe (uncompressed)*	...	1000	1000	1.9×10^{5}
^{133}Xe (compressed)*	...	5	5	1.9×10^{5}
^{135}Xe (uncompressed)*	...	70	70	2.5×10^{5}
^{135}Xe (compressed)*	...	2	2	2.5×10^{5}
^{87}Y	Yttrium (39)	20	20	4.5×10
^{90}Y	...	10	10	2.5×10^{5}
^{91m}Y	...	30	30	4.1×10^{7}
^{91}Y	...	30	30	2.5×10^{4}
^{92}Y	...	10	10	9.5×10^{6}
^{93}Y	...	10	10	3.2×10^{6}
^{169}Yb	Ytterbium (70)	80	80	2.3×10^{5}
^{175}Yb	...	400	25	1.8×10^{5}
^{65}Zn	Zinc (30)	30	30	8.0×10^{3}

TABLE A-1-A_1 AND A_2 VALUES FOR RADIONUCLIDES

(See footnotes at end of Table A-1)

Symbol of radionuclide	Element and atomic number	A_1(Ci)	A_2(Ci)	Specific activity (Ci/g)
.....	.....			
^{69m}Zn	.....	40	20	3.3×10^{5}
^{69}Zn	.....	300	20	5.3×10^{7}
^{93}Zr	Zirconium (40)	1000	200	3.5×10^{-3}
^{95}Zr	.....	20	20	2.1×10^{4}
^{97}Zr	.....	20	20	2.0×10^{6}

*For the purpose of Table A-1, compressed has means a gas at a pressure which exceeds the ambient atmospheric pressure at the location where the contaminant system was closed.

**The values of A_1 and A_2 must be calculated in accordance with the procedure specified in Appendix A, paragraph II(3), taking into account the activity of the fission products and of the uranium-233 in addition to that of the thorium.

***The values of A_1 and A_2 must be calculated in accordance with the procedure specified in Appendix A, paragraph II(3), taking into account the activity of the fission products and plutonium isotopes in addition to that of the uranium.

TABLE A-2-RELATIONSHIP BETWEEN A_1 AND E_{max} FOR BETA EMITTERS

E_{max} (MeV)	A_1 (Ci)
<0.5	1,000
0.5-<1.0	300
1.0-<1.5	100
1.5-<2.0	30
≥2.0	10

TABLE A-3-RELATIONSHIP BETWEEN A_3 AND THE ATOMIC NUMBER OF THE RADIONUCLIDE

Atomic No.	A_3		
	Half-life less than 1,000 days	Half-life 1,000 days to 10^6 years	Half-life greater than 10^6 years
1 to 81	3 Ci	.05 Ci	3 Ci
82 and above.	.002 Ci	.002 Ci	3 Ci

TABLE A-4-ACTIVITY-MASS RELATIONSHIPS FOR URANIUM/THORIUM

Thorium and uranium enrichment[1] wt % ^{235}U present	Specific activity Ci/g	Specific activity g/Ci
0.45	5.0×10^{-7}	2.0×10^{6}
0.72 (natural)	7.06×10^{-7}	1.42×10^{6}
1.0	7.6×10^{-7}	1.3×10^{6}
1.5	1.0×10^{-6}	1.0×10^{6}
5.0	2.7×10^{-6}	3.7×10^{5}
10.0	4.8×10^{-6}	2.1×10^{5}
20.0	1.0×10^{-5}	1.0×10^{5}
35.0	2.0×10^{-5}	5.0×10^{4}
50.0	2.5×10^{-5}	4.0×10^{4}
90.0	5.8×10^{-5}	1.7×10^{4}
93.0	7.0×10^{-5}	1.4×10^{4}
95.0	9.1×10^{-5}	1.1×10^{4}
Natural Thorium	2.2×10^{-7}	4.6×10^{6}

[1]The figures for uranium include representative values for the activity of the uranium-234 which is concentrated during the enrichment process. The acitvity for Thorium includes the equilibrium concentration of Thorium-228.

[48 FR 35607, Aug. 5, 1983; 48 FR 38450, Aug. 24, 1983; 48 FR 45382, Oct. 10, 1983; 48 FR 51903, Nov. 15, 1983]

10 CFR 100

PART 100—REACTOR SITE CRITERIA

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Appendix A—Seismic and Geologic Siting Criteria for Nuclear Power Plants

Authority: Secs. 103, 104, 161, 182, 68 Stat. 936, 937, 948, 953, as amended (42 U.S.C. 2133, 2134, 2201, 2232); sec. 201, as amended, 202, 88 Stat. 1242, as amended, 1244 (42 U.S.C. 5841, 5842).

Source: 27 FR 3509, Apr. 12, 1962, unless otherwise noted.

§100.1 Purpose.

(a) It is the purpose of this part to describe criteria which guide the Commission in its evaluation of the suitability of proposed sites for stationary power and testing reactors subject to Part 50 of this chapter.

(b) Insufficient experience has been accumulated to permit the writing of detailed standards that would provide a quantitative correlation of all factors significant to the question of acceptability of reactor sites. This part is intended as an interim guide to identify a number of factors considered by the Commission in the evaluation of reactor sites and the general criteria used at this time as guides in approving or disapproving proposed sites. Any applicant who believes that factors other than those set forth in the guide should be considered by the Commission will be expected to demonstrate the applicability and significance of such factors.

§100.2 Scope.

(a) This part applies to applications filed under Part 50 of this chapter for stationary power and testing reactors.

(b) The site criteria contained in this part apply primarily to reactors of a general type and design on which experience has been developed, but can also be applied to other reactor types. In particular, for reactors that are novel in design and unproven as prototypes or pilot plants, it is expected that these basic criteria will be applied in a manner that takes into account the lack of experience. In the application of these criteria which are deliberately flexible, the safeguards provided—either site isolation or engineered features—should reflect the lack of certainty that only experience can provide.

[27 FR 3509, Apr. 12, 1962, as amended at 40 FR 8793, Mar. 3, 1975]

§100.3 Definitions.

As used in this part:

(a) "Exclusion area" means that area surrounding the reactor, in which the reactor licensee has the authority to determine all activities including exclusion or removal of personnel and property from the area. This area may be traversed by a highway, railroad, or waterway, provided these are not so close to the facility as to interfere with normal operations of the facility and provided appropriate and effective arrangements are made to control traffic on the highway, railroad, or waterway, in case of emergency, to protect the public health and safety. Residence within the exclusion area shall normally be prohibited. In any event, residents shall be subject to ready removal in case of necessity. Activities unrelated to operation of the reactor may be permitted in an exclusion area under appropriate limitations, provided that no significant hazards to the public health and safety will result.

(b) "Low population zone" means the area immediately surrounding the exclusion area which contains residents, the total number and density of which are such that there is a reasonable probability that appropriate protective measures could be taken in their behalf in the event of a serious accident. These guides do not specify a permissible population density or total population within this zone because the situation may vary from case to case. Whether a specific number of people can, for example, be evacuated from a specific area, or instructed to take shelter, on a timely basis will depend on many factors such as location, number and size of highways, scope and extent of advance planning, and actual distribution of residents within the area.

(c) "Population center distance" means the distance from the reactor to the nearest boundary of a densely populated center containing more than about 25,000 residents.

(d) "Power reactor" means a nuclear reactor of a type described in §50.21(b) or §50.22 of this chapter designed to produce electrical or heat energy.

(e) "Testing reactor" means a "testing facility" as defined in §50.2 of this chapter.

§100.8 Information collection requirements: OMB approval.

(a) The Nuclear Regulatory Commission has submitted the information collection requirements contained in this part to the Office of Management and Budget (OMB) for approval as required by the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et seq.). OMB has approved the information collection requirements contained in this part under control number 3150-0093.

(b) The approved information collection requirements contained in this part appear in Appendix A.

[49 FR 19629, May 9, 1984]

Site Evaluation Factors

§100.10 Factors to be considered when evaluating sites.

Factors considered in the evaluation of sites include those relating both to the proposed reactor design and the characteristics peculiar to the site. It is expected that reactors will reflect through their design, construction and operation an extremely low probability for accidents that could result in release of significant quantities of radioactive fission products. In addition, the site location and the engineered features included as safeguards against the hazardous consequences of an accident, should one occur, should insure a low risk of public exposure. In particular, the Commission will take the following factors into consideration in determining the acceptability of a site for a power or testing reactor:

(a) Characteristics of reactor design and proposed operation including:

(1) Intended use of the reactor including the proposed maximum power level and the nature and inventory of contained radioactive materials;

(2) The extent to which generally accepted engineering standards are applied to the design of the reactor;

(3) The extent to which the reactor incorporates unique or unusual features having a significant bearing on the probability or consequences of accidental release of radioactive materials;

(4) The safety features that are to be engineered into the facility and those barriers that must be breached as a result of an accident before a release of radioactive material to the environment can occur.

(b) Population density and use characteristics of the site environs, including the exclusion area, low population zone, and population center distance.

(c) Physical characteristics of the site, including seismology, meteorology, geology, and hydrology.

(1) Appendix A, "Seismic and Geologic Siting Criteria for Nuclear Power Plants," describes the nature of investigations required to obtain the geologic and seismic data necessary to determine site suitability and to provide reasonable assurance that a nuclear power plant can be constructed and operated at a proposed site without undue risk to the health and safety of the public. It describes procedures for determining the quantitative vibratory ground motion design basis at a site due to earthquakes and describes information needed to determine whether and to what extent a nuclear power plant need be designed to withstand the effects of surface faulting.

(2) Meteorological conditions at the site and in the surrounding area should be considered.

(3) Geological and hydrological characteristics of the proposed site may have a bearing on the consequences of an escape of

radioactive material from the facility. Special precautions should be planned if a reactor is to be located at a site where a significant quantity of radioactive effluent might accidentally flow into nearby streams or rivers or might find ready access to underground water tables.

(d) Where unfavorable physical characteristics of the site exist, the proposed site may nevertheless be found to be acceptable if the design of the facility includes appropriate and adequate compensating engineering safeguards.

[27 FR 3509, Apr. 12, 1962, as amended at 38 FR 31281, Nov. 13, 1973]

§100.11 Determination of exclusion area, low population zone, and population center distance.

(a) As an aid in evaluating a proposed site, an applicant should assume a fission produce release[1] from the core, the expected demonstrable leak rate from the containment and the meteorological conditions pertinent to his site to derive an exclusion area, a low population zone and population center distance. For the purpose of this analysis, which shall set forth the basis for the numerical values used, the applicant should determine the following:

(1) An exclusion area of such size that an individual located at any point on its boundary for two hours immediately following onset of the postulated fission product release would not receive a total radiation dose to the whole body in excess of 25 rem[2] or a total radiation dose in excess of 300 rem[2] to the thyroid from iodine exposure.

(2) A low population zone of such size that an individual located at any point on its outer boundary who is exposed to the radioactive cloud resulting from the postulated fission product release (during the entire period of its passage) would not receive a total radiation dose to the whole body in excess of 25 rem or a total radiation dose in excess of 300 rem to the thyroid from iodine exposure.

(3) A population center distance of at least one and one-third times the distance from the reactor to the outer boundary of the low population zone. In applying this guide, the boundary of the population center shall be determined upon consideration of population distribution. Political boundaries are not controlling in the application of this guide. Where very large cities are involved, a greater distance may be necessary because of total integrated population dose consideration.

(b) For sites for multiple reactor facilities consideration should be given to the following:

(1) If the reactors are independent to the extent that an accident in one reactor would not initiate an accident in another, the size of the exclusion area, low population zone and population center distance shall be fulfilled with respect to each reactor individually. The envelopes of the plan overlay of the areas so calculated shall then be taken as their respective boundaries.

(2) If the reactors are interconnected to the extent that an accident in one reactor could affect the safety of operation of any other, the size of the exclusion area, low population zone and population center distance shall be based upon the assumption that all interconnected reactors emit their postulated fission product releases simultaneously. This requirement may be reduced in relation to the degree of coupling between reactors, the probability of concomitant accidents and the probability that an individual would not be exposed to the radiation effects from simultaneous releases. The applicant would be expected to justify to the satisfaction of the Commission the basis for such a reduction in the source term.

(3) The applicant is expected to show that the simultaneous operation of multiple reactors at a site will not result in total radioactive effluent releases beyond the allowable limits of applicable regulations.

Note: For further guidance in developing the exclusion area, the low population zone, and the population center distance, reference is made to Technical Information Document 14844, dated March 23, 1962, which contains a procedural method and a sample calculation that result in distances roughly reflecting current siting practices of the Commission. The calculations described in Technical Information Document 14844 may be used as a point of departure for consideration of particular site requirements which may result from evaluation of the characteristics of a particular reactor, its purpose and method of operation.

Copies of Technical Information Document 14844 may be obtained from the Commission's Public Document Room, 2120 L Street NW., Washington, D.C., or by writing the Director of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.

[27 FR 3509, Apr. 12, 1962, as amended at 31 FR 4670, Mar. 19, 1966; 38 FR 1273, Jan. 11, 1973; 40 FR 8793, Mar. 3, 1975; 40 FR 26527, June 24, 1975]

[1] The fission product release assumed for these calculations should be based upon a major accident, hypothesized for purposes of site analysis or postulated from considerations of possible accidental events, that would result in potential hazards not exceeded by those from any accident considered credible. Such accidents have generally been assumed to result in substantial meltdown of the core with subsequent release of appreciable quantities of fission products.

[2] The whole body dose of 25 rem referred to above corresponds numerically to the once in a lifetime accidental or emergency dose for radiation workers which, according to NCRP recommendations may be disregarded in the determination of their radiation exposure status (see NBS Handbook 69 dated June 5, 1959). However, neither its use nor that of the 300 rem value for thyroid exposure as set forth in these site criteria guides are intended to imply that these numbers constitute acceptable limits for emergency doses to the public under accident conditions. Rather, this 25 rem whole body value and the 300 rem thyroid value have been set forth in these guides as reference values, which can be used in the evaluation of reactor sites with respect to potential reactor accidents of exceedingly low probability of occurrence, and low risk of public exposure to radiation.

Appendix A—Seismic and Geologic Siting Criteria for Nuclear Power Plants

I. PURPOSE

General Design Criterion 2 of Appendix A to Part 50 of this chapter requires that nuclear power plant structures, systems, and components important to safety be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunami, and seiches without loss of capability to perform their safety functions. It is the purpose of these criteria to set forth the principal seismic and geologic considerations which guide the Commission in its evaluation of the suitability of proposed sites for nuclear power plants and the suitability of the plant design bases established in consideration of the seismic and geologic characteristics of the proposed sites.

These criteria are based on the limited geophysical and geological information available to date concerning faults and earthquake occurrence and effect. They will be revised as necessary when more complete information becomes available.

II. SCOPE

These criteria, which apply to nuclear power plants, describe the nature of the investigations required to obtain the geologic and seismic data necessary to determine site suitability and provide reasonable assurance that a nuclear power plant can be constructed and operated at a proposed site without undue risk to the health and safety of the public. They describe procedures for determining the quantitative vibratory ground motion design basis at a site due to earthquakes and describe information needed to determine whether and to what extent a nuclear power plant need be designed to withstand the effects of surface faulting. Other geologic and seismic factors required to be taken into account in the siting and design of nuclear power plants are identified.

The investigations described in this appendix are within the scope of investigations permitted by §50.10(c)(1) of this chapter.

Each applicant for a construction permit shall investigate all seismic and geologic factors that may affect the design and operation of the proposed nuclear power plant irrespective of whether such factors are explicitly included in these criteria. Additional investigations and/or more conservative determinations than those included in these criteria may be required for sites located in areas having complex geology or in areas of high seismicity. If an applicant believes that the particular seismology and geology of a site indicate that some of these criteria, or portions thereof, need not be satisfied, the specific sections of these criteria should be identified in the license

application, and supporting data to justify clearly such departures should be presented.

These criteria do not address investigations of volcanic phenomena required for sites located in areas of volcanic activity. Investigations of the volcanic aspects of such sites will be determined on a case-by-case basis.

III. DEFINITIONS

As used in these criteria:

(a) The "magnitude" of an earthquake is a measure of the size of an earthquake and is related to the energy released in the form of seismic waves. "Magnitude" means the numerical value on a Richter scale.

(b) The "intensity" of an earthquake is a measure of its effects on man, on man-built structures, and on the earth's surface at a particular location. "Intensity" means the numerical value on the Modified Mercalli scale.

(c) The "Safe Shutdown Earthquake"[1] 135 is that earthquake which is based upon an evaluation of the maximum earthquake potential considering the regional and local geology and seismology and specific characteristics of local subsurface material. It is that earthquake which produces the maximum vibratory ground motion for which certain structures, systems, and components are designed to remain functional. These structures, systems, and components are those necessary to assure:

(1) The integrity of the reactor coolant pressure boundary,

(2) The capability to shut down the reactor and maintain it in a safe shutdown condition, or

(3) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to the guideline exposures of this part.

(d) The "Operating Basis Earthquake" is that earthquake which, considering the regional and local geology and seismology and specific characteristics of local subsurface material, could reasonably be expected to affect the plant site during the operating life of the plant; it is that earthquake which produces the vibratory growth motion for which those features of the nuclear power plant necessary for continued operation without undue risk to the health and safety of the public are designed to remain functional.

(e) A "fault" is a tectonic structure along which differential slippage of the adjacent earth materials has occurred parallel to the fracture plane. It is distinct from other types of ground disruptions such as landslides, fissures, and craters. A fault may have gouge or breccia between its two walls and includes any associated monoclinal flexure or other similar geologic structural feature.

(f) "Surface faulting" is differential ground displacement at or near the surface caused directly by fault movement and is distinct from nontectonic types of ground disruptions, such as landslides, fissures, and craters.

(g) A "capable fault" is a fault which has exhibited one or more of the following characteristics:

(1) Movement at or near the ground surface at least once within the past 35,000 years or movement of a recurring nature within the past 500,000 years.

(2) Macro-seismicity instrumentally determined with records of sufficient precision to demonstrate a direct relationship with the fault.

(3) A structural relationship to a capable fault according to characteristics (1) or (2) of this paragraph such that movement on one could be reasonably expected to be accompanied by movement on the other.

In some cases, the geologic evidence of past activity at or near the ground surface along a particular fault may be obscured at a particular site. This might occur, for example, at a site having a deep overburden. For these cases, evidence may exist elsewhere along the fault from which an evaluation of its characteristics in the vicinity of the site can be reasonably based. Such evidence shall be used in determining whether the fault is a capable fault within this definition.

Notwithstanding the foregoing paragraphs III(g) (1), (2) and (3), structural association of a fault with geologic structural features which are geologically old (at least pre-Quaternary) such as many of those found in the Eastern region of the United States shall, in the absence of conflicting evidence, demonstrate that the fault is not a capable fault within this definition.

(h) A "tectonic province" is a region of the North American continent characterized by a relative consistency of the geologic structural features contained therein.

(i) A "tectonic structure" is a large scale dislocation or distortion within the earth's crust. Its extent is measured in miles.

(j) A "zone requiring detailed faulting investigation" is a zone within which a nuclear power reactor may not be located unless a detailed investigation of the regional and local geologic and seismic characteristics of the site demonstrates that the need to design for surface faulting has been properly determined.

(k) The "control width" of a fault is the maximum width of the zone containing mapped fault traces, including all faults which can be reasonably inferred to have experienced differential movement during Quaternary times and which join or can reasonably be inferred to join the main fault trace, measured within 10 miles along the fault's trend in both directions from the point of nearest approach to the site. (See Figure 1 of this appendix.)

(l) A "response spectrum" is a plot of the maximum responses (acceleration, velocity or displacement) of a family of idealized single-degree-of-freedom damped oscillators against natural frequencies (or periods) of the oscillators to a specified vibratory motion input at their supports.

IV. REQUIRED INVESTIGATIONS

The geologic, seismic and engineering characteristics of a site and its environs shall be investigated in sufficient scope and detail to provide reasonable assurance that they are sufficiently well understood to permit an adequate evaluation of the proposed site, and to provide sufficient information to support the determinations required by these criteria and to permit adequate engineering solutions to actual or potential geologic and seismic effects at the proposed site. The size of the region to be investigated and the type of data pertinent to the investigations shall be determined by the nature of the region surrounding the proposed site. The investigations shall be carried out by a review of the pertinent literature and field investigations and shall include the steps outlined in paragraphs (a) through (c) of this section.

(a) *Required Investigation for Vibratory Ground Motion.* The purpose of the investigations required by this paragraph is to obtain information needed to describe the vibratory ground motion produced by the Safe Shutdown Earthquake. All of the steps in paragraphs (a)(5) through (a)(8) of this section need not be carried out if the Safe Shutdown Earthquake can be clearly established by investigations and determinations of a lesser scope. The investigations required by this paragraph provide an adequate basis for selection of an Operating Basis Earthquake. The investigations shall include the following:

(1) Determination of the lithologic, stratigraphic, hydrologic, and structural geologic conditions of the site and the region surrounding the site, including its geologic history;

(2) Identification and evaluation of tectonic structures underlying the site and the region surrounding the site, whether buried or expressed at the surface. The evaluation should consider the possible effects caused by man's activities such as withdrawal of fluid from or addition of fluid to the subsurface, extraction of minerals, or the loading effects of dams or reservoirs;

(3) Evaluation of physical evidence concerning the behavior during prior earthquakes of the surficial geologic materials and the substrata underlying the site from the lithologic, stratigraphic, and structural geologic studies;

(4) Determination of the static and dynamic engineering properties of the materials underlying the site. Included should be properties needed to determine the behavior of the underlying material during earthquakes and the characteristics of the underlying material in transmitting earthquake-induced motions to the foundations of the plant, such as seismic wave velocities, density, water content, porosity, and strength;

(5) Listing of all historically reported earthquakes which have affected or which could reasonably be expected to have affected the site, including the date of occurrence and the following measured or estimated data: magnitude or highest intensity, and a plot of the epicenter or location of highest intensity. Where historically reported earthquakes could have caused a maximum ground acceleration of at least one-tenth the acceleration of gravity (0.1g) at the foundations of the proposed nuclear power plant structures, the acceleration or intensity and duration of ground

[1] The "Safe Shutdown Earthquake" defines that earthquake which has commonly been referred to as the "Design Basis Earthquake."

shaking at these foundations shall also be estimated. Since earthquakes have been reported in terms of various parameters such as magnitude, intensity at a given location, and effect on ground, structures, and people at a specific location, some of these data may have to be estimated by use of appropriate empirical relationships. The comparative characteristics of the material underlying the epicentral location or region of highest intensity and of the material underlying the site in transmitting earthquake vibratory motion shall be considered;

(6) Correlation of epicenters or locations of highest intensity of historically reported earthquakes, where possible, with tectonic structures any part of which is located within 200 miles of the site. Epicenters or locations of highest intensity which cannot be reasonably correlated with tectonic structures shall be identified with tectonic provinces any part of which is located within 200 miles of the site;

(7) For faults, any part of which is within 200 miles[2] of the site and which may be of significance in establishing the Safe Shutdown Earthquake, determination of whether these faults are to be considered as capable faults.[3,4] This determination is required in order to permit appropriate consideration of the geologic history of such faults in establishing the Safe Shutdown Earthquake. For guidance in determining which faults may be of significance in determining the Safe Shutdown Earthquake, Table 1 of this appendix presents the minimum length of fault to be considered versus distance from site. Capable faults of lesser length than those indicated in Table 1 and faults which are not capable faults need not be considered in determining the Safe Shutdown Earthquake, except where unusual circumstances indicate such consideration is appropriate;

Table 1

	Minimum length [1]
Distance from the site (miles)	
0 to 20.....	1
Greater than 20 to 50.....	5
Greater than 50 to 100.....	10
Greater than 100 to 150.....	20
Greater than 150 to 200.....	40

[1]Minimum length of fault (miles)which shall be considered in establishing Safe Shutdown Earthquake.

(8) For capable faults, any part of which is within 200 miles[2] of the site and which may be of significance in establishing the Safe Shutdown Earthquake, determination of:

(i) The length of the fault;

(ii) The relationship of the fault to regional tectonic structures; and

(iii) The nature, amount, and geologic history of displacements along the fault, including particularly the estimated amount of the maximum Quaternary displacement related to any one earthquake along the fault.

(b) *Required Investigation for Surface Faulting.* The purpose of the investigations required by this paragraph is to obtain information to determine whether and to what extent the nuclear power plant need be designed for surface faulting. If the design basis for surface faulting can be clearly established by investigations of a lesser scope, not all of the steps in paragraphs (b)(4) through (b)(7) of this section need be carried out. The investigations shall include the following:

(1) Determination of the lithologic, stratigraphic, hydrologic, and structural geologic conditions of the site and the area surrounding the site, including its geologic history;

(2) Evaluation of tectonic structures underlying the site, whether buried or expressed at the surface, with regard to their potential for causing surface displacement at or near the site. The evaluation shall consider the possible effects caused by man's activities such as withdrawal of fluid from or addition of fluid to the subsurface, extraction of minerals, or the loading effects of dams or reservoirs;

(3) Determination of geologic evidence of fault offset at or near the ground surface at or near the site;

(4) For faults greater than 1000 feet long, any part of which is within 5 miles[5] of the site, determination of whether these faults are to be considered as capable faults;[6,7]

(5) Listing of all historically reported earthquakes which can reasonably be associated with capable faults greater than 1000 feet long, any part of which is within 5 miles[5] of the site, including the date of occurrence and the following measured or estimated data: magnitude or highest intensity, and a plot of the epicenter or region of highest intensity;

(6) Correlation of epicenters or locations of highest intensity of historically reported earthquakes with capable faults greater than 1000 feet long, any part of which is located within 5 miles[5] of the site;

(7) For capable faults greater than 1000 feet long, any part of which is within 5 miles[5] of the site, determination of:

(i) The length of the fault;

(ii) The relationship of the fault to regional tectonic structures;

(iii) The nature, amount, and geologic history of displacements along the fault, including particularly the estimated amount of the maximum Quaternary displacement related to any one earthquake along the fault; and

(iv) The outer limits of the fault established by mapping Quaternary fault traces for 10 miles along its trend in both directions from the point of its nearest approach to the site.

(c) *Required Investigation for Seismically Induced Floods and Water Waves.*

(1) For coastal sites, the investigations shall include the determination of:

(i) Information regarding distantly and locally generated waves or tsunami which have affected or could have affected the site. Available evidence regarding the runup and drawdown associated with historic tsunami in the same coastal region as the site shall also be included;

(ii) Local features of coastal topography which might tend to modify tsunami runup or drawdown. Appropriate available evidence regarding historic local modifications in tsunami runup or drawndown at coastal locations having topography similar to that of the site shall also be obtained; and

(iii) Appropriate geologic and seismic evidence to provide information for establishing the design basis for seismically induced floods or water waves from a local offshore earthquake, from local offshore effects of an onshore earthquake, or from coastal subsidence. This evidence shall be determined, to the extent practical, by a procedure similar to that required in paragraphs (a) and (b) of this section. The probable slip characteristics of offshore faults shall also be considered as well as the potential for offshore slides in submarine material.

(2) For sites located near lakes and rivers, investigations similar to those required in paragraph (c)(1) of this section shall be carried out, as appropriate, to determine the potential for the nuclear power plant to be exposed to seismically induced floods and water waves as, for example, from the failure during an earthquake of an upstream dam or from slides of earth or debris into a nearby lake.

V. SEISMIC AND GEOLOGIC DESIGN BASES

(a) *Determination of Design Basis for Vibratory Ground Motion.* The design of each nuclear power plant shall take into account the potential effects of vibratory ground motion caused by earthquakes. The design basis for the

[2]If the Safe Shutdown Earthquake can be associated with a fault closer than 200 miles to the site, the procedures of paragraphs (a)(7) and (a)(8) of this section need not be carried out for successively more remote faults.

[3]In the absence of absolute dating, evidence of recency of movement may be obtained by applying relative dating technique to ruptured, offset, warped or otherwise structurally disturbed surface or near surface materials or geomorphic features.

[4]The applicant shall evaluate whether or not a fault is a capable fault with respect to the characteristics outlined in paragraphs III(g)(1), (2), and (3) by conducting a reasonable investigation using suitable geologic and geophysical techniques.

[5]If the design basis for surface faulting can be determined from a fault closer than 5 miles to the site, the procedures of paragraphs (b)(4) through (b)(7) of this section need not be carried out for successively more remote faults.

[6]In the absence of absolute dating, evidence of recency of movement may be obtained by applying relative dating techniques to ruptured, offset, warped or otherwise structurally disturbed surface of near-surface materials or geomorphic features.

[7]The applicant shall evaluate whether or not a fault is a capable fault with respect to the characteristics outlined in paragraphs III(g)(1), (2), and (3) by conducting a reasonable investigation using suitable geological and geophysical techniques.

maximum vibratory ground motion and the expected vibratory ground motion should be determined through evaluation of the seismology, geology, and the seismic and geologic history of the site and the surrounding region. The most severe earthquakes associated with tectonic structures or tectonic provinces in the region surrounding the site should be identified, considering those historically reported earthquakes that can be associated with these structures or provinces and other relevant factors. If faults in the region surrounding the site are capable faults, the most severe earthquakes associated with these faults should be determined by also considering their geologic history. The vibratory ground motion at the site should be then determined by assuming that the epicenters or locations of highest intensity of the earthquakes are situated at the point on the tectonic structures or tectonic provinces nearest to the site. The earthquake which could cause the maximum vibratory ground motion at the site should be designated the Safe Shutdown Earthquake. The specific procedures for determining the design basis for vibratory ground motion are given in the following paragraphs.

(1) *Determination of Safe Shutdown Earthquake.* The Safe Shutdown Earthquake shall be identified through evaluation of seismic and geologic information developed pursuant to the requirements of paragraph IV(a), as follows:

(i) The historic earthquakes of greatest magnitude or intensity which have been correlated with tectonic structures pursuant to the requirements of paragraph (a)(6) of section IV shall be determined. In addition, for capable faults, the information required by paragraph (a)(8) of section IV shall also be taken into account in determining the earthquakes of greatest magnitude related to the faults. The magnitude or intensity of earthquakes based on geologic evidence may be larger than that of the maximum earthquakes historically recorded. The accelerations at the site shall be determined assuming that the epicenters of the earthquakes of greatest magnitude or the locations of highest intensity related to the tectonic structures are situated at the point on the structures closest to the site;

(ii) Where epicenters or locations of highest intensity of historically reported earthquakes cannot be reasonably related to tectonic structures but are identified pursuant to the requirements of paragraph (a)(6) of section IV with tectonic provinces in which the site is located, the accelerations at the site shall be determined assuming that these earthquakes occur at the site;

(iii) Where epicenters or locations of the highest intensity of historically reported earthquakes cannot be reasonably related to tectonic structures but are identified pursuant to the requirements of paragraph (a)(6) of section IV with tectonic provinces in which the site is not located, the accelerations at the site shall be determined assuming that the epicenters or locations of highest intensity of these earthquakes are at the closest point to the site on the boundary of the tectonic province;

(iv) The earthquake producing the maximum vibratory acceleration at the site, as determined from paragraph (a)(1)(i) through (iii) of this section shall be designated the Safe Shutdown Earthquake for vibratory ground motion, except as noted in paragraph (a)(1)(v) of this section. The characteristics of the Safe Shutdown Earthquake shall be derived from more than one earthquake determined from paragraph (a)(1)(i) through (iii) of this section, where necessary to assure that the maximum vibratory acceleration at the site throughout the frequency range of interest is included. In the case where a causative fault is near the site, the effect of proximity of an earthquake on the spectral characteristics of the Safe Shutdown Earthquake shall be taken into account. The procedures in paragraphs (a)(1)(i) through (a)(1)(iii) of this section shall be applied in a conservative manner. The determinations carried out in accordance with paragraphs (a)(1)(ii) and (a)(1)(iii) shall assure that the safe shutdown earthquake intensity is, as a minimum, equal to the maximum historic earthquake intensity experienced within the tectonic province in which the site is located. In the event that geological and seismological data warrant, the Safe Shutdown Earthquake shall be larger than that derived by use of the procedures set forth in section IV and V of the appendix. The maximum vibratory accelerations of the Safe Shutdown Earthquake at each of the various foundation locations of the nuclear power plant structures at a given site shall be determined taking into account the characteristics of the underlying soil material in transmitting the earthquake-induced motions, obtained pursuant to paragraphs (a)(1), (3), and (4) of section IV. The Safe Shutdown Earthquake shall be defined by response spectra corresponding to the maximum vibratory accelerations as outlined in paragraph (a) of section VI; and

(v) Where the maximum vibratory accelerations of the Safe Shutdown Earthquake at the foundations of the nuclear power plant structures are determined to be less than one-tenth the acceleration of gravity (0.1 g) as a result of the steps required in paragraphs (a)(1)(i) through (iv) of this section, it shall be assumed that the maximum vibratory accelerations of the Safe Shutdown Earthquake at these foundations are at least 0.1 g.

(2) *Determination of Operating Basis Earthquake.* The Operating Basis Earthquake shall be specified by the applicant after considering the seismology and geology of the region surrounding the site. If vibratory ground motion exceeding that of the Operating Basis Earthquake occurs, shutdown of the nuclear power plant will be required. Prior to resuming operations, the licensee will be required to demonstrate to the Commission that no functional damage has occurred to those features necessary for continued operation without undue risk to the health and safety of the public.

The maximum vibratory ground acceleration of the Operating Basis Earthquake shall be at least one-half the maximum vibratory ground acceleration of the Safe Shutdown Earthquake.

(b) *Determination of Need to Design for Surface Faulting.* In order to determine whether a nuclear power plant is required to be designed to withstand the effects of surface faulting, the location of the nuclear power plant with respect to capable faults shall be considered. The area over which each of these faults has caused surface faulting in the past is identified by mapping its fault traces in the vicinity of the site. The fault traces are mapped along the trend of the fault for 10 miles in both directions from the point of its nearest approach to the nuclear power plant because, for example, traces may be obscured along portions of the fault. The maximum width of the mapped fault traces, called the control width, is then determined from this map. Because surface faulting has sometimes occurred beyond the limit of mapped fault traces or where fault traces have not been previously recognized, the control width of the fault is increased by a factor which is dependent upon the largest potential earthquake related to the fault. This larger width delineates a zone, called the zone requiring detailed faulting investigation, in which the possibility of surface faulting is to be determined. The following paragraphs outline the specific procedures for determining the zone requiring detailed faulting investigation for a capable fault.

(1) *Determination of Zone Requiring Detailed Faulting Investigation.* The zone requiring detailed faulting investigation for a capable fault which was investigated pursuant to the requirement of paragraph (b)(7) of section IV shall be determined through use of the following table:

Table 2—Determination of Zone Requiring Detailed Faulting Investigation

Magnitude of earthquake	Width of zone requiring detailed faulting investigation
(See fig. 1)	
Less than 5.5	1 x control width
5.5-6.4	2 x control width
6.5-7.5	3 x control width
Greater than 7.5	4 x control width

The largest magnitude earthquake related to the fault shall be used in Table 2. This earthquake shall be determined from the information developed pursuant to the requirements of paragraph (b) of section IV for the fault, taking into account the information required by paragraph (b)(7) of section IV. The control width used in Table 2 is determined by mapping the outer limits of the fault traces from information developed pursuant to paragraph (b)(7)(iv) of section IV. The control width shall be used in Table 2 unless the characteristics of the fault are obscured for a significant portion of the 10 miles on either side of the point of nearest approach to the nuclear power plant. In this event, the use in Table 2 of the width of mapped fault traces more

than 10 miles from the point of nearest approach to the nuclear power plant may be appropriate.

The zone requiring detailed faulting investigation, as determined from Table 2, shall be used for the fault except where:

(i) The zone requiring detailed faulting investigation from Table 2 is less than one-half mile in width. In this case the zone shall be at least one-half mile in width; or

(ii) Definitive evidence concerning the regional and local characteristics of the fault justifies use of a different value. For example, thrust or bedding-plane faults may require an increase in width of the zone to account for the projected dip of the fault plane; or

(iii) More detailed three-dimensional information, such as that obtained from precise investigative techniques, may justify the use of a narrower zone. Possible examples of such techniques are the use of accurate records from closely spaced drill holes or from closely spaced, high-resolution offshore geophysical surveys.

In delineating the zone requiring detailed faulting investigation for a fault, the center of the zone shall coincide with the center of the fault at the point of nearest approach of the fault to the nuclear power plant as illustrated in Figure 1.

(c) *Determination of Design Bases for Seismically Induced Floods and Water Waves.* The size of seismically induced floods and water waves which could affect a site from either locally or distantly generated seismic activity shall be determined, taking into consideration the results of the investigation required by paragraph (c) of section IV. Local topographic characteristics which might tend to modify the possible runup and drawdown at the site shall be considered. Adverse tide conditions shall also be taken into account in determining the effect of the floods and waves on the site. The characteristics of the earthquake to be used in evaluating the offshore effects of local earthquakes shall be determined by a procedure similar to that used to determine the characteristics of the Safe Shutdown Earthquake in paragraph V(a).

(d) *Determination of Other Design Conditions*—

(1) Soil Stability. Vibratory ground motion associated with the Safe Shutdown Earthquake can cause soil instability due to ground disruption such as fissuring, differential consolidation, liquefaction, and cratering which is not directly related to surface faulting. The following geologic features which could affect the foundations of the proposed nuclear power plant structures shall be evaluated, taking into account the information concerning the physical properties of materials underlying the site developed pursuant to paragraphs (a)(1), (3), and (4) of section IV and the effects of the Safe Shutdown Earthquake:

(i) Areas of actual or potential surface or subsurface subsidence, uplift, or collapse resulting from:

(*a*) Natural features such as tectonic depressions and cavernous or karst terrains, particularly those underlain by calcareous or other soluble deposits;

(*b*) Man's activities such as withdrawal of fluid from or addition of fluid to the subsurface, extraction of minerals, or the loading effects of dams or reservoirs; and

(*c*) Regional deformation.

(ii) Deformational zones such as shears, joints, fractures, folds, or combinations of these features.

(iii) Zones of alteration or irregular weathering profiles and zones of structural weakness composed of crushed or disturbed materials.

(iv) Unrelieved residual stresses in bedrock.

(v) Rocks or soils that might be unstable because of their mineralogy, lack of consolidation, water content, or potentially undesirable response to seismic or other events. Seismic response characteristics to be considered shall include liquefaction, thixotropy, differential consolidation, cratering, and fissuring.

(2) *Slope stability.* Stability of all slopes, both natural and artificial, the failure of which could adversely affect the nuclear power plant, shall be considered. An assessment shall be made of the potential effects of erosion or deposition and of combinations of erosion or deposition with seismic activity, taking into account information concerning the physical property of the materials underlying the site developed pursuant to paragraph (a)(1), (3), and (4) of section IV and the effects of the Safe Shutdown Earthquake.

(3) *Cooling water supply.* Assurance of adequate cooling water supply for emergency and long-term shutdown decay heat removal shall be considered in the design of the nuclear power plant, taking in to account information concerning the physical properties of the materials underlying the site developed pursuant to paragraphs (a)(1), (3), and (4) of section IV and the effects of the Safe Shutdown Earthquake and the design basis for surface faulting. Consideration of river blockage or diversion or other failures which may block the flow of cooling water, coastal uplift or subsidence, or tsunami runup and drawdown, and failure of dams and intake structures shall be included in the evaluation, where appropriate.

(4) *Distant structures.* Those structures which are not located in the immediate vicinity of the site but which are safety related shall be designed to withstand the effect of the Safe Shutdown Earthquake and the design basis for surface faulting determined on a comparable basis to that of the nuclear power plant, taking into account the material underlying the structures and the different location with respect to that of the site.

VI. APPLICATION TO ENGINEERING DESIGN

(a) *Vibratory ground motion*—

(1) Safe Shutdown Earthquake. The vibratory ground motion produced by the Safe Shutdown Earthquake shall be defined by response spectra corresponding to the maximum vibratory accelerations at the elevations of the foundations of the nuclear power plant structures determine pursuant to paragraph (a)(1) of section V. The response spectra shall relate the response of the foundations of the nuclear power plant structures to the vibratory ground motion, considering such foundations to be single-degree-of-freedom damped oscillators and neglecting soil-structure interaction effects. In view of the limited data available on vibratory ground motions of strong earthquakes, it usually will be appropriate that the response spectra be smoothed design spectra developed from a series of response spectra related to the vibratory motions caused by more than one earthquake.

The nuclear power plant shall be designed so that, if the Safe Shutdown Earthquake occurs, certain structures, systems, and components will remain functional. These structures, systems, and components are those necessary to assure (i) the integrity of the reactor coolant pressure boundary, (ii) the capability to shut down the reactor and maintain it in a safe condition, or (iii) the capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to the guideline exposures of this part. In addition to seismic loads, including aftershocks, applicable concurrent functional and accident-induced loads shall be taken into account in the design of these safety-related structures, systems, and components. The design of the nuclear power plant shall also take into account the possible effects of the Safe Shutdown Earthquake on the facility foundations by ground disruption, such as fissuring, differential consolidation, cratering, liquefaction, and landsliding, as required in paragraph (d) of section V.

The engineering method used to insure that the required safety functions are maintained during and after the vibratory ground motion associated with the Safe Shutdown Earthquake shall involve the use of either a suitable dynamic analysis or a suitable qualification test to demonstrate that structures, systems and components can withstand the seismic and other concurrent loads, except where it can be demonstrated that the use of an equivalent static load method provides adequate conservatism.

The analysis or test shall take into account soil-structure interaction effects and the expected duration of vibratory motion. It is permissible to design for strain limits in excess of yield strain in some of these safety-related structures, systems, and components during the Safe Shutdown Earthquake and under the postulated concurrent conditions, provided that the necessary safety functions are maintained.

(2) *Operating Basis Earthquake.* The Operating Basis Earthquake shall be defined by response spectra. All structures, systems, and components of the nuclear power plant necessary for continued operation without undue risk to the health and safety of the public shall be designed to remain functional and within applicable stress and deformation limits when subjected to the effects of the vibratory motion of the Operating Basis Earthquake in combination with normal operating loads. The engineering method used to insure that these structures, systems, and components are capable of withstanding the effects of the Operating Basis Earthquake shall involve the use of either a suitable dynamic

analysis or a suitable qualification test to demonstrate that the structures, systems and components can withstand the seismic and other concurrent loads, except where it can be demonstrated that the use of an equivalent static load method provides adequate conservatism. The analysis or test shall take into account soil-structure interaction effects and the expected duration of vibratory motion.

(3) *Required Seismic instrumentation.* Suitable instrumentation shall be provided so that the seismic response of nuclear power plant features important to safety can be determined promptly to permit comparison of such response with that used as the design basis. Such a comparison is needed to decide whether the plant can continue to be operated safely and to permit such timely action as may be appropriate.

These criteria do not address the need for instrumentation that would automatically shut down a nuclear power plant when an earthquake occurs which exceeds a predetermined intensity. The need for such instrumentation is under consideration.

(b) *Surface Faulting.*

(1) If the nuclear power plant is to be located within the zone requiring detailed faulting investigation, a detailed investigation of the regional and local geologic and seismic characteristics of the site shall be carried out to determine the need to take into account surface faulting in the design of the nuclear power plant. Where it is determined that surface faulting need not be taken into account, sufficient data to clearly justify the determination shall be presented in the license application.

(2) Where it is determined that surface faulting must be taken into account, the applicant shall, in establishing the design basis for surface faulting on a site take into account evidence concerning the regional and local geologic and seismic characteristics of the site and from any other relevant data.

(3) The design basis for surface faulting shall be taken into account in the design of the nuclear power plant by providing reasonable assurance that in the event of such displacement during faulting certain structures, systems, and components will remain functional. These structures, systems, and components are those necessary to assure (i) the integrity of the reactor coolant pressure boundary, (ii) the capability to shut down the reactor and maintain it in a safe shutdown condition, or (iii) the capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to the guideline exposures of this part. In addition to seismic loads, including aftershocks, applicable concurrent functional and accident-induced loads shall be taken into account in the design of such safety features. The design provisions shall be based on an assumption that the design basis for surface faulting can occur in any direction and azimuth and under any part of the nuclear power plant unless evidence indicates this assumption is not appropriate, and shall take into account the estimated rate at which the surface faulting may occur.

(c) *Seismically Induced Floods and Water Waves and Other Design Conditions.* The design basis for seismically induced floods and water waves from either locally or distantly generated seismic activity and other design conditions determined pursuant to paragraphs (c) and (d) of section V, shall be taken into account in the design of the nuclear power plant so as to prevent undue risk to the health and safety of the public.

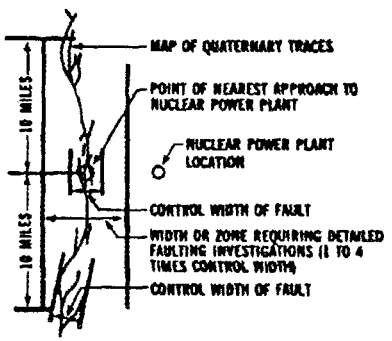

FIGURE 1—DIAGRAMMATIC ILLUSTRATION OF DELINEATION OF WIDTH OF ZONE REQUIRING DETAILED FAULTING INVESTIGATIONS FOR SPECIFIC NUCLEAR POWER PLANT LOCATION.

[Sec. 201, Pub. L. 93-438, 88 Stat. 1243 (42 U.S.C. 5841)]

[38 FR 31281, Nov. 13, 1973, as amended at 38 FR 32575, Nov. 27, 1973; 42 FR 2052, Jan. 10, 1977]

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10 CFR 762

PART 762—URANIUM ENRICHMENT SERVICES CRITERIA

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Authority: Sec. 161(v) of the Atomic Energy Act of 1954, 68 Stat. 921 (42 U.S.C. 2201(v)).

Source: 51 FR 27144, July 29, 1986, unless otherwise noted.

§762.1 General.

(a) *Authority.* These criteria set forth the general terms and conditions applicable to the provision to civilian customers of uranium enrichment services in facilities owned by DOE, as authorized by the Atomic Energy Act of 1954, as amended (the Act). Specifically, these criteria are established pursuant to section 161(v) of the Act, which was added by Pub. L. 88-489, the "Private Ownership of Special Nuclear Materials Act."

(b) *Eligible customers.* DOE may enter into contracts for providing enrichment services with licensees and cooperative agreement customers. Enrichment services can be offered to cooperative agreement customers only while comparable services are available to licensees and cannot be offered for prices less than the prices for services to licensees.

(c) *Capacity limitations.* DOE will not enter into contracts in excess of the available capabilities of DOE. Available capability consists of inventories of material available or committed to DOE and the physical capability of existing and authorized enrichment plants, fully powered and operated without limitation as to mode of operation, but as reduced by potential commitments involving forecasts of Government needs.

(d) *Sale limitations.* Except as specifically provided, nothing in this notice shall be deemed to affect the sale or leasing of special nuclear material by DOE or the entering into "barter" arrangements whereby special nuclear material is distributed pursuant to section 54 of the Act and source material is accepted in part payment therefor.

(e) *Committed services.* Contracts for the provision of enrichment services shall specify the extent to which a customer is committed to take services from DOE and the charge, if any, for not taking committed services.

(f) *Duration.* Contracts for the provision of enrichment services shall be long-term, except that DOE may offer short-term contracts if, in its view, such contracts would promote the objectives of the AEA.

(g) *Revision of criteria.* The criteria contained in this notice are subject to change by DOE from time to time; however, any such changes shall be developed in conformance with applicable administrative guidelines and shall be submitted to the Committees of the Senate and House of Representatives which under the rules of the Senate and House have jurisdiction for review in accordance with the Act.

§762.2 Definitions.

(a) "Enrichment services" means the separative work necessary to enrich or further enrich uranium in the isotope U-235.

(b) "Cooperative agreement customer" means a person receiving enrichment services pursuant to an agreement for cooperation arranged pursuant to section 123 of the AEA.

(c) "Licensee" means a person licensed under sections 53, 63, 103 or 104 of the AEA.

(d) "Separative work" means the measure of the effort required to separate a quantity of uranium feed material into (1) an enriched fraction containing a higher concentration of U-235 than the feed material and (2) a tails fraction containing a lower concentration of U-235.

§762.3 Enrichment of uranium of foreign origin.

DOE may not restrict the enrichment of uranium of foreign origin for domestic use except to the extent it determines such a restriction is necessary to assure the maintenance of a viable domestic uranium industry.

§762.4 Prices.

DOE may negotiate prices in individual enrichment services contracts in accordance with an overall approach intended to maintain the long-term competitive position of DOE while obtaining the recovery of the Government's costs over a reasonable period of time.

§762.5 Costs.

DOE will establish charges for enrichment services on a basis that recovers appropriate Government costs over a reasonable period of time. Such costs will be determined on a basis that includes the costs incurred in providing enrichment services as follows:

(a) Electric power and all other costs, direct and indirect, of operating the enrichment plants;

(b) Depreciation of enrichment plants;

(c) Costs of process development;

(d) Cost of DOE administration and other Government functions in support of the Enrichment Program; and

(e) Imputed interest on investment in plant, working capital, the natural uranium contained in those inventories at the DOE enrichment plants needed to provide enrichment services, and the separative work costs of preproduced inventories.

§762.6 Recovery of prior unrecouped Government costs.

In establishing prices for providing enrichment services for civilian customers, DOE will establish reserves sufficient to return to the Treasury of the United States, over a reasonable period of time, previously unrecouped and unrecovered costs associated with provision of enrichment services to civilian customers. The estimate of such costs will include costs attributable to plant capacity used to provide enrichment services for civilian customers, but will not necessarily include costs attributable to plant capacity or other investments not properly allocable to the Government's costs associated with providing enrichment services to civilian customers. DOE shall determine the amount to be returned to the U.S. Treasury each year. In determining this amount, DOE shall consider all relevant factors, including the following:

(a) Long-term financial integrity of the enrichment program;

(b) Reliability of service at competitive prices;

(c) Market share;

(d) Impact upon existing enrichment facilities and other program expenditures;

(e) Impact upon research and development; and

(f) Need to reduce the deficit.

§762.7 Non-discrimination.

The same prices, as well as other terms and conditions, shall be available to all similarly-situated customers on a non-discriminatory basis, reflecting DOE's judgment of cost differentials associated with supplying enrichment services to different customers.

§762.8 Amendment of contract.

At the request of either DOE or the customer, the parties will negotiate and, to the extent mutually agreed, amend the contract without additional consideration. A contract may provide for renegotiation of prices, as well as other terms and conditions, at specified times or upon request by either party.

§762.9 Termination by DOE.

(a) The contract may be terminated by DOE without cost to DOE upon reasonable notice at such time as commercial enrichment services are provided by another domestic source: Provided, however, that DOE will upon request by the customer rescind any notice of termination and will continue to furnish the services specified in

the contract if the services of the domestic source are not available to the customer;

(1) To the extent provided for in the DOE contract during the remainder of its terms; and

(2) on terms and conditions, including charges, which are considered by the DOE to be reasonable and nondiscriminatory.

(b) DOE may terminate the contract without cost to DOE in the event the customer loses its right to possess enriched uranium, or defaults on its contractual obligations, or becomes involved in bankruptcy proceedings where such involvement interferes with the customer's ability to perform its obligations. In such instances, the customer will be required to pay a termination charge determined as if the customer had terminated the contract.

§762.10 Termination by customer.

The contract shall provide the circumstances under which the customer may terminate the contract in whole or in part. Reasonable and appropriate charges for termination as are negotiated shall be specified in the contract.

§762.11 Quantities and form of feed and product material.

The form of feed and product material shall be UF-6, except where DOE and the customer agree to another form. The quantity of material to be furnished by the customer in relationship to the quantity of enriched uranium to be delivered by DOE and the related amount of separative work to be performed by DOE normally will be determined in accordance with the then current standard table of enrichment services published by DOE. DOE may agree to perform such services in accordance with such other table as is within its capability. DOE will not necessarily use the specific feed material or quantity of material furnished by the customer in producing the enriched uranium delivered to the customer.

§762.12 Customer's option to acquire tails material.

The customer shall be granted an option to acquire tails material (depleted uranium) resulting from the performance of enrichment services. The option as to quantity (kg U) of tails material desired by the customer, within the maximum quantity subject to the option, must be exercised at the time of delivery of the related quantity of feed material. The U-235 assay of the tails material delivered to the customer will be within the sole discretion of DOE. The maximum quantity of depleted uranium subject to the option will be equal to the difference between the total uranium supplied by the customer as feed material and the total enriched uranium furnished to the customer, less processing losses as established from time to time by DOE. Delivery of tails material will normally be at the same time as delivery of enriched uranium.

§762.13 Responsibility for material meeting specifications.

The customer warrants that all feed material meets specifications and, with stated exceptions, agrees to hold DOE and its representatives harmless from all damages, liabilities, or costs arising out of a breach of the warranty where such damages, liabilities, or costs are incurred prior to final acceptance of the feed material by DOE. However, the customer is not deprived of any rights under indemnification agreements entered into pursuant to section 170 of the Act (Price-Anderson indemnification). DOE's obligation to furnish specification material to the customer terminates upon final acceptance of such material by the customer.

§762.14 Other terms.

A contract may contain terms and conditions not specified in these criteria, so long as the terms and conditions are not inconsistent with these criteria.

§762.15 Prior contracts.

All contracts under which DOE was providing enrichment services prior to the adoption of these criteria are valid. These prior contracts may be amended to conform to these criteria without penalty, if both parties agree.

10 CFR 960

PART 960—GENERAL GUIDELINES FOR THE RECOMMENDATION OF SITES FOR NUCLEAR WASTE REPOSITORIES

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Authority: The Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.); Energy Reorganization Act of 1974 (42 U.S.C. 5801 et seq.); Department of Energy Organization Act of 1977 (42 U.S.C. 7101 et seq.); Nuclear Waste Policy Act of 1982 (Pub. L. 97-425, 96 Stat. 2201).

Source: 49 FR 47752, Dec. 6, 1984, unless otherwise noted.

Subpart A—General Provisions

§960.1 Applicability.

These guidelines were developed in accordance with the requirements of Section 112(a) of the Nuclear Waste Policy Act of 1982 for use by the Secretary of Energy in evaluating the suitability of sites for the development of repositories. The guidelines will be used for suitability evaluations and determinations made pursuant to Section 112(b) and any preliminary suitability determinations required by Section 114(f). The guidelines set forth in this Part are intended to complement the requirements set forth in the Act, 10 CFR Part 60, and 40 CFR Part 191. The DOE recognizes NRC jurisdiction for the resolution of differences between the guidelines and 10 CFR Part 60. The guidelines have received the concurrence of the NRC. The DOE contemplates revising the guidelines from time to time, as permitted by the Act, to take into account revisions made to the above regulations and to otherwise update the guidelines as necessary. The DOE will submit the revisions to the NRC and obtain its concurrence before issuance.

§960.2 Definitions

As used in this part:

"Accessible environment" means the atmosphere, the land surface, surface water, oceans, and the portion of the lithosphere that is outside the controlled area.

"Act" means the Nuclear Waste Policy Act of 1982.

"Active fault" means a fault along which there is recurrent movement, which is usually indicated by small, periodic displacements or seismic activity.

"Affected area" means either the area of socioeconomic impact or the area of environmental impact, each of which will vary in size among potential repository sites.

"Affected Indian tribe" means any Indian tribe (1) within whose reservation boundaries a repository for radioactive waste is proposed to be located or (2) whose federally defined possessory or usage rights to other lands outside the reservation's boundaries arising out of congressionally ratified treaties may be substantially and adversely affected by the locating of such a facility; *Provided*, That the Secretary of the Interior finds, upon the petition of the appropriate governmental officials of the tribe, that such effects are both substantial and adverse to the tribe.

"Affected State" means any State that (1) has been notified by the DOE in accordance with Section 116(a) of the Act as containing a potentially acceptable site; (2) contains a candidate site for site characterization or repository development; or (3) contains a site selected for repository development.

"Application" means the act of making a finding of compliance or noncompliance with the qualifying or disqualifying conditions specified in the guidelines of Subparts C and D, in accordance with the types of findings specified in Appendix III.

"Aquifer" means a formation, a group of formations, or a part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs.

"Barrier" means any material or structure that prevents or substantially delays the movement of water or radionuclides.

"Candidate site" means an area, within a geohydrologic setting, that is recommended by the Secretary of Energy under Section 112 of the Act for site characterization, approved by the President under Section 112 of the Act for characterization, or undergoing site characterization under Section 113 of the Act.

"Closure" means final backfilling of the remaining open operational areas of the underground facility and boreholes after the termination of waste emplacement, culminating in the sealing of shafts.

"Confining unit" means a body of impermeable or distinctly less permeable material stratigraphically adjacent to one or more aquifers.

"Containment" means the confinement of radioactive waste within a designated boundary.

"Controlled area" means a surface location, to be marked by suitable monuments, extending horizontally no more than 10 kilometers in any direction from the outer boundary of the underground facility, and the underlying subsurface, which area has been committed to use as a geologic repository and from which incompatible activities would be prohibited before and after permanent closure.

"Cumulative releases of radionuclides" means the total number of curies of radionuclides entering the accessible environment in any 10,000-year period, normalized on the basis of radiotoxicity in accordance with 40 CFR Part 191. The peak cumulative release of radionuclides refers to the 10,000-year period during which any such release attains its maximum predicted value.

"Decommissioning" means the permanent removal from service of surface facilities and components necessary for preclosure operations only, after repository closure, in accordance with regulatory requirements and environmental policies.

"Determination" means a decision by the Secretary that a site is suitable for site characterization for the selection of a repository site or that a site is suitable for the development of a repository, consistent with applications of the guidelines of Subparts C and D in accordance with the provisions set forth in Subpart B.

"Disposal" means the emplacement in a repository of high-level radioactive waste, spent nuclear fuel, or other highly radioactive material with no foreseeable intent of recovery, whether or not such emplacement permits the recovery of such waste, and the isolation of such waste from the accessible environment.

"Disqualifying condition" means a condition that, if present at a site, would eliminate that site from further consideration.

"Disturbed zone" means that portion of the controlled area, excluding shafts, whose physical or chemical properties are predicted to change as a result of underground facility construction or heat generated by the emplaced radioactive waste such that the resultant change of properties could have a significant effect on the performance of the geologic repository.

"DOE" means the U.S. Department of Energy or its duly authorized representatives.

"Effective porosity" means the amount of interconnected pore space and fracture openings available for the transmission of fluids, expressed as the ratio of the volume of interconnected pores and openings to the volume of rock.

"Engineered-barrier system" means the manmade components of a disposal system designed to prevent the release of radionuclides from the underground facility or into the geohydrologic setting. Such term includes the radioactive-waste form, radioactive-waste canisters, materials placed over and around such canisters, any other components of the waste package, and barriers used to seal penetrations in and into the underground facility.

"Environmental assessment" means the document required by Section 112(b)(1)(E) of the Nuclear Waste Policy Act of 1982.

"Environmental impact statement" means the document required by Section 102(2)(C) of the National Environmental Policy Act of 1969. Sections 114(a) and 114(f) of the Nuclear Waste Policy Act of 1982 include certain limitations on the National Environmental Policy Act requirements as they apply to the preparation of an environmental impact statement for the development of a repository at a characterized site.

"EPA" means the U.S. Environmental Protection Agency or its duly authorized representatives.

"Evaluation" means the act of carefully examining the characteristics of a site in relation to the requirements of the qualifying or disqualifying conditions specified in the guidelines of Subparts C and D. Evaluation includes the consideration of favorable and potentially adverse conditions.

"Excepted" means assumed to be probable or certain on the basis of existing evidence and in the absence of significant evidence to the contrary.

"Expected repository performance" means the manner in which the repository is predicted to function, consideration those conditions, processes, and events that are likely to prevail or may occur during the time period of interest.

"Facility" means any structure, system, or system component, including engineered barriers, created by the DOE to meet repository-performance or functional objectives.

"Fault" means a fracture or a zone of fractures along which there has been displacement of the side relative to one another parallel to the fracture or zone of fractures.

"Faulting" means the process of fracturing and displacement that produces a fault.

"Favorable condition" means a condition that, though not necessary to qualify a site, is presumed, if present, to enhance confidence that the qualifying condition of a particular guideline can be met.

"Finding" means a conclusion that is reached after evaluation.

"Geohydrologic setting" means the system of geohydrologic units that is located within a given geologic setting.

"Geohydrologic system" means the geohydrologic units within a geologic setting, including any recharge, discharge, interconnections between units, and any natural or man-induced processes or events that could affect ground-water flow within or among those units.

"Geohydrologic unit" means an aquifer, a confining unit, or a combination of aquifers and confining units comprising a framework for a reasonably distinct geohydrologic system.

"Geologic repository" means a system, requiring licensing by the NRC, that is intended to be used, or may be used, for the disposal of radioactive waste in excavated geologic media. A geologic repository includes (1) the geologic-repository operations area and (2) the portion of the geologic setting that provides isolation of the radioactive waste and is located within the controlled area.

"Geologic-repository operations area" means a radioactive-waste facility that is part of the geologic repository, including both surface and subsurface areas and facilities where waste-handling activities are conducted.

"Geologic setting" means the geologic, hydrologic, and geochemical systems of the region in which a geologic-repository operations area is or may be located.

"Geomorphic processes" means geologic processes that are responsible for the general configuration of the Earth's surface, including the development of present landforms and their relationships to underlying structures, and are responsible for the geologic changes recorded by these surface features.

"Ground water" means all subsurface water as distinct from surface water.

"Ground-water flux" means the rate of ground-water flow per unit area of porous or fractured media measured perpendicular to the direction of flow.

"Ground-water sources" means aquifers that have been or could be economically and technologically developed as sources of water in the foreseeable future.

"Ground-water travel time" means the time required for a unit volume of ground water to travel between two locations. The travel time is the length of the flow path divided by the velocity, where velocity is the average ground-water flux passing through the cross-sectional area of the geologic medium through which flow occurs, perpendicular to the flow direction, divided by the effective porosity along the flow path. If discrete segments of the flow path have different hydrologic properties, the total travel time will be the sum of the travel times for each discrete segment.

"Guideline" means a statement of policy or procedure that may include, when appropriate, qualifying, disqualifying, favorable, or potentially adverse conditions as specified in the "guidelines."

"Guidelines" means Part 960 of Title 10 of the Code of Federal Regulations—General Guidelines for the Recommendation of Sites for Nuclear Waste Repositories.

"High-level radioactive waste" means (1) the highly radioactive material resulting from the reprocessing of spent nuclear fuel, including

liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations and (2) other highly radioactive material that the NRC, consistent with existing law, determines by rule requires permanent isolation.

"Highly populated area" means any incorporated place (recognized by the decennial reports of the U.S. Bureau of the Census) of 2,500 or more persons, or any census designated place (as defined and delineated by the Bureau) of 2,500 or more persons, unless it can be demonstrated that any such place has a lower population density than the mean value for the continental United States. Counties or county equivalents, whether incorporated or not, are specifically excluded form the definition of "place" as used herein.

"Host rock" means the geologic medium in which the waste is emplaced, specifically the geologic materials that directly encompass and are in close proximity to the underground facility.

"Hydraulic conductivity" means the volume of water that will move through a medium in a unit of time under a unit hydraulic gradient through a unit area measured perpendicular to the direction of flow.

"Hydraulic gradient" means a change in the static pressure of ground water, expressed in terms of the height of water above a datum, per unit of distance in a given direction.

"Hydrologic process" means any hydrologic phenomenon that exhibits a continuous change in time, whether slow or rapid.

"Hydrologic properties" means those properties of a rock that govern the entrance of water and the capacity to hold, transmit, and deliver water, such as porosity, effective porosity, specific retention, permeability, and the directions of maximum and minimum permeabilities.

"Igneous activity" means the emplacement (intrusion) of molten rock material (magma) into material in the Earth's crust or the expulsion (extrusion) of such material onto the Earth's surface or into its atmosphere or surface water.

"Isolation" means inhibiting the transport of radioactive material so that the amounts and concentrations of this material entering the accessible environment will be kept within prescribed limits.

"Likely" means processing or displaying the qualities, characteristics, or attributes that provide a reasonable basis for confidence that what is expected indeed exists or will occur.

"Lithosphere" means the solid part of the Earth, including any ground water contained within it.

"Member of the public" means any individual who is not engaged in operations involving the management, storage, and disposal of radioactive waste. A worker so engaged is a member of the public except when on duty at the geologic-repository operations area.

"Mitigation" means:

(1) Avoiding the impact altogether by not taking a certain action or parts of an action;

(2) minimizing impacts by limiting the degree or magnitude of the action and its implementation;

(3) rectifying the impact by repairing, rehabilitating, or restoring the affected environment;

(4) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or

(5) compensating for the impact by replacing or providing substitute resources or environments.

"Model" means a conceptual description and the associated mathematical representation of a system, subsystem, component, or condition that is used to predict changes from a baseline state as a function of internal and/or external stimuli and as a function of time and space.

"NRC" means the U.S. Nuclear Regulatory Commission or its duly authorized representatives.

"Perched ground water" means unconfined ground water separated from an underlying body of ground water by an unsaturated zone. Its water table is a perched water table. Perched ground water is held up by a perching bed whose permeability is so low that water percolating downward through it is not able to bring water in the underlying unsaturated zone above atmospheric pressure.

"Performance assessment" means any analysis that predicts the behavior of a system or system component under a given set of constant and/or transient conditions. Performance assessments will include estimates of the effects of uncertainties in data and modeling.

"Permanent closure" is synonymous with "closure."

"Postclosure" means the period of time after the closure of the geologic repository.

"Potentially acceptable site" means any site at which, after geologic studies and field mapping but before detailed geologic data gathering, the DOE undertakes preliminary drilling and geophysical testing for the definition of site location.

"Potentially adverse condition" means a condition that is presumed to detract from expected system performance, but further evaluation, additional data, or the identification of compensating or mitigating factors may indicate that its effect on the expected system performance is acceptable.

"Preclosure" means the period of time before and during the closure of the geologic repository.

"Pre-waste-emplacement" means before the authorization of repository construction by the NRC.

"Qualifying condition" means a condition that must be satisfied for a site to be considered acceptable with respect to a specific guideline.

"Quaternary Period" means the second period of the Cenozoic Era, following the Tertiary, beginning 2 to 3 million years ago and extending to the present.

"Radioactive waste" or "waste" means high-level radioactive waste and other radioactive materials, including spent nuclear fuel, that are received for emplacement in a geologic repository.

"Radioactive-waste facility" means a facility subject to the licensing and related regulatory authority of the NRC pursuant to Sections 202(3) and 202(4) of the Energy Reorganization Act of 1974 (88 Stat. 1244).

"Radionuclide retardation" means the process or processes that cause the time required for a given radionuclide to move between two locations to be greater than the ground-water travel time, because of physical and chemical interactions between the radionuclide and the geohydrologic unit through which the radionuclide travels.

"Reasonably available technology" means technology which exists and has been demonstrated or for which the results of any requisite development, demonstration, or confirmatory testing efforts before application will be available within the required time period.

"Repository" is synonymous with "geologic repository."

"Repository closure" is synonymous with "closure."

"Repository construction" means all excavation and mining activities associated with the construction of shafts, shaft stations, rooms, and necessary openings in the underground facility, preparatory to radioactive-waste emplacement, as well as the construction of necessary surface facilities, but excluding site-characterization activities.

"Repository operation" means all of the functions at the site leading to and involving radioactive-waste emplacement in the underground facility, including receiving, transportation, handling, emplacement, and, if necessary, retrieval.

"Repository support facilities" means all permanent facilities constructed in support of site-characterization activities and repository construction, operation, and closure activities, including surface structures, utility lines, roads, railroads, and similar facilities, but excluding the underground facility.

"Restricted area" means any area access to which is controlled by the DOE for purposes of protecting individuals from exposure to radiation and radioactive materials before repository closure, but not including any areas used as residential quarters, although a separate room or rooms in a residential building may be set apart as a restricted area.

"Retrieval" means the act of intentionally removing radioactive waste before repository closure from the underground location at which the waste had been previously emplaced for disposal.

"Saturated zone" means that part of the Earth's crust beneath the water table in which all voids, large and small, are ideally filled with water under pressure greater than atmospheric.

"Secretary" means the Secretary of Energy.

"Site" means a potentially acceptable site or a candidate site, as appropriate, until such time as the controlled area has been established, at which time the site and the controlled area are the same.

"Site characterization" means activities, whether in the laboratory or in the field,

undertaken to establish the geologic conditions and the ranges of the parameters of a candidate site relevant to the location of a repository, including borings, surface excavations, excavations of exploratory shafts, limited subsurface lateral excavations and borings, and in situ testing needed to evaluate the suitability of a candidate site for the location of a repository, but not including preliminary borings and geophysical testing needed to assess whether site characterization should be undertaken.

"Siting" means the collection of exploration, testing, evaluation, and decision-making activities associated with the process of site screening, site nomination, site recommendation, and site approval for characterization or repository development.

"Source term" means the kinds and amounts of radionuclides that make up the source of a potential release of radioactivity.

"Spent nuclear fuel" means fuel that has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated by reprocessing.

"Surface facilities" means repository support facilities within the restricted area.

"Surface water" means any waters on the surface of the Earth, including fresh and salt water, ice, and snow.

"System" means the geologic setting at the site, the waste package, and the repository, all acting together to contain and isolate the waste.

"System performance" means the complete behavior of a repository system in response to the conditions, processes, and events that may affect it.

"Tectonic" means of, or pertaining to, the forces involved in, or the resulting structures or features of, "tectonics."

"Tectonics" means the branch of geology dealing with the broad architecture of the outer part of the Earth, that is, the regional assembling of structural or deformational features and the study of their mutual relations, origin, and historical evolution.

"To the extent practicable" means the degree to which an intended course of action is capable of being effected in a manner that is reasonable and feasible within a framework of constraints.

"Underground facility" means the underground structure and the rock required for support, including mined openings and backfill materials, but excluding shafts, boreholes, and their seals.

"Unsaturated zone" means the zone between the land surface and the water table. Generally, water in this zone is under less than atmospheric pressure, and some of the voids may contain air or other gases at atmospheric pressure. Beneath flooded areas or in perched water bodies, the water pressure locally may be greater than atmospheric.

"Waste form" means the radioactive waste materials and any encapsulating or stabilizing matrix.

"Waste package" means the waste form and any containers, shielding, packing, and other sorbent materials immediately surrounding an individual waste container.

"Water table" means that surface in a body of ground water at which the water pressure is atmospheric.

Subpart B—Implementation Guidelines

§960.3 Implementation guidelines.

The guidelines of this subpart establish the procedure and basis for applying the postclosure and the preclosure guidelines of Subparts C and D, respectively, to evaluations of the suitability of sites for the development of repositories. As may be appropriate during the siting process, this procedure requires consideration of a variety of geohydrologic settings and rock types, regionality, and environmental impacts and consultation with affected States, affected Indian tribes, and Federal agencies.

§960.3-1 Siting provisions.

The siting provisions establish the framework for the implementation of the siting process specified in §960.3-2. Sections 960.3-1-1 and 960.3-1-2 require that consideration be given to sites situated in different geohydrologic settings and different types of host rock, respectively. These diversity guidelines are intended to balance the process of site selection by requiring consideration of a variety of geologic conditions and media, and thereby enhance confidence in the technical suitability of sites selected for the development of repositories. As required by the Act, §960.3-1-3 specifies consideration of a regional distribution of repositories after recommendation of a site for development of the first repository. Section 960.3-1-4 describes the evidence that is required to support siting decisions. Section 960.3-1-5 establishes the basis for site evaluations against the postclosure and the preclosure guidelines of Subparts C and D during the various phases of the siting process.

§960.3-1-1 Diversity of geohydrologic settings.

Consideration shall be given to a variety of geohydrologic settings in which sites for the development of repositories may be located. To the extent practicable, sites recommended as candidate sites for characterization shall be located in different geohydrologic settings.

§960.3-1-2 Diversity of rock types.

Consideration shall be given to a variety of geologic media in which sites for the development of repositories may be located. To the extent practicable, and with due consideration of candidate sites characterized previously or approved for such characterization if the circumstances apply, sites recommended as candidate sites for characterization shall have different types of host rock.

§960.3-1-3 Regionality.

In making site recommendations for repository development after the site for the first repository has been recommended, the Secretary shall give due consideration to the need for, and the advantages of, a regional distribution in the siting of subsequent repositories. Such consideration shall take into account the proximity of sites to locations at which waste is generated or temporarily stored and at which other repositories have been or are being developed.

§960.3-1-4 Evidence for siting decisions.

The siting process involves a sequence of four decisions: The identification of potentially acceptable sites; the nomination of sites as suitable for characterization; the recommendation of sites as candidate sites for site characterization; and after the completion of site characterization and nongeologic data gathering, the recommendation of a candidate site for the development of a repository. Each of these decisions will be supported by the evidence specified below.

§960.3-1-4-1 Site identification as potentially acceptable.

The evidence for the identification of a potentially acceptable site shall be the types of information specified in Appendix IV of this part. Such evidence will be relatively general and less detailed than that required for the nomination of a site as suitable for characterization. Because the gathering of detailed geologic data will not take place until after the recommendation of a site for characterization, the levels of information may be relatively greater for the evaluation of those guidelines in Subparts C and D that pertain to surface-identifiable factors for such site. The sources of information shall include the literature in the public domain and the private sector, when available, and will be supplemented in some instances by surface investigations and conceptual engineering design studies conducted by the DOE. Geologic surface investigations may include the mapping of identifiable rock masses, fracture and joint characteristics, and fault zones. Other surface investigations will consider the aquatic and terrestrial ecology; water rights and uses; topography; potential offsite hazards; natural resource concentrations; national or State protected resources; existing transportation systems; meteorology and climatology; population densities, centers, and distributions; and general socioeconomic characteristics.

§960.3-1-4-2 Site nomination for characterization.

The evidence required to support the nomination of a site as suitable for characterization shall include the types of information specified in Appendix IV of this part and shall be contained or referenced in the environmental assessments to be prepared in accordance with the requirements of the Act. The source of this information shall include the literature and related studies in the public domain

and the private sector, when available, and various meteorological, environmental, socioeconomic, and transportation studies conducted by the DOE in the affected area; exploratory boreholes in the region of such site, including lithologic logging and hydrologic and geophysical testing of such boreholes, laboratory testing of core samples for the evaluation of geochemical and engineering rock properties, and chemical analyses of water samples from such boreholes; surface investigations, including geologic mapping and geophysical surveys, and compilations of satellite imagery data; in situ or laboratory testing of similar rock types under expected repository conditions; evaluations of natural and man-made analogs of the repository and its subsystems, such as geothermally active areas, underground excavations, and case histories of socioeconomic cycles in areas that have experienced intermittent large-scale construction and industrial activities; and extrapolations of regional data to estimate site-specific characteristics and conditions. The exact types and amounts of information to be collected within the above categories, including such details as the specific types of hydrologic tests, combinations of geophysical tests, or number of exploratory boreholes, are dependent on the site-specific needs for the application of the guidelines of Subparts C and D, in accordance with the provisions of this Subpart and the application requirements set forth in Appendix III of this part. The evidence shall also include those technical evaluations that use the information specified above and that provide additional bases for evaluating the ability of a site to meet the qualifying conditions of the guidelines of Subparts C and D. In developing the above-mentioned bases for evaluation, as may be necessary, assumptions that approximate the characteristics or conditions considered to exist at a site, or expected to exist or occur in the future, may be used. These assumptions will be realistic but conservative enough to underestimate the potential for a site to meet the qualifying condition of a guideline; that is, the use of such assumptions should not lead to an exaggeration of the ability of a site to meet the qualifying condition.

§960.3-1-4-3 Site recommendation for characterization.

The evidence required to support the recommendation of a site as a candidate site for characterization shall consist of the evaluations and data contained or referenced in the environmental assessment for such site, unless the Secretary certifies that such information, in the absence of additional preliminary borings or excavations, will not be adequate to satisfy applicable requirements of the Act.

§960.3-1-4-4 Site recommendation for repository development.

The evidence required to support the recommendation of a candidate site for the development of a repository, after the completion of characterization activities at such site, shall consist of the information specified in Section 114(a) of the Act for the comprehensive statement of the basis for such recommendation and Section 114(f) of the Act for the environmental impact statement. This evidence shall be obtained by the characterization of such site, according to the requirements specified in Section 113(b) of the Act and in 10 CFR 60.11, and by nongeologic data gathering.

§960.3-1-5 Basis for site evaluations.

Evaluations of individual sites and comparisons between and among sites shall be based on the postclosure and preclosure guidelines specified in Subparts C and D, respectively. Except for screening for potentially acceptable sites as specified in §960.3-2-1, such evaluations shall place *primary significance* on the postclosure guidelines and *secondary significance* on the preclosure guidelines, with each set of guidelines considered collectively for such purposes. Both the postclosure and the preclosure guidelines consist of a system guideline or guidelines and corresponding groups of technical guidelines. The postclosure guidelines of Subpart C contain eight technical guidelines in one group. The preclosure guidelines of Subpart D contain eleven technical guidelines separated into three groups that represent, *in decreasing order of importance*, preclosure radiological safety; environment, socioeconomics, and transportation; and ease and cost of siting, construction, operation, and closure. The relative significance of any technical guideline to its corresponding system guideline is site specific. Therefore, for each technical guideline, an evaluation of compliance with the qualifying condition shall be made in the context of the collection of system elements and the evidence related to that guideline, considering on balance the favorable conditions and the potentially adverse conditions identified at a site. Similarly, for each system guideline, such evaluation shall be made in the context of the group of technical guidelines and the evidence related to that system guideline. For purposes of recommending sites for development as repositories, such evidence shall include analyses of expected repository performance to assess the likelihood of demonstrating compliance with 40 CFR Part 191 and 10 CFR Part 60, in accordance with §960.4-1. A site shall be disqualified at any time during the siting process if the evidence supports a finding by the DOE that a disqualifying condition exists or the qualifying condition of any system or technical guideline cannot be met. Comparisons between and among sites shall be based on the system guidelines, to the extent practicable and in accordance with the levels of relative significance specified above for the postclosure and the preclosure guidelines. Such comparisons are intended to allow comparative evaluations of sites in terms of the capabilities of the natural barriers for waste isolation and to identify innate deficiencies that could jeopardize compliance with such requirements. If the evidence for the sites is not adequate to substantiate such comparisons, then the comparisons shall be based on the groups of technical guidelines under the postclosure and the preclosure guidelines, considering the levels of relative significance appropriate to the postclosure and the preclosure guidelines and the order of importance appropriate to the subordinate groups within the preclosure guidelines. Comparative site evaluations shall place primary importance on the natural barriers of the site. In such evaluations for the postclosure guidelines of Subpart C, engineered barriers shall be considered only to the extent necessary to obtain realistic source terms for comparative site evaluations based on the sensitivity of the natural barriers to such realistic engineered barriers. For a better understanding of the potential effects of engineered barriers on the overall performance of the repository system, these comparative evaluations shall consider a range of levels in the performance of the engineered barriers. That range of performance levels shall vary by at least a factor of 10 above and below the engineered-barrier performance requirements set forth in 10 CFR 60.113, and the range considered shall be identical for all sites compared. The comparisons shall assume equivalent engineered-barrier performance for all sites compared and shall be structured so that engineered barriers are not relied upon to compensate for deficiencies in the geologic media. Furthermore, engineered barriers shall not be used to compensate for an inadequate site; mask the innate deficiencies of a site; disguise the strengths and weaknesses of a site and the overall system; and mask differences between sites when they are compared. Site comparisons performed to support the recommendation of sites for the development of repositories in §960.3-2-4 shall evaluate predicted releases of radionuclides to the accessible environment. For the purposes of such comparison, the accessible environment shall consist of the atmosphere, the land surface, any nearby surface water, and those portions of the lithosphere that are situated more than 10 kilometers in a horizontal direction from the outer boundary of the original location of the waste emplacement in the geologic repository. Releases of different radionuclides shall be combined by the methods specified in Appendix A of 40 CFR Part 191. The comparisons specified above shall consist of two comparative evaluations that predict radionuclide releases for 100,000 years after repository closure and shall be conducted as follows. First, the sites shall be compared by means of evaluations that emphasize the performance of the natural barriers at the site. Second, the sites shall be compared by means of evaluations that emphasize the performance of the total repository system. These second evaluations shall consider the expected performance of the repository system; be based on the expected performance of waste packages and waste forms, in compliance with the requirements of 10 CFR 60.113, and on the expected hydrologic and

geochemical conditions at each site; and take credit for the expected performance of all other engineered components of the repository system. The comparison of isolation capability shall be one of the significant considerations in the recommendation of sites for the development of repositories. The first of the two comparative evaluations specified in the preceding paragraph shall take precedence unless the second comparative evaluation would lead to substantially different recommendations. In the latter case, the two comparative evaluations shall receive comparable consideration. Sites with predicted isolation capabilities that differ by less than a factor of 10, with similar uncertainties, may be assumed to provide equivalent isolation.

§960.3-2 Siting process.

The siting process begins with site screening for the identification of potentially acceptable sites. This process was completed for purposes of the first repository before the enactment of the Act, and the identification of such sites was made after enactment in accordance with the provisions of section 116(a) of the Act. The screening process for the identification of potentially acceptable sites for the second and subsequent repositories shall be conducted in accordance with the requirements specified in §960.3-2-1 of this Subpart. The nomination of any site as suitable for characterization shall follow the process specified in §960.3-2-2, and such nomination shall be accompanied by an environmental assessment as specified in section 112(b)(1)(E) of the Act. The recommendation of sites as candidate sites for characterization and the recommendation of a characterized site for the development of a repository shall be accomplished in accordance with the requirements specified in 960.3-2-3 and 960.3-2-4, respectively.

§960.3-2-1 Site screening for potentially acceptable sites.

To identify potentially acceptable sites for the development of other than the first repository, the process shall begin with site-screening activities that consider large land masses that contain rock formations of suitable depth, thickness, and lateral extent and have structural, hydrologic, and tectonic features favorable for waste containment and isolation. Within those large land masses, subsequent site-screening activities shall focus on successively smaller and increasingly more suitable land units. This process shall be developed in consultation with the States that contain land units under consideration. It shall be implemented in a sequence of steps that first applies the applicable disqualifying conditions to eliminate land units on the basis of the evidence specified in §960.3-1-4-1 and in accordance with the application requirements set forth in Appendix III of this Part. After the disqualifying conditions have been applied, the favorable and potentially adverse conditions, as identified for each remaining land unit, shall be evaluated. The presence of favorable conditions shall favor a given land unit, while the presence of potentially adverse conditions shall penalize that land unit. Recognizing that favorable conditions and potentially adverse conditions for different technical guidelines can exist in the same land unit, the DOE shall seek to evaluate the composite favorability of each land unit. Land units that, in the aggregate, exhibit potentially adverse conditions shall be deferred in favor of land units that exhibit favorable conditions. The siting provisions that require diversity of geohydrologic settings and rock types and consideration of regionality, as specified in 960.3-1-1, 960.3-1-2, and 960.3-1-3, respectively, may be used to discriminate between land units and to establish the range of options in site screening. To identify a site as potentially acceptable, the evidence shall support a finding that the site is not disqualified in accordance with the application requirements set forth in Appendix III of this Part and shall support the decision by the DOE to proceed the continued investigation of the site on the basis of the favorable and potentially adverse conditions identified to date. In continuation of the screening process after such identification and before site nomination, the DOE may defer from further consideration land units or potentially acceptable sites or portions thereof on the basis of additional information or by the application of the siting provisions for diversity of geohydrologic settings, diversity of rock types, and regionality (960.3-1-1, 960.3-1-2, and 960.3-1-3, respectively). The deferral of potentially acceptable sites will be described in the environmental assessments that accompany the nomination of at least five sites as suitable for characterization. In order to identify potentially acceptable sites for the second and subsequent repositories, the Secretary shall *first* identify the State within which the site is located in a decision-basis document that describes the process and the considerations that led to the identification of such site and that has been issued previously in draft for review and comment by such State. *Second*, when such document is final, the Secretary shall notify the Governor and the legislature of that State and the tribal council of any affected Indian tribe of the potentially acceptable site.

§960.3-2-2 Nomination of sites as suitable for characterization.

From the sites identified as potentially acceptable, the Secretary shall nominate at least five sites determined suitable for site characterization for the selection of each repository site. For the second repository, at least three of the sites shall not have been nominated previously. Any site nominated as suitable for characterization for the first repository, but not recommended as a candidate site for characterization, may not be nominated as suitable for characterization for the second repository. The nomination of a site as suitable for characterization shall be accompanied by an environmental assessment as specified in section 112(b)(1)(E) of the Act. Such nomination shall be based on evaluations in accordance with the guidelines of this Part, and the bases and relevant details of those evaluations and of the decision processes involved therein shall be contained in the environmental assessment for the site in the manner specified in this Subpart. The evidence required to support such evaluations and siting decisions is specified in §960.3-1-4-2.

§960.3-2-2-1 Evaluation of all potentially acceptable sites.

First, in considering sites for nomination, each of the potentially acceptable sites shall be evaluated on the basis of the disqualifying conditions specified in the technical guidelines of Subparts C and D, in accordance with the application requirements set forth in Appendix III of this part. This evaluation shall support a finding by the DOE that such sites is not disqualified.

§960.3-2-2-2 Selection of sites within geohydrologic settings.

Second, the siting provision requiring diversity of geohydrologic settings, as specified in §960.3-1-1, shall be applied to group all potentially acceptable sites according to their geohydrologic settings. *Third*, for those geohydrologic settings that contain more than one potentially acceptable site, the preferred site shall be selected on the basis of a comparative evaluation of all potentially acceptable sites in that setting. This evaluation shall consider the distinguishing characteristics displayed by the potentially acceptable sites within the setting and the related guidelines from Subparts C and D. That is, the appropriate guidelines shall be selected primarily on the basis of the kinds of evidence among sites for which distinguishing characteristics can be identified. Such comparative evaluation shall be made on the basis of the qualifying conditions for those guidelines, considering, on balance, the favorable conditions and potentially adverse conditions identified at each site. Due consideration shall also be given to the siting provisions specifying the basis for site evaluations in §960.3-1-5, to the extent practicable, and diversity of rock types in §960.3-1-2, if the circumstances so apply. If less than five geohydrologic settings are available for consideration, the above process shall be used to select two or more preferred sites from those settings that contain more than one potentially acceptable site, as required to obtain the number of sites to be nominated as suitable for characterization. For purposes of the second and subsequent repositories, due consideration shall also be given to the siting provision for regionality as specified in §960.3-1-3. *Fourth*, each preferred site within a geohydrologic setting shall be evaluated as to whether such site is suitable for the development of a repository under the qualifying condition of each guideline specified in Subparts C and D that does not require site characterization as a prerequisite for the application of such guideline. The guidelines considered appropriate to this evaluation have been selected on the basis

of their exclusion under the definition of site characterization as specified in §960.2. Although the final application of these guidelines, in accordance with the provisions set forth in Appendix III of this part, does not require geologic data from site-characterization activities, such application will require additional data beyond those specified in Appendix IV of this part, which will be obtained concurrently with site characterization. Such guidelines include those specified in §960.4-2-8-2 (Site Ownership and Control) of Subpart C; 960.5-1(a)(1) and 960.5-1(a)(2) of Subpart D (preclosure system guidelines for radiological safety and environmental quality, socioeconomics, and transportation); and 960.5-2-1 through 960.5-2-7 of Subpart D (Population Density and Distribution, Site Ownership and Control, Meteorology, Offsite Installations and Operations, Environmental Quality, Socioeconomic Impacts, and Transportation). This evaluation shall consider on balance those favorable conditions and potentially adverse conditions identified as such at a preferred site in relation to the qualifying condition of each such guideline. For each such guideline, this evaluation shall focus on the suitability of the site for the development of a repository by considering the activities from the start of site characterization through decommissioning and shall support a finding by the DOE in accordance with the application requirements set forth in Appendix III of this part. *Fifth*, each preferred site within a geohydrologic setting shall be evaluated as to whether such site is suitable for site characterization under the qualifying conditions of those guidelines specified in Subparts C and D that require characterization (i.e., subsurface geologic, hydrologic, and geochemical data gathering). Such guidelines include those specified in §960.4-1(a) (postclosure system guideline); 960.4-2-1 through 960.4-2-8-1 of Subpart C (Geohydrology, Geochemistry, Rock Characteristics, Climatic Changes, Erosion, Dissolution, Tectonics, Human Interference, and Natural Resources); 60.5-1(a)(3) (preclosure system guideline for ease and cost of siting, construction, operation, and closure); and §960.5-2-8 through 960.5-2-11 of Subpart D (Surface Characteristics, Rock Characteristics, Hydrology, and Tectonics). This evaluation shall consider on balance the favorable conditions and potentially adverse conditions identified as such at a preferred site in relation to the qualifying condition of each such guideline. For each such guideline, this evaluation shall focus on the suitability of the site for characterization and shall support a finding by the DOE in accordance with the application requirements set forth in Appendix III of this part.

§960.3-2-2-3 Comparative evaluation of all sites proposed for nomination.

Sixth, for those potentially acceptable sites to be proposed for nomination, as determined by the process specified in §960.3-2-2-2, a reasonable comparative evaluation of each such site with all other such sites shall be made. For each site and for each guideline specified in Subparts C and D, the DOE shall summarize the evaluations and findings specified under §960.3-2-2-1 and under the fourth and fifth provisions of §960.3-2-2-2. Each such summary shall allow comparisons to be made among sites on this basis of each guideline.

§960.3-2-2-4 The environmental assessment.

To document the process specified above, and in compliance with section 112(b)(1)(E) of the Act, an environmental assessment shall be prepared for each site proposed for nomination as suitable for characterization. Each such environmental assessment shall describe the decision process by which such site was proposed for nomination as described in the preceding six steps and shall contain or reference the evidence that supports such process according to the requirements of §960.3-1-4-2 and Appendix IV of this part. As specified in the Act, each environmental assessment shall include an evaluation of the effects of the site-characterization activities at the site on public health and safety and the environment; a discussion of alternative activities related to site characterization that may be taken to avoid such impact; and an assessment of the regional and local impacts of locating a repository at the site. The draft environmental assessment for each site proposed for nomination as suitable for characterization shall be made available by the DOE for public comment after the Secretary has notified the Governor and legislature of the State in which the site is located, and the governing body of the affected Indian tribe where such site is located, of such impending availability.

§960.3-2-2-5 Formal site nomination.

After the final environmental assessments have been prepared, the Secretary shall nominate at least five sites that he determines suitable for site characterization for the selection of a repository site, and, in so doing, he shall cause to have published in the Federal Register a notice specifying the sites so nominated and announcing the availability of the final environmental assessments for such sites. This determination by the Secretary shall be based on the final environmental assessments for such sites, including, in particular, consideration of the available evidence, evaluations, and the resultant findings for the guidelines of Subparts C and D so specified under the fourth and fifth provisions of §960.3-2-2-2. Before nominating a site, the Secretary shall notify the Governor and legislature of the State in which the site is located, and the governing body of the affected Indian tribe where such site is located, of such nomination and the basis for such nomination.

§960.3-2-3 Recommendation of sites for characterization.

After the nomination of at least five sites as suitable for site characterization for the selection of the first repository, the Secretary shall recommend in writing to the President not less than three candidate sites for such characterization. The recommendation decision shall be based on the available geophysical, geologic, geochemical, and hydrologic data; other information; associated evaluations and findings reported in the environmental assessments accompanying the nominations; and the considerations specified below, unless the Secretary certifies that such available data will not be adequate to satisfy applicable requirements of the Act in the absence of further preliminary borings or excavations. On the basis of the evidence and in accordance with the siting provision specifying the basis for site evaluations in §960.3-1-5, the sites nominated as suitable for characterization shall be considered as to their order of preference as candidate sites for characterization. Subsequently, the siting provisions specifying diversity of geohydrologic settings, diversity of rock types, and, after the first repository, consideration of regionality in 960.3-1-1, 960.3-1-2, and 960.3-1-3, respectively, shall be considered to determine a final order of preference for the characterization of such sites. Considering this order of preference together with the available siting alternatives specified in the Act, the sites recommended as candidate sites for characterization shall offer, on balance, the most advantageous combination of characteristics and conditions for the successful development of repositories at such sites. The process for the recommendation of sites as candidate sites for characterization for the selection of any subsequent repository shall be the same as that specified above for the first repository.

§960.3-2-4 Recommendation of sites for the development of repositories.

After completion of site characterization and nongeologic data gathering activities at the candidate sites for the development of the first repository, or from all of the characterized sites for the development of subsequent repositories, the candidate sites shall be compared with each other on the basis of the guidelines specified in Subparts C and D according to the siting provision specifying the basis for site evaluations in §960.3-1-5. This comparison shall lead to a recommendation by the Secretary to the President of a site for the development of a repository. Together with any recommendation to the President to approve a site for the development of a repository, the Secretary shall make available to the public, and submit to the President, a comprehensive statement of the basis of such recommendation pursuant to the requirements specified in section 114(a)(1) of the Act, including an environmental impact statement prepared in accordance with the provisions of sections 114(a)(1)(D) and 114(f) of the Act. The

environmental impact statement shall include the results of the comparative evaluation specified above and a description of the decision process that resulted in the selection of the candidate site recommended for the development of such repository.

§960.3-3 Consultation.

The DOE shall provide to designated officials of the affected States and to the governing bodies of any affected Indian tribe timely and complete information regarding determinations or plans made with respect to the siting, site characterization, design, development, construction, operation, closure, decommissioning, licensing, or regulation of a repository. Written responses to written requests for information from the designated officials of affected States or affected Indian tribes will be provided within 30 days after receipt of the written requests. In performing any study of an area for the purpose of determining the suitability of such area for the development of a repository, the DOE shall consult and cooperate with the Governor and the legislature of an affected State and the governing body of an affected Indian tribe in an effort to resolve concerns regarding public health and safety, environmental impacts, socioeconomic impacts, and technical aspects of the siting process. After notifying affected States and affected Indian tribes that potentially acceptable sites have been identified, or that a site has been approved for characterization, the DOE shall seek to enter into binding written agreements with such affected States or affected Indian tribes in accordance with the requirements of the Act. The DOE shall also consult, as appropriate, with other Federal agencies.

§960.3-4 Environmental impacts.

Environmental impacts shall be considered by the DOE throughout the site characterization, site selection, and repository development process. The DOE shall mitigate significant adverse environmental impacts, to the extent practicable, during site characterization and repository construction, operation, closure, and decommissioning.

Subpart C—Postclosure Guidelines

§960.4 Postclosure guidelines.

The guidelines in this subpart specify the factors to be considered in evaluating and comparing sites on the basis of expected repository performance after closure. The postclosure guidelines are separated into a system guideline and eight technical guidelines. The system guideline establishes waste containment and isolation requirements that are based on NRC and EPA regulations. These requirements must be met by the repository system, which contains natural barriers and engineered barriers. The engineered barriers will be designed to complement the natural barriers, which provide the primary means for waste isolation.

§960.4-1 System guideline.

(a) *Qualifying Condition.* The geologic setting at the site shall allow for the physical separation of radioactive waste from the accessible environment after closure in accordance with the requirements of 40 CFR Part 191, Subpart B, as implemented by the provisions of 10 CFR Part 60. The geologic setting at the site will allow for the use of engineered barriers to ensure compliance with the requirements of 40 CFR Part 191 and 10 CFR Part 60 (see Appendix I of this part).

§960.4-2 Technical guidelines.

The technical guidelines in this subpart set forth qualifying, favorable, potentially adverse, and, in five guidelines, disqualifying conditions on the characteristics, processes, and events that may influence the performance of a repository system after closure. The favorable conditions and the potentially adverse conditions under each guideline are *not* listed in any assumed order of importance. Potentially adverse conditions will be considered if they affect waste isolation within the controlled area even though such conditions may occur outside the controlled area. The technical guidelines that follow establish conditions that shall be considered in determining compliance with the qualifying condition of the postclosure system guideline. For each technical guideline, an evaluation of qualification or disqualification shall be made in accordance with the requirements specified in Subpart B.

§960.4-2-1 Geohydrology.

(a) *Qualifying Condition.* The present and expected geohydrologic setting of a site shall be compatible with waste containment and isolation. The geohydrologic setting, considering the characteristics of and the processes operating within the geologic setting, shall permit compliance with (1) the requirements specified in §960.4-1 for radionuclide releases to the accessible environment and (2) the requirements specified in 10 CFR 60.113 for radionuclide releases from the engineered-barrier system using reasonably available technology.

(b) *Favorable Conditions.*

(1) Site conditions such that the pre-waste-emplacement ground-water travel time along any path of likely radionuclide travel from the disturbed zone to the accessible environment would be more than 10,000 years.

(2) The nature and rates of hydrologic processes operating within the geologic setting during the Quaternary Period would, if continued into the future, not affect or would favorably affect the ability of the geologic repository to isolate the waste during the next 100,000 years.

(3) Sites that have stratigraphic, structural, and hydrologic features such that the geohydrologic system can be readily characterized and modeled with reasonable certainty.

(4) For disposal in the saturated zone, at least one of the following pre-waste-emplacement conditions exists:

(i) A host rock and immediately surrounding geohydrologic units with low hydraulic conductivities.

(ii) A downward or predominantly horizontal hydraulic gradient in the host rock and in the immediately surrounding geohydrologic units.

(iii) A low hydraulic gradient in and between the host rock and the immediately surrounding geohydrologic units.

(iv) High effective porosity together with low hydraulic conductivity in rock units along paths of likely radionuclide travel between the host rock and the accessible environment.

(5) For disposal in the unsaturated zone, at least one of the following pre-waste-emplacement conditions exists:

(i) A low and nearly constant degree of saturation in the host rock and in the immediately surrounding geohydrologic units.

(ii) A water table sufficiently below the underground facility such that the fully saturated voids continuous with the water table do not encounter the host rock.

(iii) A geohydrologic unit above the host rock that would divert the downward infiltration of water beyond the limits of the emplaced waste.

(iv) A host rock that provides for free drainage.

(v) A climatic regime in which the average annual historical precipitation is a small fraction of the average annual potential evapotranspiration.

Note: The DOE will, in accordance with the general principles set forth in §960.1 of these regulations, revise the guidelines as necessary, to ensure consistency with the final NRC regulations on the unsaturated zone, which were published as a proposed rule on February 16, 1984, in 49 FR 5934.

(c) *Potentially Adverse Conditions.*

(1) Expected changes in geohydrologic conditions—such as changes in the hydraulic gradient, the hydraulic conductivity, the effective porosity, and the ground-water flux through the host rock and the surrounding geohydrologic units—sufficient to significantly increase the transport of radionuclides to the accessible environment as compared with pre-waste-emplacement conditions.

(2) The presence of ground-water sources, suitable for crop irrigation or human consumption without treatment, along ground-water flow paths from the host rock to the accessible environment.

(3) The presence in the geologic setting of stratigraphic or structural features— such as dikes, sills, faults, shear zones, folds, dissolution effects, or brine pockets—if their presence could significantly contribute to the difficulty of characterizing or modeling the geohydrologic system.

(d) *Disqualifying Condition.* A site shall be disqualified if the pre-waste- emplacement ground-water travel time from the disturbed zone to the accessible environment is expected to be less than 1,000 years along any pathway of likely and significant radionuclide travel.

§960.4-2-2 Geochemistry.

(a) *Qualifying Condition.* The present and expected geochemical characteristics of a site shall be compatible with waste containment and isolation. Considering the likely chemical interactions among radionuclides, the host rock, and the ground water, the characteristics of and the processes operating within the geologic setting shall permit compliance with (1) the requirements specified in §960.4-1 for radionuclide releases to the accessible environment and (2) the requirements specified in 10 CFR 60.113 for radionuclide releases from the engineered-barrier system using reasonably available technology.

(b) *Favorable Conditions.*

(1) The nature and rates of the geochemical processes operating within the geologic setting during the Quaternary Period would, if continued into the future, not affect or would favorably affect the ability of the geologic repository to isolate the waste during the next 100,000 years.

(2) Geochemical conditions that promote the precipitation, diffusion into the rock matrix, or sorption of radionuclides; inhibit the formation of particulates, colloids, inorganic complexes, or organic complexes that increase the mobility of radionuclides; or inhibit the transport of radionuclides by particulates, colloids, or complexes.

(3) Mineral assemblages that, when subjected to expected repository conditions, would remain unaltered or would alter to mineral assemblages with equal or increased capability to retard radionuclide transport.

(4) A combination of expected geochemical conditions and a volumetric flow rate of water in the host rock that would allow less than 0.001 percent per year of the total radionuclide inventory in the repository at 1,000 years to be dissolved.

(5) Any combination of geochemical and physical retardation processes that would decrease the predicted peak cumulative releases of radionuclides to the accessible environment by a factor of 10 as compared to those predicted on the basis of ground-water travel time without such retardation.

(c) *Potentially Adverse Conditions.*

(1) Ground-water conditions in the host rock that could affect the solubility or the chemical reactivity of the engineered- barrier system to the extent that the expected repository performance could be compromised.

(2) Geochemical processes or conditions that could reduce the sorption of radionuclides or degrade the rock strength.

(3) Pre-waste-emplacement ground-water conditions in the host rock that are chemically oxidizing.

§960.4-2-3 Rock characteristics.

(a) *Qualifying condition.* The present and expected characteristics of the host rock and surrounding units shall be capable of accommodating the thermal, chemical, mechanical, and radiation stresses expected to be induced by repository construction, operation, and closure and by expected interactions among the waste, host rock, ground water, and engineered components. The characteristics of and the processes operating within the geologic setting shall permit compliance with (1) the requirements specified in §960.4-1 for radionuclide releases to the accessible environment and (2) the requirements set forth in 10 CFR 60.113 for radionuclide releases from the engineered-barrier system using reasonably available technology.

(b) *Favorable Conditions.*

(1) A host rock that is sufficiently thick and laterally extensive to allow significant flexibility in selecting the depth, configuration, and location of the underground facility to ensure isolation.

(2) A host rock with a high thermal conductivity, a low coefficient of thermal expansion, or sufficient ductility to seal fractures induced by repository construction, operation, or closure or by interactions among the waste, host rock, ground water, and engineered components.

(c) *Potentially Adverse Conditions.*

(1) Rock conditions that could require engineering measures beyond reasonably available technology for the construction, operation, and closure of the repository, if such measures are necessary to ensure waste containment or isolation.

(2) Potential for such phenomena as thermally induced fractures, the hydration or dehydration of mineral components, brine migration, or other physical, chemical, or radiation-related phenomena that could be expected to affect waste containment or isolation.

(3) A combination of geologic structure, geochemical and thermal properties, and hydrologic conditions in the host rock and surrounding units such that the heat generated by the waste could significantly decrease the isolation provided by the host rock as compared with pre-waste-emplacement conditions.

§960.4-2-4 Climatic changes.

(a) *Qualifying Condition.* The site shall be located where future climatic conditions will not be likely to lead to radionuclide releases greater than those allowable under the requirements specified in §960.4-1. In predicting the likely future climatic conditions at a site, the DOE will consider the global, regional, and site climatic patterns during the Quaternary Period, considering the geomorphic evidence of the climatic conditions in the geologic setting.

(b) *Favorable Conditions.*

(1) A surface-water system such that expected climatic cycles over the next 100,000 years would not adversely affect waste isolation.

(2) A geologic setting in which climatic changes have had little effect on the hydrologic system throughout the Quaternary Period.

(c) *Potentially Adverse Conditions.*

(1) Evidence that the water table could rise sufficiently over the next 10,000 years to saturate the underground facility in a previously unsaturated host rock.

(2) Evidence that climatic changes over the next 10,000 years could cause perturbations in the hydraulic gradient, the hydraulic conductivity, the effective porosity, or the ground-water flux through the host rock and the surrounding geohydrologic units, sufficient to significantly increase the transport of radionuclides to the accessible environment.

§960.4-2-5 Erosion.

(a) *Qualifying Condition.* The site shall allow the underground facility to be placed at a depth such that erosional processes acting upon the surface will not be likely to lead to radionuclide releases greater than those allowable under the requirements specified in §960.4-1. In predicting the likelihood of potentially disruptive erosional processes, the DOE will consider the climatic, tectonic, and geomorphic evidence of rates and patterns of erosion in the geologic setting during the Quaternary Period.

(b) *Favorable Conditions.*

(1) Site conditions that permit the emplacement of waste at a depth of at least 300 meters below the directly overlying ground surface.

(2) A geologic setting where the nature and rates of the erosional processes that have been operating during the Quaternary Period are predicted to have less than one chance in 10,000 over the next 10,000 years of leading to releases of radionuclides to the accessible environment.

(3) Site conditions such that waste exhumation would not be expected to occur during the first one million years after repository closure.

(c) *Potentially Adverse Conditions.*

(1) A geologic setting that shows evidence of extreme erosion during the Quaternary Period.

(2) A geologic setting where the nature and rates of geomorphic processes that have been operating during the Quaternary Period could, during the first 10,000 years after closure, adversely affect the ability of the geologic repository to isolate the waste.

(d) *Disqualifying Condition.* The site shall be disqualified if site conditions do not allow all portions of the underground facility to be situated at least 200 meters below the directly overlying ground surface.

§960.4-2-6 Dissolution.

(a) *Qualifying Condition.* The site shall be located such that any subsurface rock dissolution will not be likely to lead to radionuclide releases greater than those allowable under the requirements specified in §960.4-1. In predicting the likelihood of dissolution within the geologic setting at a site, the DOE will consider the evidence of dissolution within that setting during the Quaternary Period, including the locations and characteristics of dissolution fronts or other dissolution features, if identified.

(b) *Favorable Condition.* No evidence that the host rock within the site was subject to significant dissolution during the Quaternary Period.

(c) *Potentially Adverse Condition.* Evidence of dissolution within the geologic setting—such as breccia pipes, dissolution cavities, significant

volumetric reduction of the host rock or surrounding strata, or any structural collapse—such that a hydraulic interconnection leading to a loss of waste isolation could occur.

(d) *Disqualifying Condition.* The site shall be *disqualified* if it is likely that, during the first 10,000 years after closure, active dissolution, as predicted on the basis of the geologic record, would result in a loss of waste isolation.

§960.4-2-7 Tectonics.

(a) *Qualifying Condition.* The site shall be located in a geologic setting where future tectonic processes or events will not be likely to lead to radionuclide releases greater than those allowable under the requirements specified in §960.4-1. In predicting the likelihood of potentially disruptive tectonic processes or events, the DOE will consider the structural, stratigraphic, geophysical, and seismic evidence for the nature and rates of tectonic processes and events in the geologic setting during the Quaternary Period.

(b) *Favorable Condition.* The nature and rates of igneous activity and tectonic processes (such as uplift, subsidence, faulting, or folding), if any, operating within the geologic setting during the Quaternary Period would, if continued into the future, have less than one chance in 10,000 over the first 10,000 years after closure of leading to releases of radionuclides to the accessible environment.

(c) *Potentially Adverse Conditions.*

(1) Evidence of active folding, faulting, diapirism, uplift, subsidence, or other tectonic processes or igneous activity within the geologic setting during the Quaternary Period.

(2) Historical earthquakes within the geologic setting of such magnitude and intensity that, if they recurred, could affect waste containment or isolation.

(3) Indications, based on correlations of earthquakes with tectonic processes and features, that either the frequency of occurrence or the magnitude of earthquakes within the geologic setting may increase.

(4) More-frequent occurrences of earthquakes or earthquakes of higher magnitude than are representative of the region in which the geologic setting is located.

(5) Potential for natural phenomena such as landslides, subsidence, or volcanic activity of such magnitudes that they could create large-scale surface-water impoundments that could change the regional ground-water flow system.

(6) Potential for tectonic deformations—such as uplift, subsidence, folding, or faulting—that could adversely affect the regional ground-water flow system.

(d) *Disqualifying Condition.* A site shall be disqualified if, based on the geologic record during the Quaternary Period, the nature and rates of fault movement or other ground motion are expected to be such that a loss of waste isolation is likely to occur.

§960.4-2-8 Human interference.

The site shall be located such that activities by future generations at or near the site will not be likely to affect waste containment and isolation. In assessing the likelihood of such activities, the DOE will consider the estimated effectiveness of the permanent markers and records required by 10 CFR Part 60, taking into account site-specific factors, as stated in 960.4-2-8-1 and 960.4-2-8-2, that could compromise their continued effectiveness.

§960.4-2-8-1 Natural resources.

(a) *Qualifying Condition.* This site shall be located such that—considering permanent markers and records and reasonable projections of value, scarcity, and technology—the natural resources, including ground water suitable for crop irrigation or human consumption without treatment, present at or near the site will not be likely to give rise to interference activities that would lead to radionuclide releases greater than those allowable under the requirements specified in §960.4-1.

(b) *Favorable Conditions.*

(1) No known natural resources that have or are projected to have in the foreseeable future a value great enough to be considered a commercially extractable resource.

(2) Ground water with 10,000 parts per million or more of total dissolved solids along any path of likely radionuclide travel from the host rock to the accessible environment.

(c) *Potentially Adverse Conditions.*

(1) Indications that the site contains naturally occurring materials, whether or not actually identified in such form that (i) economic extraction is potentially feasible during the foreseeable future or (ii) such materials have a greater gross value, net value, or commercial potential than the average for other areas of similar size that are representative of, and located in, the geologic setting.

(2) Evidence of subsurface mining or extraction for resources within the site if it could affect waste containment or isolation.

(3) Evidence of drilling within the site for any purpose other than repository-site evaluation to a depth sufficient to affect waste containment and isolation.

(4) Evidence of a significant concentration of any naturally occurring material that is not widely available from other sources.

(5) Potential for foreseeable human activities—such as ground-water withdrawal, extensive irrigation, subsurface injection of fluids, underground pumped storage, military activities, or the construction of large-scale surface-water impoundments—that could adversely change portions of the ground-water flow system important to waste isolation.

(d) *Disqualifying Conditions.* A site shall be disqualified if—

(1) Previous exploration, mining, or extraction activities for resources of commercial importance at the site have created significant pathways between the projected underground facility and the accessible environment; or

(2) Ongoing or likely future activities to recover presently valuable natural mineral resources outside the controlled area would be expected to lead to an inadvertent loss of waste isolation.

§960.4-2-8-2 Site ownership and control.

(a) *Qualifying Condition.* The site shall be located on land for which the DOE can obtain, in accordance with the requirements of 10 CFR Part 60, ownership, surface and subsurface rights, and control of access that are required in order that potential surface and subsurface activities as the site will not be likely to lead to radionuclide releases greater than those allowable under the requirements specified in §960.4-1.

(b) *Favorable Condition.* Present ownership and control of land and all surface and subsurface rights by the DOE.

(c) *Potentially Adverse Condition.* Projected land-ownership conflicts that cannot be successfully resolved through voluntary purchase-sell agreements, nondisputed agency-to-agency transfers of title, or Federal condemnation proceedings.

Subpart D—Preclosure Guidelines

§960.5 Preclosure guidelines.

The guidelines in this subpart specify the factors to be considered in evaluating and comparing sites on the basis of expected repository performance before closure. The preclosure guidelines are separated into three system guidelines and eleven technical guidelines.

§960.5-1 System guidelines.

(a) *Qualifying Conditions—*

(1) *Preclosure Radiological Safety.* Any projected radiological exposures of the general public and any projected releases of radioactive materials to restricted and unrestricted areas during repository operation and closure shall meet the applicable safety requirements set forth in 10 CFR Part 20, 10 CFR Part 60, and 40 CFR 191, Subpart A (see Appendix II of this part).

(2) *Environment, Socioeconomics, and Transportation.* During repository siting, construction, operation, closure, and decommissioning the public and the environment shall be adequately protected from the hazards posed by the disposal of radioactive waste.

(3) *Ease and Cost of Siting, Construction, Operation, and Closure.* Repository siting, construction, operation, and closure shall be demonstrated to be technically feasible on the basis of reasonably available technology, and the associated costs shall be demonstrated to be reasonable relative to other available and comparable siting options.

§960.5-2 Technical guidelines.

The technical guidelines in this subpart set forth qualifying, favorable, potentially adverse, and, in seven guidelines, disqualifying conditions for the characteristics, processes, and events that influence the suitability of a site relative to the preclosure system guidelines. These conditions

are separated into three main groups: Preclosure radiological safety; environment, socioeconomics, and transportation; and ease and cost of siting, construction, operation, and closure. The first group includes conditions on population density and distribution, site ownership and control, meteorology, and offsite installations and operations. The second group includes conditions related to environmental quality and socioeconomic impacts in areas potentially affected by a repository and to the transportation of waste to a repository site. The third group includes conditions on the surface characteristics of the site, the characteristics of the host rock and surrounding strata, hydrology, and tectonics. The individual technical guidelines within each group, as well as the favorable conditions and the potentially adverse conditions under each guideline, are not listed in any assumed order of importance. The technical guidelines that follow establish conditions that shall be considered in determining compliance with the qualifying conditions of the preclosure system guidelines. For each technical guideline, an evaluation of qualification or disqualification shall be made in accordance with the requirements specified in Subpart B.

Preclosure Radiological Safety

§960.5-2-1 Population density and distribution.

(a) *Qualifying Condition.* The site shall be located such that, during repository operation and closure, (1) the expected average radiation dose to members of the public within any highly populated area will not be likely to exceed a small fraction of the limits allowable under the requirements specified in §960.5-1(a)(1), and (2) the expected radiation dose to any member of the public in an unrestricted area will not be likely to exceed the limit allowable under the requirements specified in §960.5-1(a)(1).

(b) *Favorable Conditions.*

(1) A low population density in the general region of the site.

(2) Remoteness of site from highly populated areas.

(c) *Potentially Adverse Conditions.*

(1) High residential, seasonal, or daytime population density within the projected site boundaries.

(2) Proximity of the site to highly populated areas, or to areas having at least 1,000 individuals in an area 1 mile by 1 mile as defined by the most recent decennial count of the U.S. census.

(d) *Disqualifying Conditions.* A site shall be *disqualified* if—

(1) Any surface facility of a repository would be located in a highly populated area; or

(2) Any surface facility of a repository would be located adjacent to an area 1 mile by 1 mile having a population of not less than 1,000 individuals as enumerated by the most recent U.S. census; or

(3) The DOE could not develop an emergency preparedness program which meets the requirements specified in DOE Order 5500.3 (Reactor and Non-Reactor Facility Emergency Planning, Preparedness, and Response Program for Department of Energy Operations) and related guides or, when issued by the NRC, in 10 CFR Part 60, Subpart I, "Emergency Planning Criteria."

§960.5-2-2 Site ownership and control.

(a) *Qualifying Condition.* The site shall be located on land for which the DOE can obtain, in accordance with the requirements of 10 CFR 60.121, ownership, surface and subsurface rights, and control of access that are required in order that surface and subsurface activities during repository operation and closure will not be likely to lead to radionuclide releases to an unrestricted area greater than those allowable under the requirements specified in §960.5-1(a)(1).

(b) *Favorable Condition.* Present ownership and control of land and all surface and subsurface mineral and water rights by the DOE.

(c) *Potentially Adverse Condition.* Projected land-ownership conflicts that cannot be successfully resolved through voluntary purchase-sell agreements, nondisputed agency-to-agency transfers of title, or Federal condemnation proceedings.

§960.5-2-3 Meteorology.

(a) *Qualifying Condition.* The site shall be located such that expected meteorological conditions during repository operation and closure will not be likely to lead to radionuclide releases to an unrestricted area greater than those allowable under the requirements specified in §960.5-1(a)(1).

(b) *Favorable Condition.* Prevailing meteorological conditions such that any radioactive releases to the atmosphere during repository operation and closure would be effectively dispersed, thereby reducing significantly the likelihood of unacceptable exposure to any member of the public in the vicinity of the repository.

(c) *Potentially Adverse Conditions.*

(1) Prevailing meteorological conditions such that radioactive emissions from repository operation of closure could be preferentially transported toward localities in the vicinity of the repository with higher population densities than are the average for the region.

(2) History of extreme weather phenomena—such as hurricanes, tornadoes, severe floods, or severe and frequent winter storms—that could significantly affect repository operation or closure.

§960.5-2-4 Offsite installations and operations.

(a) *Qualifying Condition.* The site shall be located such that present projected effects from nearby industrial, transportation, and military installations and operations, including atomic energy defense activities, (1) will not significantly affect repository siting, construction, operation, closure, or decommissioning or can be accommodated by engineering measures and (2), when considered together with emissions from repository operation and closure, will not be likely to lead to radionuclide releases to an unrestricted area greater than those allowable under the requirements specified in §960.5-1(a)(1).

(b) *Favorable Condition.* Absence of contributing radioactive releases from other nuclear installations and operations that must be considered under the requirements of 40CFR 191, Subpart A.

(c) *Potentially Adverse Conditions.*

(1) The presence of nearby potentially hazardous installations or operations that could adversely affect repository operation or closure.

(2) Presence of other nuclear installations and operations, subject to the requirements of 40 CFR Part 190 or 40 CFR 191, Subpart A, with actual or projected releases near the maximum value permissible under those standards.

(d) *Disqualifying Condition.* A site shall be disqualified if atomic energy defense activities in proximity to the site are expected to conflict irreconcilably with repository siting, construction, operation, closure, or decommissioning.

Environment, Socioeconomics, and Transportation

§960.5-2-5 Environmental quality.

(a) *Qualifying Condition.* The site shall be located such that (1) the quality of the environment in the affected area during this and future generations will be adequately protected during repository siting, construction, operation, closure, and decommissioning, and projected environmental impacts in the affected area can be mitigated to an acceptable degree, taking into account programmatic, technical, social, economic, and environmental factors; and (2) the requirements specified in §960.5-1(a)(2) can be met.

(b) *Favorable Conditions.*

(1) Projected ability to meet, within time constraints, all Federal, State, and local procedural and substantive environmental requirements applicable to the site and the activities proposed to take place thereon.

(2) Potential significant adverse environmental impacts to present and future generations can be mitigated to an insignificant level through the application of reasonable measures, taking into account programmatic, technical, social, economic, and environmental factors.

(c) *Potentially Adverse Conditions.*

(1) Projected major conflict with applicable Federal, State, or local environmental requirements.

(2) Projected significant adverse environmental impacts that cannot be avoided or mitigated.

(3) Proximity to, or projected significant adverse environmental impacts of the repository or its support facilities on, a component of the National Park System, the National Wildlife Refuge System, the National Wild and Scenic Rivers System, the National Wilderness Preservation System, or National Forest Land.

(4) Proximity to, and projected significant adverse environmental impacts of the repository or its support facilities on, a significant State or regional protected resource area, such as a State park, a wildlife area, or a historical area.

(5) Proximity to, and projected significant adverse environmental impacts of the repository and its support facilities on, a significant Native American resource, such as a major Indian religious site, or other sites of unique cultural interest.

(6) Presence of critical habitats for threatened or endangered species that may be compromised by the repository or its support facilities.

(d) *Disqualifying Conditions.* Any of the following conditions shall *disqualify* a site:

(1) During repository siting, construction, operation, closure, or decommissioning the quality of the environment in the affected area could not be adequately protected or projected environmental impacts in the affected area could not be mitigated to an acceptable degree, taking into account programmatic, technical, social, economic, and environmental factors.

(2) Any part of the restricted area or repository support facilities would be located within the boundaries of a component of the National Park System, the National Wildlife Refuge System, the National Wilderness Preservation System, or the National Wild and Scenic Rivers System.

(3) The presence of the restricted area or the repository support facilities would conflict irreconcilably with the previously designated resource-preservation use of a component of the National Park System, the National Wildlife Refuge System, the National Wilderness Preservation System, the National Wild and Scenic Rivers System, or National Forest Lands, or any comparably significant State protected resource that was dedicated to resource preservation at the time of the enactment of the Act.

§960.5-2-6 Socioeconomic impacts.

(a) *Qualifying Condition.* The site shall be located such that (1) any significant adverse social and/or economic impacts induced in communities and surrounding regions by repository siting, construction, operation, closure, and decommissioning can be offset by reasonable mitigation or compensation, as determined by a process of analysis, planning, and consultation among the DOE, affected State and local government jurisdictions, and affected Indian tribes; and (2) the requirements specified in §960.5-1(a)(2) can be met.

(b) *Favorable Conditions*

(1) Ability of an affected area to absorb the project-related population changes without significant disruptions of community services and without significant impacts on housing supply and demand.

(2) Availability of an adequate labor force in the affected area.

(3) Projected net increases in employment and business sales, improved community services, and increased government revenues in the affected area.

(4) No projected substantial disruption of primary sectors of the economy of the affected area.

(c) *Potentially Adverse Conditions.*

(1) Potential for significant repository-related impacts on community services, housing supply and demand, and the finances of State and local government agencies in the affected area.

(2) Lack of an adequate labor force in the affected area.

(3) Need for repository-related purchase or acquisition of water rights, if such rights could have significant adverse impacts on the present or future development of the affected area.

(4) Potential for major disruptions of primary sectors of the economy of the affected area.

(d) *Disqualifying Condition.* A site shall be disqualified if repository construction, operation, or closure would significantly degrade the quality, or significantly reduce the quantity, of water from major sources of offsite supplies presently suitable for human consumption or crop irrigation and such impacts cannot be compensated for, or mitigated by, reasonable measures.

§960.5-2-7 Transportation.

(a) *Qualifying Condition.* The site shall be located such that (1) the access routes constructed from existing local highways and railroads to the site (i) will not conflict irreconcilably with the previously designated use of any resource listed in §960.5-2-5(d) (2) and (3); (ii) can be designed and constructed using reasonably available technology; (iii) will not require transportation system components to meet performance standards more stringent than those specified in the applicable DOT and NRC regulations, nor require the development of new packaging containment technology; (iv) will allow transportation operations to be conducted without causing an unacceptable risk to the public or unacceptable environmental impacts, taking into account programmatic, technical, social, economic, and environmental factors; and (2) the requirements of §960.5-1(a)(2) can be met.

(b) *Favorable Conditions.*

(1) Availability of access routes from local existing highways and railroads to the site which have any of the following characteristics:

(i) Such routes are relatively short and economical to construct as compared to access routes for other comparable siting options.

(ii) Federal condemnation is not required to acquire rights-of-way for the access routes.

(iii) Cuts, fills, tunnels, or bridges are not required.

(iv) Such routes are free of sharp curves or steep grades and are not likely to be affected by landslides or rock slides.

(v) Such routes bypass local cities and towns.

(2) Proximity to local highways and railroads that provide access to regional highways and railroads and are adequate to serve the repository without significant upgrading or reconstruction.

(3) Proximity to regional highways, mainline railroads, or inland waterways that provide access to the national transportation system.

(4) Availability of a regional railroad system with a minimum number of interchange points at which train crew and equipment changes would be required.

(5) Total projected life-cycle cost and risk for transportation of all wastes designated for the repository site which are significantly lower than those for comparable siting options, considering locations of present and potential sources of waste, interim storage facilities, and other repositories.

(6) Availability of regional and local carriers—truck, rail, and water—which have the capability and are willing to handle waste shipments to the repository.

(7) Absence of legal impediment with regard to compliance with Federal regulations for the transportation of waste in or through the affected State and adjoining States.

(8) Plans, procedures, and capabilities for response to radioactive waste transportation accidents in the affected State that are completed or being developed.

(9) A regional meteorological history indicating that significant transportation disruptions would not be routine seasonal occurrences.

(c) *Potentially Adverse Conditions.*

(1) Access routes to existing local highways and railroads that are expensive to construct relative to comparable siting options.

(2) Terrain between the site and existing local highways and railroads such that steep grades, sharp switchbacks, rivers, lakes, landslides, rock slides, or potential sources of hazard to incoming waste shipments will be encountered along access routes to the site.

(3) Existing local highways and railroads that could require significant reconstruction or upgrading to provide adequate routes to the regional and national transportation system.

(4) Any local condition that could cause the transportation-related costs, environmental impacts, or risk to public health and safety from waste transportation operations to be significantly greater than those projected for other comparable siting options.

Ease and Cost of Siting, Construction, Operation, and Closure

§960.5-2-8 Surface characteristics.

(a) *Qualifying Condition.* The site shall be located such that, considering the surface characteristics and conditions of the site and

surrounding area, including surface-water systems and the terrain, the requirements specified in §960.5-1(a)(3) can be met during repository siting, construction, operation, and closure.

(b) *Favorable Conditions.*

(1) Generally flat terrain.

(2) Generally well-drained terrain.

(c) *Potentially Adverse Condition.* Surface characteristics that could lead to the flooding of surface or underground facilities by the occupancy and modification of flood plains, the failure of existing or planned man-made surface-water impoundments, or the failure of engineered components of the repository.

§960.5-2-9 Rock characteristics.

(a) *Qualifying Condition.* The site shall be located such that (1) the thickness and lateral extent and the characteristics and composition of the host rock will be suitable for accommodation of the underground facility; (2) repository construction, operation, and closure will not cause undue hazard to personnel; and (3) the requirements specified in §960.5-1(a)(3) can be met.

(b) *Favorable Conditions.*

(1) A host rock that is sufficiently thick and laterally extensive to allow significant flexibility in selecting the depth, configuration, and location of the underground facility.

(2) A host rock with characteristics that would require minimal or no artificial support for underground openings to ensure safe repository construction, operation, and closure.

(c) *Potentially Adverse Conditions.*

(1) A host rock that is suitable for repository construction, operation, and closure, but is so thin or laterally restricted that little flexibility is available for selecting the depth, configuration, or location of an underground facility.

(2) In situ characteristics and conditions that could require engineering measures beyond reasonably available technology in the construction of the shafts and underground facility.

(3) Geomechanical properties that could necessitate extensive maintenance of the underground openings during repository operation and closure.

(4) Potential for such phenomena as thermally induced fracturing, the hydration and dehydration of mineral components, or other physical, chemical, or radiation-related phenomena that could lead to safety hazards or difficulty in retrieval during repository operation.

(5) Existing faults, shear zones, pressurized brine pockets, dissolution effects, or other stratigraphic or structural features that could compromise the safety of repository personnel because of water inflow or construction problems.

(d) *Disqualifying Condition.* The site shall be disqualified if the rock characteristics are such that the activities associated with repository construction, operation, or closure are predicted to cause significant risk to the health and safety of personnel, taking into account mitigating measures that use reasonably available technology.

§960.5-2-10 Hydrology.

(a) *Qualifying Condition.* The site shall be located such that the geohydrologic setting of the site will (1) be compatible with the activities required for repository construction, operation, and closure; (2) not compromise the intended functions of the shaft liners and seals; and (3) permit the requirements specified in §960.5-1(a)(3) to be met.

(b) *Favorable Conditions.*

(1) Absence of aquifers between the host rock and the land surface.

(2) Absence of surface-water systems that could potentially cause flooding of the repository.

(3) Availability of the water required for repository construction, operation, and closure.

(c) *Potentially Adverse Condition.* Ground-water conditions that could require complex engineering measures that are beyond reasonably available technology for repository construction, operation, and closure.

(d) *Disqualifying Condition.* A site shall be disqualified if, based on expected ground-water conditions, it is likely that engineering measures that are beyond reasonably available technology will be required for exploratory-shaft construction or for repository construction, operation, or closure.

§960.5-2-11 Tectonics.

(a) *Qualifying Conditions.* The site shall be located in a geologic setting in which any projected effects of expected tectonic phenomena or igneous activity on repository construction, operation, or closure will be such that the requirements specified in §960.5-1(a)(3) can be met.

(b) *Favorable Condition.* The nature and rates of faulting, if any, within the geologic setting are such that the magnitude and intensity of the associated seismicity are significantly less than those generally allowable for the construction and operation of nuclear facilities.

(c) *Potentially Adverse Conditions.*

(1) Evidence of active faulting within the geologic setting.

(2) Historical earthquakes or past man-induced seismicity that, if either were to recur, could produce ground motion at the site in excess of reasonable design limits.

(3) Evidence, based on correlations of earthquakes with tectonic processes and features, (e.g., faults) within the geologic setting, that the magnitude of earthquakes at the site during repository construction, operation, and closure may be larger then predicted from historical seismicity.

(d) *Disqualifying Condition.* A site shall be disqualified if, based on the expected nature and rates of fault movement or other ground motion, it is likely that engineering measures that are beyond reasonably available technology will be required for exploratory-shaft construction or for repository construction, operation, or closure.

Appendix I—NRC and EPA Requirements for Postclosure Repository Performance

Under proposed 40 CFR Part 191, Subpart B—*Environmental Standards for Disposal,* §191.13, "Containment Requirements", specifies that for 10,000 years after disposal (a) releases of radioactive materials to the accessible environment that are estimated to have more than one chance in 100 of occurring over a 10,000 year period ("reasonably foreseeable releases") shall be projected to be less than the quantities permitted by Table 2 of that regulation's Appendix; and (b) for "very unlikely releases" (i.e., those estimated to have between one chance in 100 and one chance in 10,000 of occurring over a 10,000 year period), the limits specified in Table 2 would be multiplied by 10. The basis for Table 2 is an upper limit on long term risks of 1,000 health effects over 10,000 years for a repository containing wastes generated from 100,000 metric tons of heavy metal of reactor fuel. For releases involving more than one radionuclide, the allowed release for each radionuclide is reduced to the fraction of its limit that insures that the overall limit on harm is not exceeded. Additionally, to provide confidence needed for compliance with the containment requirements specified above, §191.14, "Assurance Requirements", specifies the disposal of radioactive waste in accordance with seven requirements, relating to prompt disposal of waste; selection and design of disposal systems to keep releases to the accessible environment as small as reasonably achievable; engineered and natural barriers; nonreliance on active institutional controls after closure; passive controls after closure; natural resource areas; and design of disposal systems to allow future recovery of wastes.

The guidelines will be revised as necessary after the adoption of final regulations by the EPA.

The implementation of 40 CFR Part 191, Subpart B is required by 10 CFR 60.112. 10 CFR 60.113 establishes minimum conditions to be met for engineered components and ground-water flow; specifically:

(1) Containment of radioactive waste within the waste packages will be substantially complete for a period to be determined by the NRC taking into account the factors specified in 10 CFR 60.113(b) provided that such period shall be not less than 300 years nor more than 1,000 years after permanent closure of the geologic repository;

(2) the release rate of any radionuclide from the engineered barrier system following the containment period shall not exceed one part in 100,000 per year of the inventory of that radionuclide calculated to be present at 1,000 years following permanent closure, or such other fraction of the inventory as may be approved or specified by the NRC, provided that this requirement does not apply to any radionuclide which is released at a rate less than 0.1% of the

calculated total release rate limit. The calculated total release rate limit shall be taken to be one part in 100,000 per year of the inventory of radioactive waste originally emplaced in the underground facility that remains after 1,000 years of radioactive decay; and

(3) the geologic repository shall be located so that pre-waste-emplacement ground-water travel time along the fastest path of likely radionuclide travel from the disturbed zone to the accessible environment shall be at least 1,000 years or such other travel time as may be approved or specified by the NRC.

The guidelines will be revised as necessary to ensure consistency with 10 CFR Part 60.

Appendix II—NRC and EPA Requirements for Preclosure Repository Performance

Under proposed 40 CFR Part 191, Subpart A—*Environmental Standards for Management and Storage,* Section 191.03, "Standards for Normal Operations", specifies:

(1) That operations should be conducted so as to reduce exposure to members of the public to the extent reasonably achievable, taking into account technical, social, and economic considerations; and

(2) that, except for variances permitted for unusual operations under Section 191.04 as an upper limit, normal operations shall be conducted in such a manner as to provide reasonable assurance that the combined annual dose equivalent to any member of the public due to:

(i) operations covered by 40 CFR Part 190,

(ii) planned discharges of radioactive material to the general environment from operations covered by this Subpart, and

(iii) direct radiation from these operations; shall not exceed 25 millirems to the whole body, 75 millirems to the thyroid, or 25 millirems to any other organ.

The guidelines will be revised as necessary after the adoption of final regulations by the EPA.

The implementation of 40 CFR Part 191, Subpart A and 10 CFR Part 20 is required by 10 CFR 60.111. 10 CFR 60.111 also specifies requirements for waste retrieval, if necessary, including considerations of design, backfilling, and schedule. 10 CFR Part 20 establishes (a) exposure limits for operating personnel and (b) permissible concentrations of radionuclides in uncontrolled areas for air and water. The latter are generally less restrictive than 40 CFR 191, Subpart A, but may be limiting under certain conditions (i.e., if used as a maximum for short durations rather than annual averages).

The guidelines will be revised as necessary to ensure consistency with 10 CFR Part 60.

Appendix III—Application of the System and Technical Guidelines dsuring the Siting Process

1. This appendix presents a table that specifies how the guidelines of Subparts C and D are to be applied at the principal decision points of the siting process. The decision points, as referenced in the table, are defined as follows:

"Potentially acceptable" means the decision point at which a site is identified as potentially acceptable.

"Nomination and recommendation" means the decision point at which a site is nominated as suitable for characterization or recommended as a candidate site for characterization.

"Repository site selection" means the decision point at which a site is recommended for the development of a repository.

2. The findings resulting from the application of a disqualifying condition for any particular guideline at a given decision point are denoted in the table by the numeral 1 or 2. The numerals 1 and 2 signify the types of findings that are required and are defined as follows:

"1" means *either* of the following:

(a) The evidence does *not* support a finding that the site is disqualified.

or

(b) The evidence supports a finding that the site is disqualified.

"2" means *either* of the following:

(a) The evidence supports a finding that the site is *not* disqualified on the basis of that evidence and is *not* likely to be disqualified.

or

(b) The evidence supports a finding that the site is disqualified or is likely to be disqualified.

3. The findings resulting from the application of a qualifying condition for any particular guideline at a given decision point are denoted in the table by the numeral 3 or 4. The numerals 3 and 4 signify the types of findings that are required and are defined as follows:

"3" means *either* of the following:

(a) The evidence does *not* support a finding that the site is *not* likely to meet the qualifying condition.

or

(b) The evidence supports a finding that the site is *not* likely to meet the qualifying condition, and therefore the site is disqualified.

"4" means *either* of the following:

(a) The evidence supports a finding that the site meets the qualifying condition and is likely to continue to meet the qualifying condition.

or

(b) The evidence supports a finding that the site cannot meet the qualifying condition or is unlikely to be able to meet the qualifying condition, and therefore the site is disqualified.

4. If performance assessments are used to substantiate any of the above findings, those assessments shall include estimates of the effects of uncertainties in data and modeling.

FINDINGS RESULTING FROM THE APPLICATION OF THE QUALIFYING AND DISQUALIFYING CONDITIONS OF THE TECHNICAL GUIDELINES AT MAJOR SITING DECISIONS

Section 960	Guideline	Condition	Siting decision		
			Potentially acceptable	Nomination and recommendation	Repository site selection
4-1(a)	System	Qualifying		3	4
4-2-1(a)	Geohydrology	do		3	4
4-2-1(b)	do	Disqualifying		1	2
4-2-2(a)	Geochemistry	Qualifying		3	4
4-2-3(a)	Rock Characteristics	do		3	4
4-2-4(a)	Climatic Changes	do		3	4
4-2-5(a)	Erosion	do		3	4
4-2-5(d)	do	Disqualifying	1	1	2
4-2-6(a)	Dissolution	Qualifying		3	4
4-2-6(d)	do	Disqualifying	1	1	2
4-2-7(a)	Tectonics	Qualifying		3	4
4-2-7(d)	do	Disqualifying	1	1	2
4-2-8-1(a)	Natural Resources	Qualifying		3	4
4-2-8-1(d)(1)	do	Disqualifying	1	1	2
4-2-8-1(d)(2)	do	do		1	2
4-2-8-2(a)	Site Ownership and Control	Qualifying		3	4
5-1(a)(1)	System	do	do	do	
5-1(a)(2)	do	do		3	4
5-1(a)(3)	Population Density and Distribution	do		3	4
5-2-1(d)(1)	do	Disqualifying	1	1	2
5-2-1(d)(2)	do	do	1	1	2
5-2-1(d)(3)	do	do		1	2

FINDINGS RESULTING FROM THE APPLICATION OF THE QUALIFYING AND DISQUALIFYING CONDITIONS OF THE TECHNICAL GUIDELINES AT MAJOR SITING DECISIONS

Section 960	Guideline	Condition	Siting decision		
			Potentially acceptable	Nomination and recommendation	Repository site selection
5-2-2(a)	Site Ownership and Control	Qualifying	.....	3	4
5-2-3(a)	Meteorology	do	.....	3	4
5-2-4(a)	Offsite Installations and Operations	do	.....	3	4
5-2-4(d)	do	Disqualifying	1	1	2
5-2-5(a)	Environmental Quality	Qualifying	.....	3	4
5-2-5(d)(1)	do	Disqualifying	.....	1	2
5-2-5(d)(2)	do	do	1	1	2
5-2-5(d)(3)	do	do	1	1	2
5-2-6(a)	Socioeconomic Impacts	Qualifying	.....	3	4
5-2-6(d)	do	Disqualifying	.....	1	2
5-2-7(a)	Transportation	Qualifying	.....	3	4
5-2-8(a)	Surface Characteristics	do	.....	3	4
5-2-9(a)	Rock Characteristics	do	.....	3	4
5-2-9(d)	do	Disqualifying	.....	1	2
5-2-10(a)	Hydrology	Qualifying	.....	3	4
5-2-10(d)	do	Disqualifying	.....	1	2
5-2-11(a)	Tectonics	Qualifying	.....	3	4
5-2-11(d)	do	Disqualifying	1	1	2

5. For both the disqualifying and qualifying conditions of any guideline, a higher finding (e.g., a "2" finding rather than "1") shall be made if there is sufficient evidence to support such a finding.

Appendix IV—Types of Information for the Nomination of Sites as Suitable for Characterization

The types of information specified below are those that the DOE expects will be included in the evidence used for evaluations and applications of the guidelines of Subparts C and D at the time of nomination of a site as suitable for characterization. The types of information listed under each guideline are considered to be the most significant for the evaluation of that guideline. However, the types of information listed under any particular guideline will be used, as necessary, for the evaluation of any other guideline. As stated in §960.3-1-4-2, the DOE will use technically conservative assumptions or extrapolations of regional data, where necessary, to supplement this information. The information specified below will be supplemented with conceptual models, as appropriate, and analyses of uncertainties in the data.

Before site-characterization studies and related nongeologic data gathering activities, the evidence is not expected to provide precise information, but, rather, to provide a reasonable basis for assessing the merits or shortcomings of the site against the guidelines of Subparts C and D. Consequently, the types of information described below should be interpreted so as to accommodate differences among sites and differences in the information acquired before detailed studies.

The specific information required for the guideline applications set forth in Appendix III of this Part is expected to differ from site to site because of site-specific factors, both with regard to favorable and potentially adverse conditions and with regard to the sources and reliability of the information. The types of information specified in this appendix will be used except where the findings set forth in Appendix III of this part can be arrived at by reasonable alternative means or the information is not required for the particular site.

Section 960.4-2-1 Geohydrology.

Description of the geohydrologic setting of the site, in context with its geologic setting, in order to estimate the pre-waste-emplacement ground-water flow conditions. The types of information to support this description should include—

- Location and estimated hydraulic properties of aquifers, confining units, and aquitards.
- Potential areas and modes of recharge and discharge for aquifers.
- Regional potentiometric surfaces of aquifers.
- Likely flow paths from the repository to locations in the expected accessible environment, as based on regional data.
- Preliminary estimates of ground-water travel times along the likely flow paths from the repository to locations in the expected accessible environment.
- Current use of principal aquifers and State or local management plans for such use.

Section 960.4-2-2 Geochemistry.

Description of the geochemical and hydrochemical conditions of the host rock, of the surrounding geohydrologic units, and along likely ground-water paths to locations in the expected accessible environment, in order to estimate the potential for the migration of radionuclides. The types of information to support this description should include—

- Petrology of the rocks.
- Mineralogy of the rocks and general characteristics of fracture fillings.
- Geochemical and mechanical stability of the minerals under expected repository conditions.
- General characteristics of the ground-water chemistry (e.g., reducing/oxidizing conditions and the principal ions that may affect the waste package or radionuclide behavior).
- Geochemical properties of minerals as related to radionuclide transport.

Section 960.4-2-3 Rock characteristics.

Description of the geologic and geomechanical characteristics of the site, in context with the geologic setting, in order to estimate the capability of the host rock and surrounding rock units to accommodate the thermal, mechanical, chemical, and radiation stresses expected to be induced by repository construction, operation, and closure and by expected interactions among the waste, host rock, ground-water, and engineered components of the repository system. The types of information to support this description should include—

- Approximate geology and stratigraphy of the site, including the depth, thickness, and lateral extent of the host rock and surrounding rock units.
- Approximate structural framework of the rock units and any major discontinuities identified from core samples.
- Approximate thermal, mechanical, and thermomechanical properties of the rocks, with consideration of the effects of time, stress, temperature, dimensional scale, and any major identified structural discontinuities.
- Estimates of the magnitude and direction of in situ stress and of

temperature in the host rock and surrounding rock units.

Section 960.4-2-4 Climatic changes.

Description of the climatic conditions of the site region, in context with global and regional patterns of climatic changes during the Quaternary Period, in order to project likely future changes in climate such that potential impacts on the repository can be estimated. The types of information to support this description should include—

- Expected climatic conditions and cycles, based on extrapolation of climates during the Quaternary Period.
- Geomorphology of the site region and evidence of changes due to climatic changes.
- Estimated effects of expected climatic cycles on the surface-water and the ground-water systems.

Section 960.4-2-5 Erosion.

Description of the structure, stratigraphy, and geomorphology of the site, in context with the geologic setting, in order to estimate the depth of waste emplacement and the likelihood for erosional processes to uncover the waste in less than one million years. The types of information to support this description should include—

- Depth, thickness, and lateral extent of the host rock and the overlying rock units.
- Lithology of the stratigraphic units above the host rock.

Nature and rates of geomorphic processes during the Quaternary Period.

Section 960.4-2-6 Dissolution.

Description of the stratigraphy, structure, hydrology, and geochemistry of the site, in context with the geologic setting, to delineate the approximate limits of subsurface rock dissolution, if any. This description should include such information as the following:

- The stratigraphy of the site, including rock units largely comprised of water-soluble minerals.
- The approximate extent and configuration of features indicative of dissolution within the geologic setting.

Section 960.4-2-7 Tectonics.

Description of the tectonic setting of the site, in context with its geologic setting, in order to project the tectonic stability of the site over the next 10,000 years and to identify tectonic features and processes that could be reasonably expected to have a potentially adverse effect on the performance of the repository. The types of information to support this description should include—

- The tectonic history and framework of the geologic setting and the site.
- Quaternary faults in the geologic setting, including their length, displacement, and any information regarding the age of latest movement.
- Active tectonic processes, such as uplift, diapirism, tilting, subsidence, faulting, and volcanism.
- Estimate of the geothermal gradient.
- Estimate of the regional in situ stress field.
- The historical seismicity of the geologic setting.

Section 960.4-2-8 Human interference.

Section 960.4-2-8-1 Natural resources.

Description of the mineral and energy resources of the site, in order to project whether past or future exploration and recovery could have a potentially adverse effect on the performance of the repository. The types of information to support this description should include—

- Known occurrences of energy and mineral resources, including ground water.
- Estimates of the present and projected value of these resources compared with resources contained in other areas of similar size in the geologic setting.
- Past and present drilling and mining operations in the vicinity of the site.

Section 960.4-2-8-2 Site ownership and control.

Description of the ownership of land for the geologic-repository operations area and the controlled area, in order to evaluate whether the DOE can obtain ownership of, and control access to, the site. The types of information to support this description should include—

- Present land ownership.

Section 960.5-2-1 Population density and distribution.

Description of the population density and distribution of the site region, in order to identify highly populated areas and the nearest 1 mile by 1 mile area having a population greater than 1,000 persons. The types of information to support this description should include—

- The most-recent U.S. census, including population composition, distribution, and density.

Section 960.5-2-2 Site ownership and control.

Description of current ownership of land, including surface and subsurface mineral and water rights, in order to evaluate whether the DOE can obtain control of land within the projected restricted area. The types of information to support this description should include—

- Present land ownership.

Section 960.5-2-3 Meteorology.

The meteorological setting, as determined from the closest recording station, in order to project meteorological conditions during repository operation and closure and their potential effects on the transport of airborne emissions. The types of information to support this description should include—

- Wind and atmospheric-dispersion characteristics.
- Precipitation characteristics.
- Extreme weather phenomena.

Section 960.5-2-4 Offsite installations and operations.

Description of offsite installations and operations in the vicinity of the site in order to estimate their projected effects on repository construction, operation, or closure. The types of information to support this description should include—

- Location and nature of nearby industrial, transportation, and military installations and operations, including atomic energy defense activities.

Section 960.5-2-5 Environmental quality.

Description of environmental conditions in order to estimate potential impacts on public health and welfare and on environmental quality. The types of information to support this description should include—

- Applicable Federal, State, and local procedural and substantive environmental requirements.
- Existing air quality and trends.
- Existing surface-water and ground-water quality and quantity.
- Existing land resources and uses.
- Existing terrestrial and aquatic vegetation and wildlife.
- Location of any identified critical habitats for threatened or endangered species.
- Existing aesthetic characteristics.
- Location of components of the National Park System, the National Wildlife Refuge System, the National Wild and Scenic Rivers System, the National Wilderness Preservation System, or National Forest Land.
- Location of significant State or regional protected resource areas, such as State parks, wildlife areas, or historical areas.
- Location of significant Native American resources such as major Indian religious sites, or other sites of unique cultural interest.

Section 960.5-2-6 Socioeconomic impacts.

Description of the socioeconomic conditions of the site, including population density and distribution, economics, community services and facilities, social conditions, and fiscal and government structure, in order to estimate the impacts that might result from site characterization and from the development of a repository at that site. The types of information to support this description should include—

- Population composition, density, and distribution.
- Economic base and economic activity, including major sectors of local economy.
- Employment distribution and trends by economic sector.
- Resource usage.
- Community services and infrastructure, including trends in use and current capacity utilization.
- Housing supply and demand.
- Life style and indicators of the quality of life.
- Existing social problems.
- Sources of, and trends in, local government expenditures and revenues.

Section 960.5-2-7 Transportation.

Description of the transportation facilities in the vicinity of the site in order to evaluate existing or required access routes or improvements. The types of information to support this description should include—

- Estimates of the overall cost and risk of transporting waste to the site.
- Description of the road and rail network between the site and the nearest Interstate highways and major rail lines; also, description of the waterway system, if any.
- Analyses of the adequacy of the existing regional transportation network to handle waste shipments; the movement of supplies for repository construction, operation, and closure; removal of nonradioactive waste from the site; and the transportation of the labor force.
- Improvements anticipated to be required in the transportation network and their feasibility, cost, and environmental impacts.
- Compatibility of the required transportation network improvements with the local and regional transportation and land-use plans.
- Analysis of weather impacts on transportation.

Analysis of emergency response requirements and capabilities related to transportation.

Section 960.5-2-8 Surface characteristics.

Description of the surface characteristics of the site, in order to evaluate whether repository construction, operation, and closure are feasible on the basis of site characteristics that influence those activities. The types of information to support this description should include—

- Topography of the site.
- Existing and planned surface bodies of water.
- Definition of areas of landslides and other potentially unstable slopes, poorly drained material, or materials of low bearing strength or of high liquefaction potential.

Section 960.5-2-9 Rock characteristics.

Description of the geologic and geomechanical characteristics of the site, in context with the geologic setting, in order to project the capability of the host rock and the surrounding rock units to provide the space required for the underground facility and safe underground openings during repository construction, operation, and closure. The types of information to support this description should include—

- Depth, thickness, and lateral extent of the host rock.
- Stratigraphic and structural features within the host rock and adjacent rock units.
- Thermal, mechanical, and thermomechanical properties and constructibility characteristics of the rocks, with consideration of the effects of time, stress, temperature, dimensional scale, and any major identified structural discontinuities.
- Fluid inclusions and gas content in the host rock.
- Estimates of the magnitude and direction of in situ stress and of temperature in the host rock.

Section 960.5-2-10 Hydrology.

Description of the hydrology of the site, in context with its geologic setting, in order to project compatibility with repository construction, operation, and closure. The types of information to support this description should include—

- Surface-water systems, including recharge and runoff characteristics, and potential for flooding of the repository.
- Nature and location of aquifers, confining units, and aquitards.
- Potentiometric surfaces of aquifers.
- Hydraulic properties of geohydrologic units.

Section 960.5-2-11 Tectonics.

Description of the tectonic setting of the site, in context with the regional setting, in order to estimate any expected effects of tectonic activity on repository construction, operation, or closure. The types of information to support this description should include—

- Quaternary faults.
- Active tectonic processes.
- Preliminary estimates of expected ground motion caused by the maximum potential earthquake within the geologic setting.

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10 CFR 961

PART 961—STANDARD CONTRACT FOR DISPOSAL OF SPENT NUCLEAR FUEL AND/OR HIGH-LEVEL RADIOACTIVE WASTE

Subpart A—General

Sec.
961.1 Purpose.
961.2 Applicability.
961.3 Definitions.
961.4 Deviations.
961.5 Federal agencies.

Subpart B—Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste

961.11 Text of the contract.

Authority: Sec. 644, Pub. L. 95-91, 91 Stat. 599 (42 U.S.C. 7254) and sec. 302, Pub. L. 97-425, 96 Stat. 2257 (42 U.S.C. 10222).

Source: 48 FR 16599, Apr. 18, 1983, unless otherwise noted.

Subpart A—General

§961.1 Purpose.

This part establishes the contractual terms and conditions under which the Department of Energy (DOE) will make available nuclear waste disposal services to the owners and generators of spent nuclear fuel (SNF) and high-level radioactive waste (HLW) as provided in section 302 of the Nuclear Waste Policy Act of 1982 (Pub. L. 97-425). Under the contract set forth in §961.11 of this part, DOE will take title to, transport, and dispose of spent nuclear fuel and/or high-level radioactive waste delivered to DOE by those owners or generators of such fuel or waste who execute the contract. In addition, the contract will specify the fees owners and generators of SNF and/or HLW will pay for these services. All receipts, proceeds, and revenues realized by DOE under the contract will be deposited in the Nuclear Waste Fund, an account established by the Act in the U.S. Treasury. This fund will pay for DOE's radioactive waste disposal activities, the full costs of which will be borne by the owners and generators under contract with DOE for disposal services.

§961.2 Applicability.

This part applies to the Secretary of Energy or his designee and any person who owns or generates spent nuclear fuel or high-level radioactive waste, of domestic origin, generated in a civilian nuclear power reactor. If executed in a timely manner, the contract contained in this part will commit DOE to accept title to, transport, and dispose of such spent fuel and waste. In exchange for these services, the owners or generators of such fuel or waste shall pay fees specified in the contract which are intended to recover fully the costs of the disposal services to be furnished by DOE. The contract must be signed by June 30, 1983, or by the date on which such owner or generator commences generation of, or takes title to, such spent fuel or waste, whichever occurs later.

§961.3 Definitions.

For purposes of this part—

"Act" means the Nuclear Waste Policy Act of 1982, Pub. L. 97-425, 96 Stat. 2201 *et seq.*, 42 U.S.C. 10101 *et seq.*

"Contract" means the agreement set forth in §961.11 of this part and any duly executed amendment or modification thereto.

"Generator" means any person who is licensed by the Nuclear Regulatory Commission to use a utilization or production facility under the authority of section 103 or 104 of the Atomic Energy Act of 1954 (42 U.S.C. 2133, 2134).

"Owner" means any person who has title to spent nuclear fuel or high-level radioactive waste.

"Purchaser" means any person, other than a Federal agency, who is licensed by the Nuclear Regulatory Commission to use a utilization or production facility under the authority of sections 103 or 104 of the Atomic Energy Act of 1954 (42 U.S.C. 2133, 2134) or who has title to spent nuclear fuel or high level radioactive waste and who has executed a contract with DOE.

"Secretary" means the Secretary of Energy of his designee.

Other definitions relating to the subject matter of this rule are set forth in Article II of the contract which is contained in §961.11, Text of the contract, of this part.

§961.4 Deviations.

Requests for authority to deviate from this part shall be submitted in writing to the Contracting Officer, who shall forward the request for approval to the Senior Procurement Official, Headquarters. Each request for deviation shall contain the following information:

(a) A statement of the deviation desired, including identification of the specific paragraph number(s) of the contract;

(b) A description of the intended effect of the deviation;

(c) The reason why the deviation is considered necessary or would be in the best interests of the Government;

(d) The name of the owner or generator seeking the deviation and nuclear power reactor(s) affected;

(e) A statement as to whether the deviation has been requested previously and, if so, circumstances of the previous request;

(f) A statement of the period of time for which the deviation is needed; and

(g) Any pertinent background information will contribute to a full understanding of the desired deviation.

§961.5 Federal agencies.

Federal agencies or departments requiring DOE's disposal services for SNF and/or HLW will be accommodated by a suitable interagency agreement reflecting, as appropriate, the terms and conditions set forth in the contract in §961.11; *Provided, however,* that the fees to be paid by Federal agencies will be equivalent to the fees that would be paid under the contract.

Subpart B—Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste

§961.11 Text of the contract.

The text of the standard contract for disposal of spent nuclear fuel and/or high/level radioactive waste follows:

U.S. Department of Energy Contract No.

——

Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste

THIS CONTRACT, entered into this __ day of _____ 19__, by and between the UNITED STATES OF AMERICA (hereinafter referred to as the "Government"), represented by the UNITED STATES DEPARTMENT OF ENERGY (hereafter referred to as "DOE") and _____, (hereinafter referred to as the "Purchaser"), a corporation organized and existing under the laws of the State of _____ [add as applicable: "acting on behalf of itself and _____."].

Witnesseth that:

Whereas, the DOE has the responsibility for the disposal of spent nuclear fuel and high-level radioactive waste of domestic origin from civilian nuclear power reactors in order to protect the public health and safety, and the environment; and

Whereas, the DOE has the responsibility, following commencement of operation of a repository, to take title to the spent nuclear fuel or high-level radioactive waste involved as expeditiously as practicable upon the request of the generator or owner of such waste or spent nuclear fuel; and

Whereas, all costs associated with the preparation, transportation, and the disposal of spent nuclear fuel and high-level radioactive waste from civilian nuclear power reactors shall be borne by the owners and generators of such fuel and waste; and

Whereas, the DOE is required to collect a full cost recovery fee from owners and generators delivering to the DOE such spent nuclear fuel and/or high level radioactive waste; and

Whereas, the DOE is authorized to enter into contracts for the permanent disposal of spent nuclear fuel and/or high-level radioactive waste of domestic origin in DOE facilities; and

Whereas, the Purchaser desires to obtain disposal services from DOE; and

Whereas, DOE is obligated and willing to provide such disposal services, under the terms and conditions hereinafter set forth; and

Whereas, this contract is made and entered into under the authority of the DOE Organization Act (Pub. L. 95-91, 42 U.S.C. 7101 *et seq.*) and

the Nuclear Waste Policy Act of 1982 (Pub. L. 97-425, 42 U.S.C. 10101 *et seq.*)

Now, therefore, the parties hereto do hereby agree as follows:

ARTICLE I—DEFINITIONS

As used throughout this contract, the following terms shall have the meanings set forth below:

1. The term "assigned three-month period" means the period that each Purchaser will be assigned by DOE, giving due consideration to the Purchaser's assignment preference, for purposes of reporting kilowatt hours generated by the Purchaser's nuclear power reactor and for establishing fees due and payable to DOE.

2. The term "cask" means a container for shipping spent nuclear fuel and/or high-level radioactive waste which meets all applicable regulatory requirements.

3. The term "civilian nuclear power reactor" means a civilian nuclear powerplant required to be licensed under Sections 103 or 104(b) of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2133, 2134(b)).

4. The term "Commission" means the United states Nuclear Regulatory Commission.

5. The term "contract" means this agreement and any duly executed amendment or modification thereto.

6. The term "Contracting Officer" means the person executing this contract on behalf of the Government, and any other officer or civilian employee who is a properly designated Contracting Officer of the DOE; and the term includes, except as otherwise provided in this contract, the authorized representative of a Contracting Officer acting within the limits of his authority.

7. The term "delivery" means the transfer of custody, f.o.b. carrier, of spent nuclear fuel or high-level radioactive waste from Purchaser to DOE at the Purchaser's civilian nuclear power reactor or such other domestic site as may be designated by the Purchaser and approved by DOE.

8. The term "disposal" means the emplacement in a repository of high-level radioactive waste, spent nuclear fuel, or other highly radioactive waste with no foreseeable intent of recovery, whether or not such emplacement permits recovery of such waste.

9. The term "DOE" means the United States Department of Energy or any duly authorized representative thereof, including the Contracting Officer.

10. The term "DOE facility" means a facility operated by or on behalf of DOE for the purpose of disposing of spent nuclear fuel and/or high-level radioactive waste, or such other facility(ies) to which spent nuclear fuel and/or high-level radioactive waste may be shipped by DOE prior to its transportation to a disposal facility.

11. The term "full cost recovery," means the recoupment by DOE, through Purchaser fees and any interest earned, of all direct costs, indirect costs, and all allocable overhead, consistent with generally accepted accounting principles consistently applied, of providing disposal services and conducting activities authorized by the Nuclear Waste Policy Act of 1982 (Pub. L. 97-425). As used herein, the term "cost" includes the application of Nuclear Waste Fund moneys for those uses expressly set forth in section 302 (d) and (e) of the said Act and all other uses specified in the Act.

12. The term "high-level radioactive waste" (HLW) means—

(a) the highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations; and

(b) other highly radioactive material that the Commission, consistent with existing law, determines by rule requires permanent isolation.

13. The term electricity (kilowatt hours) generated and sold means gross electrical output produced by a civilian nuclear power reactor measured at the output terminals of the turbine generator minus the normal onsite nuclear station service loads during the time electricity is being generated multiplied by the total energy adjustment factor. For purposes of this provision, the following definition shall apply:

a. The term Total Energy Adjustment Factor (TEAF) means the sum of individual owners' weighted energy adjustment factors.

b. The term Weighted Energy Adjustment Factor (WEAF) means the product of an owner's energy adjustment factor times the owner's share of the plant.

c. The term Owner's Energy Adjustment Factor (OEAF) means the sum of the individual owner's adjustment for sales to ultimate consumers and adjustment for sales for resale.

d. The term Owner's Share of the plant (OS) means the owner's fraction of metered electricity sales, the owner's fraction of plant ownership, or the sponsor company's fixed entitlement percentage of the plant's output. This definition includes joint owners of generating companies or participants in a generation and transmission cooperative.

e. The term Adjustment for Sales to ultimate Consumer (ASC) means the owner's fraction of sales to the ultimate consumer multiplied by the owner's sales to ultimate consumer adjustment factor.

f. The term Fraction of Sales to ultimate Consumer (FSC) means the owner's fractional quantity of electricity sold to the ultimate consumer relative to the total of electricity sales (sales to ultimate consumers plus the sales for resale).

g. The term Sales to ultimate Consumer Adjustment Factor (SCAF) means one minus the quotient of all electricity lost or otherwise not sold for each owner divided by the total electricity available for disposition to ultimate consumers. Electricity lost or otherwise not sold includes:

(1) Energy furnished without charge;

(2) Energy used by the company;

(3) Transmission losses;

(4) Distribution losses; and

(5) Other unaccounted losses as reported to the Federal Government "Annual Report of Major Electric Utilities, Licensees and Others," Federal Energy Regulatory Commission (FERC) Form No.1; Rural Electrification Administration (REA) Forms 7 and 11 if appropriate; or the "Annual Electric Utility Report," Energy Information Administration (EIA) Form EIA-861.

h. The term Total Electricity Available for Disposition to Ultimate Consumers means the reporting year's total of all of a utility's electricity supply which is available for disposition, expressed in kilowatt hours, and is equal to the sum of the energy sources minus the electricity sold for resale by the utility.

i. The term Adjustment for Sales for Resale (ASR) means the owner's fraction of sales for resale multiplied by the national average adjustment factor.

j. The term Fraction of Sales for Resale (FSR) means the owner's fractional quantity of electricity sold for resale by the utility relative to the total of electricity sales.

k. The term National Average Adjustment Factor (NAF) means the ratio of the national total of electricity sold to the national total of electricity available for disposition, based on the most recent 3 years of national data provided to the Federal Government, and will be set by the Contracting Officer. This term will be evaluated annually and revised in increments of .005.

l. Pumped storage losses. If the proportion of nuclear generated electricity consumed by a pumped-storage hydro facility can be measured or estimated and if the electricity losses associated with pumped storage facilities can be documented (e.g. based on routine and uniform records of district power data on contributions from different electricity sources), a prorated nuclear share shall be allowed as an offset to gross electricity generation reported on the annex A of appendix G, NWPA-830G form. Specific methodologies for calculating these offsets must be approved by the Contracting Officer in advance.

Instructions to annex A of appendix G, NWPA-830G provide the necessary information to calculate the energy adjustment factors.

14. The term "metric tons uranium" means that measure of weight, equivalent to 2,204.6 pounds of uranium and other fissile and fertile material that are loaded into a reactor core as fresh fuel.

15. The term "Purchaser's site" means the location of Purchaser's civilian nuclear power reactor or such other location as the Purchaser may designate.

16. The term "quarterly Treasury rate" means the current value of funds rate as specified by the Treasury Fiscal Requirements Manual, Volume 1, Part 6, section 8020.20. This rate is published quarterly in the Federal Register prior to the beginning of the affected quarter.

17. The term "shipping lot" means a specified quantity of spent nuclear fuel or high-level

radioactive waste designated by Purchaser for delivery to DOE beginning on a specified date.

18. The term "spent nuclear fuel" (SNF) means fuel that has been withdrawn from a nuclear reactor following irradiation, the consistituent elements of which have not been separated by reprocessing.

19. The term "spent nuclear fuel and high-level radioactive waste of domestic origin" means irradiated fuel material used, and radioactive wastes resulting from such use, in nuclear power reactors located only in the United States.

20. The term "year" means the period which begins on October 1 and ends on September 30.

ARTICLE II—SCOPE

This contract applies to the delivery by Purchaser to DOE of SNF and/or HLW of domestic origin from civilian nuclear power reactors, acceptance of title by DOE to such SNF and/or HLW, subsequent transportation, and disposal of such SNF and/or HLW and, with respect to such material, establishes the fees to be paid by the Purchaser for the services to be rendered hereunder by DOE. The SNF and/or HLW shall be specified in a delivery commitment schedule as provided in Article V below. The services to be provided by DOE under this contract shall begin, after commencement of facility operations, not later than January 31, 1998 and shall continue until such time as all SNF and/or HLW from the civilian nuclear power reactors specified in Appendix A, annexed hereto and made a part hereof, has been disposed of.

ARTICLE III—TERM

The term of this contract shall be from the date of execution until such time as DOE has accepted, transported from the Purchaser's site(s) and disposed of all SNF and/or HLW of domestic origin from the civilian nuclear power reactor(s) specified in Appendix A.

ARTICLE IV—RESPONSIBILITIES OF THE PARTIES

A. *Purchaser's Responsibilities*

1. *Discharge Information.*

(a) On an annual basis, commencing October 1, 1983, the Purchaser shall provide DOE with information on actual discharges to date and projected discharges for the next ten (10) years in the form and content set forth in Appendix B, annexed hereto and made a part hereof. The information to be provided will include estimates and projections and will not be Purchaser's firm commitment with respect to discharges or deliveries.

(b) No later than October 1, 1983, the Purchaser shall provide DOE with specific information on:

(1) Total spent nuclear fuel inventory as of April 7, 1983;

(2) Total number of fuel assemblies removed from the particular reactor core prior to 12:00 a.m. April 7, 1983 for which there are plans for reinsertion in the core, indicating the current planned dates for reinsertion in the core. Estimates of the burned and unburned portion of each individual assembly are to be provided.

(c) In the event that the Purchaser fails to provide the annual forecast in the form and content required by DOE, DOE may, in its sole discretion, require a rescheduling of any delivery commitment schedule then in effect.

2. *Preparation for Transportation.*

(a) The Purchaser shall arrange for, and provide, all preparation, packaging, required inspections, and loading activities necessary for the transportation of SNF and/or HLW to the DOE facility. The Purchaser shall notify DOE of such activities sixty (60) days prior to the commencement of such activities. The preparatory activities by the Purchaser shall be made in accordance with all applicable laws and regulations relating to the Purchaser's responsibilities hereunder. DOE may designate a representative to observe the preparatory activities conducted by the Purchaser at the Purchaser's site, and the Purchaser shall afford access to such representative.

(b) Except as otherwise agreed to by DOE, the Purchaser shall advise DOE, in writing as specified in Appendix F, annexed hereto and made a part hereof, as to the description of the material in each shipping lot sixty (60) days prior to scheduled DOE transportation of that shipping lot.

(c) The Purchaser shall be responsible for incidental maintenance, protection and preservation of any and all shipping casks furnished to the Purchaser by DOE for the performance of this contract. The Purchaser shall be liable for any loss of or damage to such DOE-furnished property, and for expenses incidental to such loss or damage while such casks are in the possession and control of the Purchaser except as otherwise provided for hereunder. Routine cask maintenance, such as scheduled overhauls, shall not be the responsibility of the Purchaser.

B. *DOE Responsibilities*

1. DOE shall accept title to all SNF and/or HLW, of domestic origin, generated by the civilian nuclear power reactor(s) specified in Appendix A, provide subsequent transportation for such material to the DOE facility, and dispose of such material in accordance with the terms of this contract. 2. DOE shall arrange for, and provide, a cask(s) and all necessary transportation of the SNF and/or HLW from the Purchaser's site to the DOE facility. Such cask(s) shall be furnished sufficiently in advance to accommodate scheduled deliveries. Such cask(s) shall be suitable for use at the Purchaser's site, meet applicable regulatory requirements, and be accompanied by pertinent information including, but not limited to, the following:

(a) Written procedures for cask handling and loading, including specifications on Purchaser-furnished canisters for containment of failed fuel;

(b) Training for Purchaser's personnel in cask handling and loading, as may be necessary;

(c) Technical information, special tools, equipment, lifting trunnions, spare parts and consumables needed to use and perform incidental maintenance on the cask(s); and

(d) Sufficient documentation on the equipment supplied by DOE.

3. DOE may fulfill any of its obligations, or take any action, under this contract either directly or through contractors.

4. DOE shall annually provide to the Purchaser pertinent information on the waste disposal program including information on cost projections, project plans and progress reports.

5. (a) Beginning on April 1, 1991, DOE shall issue an annual acceptance priority ranking for receipt of SNF and/or HLW at the DOE repository. This priority ranking shall be based on the age of SNF and/or HLW as calculated from the date of discharge of such material from the civilian nuclear power reactor. The oldest fuel or waste will have the highest priority for acceptance, except as provided in paragraphs B and D of Article V and paragraph B.3 of Article VI hereof.

(b) Beginning not later than July 1, 1987, DOE shall issue an annual capacity report for planning purposes. This report shall set forth the projected annual receiving capacity for the DOE facility(ies) and the annual acceptance ranking relating to DOE contracts for the disposal of SNF and/or HLW including, to the extent available, capacity information for ten (10) years following the projected commencement of operation of the initial DOE facility.

ARTICLE V—DELIVERY OF SNF AND/OR HLW

A. *Description of SNF and HLW*

The Purchaser shall deliver to DOE and DOE shall, as provided in this contract, accept the SNF and/or HLW which is described in accordance with Article VI.A. of this contract, for disposal thereof.

B. *Delivery Commitment Schedule*

1. Delivery commitment schedule(s), in the form set forth in Appendix C annexed hereto and made a part hereof, for delivery of SNF and/or HLW shall be furnished to DOE by Purchaser. After DOE has issued its proposed acceptance priority ranking, as described in paragraph B.5 of Article IV hereof, beginning January 1, 1992 the Purchaser shall submit to DOE the delivery commitment schedule(s) which shall identify all SNF and/or HLW the Purchaser wishes to deliver to DOE beginning sixty-three (63) months thereafter. DOE shall approve or disapprove such schedules within three (3) months after receipt. In the event of disapproval, DOE shall advise the Purchaser in writing of the reasons for such disapproval and request a revised schedule from the Purchaser, to be submitted to DOE within

thirty (30) days after receipt of DOE's notice of disapproval.

2. DOE shall approve or disapprove such revised schedule(s) within sixty (60) days after receipt. In the event of disapproval, DOE shall advise the Purchaser in writing of the reasons for such disapproval and shall submit its proposed schedule(s). If these are not acceptable to the Purchaser, the parties shall promptly seek to negotiate mutually acceptable schedule(s). Purchaser shall have the right to adjust the quantities of SNF and/or HLW plus or minus (±) twenty percent (20%), and the delivery schedule up to two (2) months, until the submission of the final delivery schedule.

C. *Final Delivery Schedule*

Final delivery schedule(s), in the form set forth in Appendix D, annexed hereto and made a part hereof, for delivery of SNF and/or HLW covered by an approved delivery commitment schedule(s) shall be furnished to DOE by Purchaser. The Purchaser shall submit to DOE final delivery schedules not less than twelve (12) months prior to the delivery date specified therein. DOE shall approve or disapprove a final delivery schedule within forty-five (45) days after receipt. In the event of disapproval, DOE shall advise the Purchaser in writing of the reasons for such disapproval and shall request a revised schedule from the Purchaser, to be submitted to DOE within thirty (30) days after receipt of DOE's notice of disapproval. DOE shall approve or disapprove such revised schedule(s) within sixty (60) days after receipt. In the event of disapproval, DOE shall advise the Purchaser in writing of the reasons for such disapproval and shall submit its proposed schedule(s). If these are not acceptable to the Purchaser, the parties shall promptly seek to negotiate mutually acceptable schedule(s).

D. *Emergency Deliveries*

Emergency deliveries of SNF and/or HLW may be accepted by DOE before the date provided in the delivery commitment schedule upon prior written approval by DOE.

E. *Exchanges*

Purchaser shall have the right to determine which SNF and/or HLW is delivered to DOE; *provided, however,* that Purchaser shall comply with the requirements of this contract. Purchaser shall have the right to exchange approved delivery commitment schedules with parties to other contracts with DOE for disposal of SNF and/or HLW; *provided, however,* that DOE shall, in advance, have the right to approve or disapprove, in its sole discretion, any such exchanges. Not less than six (6) months prior to the delivery date specified in the Purchaser's approved delivery commitment schedule, the Purchaser shall submit to DOE an exchange request, which states the priority rankings of both the Purchaser hereunder and any other Purchaser with whom the exchange of approved delivery commitment schedules is proposed. DOE shall approve or disapprove the proposed exchange within thirty (30) days after receipt. In the event of disapproval, DOE shall advise the Purchaser in writing of the reasons for such disapproval.

ARTICLE VI—CRITERIA FOR DISPOSAL

A. *General Requirements*

1. *Criteria.*

(a) Except as otherwise provided in this contract, DOE shall accept hereunder only such SNF and/or HLW which meets the General Specifications for such fuel and waste as set forth in Appendix E, annexed hereto and made a part hereof.

(b) Purchaser shall accurately classify SNF and/or HLW prior to delivery in accordance with paragraphs B and D of Appendix E.

2. *Procedures.*

(a) Purchaser shall provide to DOE a detailed description of the SNF and/or HLW to be delivered hereunder in the form and content as set forth in Appendix F, annexed hereto and made a part hereof. Purchaser shall promptly advise DOE of nay changes in said SNF and/or HLW as soon as they become known to the purchaser.

(b) DOE's obligation for disposing of SNF under this contract also extends to other than standard fuel; however, for any SNF which has been designated by the Purchaser as other than standard fuel, as that term is defined in Appendix E, the Purchaser shall obtain delivery and procedure confirmation from DOE prior to delivery. DOE shall advise Purchaser within sixty (60) days after receipt of such confirmation request as to the technical feasibility of disposing of such fuel on the currently agreed to schedule and any schedule adjustment for such services.

B. *Acceptance Procedures*

1. *Acceptance Priority Ranking.*

Delivery commitment schedules for SNF and/or HLW may require the disposal or more material than the annual capacity of the DOE disposal facility (or facilities) can accommodate. The following acceptance priority ranking will be utilized:

(a) Except as may be provided for in subparagraph (b) below and Article V.D. of this contract, acceptance priority shall be based upon the age of the SNF and/or HLW as calculated from the date of discharge of such material from the civilian nuclear power reactor. DOE will first accept from Purchaser the oldest SNF and/or HLW for disposal in the DOE facility, except as otherwise provided for in paragraphs B and D of Article V.

(b) Notwithstanding the age of the SNF and/or HLW, priority may be accorded any SNF and/or HLW removed from a civilian nuclear power reactor that has reached the end of its useful life or has been shut down permanently for whatever reason.

2. *Verification of SNF and/or HLW.*

During cask loading and prior to acceptance by DOE for transportation to the DOE facility, the SNF and/or HLW description of the shipping lot shall be subject to verification by DOE. To the extent the SNF and/or HLW is consistent with the description submitted and approved, in accordance with Appendices E and F, DOE agrees to accept such SNF and/or HLW for disposal when DOE has verified the SNF and/or HLW description, determined the material is properly loaded, packaged, marked, labeled and ready for transportation, and has taken custody, as evidenced in writing, of the material at the Purchaser's site, f.o.b. carrier. A properly executed off-site radioactive shipment record describing cask contents must be prepared by the Purchaser along with a signed certification which states: "This is to certify that the above-named materials are properly described, classified, packaged, marked and labeled and are in proper condition for transfer according to the applicable regulations of the U. S. Department of Transportation."

3. *Improperly described SNF and/or HLW.*

(a) *Prior to Acceptance*—If SNF and/or HLW is determined by DOE to be improperly described prior to acceptance by DOE at the Purchaser's site, DOE shall promptly notify the Purchaser in writing of such determination. DOE reserves the right, in its sole discretion, to refuse to accept such SNF and/or HLW until the SNF and/or HLW has been properly described. The Purchaser shall not transfer such SNF and/or HLW to DOE unless DOE agrees to accept such SNF and/or HLW under such other arrangements as may be agreed to, in writing, by the parties.

(b) *After Acceptance*—If subsequent to its acceptance DOE finds that such SNF and/or HLW is improperly described, DOE shall promptly notify the Purchaser, in writing, of such finding. In the event of such notification, Purchaser shall provide DOE with a proper designation within thirty (30) days. In the event of a failure by the Purchaser to provide such proper designation, DOE may hold in abeyance any and all deliveries scheduled hereunder.

ARTICLE VII—TITLE

Title to all SNF and/or HLW accepted by DOE for disposal shall pass to DOE at the Purchaser's site as provided for in Article VI hereof. DOE shall be solely responsible for control of all material upon passage of title. DOE shall have the right to dispose as it sees fit of any SNF and/or HLW to which it has taken title. The Purchaser shall have no claim against DOE or the Government with respect to such SNF or HLW nor shall DOE or the Government be obligated to compensate the Purchaser for such material.

ARTICLE VIII—FEES AND TERMS OF PAYMENT

A. *Fees*

1. Effective April 7, 1983, Purchaser shall be charged a fee in the amount of 1.0 mill per kilowatt hour (1M/kWh) electricity generated and sold.

2. For SNF, or solidified high-level radioactive waste derived from SNF, which fuel was used to generate electricity in a civilian

nuclear power reactor prior to April 7, 1983, a one-time fee will be assessed by applying industry-wide average dollar per kilogram charges to four (4) distinct ranges of fuel burnup so that the integrated cost across all discharged (i.e. spent) fuel is equivalent to an industry-wide average charge of 1.0 mill per kilowatt-hour. For purposes of this contract, discharged nuclear fuel is that fuel removed from the reactor core with no plans for reinsertion. In the event that any such fuel withdrawn with plans for reinsertion is not reinserted, then the applicable fee for such fuel shall be calculated as set forth in this paragraph 2. The categories of spent nuclear fuel burnup and the fee schedule are listed below:

[In 1982 dollars]

Nuclear spent fuel burnup range	Dollars per kilogram
0 to 5,000 MWDT/MTU	$ 80.00
5,000 to 10,000 MWDT/MTU	142.00
10,000 to 20,000 MWDT/MTU	162.00
Over 20,000 MWDT/MTU	184.00

This fee shall not be subject to adjustment, and the payment thereof by the Purchaser shall be made to DOE as specified in paragraph B of this Article VIII.

3. For in-core fuel as of April 7, 1983, that portion of the fuel burned through April 6, 1983 shall be subject to the one-time fee as calculated in accordance with the following methodology: [a] determine the total weight in kilograms of uranium loaded initially in the particular core; [b] determine the total megawatt-days (thermal) which have been generated by all of the fuel assemblies in the said core as of 12:00 A.M. April 7, 1983; [c] divide the megawatt-days (thermal) generated in the said core by the total metric tons of initially loaded uranium in that core and multiply the quotient by the conversion factor 0.0078 to obtain a value in dollars per kilogram; and [d] multiply the dollars per kilogram value by the kilograms determined in [a] above to derive the dollar charge for the one-time fee to be paid for the specified in-core fuel as of 12:00 A.M. April 7, 1983. For purposes of this contract, in-core fuel is that fuel in the reactor core as of the date specified, plus any fuel removed from the reactor with plans for reinsertion. That portion of such fuel unburned as of 12:00 A.M. April 7, 1983 shall be subject to the 1.0 mill per kilowatt-hour charge.

4. DOE will annually review the adequacy of the fees and adjust the 1M/KWH fee, if necessary, in order to assure full cost recovery by the Government. Any proposed adjustment to the said fee will be transmitted to Congress and shall be effective after a period of ninety (90) days of continuous session has elapsed following receipt of such transmittal unless either House of Congress adopts a resolution disapproving the proposed adjustment. Any adjustment to the 1M/KWH fee under paragraph A.1. of this Article VIII shall be prospective.

B. *Payment*

1. For electricity generated and sold by the Purchaser's civilian nuclear power reactor(s) on or after April 7, 1983, fees shall be paid quarterly by the Purchaser and must be received by DOE not later than the close of the last business day of the month following the end of each assigned 3-month period. The first payment shall be due on July 31, 1983, for the period April 7, 1983, to June 30, 1983. (Add as applicable: A one-time adjustment period payment shall be due on _____, for the period _____ to _____.) The assigned 3-month period, for purposes of payment and reporting of electricity generated and sold shall begin _____.

2. For SNF discharged prior to April 7, 1983, and for in-core burned fuel as of 12:00 A.M. April 7, 1983, the Purchaser shall, within two (2) years of contract execution, select one of the following fee payment options:

(a) *Option 1*—The Purchaser's financial obligation for said fuel shall be prorated evenly over forty (40) quarters and will consist of the fee plus interest on the outstanding fee balance. The interest from April 7, 1983, to date of the first payment is to be calculated based upon the 13-week Treasury bill rate, as reported on the first such issuance following April 7, 1983, and compounded quarterly thereafter by the 13-week Treasury bill rates as reported on the first such issuance of each succeeding assigned three-month period. Beginning with the first payment, interest is to be calculated on Purchaser's financial obligation plus accrued interest, at the ten-year Treasury note rate in effect on the date of the first payment. In no event shall the end of the forty (40) quarters extend beyond the first scheduled delivery date as reflected in the DOE-approved delivery commitment schedule. All payments shall be made concurrently with the assigned three month period payments. At any time prior to the end of the forty (40) quarters, Purchaser may, without penalty, make a full or partial lump sum payment at any of the assigned three month period payment dates. Subsequent quarterly payments will be appropriately reduced to reflect the reduction in the remaining balance in the fee due and payable. The remaining financial obligation, if any, will be subject to interest at the same ten-year Treasury note rate over the remainder of the ten year period.

(b) *Option 2*—The Purchaser's financial obligation shall be paid in the form of a single payment anytime prior to the first delivery, as reflected in the DOE approved delivery commitment schedule, and shall consist of the fee plus interest on the outstanding fee balance. Interest is to be calculated from April 7, 1983, to the date of the payment based upon the 13-week Treasury bill rate, as reported on the first such issuance following April 7, 1983, and compounded quarterly thereafter by the 13-week Treasury bill rates as reported on the first such issuance of each succeeding assigned three-month period until payment.

(c) *Option 3*—The Purchaser's financial obligation shall be paid prior to June 30, 1985, or prior to two (2) years after contract execution, whichever comes later, in the form of a single payment and shall consist of all outstanding fees for SNF and in-core fuel burned prior to April 7, 1983. Under this option, no interest shall be due to DOE from April 7, 1983, to the date of full payment on the outstanding fee balance.

3. *Method of Payment:*

(a) Payments shall be made by wire transfer, in accordance with instructions specified by DOE in Appendix G, annexed hereto and made a part hereof, and must be received within the time periods specified in paragraph B.1. of this Article VIII.

(b) The Purchaser will complete a Standard Remittance Advice, as set forth in Appendix G, for each assigned three month period payment, and mail it postmarked no later than the last business day of the month following each assigned three month period to Department of Energy, Office of Controller, Cash Management Division, Box 500, Room D-208, Germantown, Maryland 20874.

4. Any fees not paid on a timely basis or underpaid because of miscalculation will be subject to interest as specified in paragraph C of this Article VIII.

C. *Interest on Late Fees*

1. DOE will notify the Purchaser of amounts due only when unpaid or underpaid by the dates specified in paragraph B above. Interest will be levied according to the following formula:

Interest=Unpaid balance due to DOE for assigned three month period × Quarterly Treasury rate plus six percent (6%) × Number of months late including month of payment (fractions rounded up to whole months) 12

2. Interest is payable at any time prior to the due date for the subsequent assigned three month period fee payment. Nonpayment by the end of the subsequent assigned three month period will result in compounding of interest due. Purchaser shall complete a Standard Remittance Advice of interest payments.

3. Following the assessment of a late fee by DOE, payments will be applied against accrued interest first and the principal thereafter.

D. *Effect of Payment*

Upon payment of all applicable fees, interest and penalties on unpaid or underpaid amounts, the Purchaser shall have no further financial obligation to DOE for the disposal of the accepted SNF and/or HLW.

E. *Audit*

1. The DOE or its representative shall have the right to perform any audits or inspections necessary to determine whether Purchaser is paying the correct amount under the fee schedule and interest provisions set forth in paragraphs A, B and C above.

2. Nothing in this contract shall be deemed to preclude an audit by the General Accounting Office of any transaction under this contract.

3. The Purchaser shall furnish DOE with such records, reports and data as may be necessary for the determination of quantities delivered hereunder and for final settlement of amounts due under this contract and shall retain and make available to DOE and its authorized representative examination at all reasonable times such records, reports and data for a period of three (3) years from the completion of delivery of all material under this contract.

ARTICLE IX—DELAYS

A. *Unavoidable Delays by Purchaser or DOE*

Neither the Government nor the Purchaser shall be liable under this contract for damages caused by failure to perform its obligations hereunder, if such failure arises out of causes beyond the control and without the fault or negligence of the party failing to perform. In the event circumstances beyond the reasonable control of the Purchaser or DOE—such as acts of God, or of the public enemy, acts of Government in either its sovereign or contractual capacity, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes and unusually severe weather—cause delay in scheduled delivery, acceptance or transport of SNF and/or HLW, the party experiencing the delay will notify the other party as soon as possible after such delay is ascertained and the parties will readjust their schedules, as appropriate, to accommodate such delay.

B. *Avoidable Delays by Purchaser or DOE*

In the event of any delay in the delivery, acceptance or transport of SNF and/or HLW to or by DOE caused by circumstances within the reasonable control of either the Purchaser or DOE or their respective contractors or suppliers, the charges and schedules specified by this contract will be equitably adjusted to reflect any estimated additional costs incurred by the party not responsible for or contributing to the delay.

ARTICLE X—SUSPENSION

A. In addition to any other rights DOE may have hereunder, DOE reserves the right, at no cost to the Government, to suspend this contract or any portion thereof upon written notice to the Purchaser within ninety (90) days of the Purchaser's failure to perform its obligations hereunder, and the Purchaser's failure to take corrective action within thirty (30) days after written notice of such failure to perform as provided above, unless such failure shall arise from causes beyond the control and without the fault or negligence of the Purchaser, its contractors or agents. However, the Purchaser's obligation to pay fees required hereunder shall continue unaffected by any suspension. Any such suspension shall be rescinded if and when DOE determines that Purchaser has completed corrective action.

B. The DOE reserves the right to suspend any scheduled deliveries in the event that a national emergency requires that priority be given to Government programs to the exclusion of the work under this contract. In the event of such a suspension by the Government, the DOE shall refund that portion of payments representing services not delivered as determined by the Contracting Officer to be an equitable adjustment. Any disagreement arising from the refund payment, if any, shall be resolved as provided in the clause of this contract, entitled "DISPUTES."

ARTICLE XI—REMEDIES

Nothing in this contract shall be construed to preclude either party from asserting its rights and remedies under the contract or at law.

ARTICLE XII—NOTICES

All notices and communications between the parties under this contract (except notices published in the Federal Register) shall be in writing and shall be sent to the following addressees:

To DOE: _____

_____

_____

To the Purchaser: _____

_____

_____

However, the parties may change the addresses or addressees for such notices or communications without formal modification to this contract; *provided, however,* that notice of such changes shall be given by registered mail.

ARTICLE XIII—REPRESENTATION CONCERNING NUCLEAR HAZARDS INDEMNITY

A. DOE represents that it will include in its contract(s) for the operation of any DOE facility an indemnity agreement based upon Section 170(d) of the Atomic Energy Act of 1954, as amended, a copy of which agreement shall be furnished to the Purchaser; that under said agreement, DOE shall have agreed to indemnify the contractor and other persons indemnified against claims for public liability (as defined in said Act) arising out of or in connection with contractual activities; that the indemnity shall apply to covered nuclear incidents which (1) take place at a contract location; or (2) arise out of or in the course of transportation of source, special nuclear or by-product material to or from a contract location. The obligation of DOE to indemnify shall be subject to the conditions stated in the indemnity agreement.

B. The provisions of this Article XIII shall continue beyond the term of this contract.

ARTICLE XIV—ASSIGNMENT

The rights and duties of the Purchaser may be assignable with transfer of title to the SNF and/or HLW involved; *provided, however,* that notice of any such transfer shall be made to DOE within ninety (90) days of transfer.

ARTICLE XV—AMENDMENTS

The provisions of this contract has been developed in the light of uncertainties necessarily attendant upon long-term contracts. Accordingly, at the request of either DOE or Purchaser, the parties will negotiate and, to the extent mutually agreed, amend this contract as the parties may deem to be necessary or proper to reflect their respective interests; *provided, however,* that any such amendment shall be consistent with the DOE final rule published in the Federal Register on April 18, 1983 entitled, "Standard Contract for Disposal or SNF and/or HLW", as the same may be amended from time to time.

ARTICLE XVI—DISPUTES

A. Except as otherwise provided in this contract, any dispute concerning a question of fact arising under this contract which is not disposed of by agreement shall be decided by the Contracting Officer, who shall reduce his decision to writing and mail or otherwise furnish a copy thereof to the Purchaser. The decision of the Contracting Officer shall be final and conclusive unless within ninety (90) days from the date of receipt of such copy, the Purchaser mails or otherwise furnishes to the Contracting Officer a written appeal addressed to the DOE Board of Contract Appeals (Board). The decision of the Board shall be final and conclusive unless determined by a court of competent jurisdiction to have been fraudulent, or capricious, or arbitrary, or so grossly erroneous as necessarily to imply bad faith or not supported by substantial evidence. In connection with any appeal proceeding under this clause, the Purchaser shall proceed diligently with the performance of the contract and in accordance with the Contracting Officer's decision.

B. For Purchaser claims of more than $50,000, the Purchaser shall submit with the claim a certification that the claim is made in good faith; the supporting data are accurate and complete to the best of the Purchaser's knowledge and belief; and the amount requested accurately reflects the contract adjustment for which the Purchaser believes the Government is liable. The certification shall be executed by the Purchaser if an individual. When the Purchaser is not an individual, the certification shall be executed by a senior company official in charge at the Purchaser's plant or location involved, or by an officer or general partner of the Purchaser having overall responsibility for the conduct of the Purchaser's affairs.

C. For Purchaser claims of $50,000 or less, the Contracting Officer must render a decision within sixty (60) days. For Purchaser claims in excess of $50,000, the Contracting Officer must decide the claim within sixty (60) days or notify the Purchaser of the date when the decision will be made.

D. This "Disputes" clause does not preclude consideration of law questions in connection with decisions provided for in paragraph A above; *provided, however,* that nothing in this contract

shall be construed as making final the decision of any administrative official, representative, or board on a question of law.

ARTICLE XVII—OFFICIALS NOT TO BENEFIT

No member of or delegate to Congress or resident commissioner shall be admitted to any share or part of this contract, or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

ARTICLE XVIII—COVENANT AGAINST CONTINGENT FEES

The Purchaser warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the Purchaser for the purpose of securing business. For breach or violation of this warranty, the Government shall have the right to annul this contract without liability or in its discretion to increase the contract price or consideration, or otherwise recover, the full amount of such commission, brokerage, or contingent fee.

ARTICLE XIX—EXAMINATION OF RECORDS

The Purchaser agrees that the Comptroller General of the United States or any of his duly authorized representatives shall have access to and the right to examine any directly pertinent books, documents, papers and records of the Purchaser involving transactions related to this contract until the expiration of three years after final payment under this contract.

ARTICLE XX—PERMITS

The Government and the Purchaser shall procure all necessary permits or licenses (including any special nuclear material licenses) and comply with all applicable laws and regulations of the United States, States and municipalities necessary to execute their respective responsibilities and obligations under this contract.

ARTICLE XXI—RIGHTS IN TECHNICAL DATA

A. *Definitions.*

1. "Technical data" means recorded information regardless of form or characteristic, of a specific or technical nature. It may, for example, document research, experimental, developmental, or demonstration, or engineering work, or be usable or used to define a design or process, or to procure, produce, support, maintain or operate material. The data may be graphic or pictorial delineations in media such as drawings or photographs, text in specifications or related performance or design-type documents or computer software (including computer programs, computer software data bases, and computer software documentation). Examples of technical data include research and engineering data, engineering drawings and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identification, and related information. Technical data as used herein do not include financial reports, cost analyses, and other information incidental to contract administration.

2. "Proprietary data" means technical data which embody trade secrets developed at private expense, such as design procedures or techniques, chemical composition of materials, or manufacturing methods, processes, or treatments, including minor modifications thereof, provided that such data:

(a) Are not generally known or available from other sources without obligation concerning their confidentiality;

(b) Have not been made available by the owner to others without obligation concerning its confidentiality; and

(c) Are not already available to the Government without obligation concerning their confidentiality.

3. "Contract data" means technical data first produced in the performance of the contract, technical data which are specified to be delivered under the contract, or technical data actually delivered in connection with the contract.

4. "Unlimited rights" means rights to use, duplicate, or disclose technical data, in whole or in part, in any manner and for any purpose whatsoever, and to permit others to do so.

B. *Allocation of Rights.*

1. The Government shall have:

(a) Unlimited rights in contract data except as otherwise provided below with respect to proprietary data properly marked as authorized by this clause;

(b) The right to remove, cancel, correct or ignore any marking not authorized by the terms of this contract on any technical data furnished hereunder, if in response to a written inquiry by DOE concerning the proprietary nature of the markings, the Purchaser fails to respond thereto within 60 days or fails to substantiate the proprietary nature of the markings. In either case, DOE will notify the Purchaser of the action taken;

(c) No rights under this contract in any technical data which are not contract data.

2. Subject to the foregoing provisions of this rights in technical data clause, the Purchaser shall have the right to mark proprietary data it furnishes under the contract with the following legend and no other, the terms of which shall be binding on the Government:

Limited Rights Legend

This "proprietary data," furnished under "Contract No. ——" with the U.S. Department of Energy may be duplicated and used by the Government with the express limitations that the "proprietary data" may not be disclosed outside the Government or be used for purposes of manufacture without prior permission of the Purchaser, except that further disclosure or use may be made solely for the following purposes:

(a) This "proprietary data" may be disclosed for evaluation purposes under the restriction that the "proprietary data" be retained in confidence and not be further disclosed;

(b) This "proprietary data" may be disclosed to contractors participating in the Government's program of which this contract is a part, for information or use in connection with the work performed under their contracts and under the restriction that the "proprietary data" be retained in confidence and not be further disclosed; or

(c) This "proprietary data" may be used by the Government or others on its behalf for emergency work under the restriction that the "proprietary data" be retained in confidence and not be further disclosed. This legend shall be marked on any reproduction of this data in whole or in part.

3. In the event that proprietary data of a third party, with respect to which the Purchaser is subject to restrictions on use or disclosure, is furnished with the Limited Rights Legend above, Purchaser shall secure the agreement of such third party to the rights of the Government as set forth in the Limited Rights Legend. DOE shall upon request furnish the names of those contractors to which proprietary data has been disclosed.

ARTICLE XXII—ENTIRE CONTRACT

A. This contract, which consists of Articles I through XXII and Appendices A through G, annexed hereto and made a part hereof, contains the entire agreement between the parties with respect to the subject matter hereof. Any representation, promise, or condition not incorporated in this contract shall not be binding on either party. No course of dealing or usage of trade or course of performance shall be relevant to explain or supplement any provision contained in this contract.

B. Nothing in this contract is intended to affect in any way the contractual obligation of any other persons with whom the Purchaser may have contracted with respect to assuming some or all disposal costs or to accept title to SNF and/or HLW.

C. *Appendices*

A. Nuclear Power Reactor(s) or Other Facilities Covered

B. Discharge Information (Ten Year; Annual)

C. Delivery Commitment Schedule

D. Final Delivery Schedule

E. General Specifications

F. Detailed Description of Purchaser's Fuel

G. Standard Remittance Advice For Payment of Fees

In witness whereof, the parties hereto have executed this contract as of the day and year first above written.

United States of America
United States Department of Energy
By: _____
(Contracting Officer)

Witnesses as to Execution on Behalf of Purchaser

(Name)_____

(Address)_____

(Name)_____

(Address)_____

(Purchaser's Company Name)

By:_____

Title: _____

I, (*Name*), certify that I am the (*Title*) of the corporation named as Purchaser herein; that (*Name*) who signed this document on behalf of the Purchaser was then (*Title*) of said corporation; that said document was duly signed for and on behalf of said corporation by authority of its governing body and is within the scope of its corporate powers.

In Witness Whereof, I have hereunto affixed my hand and the seal of said corporation this —— day of ——, 1983

(Corporate Seal)

(Signature)_____

Appendix A

Nuclear Power Reactor(s) or Other Facilities Covered

Purchaser_____

Contract Number/Date ___/___ _____

Reactor/Facility Name_____

Location:_____

Street_____

City_____

County/State ____/ _____

Zip Code_____

Capacity (MWE)—Gross _____

Reactor Type:

BWR

PWR

Other (Identify)_____

Facility Description_____

Date of Commencement of Operation ___

(actual or estimated) _____

NRC License : _____

By Purchaser: _____

Signature _____

Title_____

Date _____

Appendix B

Ten Year Discharge Forecast

To be used for DOE planning purposes only and does not represent a firm commitment by Purchaser.

Purchaser _____

Contract Number/Date _____/ _____

Reactor/Facility Name _____

Location:

Street _____

City _____

County/State _____/ _____

Zip Code

Type: BWR ☐

PWR ☐

Other (Identify)

By Purchaser:

Signature _____

Title _____

Date _____

Appendix B (Enclosure 1)

Actual Discharges

Purchaser_____

Contract Number/Date_____

Reactor/Facility Name_____

Location:

Street_____

City_____

County/State_____

Zip Code_____

Type:

BWR

PWR

Other (Identify)_____

Refueling Shutdown Date_____

Metric Tons Uranium (Initial/Discharged);

Initial_____

Discharged_____

Number of Assemblies Discharged:_____

Any false, fictitious or fraudulent statement may be punishable by fine or imprisonment (U.S. Code, Title 18, Section 1001).

By Purchaser:

Signature_____

Title_____

Date_____

Appendix C

Delivery Commitment Schedule

This delivery commitment schedule shall be submitted by Purchaser to DOE as specified in Article V.B. of this contract.

Purchaser_____

Contract Number/Date_____

Reactor/Facility Name_____

Location:

Street_____

City_____

County/State_____

Zip Code_____

Type Cask Required:_____

Shipping Lot Number _____

(Assigned by DOE)

Proposed Shipping Mode:

Truck

Rail

Barge

DOE Assigned Delivery Commitment Date

Range of Discharge Date(s) (Earliest to Latest)

Mo—— Day—— Yr—— to Mo—— Day—— Yr——

	1	2	3	4	5	6	7	8	9	10	10 yr total
Discharge date—mo/yr (or refueling shut down date).....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Metric tons:	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
—iniyisl.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
—discharged.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Number of assemblies discharged (per cycle)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Date_____

Metric Tons Uranium:

(Initial)_____

(Discharged)_____

Number of Assemblies:

BWR_____

PWR_____

Other_____

Unless otherwise agreed to in writing by DOE, the Purchaser shall furnish herewith to DOE suitable proof of ownership of the SNF and/or HLW to be delivered hereunder. The Purchaser shall notify DOE in writing at the earliest practicable date of any change in said ownership.

Any false, fictitious or fraudulent statement may be punishable by fine or imprisonment (U.S. Code, *Title 18, Section 1001*).

By Purchaser:

Signature_____

Title_____

Date_____

Approved by DOE:

Technical Representative_____

Title_____

Date_____

Contracting Officer_____

Date_____

Appendix D

Final Delivery Schedule

(To be submitted to DOE by Purchaser for each designated Purchaser Delivery site not later than twelve (12) months prior to estimated date of first delivery)

Purchaser:_____
Contract Number/Date_____
Reactor/Facility Name_____
Location:_____
Street_____
City_____
County/State_____
Zip Code_____
Type(s) cask(s) required:_____
No. Assemblies per cask_____
Shipping Lot Number _____
Shipping Mode:
(Assigned by DOE)
Truck_____
Rail _____
Barge_____
Metric Tons Uranium:
(Initial)_____
(Discharged)_____
Range of Discharge Date(s) (Earliest to Latest)
(From approved commitment schedule)
Mo—— Day—— Yr—— to Mo—— Day—— Yr——
Number of Assemblies:
BWR_____
PWR_____
Other_____
Purchaser's Delivery First Estimate
Mo—— Day—— Yr—— last Mo—— Day—— Mo——

Unless otherwise agreed to in writing by DOE, the Purchaser shall furnish herewith to DOE suitable proof of ownership of the SNF and/or HLW to be delivered hereunder. The Purchaser shall notify DOE in writing at the earliest practicable date of any change in said ownership.

To confirm acceptability of delivery date(s):
Purchaser Contact _____
Phone _____
Title _____
DOE Contact _____
Phone _____
Title _____

Any false, fictitious or fraudulent statement may be punishable by fine or imprisonment (U.S. Code, Title 18, Section 1001).

By Purchaser:
Signature_____
Title_____
Date_____
Approved by DOE:
Technical Representative_____
Title_____
Date_____
Contracting Officer_____
Date_____

Appendix E

General Specifications

A. Fuel Category Identification

1. Categories—Purchaser shall use reasonable efforts, utilizing technology equivalent to and consistent with the commercial practice, to properly classify Spent Nuclear Fuel (SNF) prior to delivery to DOE, as follows:

a. "Standard Fuel" means SNF that meets all the General Specifications therefor set forth in paragraph B below.

b. "Nonstandard Fuel" means SNF that does not meet one or more of the General Specifications set forth in subparagraphs 1 through 5 of paragraph B below, and which is classified as Nonstandard Fuel Classes NS-1 through NS-5, pursuant to paragraph B below.

c. "Failed Fuel" means SNF that meets the specifications set forth in subparagraphs 1 through 3 of paragraph B below, and which is classified as Failed Fuel Class F-1 through F-3 pursuant to subparagraph 6 of paragraph B below.

d. Fuel may have "Failed Fuel" and/or several "Nonstandard Fuel" classifications

B. Fuel Description and Subclassification—General Specifications

1. *Maximum Nominal Physical Dimensions.*

	Boiling water reactor (BWR)	Pressurized water reactor (PWR)
Overall Length.....	14 feet, 11 inches	14 feet, 10 inches
Active Fuel Length.....	12 feet, 6 inches	12 feet, 0 inches
Cross Section[1]	6 inches x 6 inches	9 inches x 9 inches

[1] The cross section of the fuel assembly shall not include the channel.

Note: Fuel that does not meet these specifications shall be calssifed as Nonstandard Fuel—Class NS-1.

2. *Nonfuel Components.* Nonfuel components including, but not limited to, control spiders, burnable poison rod assemblies, control rod elements, thimble plugs, fission chambers, and primary and secondary neutron sources, that are contained within the fuel assembly, or BWR channels that are an integral part of the fuel assembly, which do not require special handling, may be included as part of the spent nuclear fuel delivered for disposal pursuant to this contract.

Note: Fuel that does not meet these specifications shall be classified as Nonstandard Fuel—Class NS-2.

3. *Cooling.* The minimum cooling time for fuel is five (5) years.

Note: Fuel that does not meet this specification shall be classified as Nonstandard Fuel—Class NS-3.

4. *Non-LWR Fuel.* Fuel from other than LWR power facilities shall be classified as Nonstandard Fuel—Class NS-4. Such fuel may be unique and require special handling, storage, and disposal facilities.

5. *Consolidated Fuel Rods.* Fuel which has been disassembled and stored with the fuel rods in a consolidated manner shall be classified as Nonstandard Fuel Class NS-5.

6. *Failed Fuel.*

a. Visual Inspection.

Assemblies shall be visually inspected for evidence of structural deformity or damage to cladding or spacers which may require special handling. Assemblies which [i] are structurally deformed or have damaged cladding to the extent that special handling may be required or [ii] for any reason cannot be handled with normal fuel handling equipment shall be classified as Failed Fuel—Class F-1.

b. Previously Encapsulated Assemblies.

Assemblies encapsulated by Purchaser prior to classification hereunder shall be classified as Failed Fuel—Class F-3. Purchaser shall advise DOE of the reason for the prior encapsulation of assemblies in sufficient detail so that DOE may plan for appropriate subsequent handling.

c. Regulatory Requirements.

Spent fuel assemblies shall be packaged and placed in casks so that all applicable regulatory requirements are met.

C. *Summary of Fuel Classifications*

1. *Standard Fuel:*
a. Class S-1: PWR
b. Class S-2: BWR
2. *Nonstandard Fuel:*
a. Class NS-1: Physical Dimensions
b. Class NS-2: Non Fuel Components
c. Class NS-3: Short Cooled
d. Class NS-4: Non-LWR
e. Class NS-5: Consolidated Fuel Rods.
3. *Failed Fuel:*
a. Class F-1: Visual Failure or Damage
b. Class F-2: Radioactive "Leakage"
c. Class F-3: Encapsulated

D. *High-Level Radioactive Waste*

The DOE shall accept high-level radioactive waste. Detailed acceptance criteria and general specifications for such waste will be issued by the DOE no later than the date on which DOE submits its license application to the Nuclear Regulatory Commission for the first disposal facility.

Appendix F

Detailed Description of Purchaser's Fuel

This information shall be provided by Purchaser for each distinct fuel type within a Shipping Lot not later than sixty (60) days prior to the schedule transportation date.

Purchaser_____
Contract Number/Date ——/————
Reactor/Facility Name_____
_____
_____

I. Drawings included in generic dossier: _____

1. Fuel Assembly DWG ——
2. Upper & Lower end fittings DWG ——

Dossier Number: ——
DOE Shipping Lot : ——
Assemblies Described:
———BWR
———PWR
———Other

II. *Design Material Descriptions.*

Fuel Element:

1. Element type —— (rod, plate, etc.)
2. Total length) ——/(in.)
3. Active length —— (in.)
4. Cladding material —— (Zr, s.s., etc.)

Assembly Description:

1. Number of Elements ——
2. Overall dimensions (length —— (cross section) —— (in.)
3. Overall weight ——

III. Describe any distortions, cladding damage or other damage to the spent fuel, or nonfuel components within this Shipping Lot which will require special handling procedures. (Attach additional pages if needed.)

_____

_____

IV. Assembly Number ——
Shipping Lot #——

	Irradiation history cycle No.				
	1	2	3	4	5
1. Startup date (mo/day/yr)	.....	.....	.....	.....	.....
2. Shutdown date (mo/day/yr)	.....	.....	.....	.....	.....
3. Cumulative fuel exposure (mwd/mtu)	.....	.....	.....	.....	.....
4. Avg. reactor power (mwth)	.....	.....	.....	.....	.....

5. Total heat output/assembly in watts, using an approved calculational method:—— as of Date ——

_____

Any false, fictitious or fraudulent statement may be punishable by fine or imprisonment (U.S. Code, Title 18, Section 1001).

By Purchaser:
Signature_____
Title_____
Date_____

NWPA-830G

U.S. DEPARTMENT OF ENERGY
Germantown, MD 20875

OMB No.: 1901-0260
Expires: 11/30/93

Appendix G - Standard Remittance Advice for Payment of Fees

[illegible]

1.0 IDENTIFICATION INFORMATION

1.1 Purchaser Information
(a) Name _____
(b) Address _____
(c) City, State & Zip Code _____

1.2 Contact Person
(a) Name _____
(b) Telephone (include Area Code) _____

1.3 Standard Contract Identification Number: _____

1.4 Period Covered by this Remittance Advice
(a) From _____ (Month/Day/Year) to _____ (Month/Day/Year)
(b) Date of this Payment _____ (Month/Day/Year)

2.0 SPENT NUCLEAR FUEL (SNF) FEE

2.1 Number of Reactors Covered _____
2.2 Total Purchaser Obligation as of April 7, 1983 $ _____
2.3 Date of First Payment:

Month	Day	Year

2.4 10-Year Treasury Note Rate as of the Date of First Payment - → _____ %
2.5 Unpaid Balance Prior to this Payment $ _____
2.6 Option Chosen _____
2.7 Fee Data
(a) Principal _____
(b) Interest _____
(c) Total Spent Nuclear Fuel Fee Transmitted with this Payment
$ _____

3.0 FEE FOR ELECTRICITY GENERATED AND SOLD (MILLS PER KILOWATT HOUR, M/kWh)

3.1 Number of Reactors Covered _____
3.2 Total Electricity Generated and Sold (Megawatt hours) (Sum of Line 4.2 from all Annex A's) _____
3.3 Current Fee Rate _____ (M/kWh)
3.4 Total Fee for Electricity Generated and Sold (M/kWh) Transmitted with this Payment
$ _____

4.0 UNDERPAYMENT/LATE PAYMENT (As notified by DOE)

Type of Payment (a)	Date of Notification (Month/Day/Year) (b)	DOE Invoice Number (c)	Date of Payment Transmitted (Month/Day/Year) (d)	Interest Paid (e)	Amount Transmitted (f)
4.1 SNF Underpayment					
4.2 Electricity Generation Late Payment					
4.3 TOTAL UNDERPAYMENT					
4.4 SNF Late Payment					
4.5 Electricity Generation Late Payment					
4.6 TOTAL LATE PAYMENT					

5.0 OTHER CREDITS CLAIMED (Attach Explanation)

Enter the Total Amount Claimed for All Credits $

6.0 TOTAL REMITTANCE

6.1 Total Spent Nuclear Fuel Fee Transmitted (from 2.7(c)) $ _____
6.2 Total Fee for Electricity Generated and Sold (from 3.4) $ _____
6.3 Total Underpayment (from 4.3(f)) $ _____
6.4 Total Late Payment (from 4.6(f)) $ _____
6.5 Total Credits (from 5.0) $ _____
6.6 TOTAL REMITTANCE (Sum of 6.1 through 6.4 minus 6.5) $ _____

7.0 CERTIFICATION

I certify that the Total Remittance is true and accurate to the best of my knowledge.

Name _____ Date _____ Signature _____

TITLE 18 USC 1001 makes it a crime for any person to knowingly and willfully make to any department or agency of the United States any false, fictitious, or fraudulent statements as to any matter within its jurisdiction.

Copy Distribution: White, DOE-Contractor; Canary, DOE-OC Field; Pink, DOE-EIA; Goldenrod, Utility Copy

DEPARTMENT OF ENERGY
Germantown, MD 20875

APPENDIX G - STANDARD REMITTANCE ADVICE FOR PAYMENT OF FEES

General Information

1. Purpose
   Standard Remittance Advice (RA) form is designed to serve as the source document, or entries into the Department's accounting records to transmit data from Purchasers concerning payment of their contribution to the Nuclear Waste Fund.
2. Who Shall Submit
   The RA must be submitted by Purchasers who signed the Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste. Submit Copy 1, 2, and 3 to DOE, Office of the Controller, Special Accounts and Payroll Division and retain Copy 4.
3. Where to Submit
   Purchasers shall forward completed RA to:

   U.S. Department of Energy
   Office of the Controller
   Special Accounts and Payroll Division (C-114 GTN)
   Box 500
   Germantown, MD 20875-0500
   Requests for further information, additional forms, and instructions may be directed in writing to the address above or by telephone to (301) 353-4914.
4. When to Submit
   For electricity generated on or after 4-7-83 fees shall be paid quarterly by the Purchaser and must be received by DOE not later than the close of the last business day of the month following the end of each assigned three month period. Payment is by electronic wire transfer only.
5. Sanctions
   The timely submission of RA by a Purchaser is mandatory. Failure of the may result in late penalty fees as provided by Article VIII.C of the Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste.
6. Prohibitions Regarding the Confidentiality of Information
   The information contained in these forms may be (i) information which is exempt from disclosure to the public under the exemption for trade secrets and confidential commercial information specified in the Freedom of Information Act of 5 USC 522(b)(4)(FOIA) or (ii) prohibited from public release by 18 USC 1905. However, before a determination can be made that particular information is within the coverage of either of these statutory provisions, the person submitting the information must make a showing satisfactory to the Department concerning its confidential nature.

   Therefore, respondents should state briefly and specifically (on an element-by-element basis if possible), on a letter accompanying submission of the form why they consider the information concerned to be a trade secret or other proprietary information, whether such information is customarily treated as confidential information by their companies and the industry, and the type of competitive hardship that would result from disclosure of the information. In accordance with the provisions of 10 CFR 1004.11 of DOE's FOIA regulations, DOE will determine whether any information submitted should be withheld from public disclosure.

   If DOE receives a response and does not receive a request, with substantive justification, that the information submitted should not be released to the public, DOE may assume that the respondent does not object to disclosure to the public of any information submitted on the form.

   A new written justification need not be submitted each time the RWPA-830G is submitted if:
   a. items containing information items identified as privileged or confidential have not changed and
   b. a written justification setting forth respondent's views in this regard was previously submitted

   In accordance with the cited statutes and other applicable authority, the information must be made available upon request, to the Congress or any committee of Congress, the General Accounting Office, and other Federal agencies authorized by law to receive such information.

INSTRUCTIONS FOR COMPLETING STANDARD REMITTANCE ADVICE FOR PAYMENT OF FEES

Section 1.0 *Identification Information*
- 1.1 Name of Purchaser as it appears on the Standard Contract, the mailing address, state, and zip code
- 1.2 Name and telephone number of person responsible for the completion of the form.
- 1.3 Standard Contract identification number as assigned by DOE.
- 1.4 Period covered by this advice and date of the payment. Any period different from the assigned three month period should be explained on a separate attachment.

Section 2.0 *Spent Nuclear Fuel (SNF) Fee*
- 2.1 Enter the number of reactors for which the Purchaser had irradiated fuel as of midnight between 6/7 April 1983 (insert in the number of Annex B Forms attached).
- 2.2 Total amount owed to the Nuclear Waste Fund for spent fuel used to generate electricity prior to April 7, 1983 (See Annex B for calculation).
- 2.3 Self explanatory.
- 2.4 Ten year Treasury Note rate on the date the payment is made, to be used if payments are being made using the 40 quarter option or if lump sum payment is made after June 30, 1985.
- 2.5 Unpaid balance before the payment is made.
- 2.6 Enter the payment option (1, 2, or 3) chosen. The selection of payment option must be made within two years of Standard Contract execution
- 2.7 Total payment of fee which the advice represents. Show principal, interest, and total.

Section 3.0 *Fee for Electricity Generated and Sold (MWH)*
- 3.1 Enter the number of reactors the Purchaser is reporting on during this reporting period.
- 3.2 Enter total electricity generated and sold during the reporting period from all reactors being reported. This is the sum of Station Total figures of line 4.2 from all Annex A forms attached, expressed in integerated Hours.
- 3.3 Current Fee Rate as provided by DOE (initially 1.0 MWh which is equal to 1.0 $/MWh)
- 3.4 Total Fee fee Electricity Generated and Sold (MWH) represented by this advice.

Section 4.0 *Underpayment/Late payment (as noted by DOE)*
- 4.1 - 4.5 Self Explanatory.

Section 5.0 *Other Credits Claimed*
- Represents all items for which a Purchaser may receive credit, as specified in the Standard Contract.

Section 6.0 *Total Remittance*
- 6.1 - 6.5 This section is a summary of the pertinent items in the previously mentioned categories with the remittance.

Section 7.0 *Certification*
- Enter the name and title of the individual your company has designated to certify the accuracy of the data. Sign the "Certification" block and enter the current date.

U.S. Department of Energy
Energy Information Administration
Form RWPA-830G

ANNEX A TO APPENDIX G
Standard Remittance Advice for Payment of Fees

OMB No. 1901-0260
(Expires 11/30/93)

Section 1: Identification Information: Please first read the instructions on the back.

1.1 Purchaser Information:
- 1.11 Name: _____
- 1.12 Address: _____
- 1.13 Attention: _____
- 1.14 City: _____
- 1.15 State: _____ 1.16 Zip: _____
- 1.17 Utility ID Number: ___ ___

1.2 Contact Person:
- 1.21 Name: _____
- 1.22 Title: _____
- 1.23 Phone No.:(___)(_____) Ext.:

1.3 Station Name: _____

1.4 Standard Contract Identification Number: _____

1.5 Period Covered (MM/DD/YY):
- 1.51 From: ___/___/___ To: ___/___/___
- 1.52 Date of This Submission: ___/___/___

Section 2. Net Electricity Generated Calculation

Item	Unit 1	Unit 2	Unit 3	Station Total*
2.1 Unit ID Code:				
2.2 Gross Thermal Energy Generated (MWh):				
2.3 Gross Electricity Generated (MWh):				
2.4 Nuclear Station Use While At Least One Nuclear Unit Is In Service** (MWh):				
2.5 Nuclear Station Use While All Nuclear Units Are Out Of Service** (MWh):				
2.6 Net Electricity Generated (MWh) (Item 2.3 minus Item 2.4):				
2.7 Footnote (If any):				

*For a nuclear station with more than one reactor and different ownerships for each reactor, a separate Annex A will be required.
**Utilities unable to meter individual unit use shall report estimated unit use and shall explain in a footnote how the unit data were estimated.

Section 3. Total Energy Adjustment Factor Calculation

3.1 Weighted Energy Adjustment Factor Calculation	Adj. for Sales to ultimate Consumer (ASC)		Adjustment for Sales for Resale (ASR)				
Name of Nuclear Station Owner(s)	Fraction of Sales to ult. Consumer (FSC)	Sales to ultimate Consumer Adj. Factor (SCAF)	Fraction of Sales for Resale (FSR)	National average Adj. Factor (NAF)	Owner's Energy Adj. Factor (OEAF)	Owner's Share (OS)	Weighted Energy Adj. Factor (WEAF)
1.	(. X .) +		(. X .) =		. X .	= .	
2.	(. X .) +		(. X .) =		. X .	= .	
3.	(. X .) +		(. X .) =		. X .	= .	
4.	(. X .) +		(. X .) =		. X .	= .	
5.	(. X .) +		(. X .) =		. X .	= .	
6.	(. X .) +		(. X .) =		. X .	= .	
7.	(. X .) +		(. X .) =		. X .	= .	
8.	(. X .) +		(. X .) =		. X .	= .	
9.	(. X .) +		(. X .) =		. X .	= .	
10.	(. X .) +		(. X .) =		. X .	= .	
11.	(. X .) +		(. X .) =		. X .	= .	
12.	(. X .) +		(. X .) =		. X .	= .	
3.2 Total Energy Adjustment Factor (TEAF = ∑ WEAF)							.

Section 4. Fee Calculation for Electricity Generated and Sold

Item	Unit 1	Unit 2	Unit 3	Station Total*
4.1 Total Energy Adjustment Factor (Enter value from 3.2 above):				
4.2 Electricity Generated and Sold (Items in 4.1 times Items in 2.6):				
— Current Fee Rate (Dollars):	$1.00/MWh	$1.00/MWh	$1.00/MWh	$1.00/MWh
4.3 Current Fee Due (Dollars): (Transfer Station Total to line 3.4 of Appendix G)				

Copy Distribution: White, DOE-Controller; Canary, DOE-OCRWM; Pink, DOE-EIA; Goldenrod, Utility Copy

U.S. Department of Energy
Energy Information Administration
Form NWPA-830G

Annex A to Appendix G

Standard Remittance Advice for Payment of Fees

OMB No. 1901-0260
(Expires 11/30/93)

Annex A Instructions

3. General Information

3.1 Purpose: To report the calculations of fees due the Department of Energy's Nuclear Waste Fund.

3.2 Please read all instructions before completing this form.

3.3 Complete a separate Annex A for each nuclear station. For a nuclear station that has different ownership arrangements for more than one reactor, a separate Annex A will be required for each reactor.

3.4 Submit Annex A Quarterly with Appendix G.

3.5 Where to submit:

U.S. DOE, Office of the Controller
Special Accounts & Payroll Division
(C-216 GTN), Box 500
Germantown, MD 20875-0500

Section 1. Identification Information: (Self explanatory)

Section 2. Net Electricity Generated Calculation

2.1 Unit ID Code: Enter the Reactor Unit Identification (ID) Code as assigned by DOE, for each reactor in the station.

2.2 Gross Thermal Energy Generated (MWh): Utility shall report the thermal output of the nuclear steam supply system during the gross hours of the reporting period.

2.3 Gross Electricity Generated (MWh): Utility shall report this amount for each unit in the appropriate column, and the total in the column labeled "Station Total." This amount is measured at the output terminals of the generator during the reporting period.

2.4 Nuclear Station Use While At Least One Nuclear Unit Is In Service (MWh): Utility shall report this amount for each unit in the appropriate column, and the total in the column called "Station Total." The utility is to report consumption of electricity by the nuclear portion of the station during days in which at least one of the station's nuclear units was on-line and producing electricity. A utility unable to meter an individual unit shall report the estimated unit use, and shall explain in item 2.7 how the unit data were estimated. Note that:

A. During days in which nuclear station use exceeds nuclear station generation, the utility shall treat all resulting negative values as zero for fee calculation purposes.

B. A utility that has multiple nuclear units at one station:

- when at least 1 nuclear unit is operating and when generation from that unit exceeds the nuclear station's use, the utility may assume that the operating unit is supplying electricity for nuclear station use whether or not the electricity has been metered separately or the units terminate to a common electrical busbar; and
- shall report under item 2.5 any electricity use by the nuclear portion of the station during the days in which all nuclear units at the station were out of service simultaneously.

C. A utility that has a metered transmission line connecting an off-station nuclear reactor with another nuclear station may treat the off-station plant as part of this station for fee calculation purposes if it is not double counted.

D. Utility may deduct small quantities of unmetered non-nuclear electricity generation included in "Gross Electricity Generated," provided that it is identified and explained in item 2.7.

E. A utility may deduct nuclear electricity generation which is not sold and does not pass the busbar, provided they identify and explain the deduction in item 2.7 and that the deduction is not double counted.

2.5 Nuclear Station Use While All Nuclear Units Are Out Of Service (MWh): Utility shall report this amount for each unit in the appropriate column, and the total in the "Station Total" column. In this row, the utility shall report the consumption of electricity by the nuclear portion of the station during days in which total nuclear unit use exceeds nuclear generation (e.g., a day in which all nuclear units at the station were out of service at once). Note that a utility unable to meter individual unit use will report estimated unit use, and shall explain in item 2.7 how the unit data were estimated.

2.6 Net Electricity Generated (MWh): The utility shall report this amount for each unit in the appropriate column, and the total in the "Station Total" column. This amount is the result of subtracting items 2.4 from items 2.3.

2.7 Footnote (if any): Utilities that are unable to meter individual unit use shall explain here how the unit data were estimated.

Section 3. Total Energy Adjustment Factor Calculation: The reporting utility shall obtain necessary data from all owners to calculate the Total Energy Adjustment Factor and maintain consistent, accurate, and complete records to support these submissions. The values provided in this section must be accurate to 4 significant digits. If there are more than 12 owners, use a continuation sheet. For a nuclear station with more than one reactor and different ownerships for each reactor, a separate Annex A will be required for each reactor.

3.1 Weighted Energy Adjustment Factor Calculation:

Name of Nuclear Station Owner(s): provide the name(s) in items 1. thru 12. of 3.1. If more than 12 names, use a continuation sheet.

Adjustment for Sales to ultimate Consumer (ASC): is the product of Fraction of Sales to Ultimate Consumer (FSC) and the Sales to ultimate Consumer Adjustment Factor(SCAF).

Fraction of Sales to ultimate Consumer (FSC): is determined by dividing the owner's previous year's annual sales to the ultimate consumer by the sum of the owner's previous year's annual sales to the ultimate consumer plus the owner's previous year's annual sales for resale. These figures can be found on the Energy Information Administration (EIA) Form EIA-861 or the Federal Energy Regulatory Commission (FERC) Form No. 1.

Sales to ultimate Consumer Adjustment Factor (SCAF): is equal to one minus the quotient of all electricity lost or otherwise not sold for each owner, divided by the total electricity available for disposition to ultimate consumers. The total electricity available is the reporting year total of all of an owner's electricity supply which is available for disposition, expressed in kilowatt hours. Electricity lost or otherwise not sold includes: (a) energy furnished without charge, (b) energy used by the company; (c) transmission losses; (d) distribution losses; (e) other unaccounted losses as reported on the Form EIA-861 or the FERC Form No. 1.

Adjustment for Sales for Resale (ASR): is the product of Fraction of Sales for Resale (FSR) and National average Adjustment Factor (NAF).

Fraction of Sales for Resale (FSR): is determined by dividing the owner's previous year's annual sales for resale by the sum of the owner's previous year's annual sales to the ultimate consumer plus the owner's previous year's annual sales for resale. These figures can be found on the Form EIA-861 or the FERC Form No. 1.

National average Adjustment Factor (NAF): is the quotient of the national total of electricity sold divided by the national total of electricity available for disposition.

Owner's Energy Adjustment Factor (OEAF): is the Owner's fraction of metered electricity.

Weighted Energy Adjustment Factor (WEAF): is the product of an Owner's Energy Adjustment Factor (OEAF) times the Owner's Share (OS).

3.2 Total Energy Adjustment Factor (TEAF): is the sum of individual owner's Weighted Energy Adjustment Factors (WEAF).

Section 4. Fee Calculation for Electricity Generated and Sold:

4.1 Total Energy Adjustment Factor. Enter the value from item 3.2 as appropriate.

4.2 Electricity Generated and Sold. Multiply the values in item 4.1 by the "Unit" values in item 2.6. Sum these values and enter in "Station Total".

4.3 Current Fee Due (Dollars): Multiply the values in item 4.2 by one (1) dollar/megawatt hour (or 1.0 mill/kWh), which is the current fee. Add this station fee to the current fee due for all other reactors operated by the Purchaser, and then enter the sum on line 3.4 of the Appendix G Remittance Advice.

[FR Doc. 91-30870 Filed 12-30-91; 8:45 am]

Annex B to Appendix G

Standard Remittance of Advice (RA) for Payment of Fees

This Annex should be completed only for SNF burned before midnight between April 6/7, 1983.

I. *Identification*

A. Purchaser:_____

B. Unit identification (Only one unit may be covered in each report.)

1. Reactor/Facility Name:_____
2. Location:_____
3. Type:_____
4. Capacity:_____
5. Date of Commencement of Operations:_
6. NRC License No.:_____

II. *Fee Calculation*

A. *Discharged nuclear fuel*

B. Nuclear fuel in the reactor core as of midnight of 6/7 April 1983.

1. Burnup[1] (MWDT/MTU)	0—5,000	5,000—10,000	10,000 20,000	20,000 up
2. Initial loading (KgU) (with indicated burnup)				
3. Fee rate($/KgU)	80.00	142.00	162.00	184.00
4. Fee ($)				
5. Total Fee(4)				

Assembly identification	Initial loading (kgu)	Burnup [1] as of midnight 6/7 April 1983 (MWDT/MTU)	Fee
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			

[1] Please provide (as an attachment) a clear reference to the methodology used to derive the burnup figures (computer codes, etc.) and a clear reference to all data used in the deviation of those figures.

C. Total fee.

(Approved by the Office of Management and Budget under control number 1091-0260)

[48 FR 16599, Apr. 18, 1983; 48 FR 23160, May 24, 1983, as amended at 52 FR 35359, Sept. 18, 1987]

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10 CFR 962

PART 962—BYPRODUCT MATERIAL

Sec.
962.1 Scope.
962.2 Purpose.
962.3 Byproduct material.

Authority: The Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.); Energy Reorganization Act of 1974 (42 U.S.C. 5801 *et seq.*); Department of Energy Organization Act (42 U.S.C. 7101 *et seq.*); Nuclear Waste Policy Act (Pub. L. 97-425, 96 Stat. 2201). Source: 52 FR 15940, May 1, 1987, unless otherwise noted.

§962.1 Scope.

This part applies only to radioactive waste substances which are owned or produced by the Department of Energy at facilities owned or operated by or for the Department of Energy under the Atomic Energy Act of 1954 (42 U.S.C. 2011 *et seq*). This part does not apply to substances which are not owned or produced by the Department of Energy.

§962.2 Purpose.

The purpose of this part is to clarify the meaning of the term "byproduct material" under section 11e(1) of the Atomic Energy Act of 1954 (42 U.S.C. 2014(e)(1)) for use only in determining the Department of Energy's obligations under the Resource Conservation and Recovery Act (42 U.S.C. 6901 *et seq.)* with regard to radioactive waste substances owned or produced by the Department of Energy pursuant to the exercise of its responsibilities under the Atomic Energy Act of 1954. This part does not affect materials deemed as byproduct material under section 11e(2) of the Atomic Energy Act of 1954 (42 U.S.C. 2014(e)(2)).

§962.3 Byproduct material.

(a) For purposes of this part, the term "byproduct material" means any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material.

(b) For purposes of determining the applicability of the Resource Conservation and Recovery Act (42 U.S.C. 6901 *et seq.)* to any radioactive waste substance owned or produced by the Department of Energy pursuant to the exercise of its atomic energy research, development, testing and production responsibilities under the Atomic Energy Act of 1954 (42 U.S.C. 2011 *et seq.)*, the words "any radioactive material," as used in paragraph (a) of this section, refer only to the actual radionuclides dispersed or suspended in the waste substance. The nonradioactive hazardous component of the waste substance will be subject to regulation under the Resource Conservation and Recovery Act.

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40 CFR 61
SUBPART H

Subpart H—National Emission Standards for Emissions of Radionuclide Other Than Radon From Department of Energy (DOE) Facilities

Sec.
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Authority: Secs. 101, 112, 114, 116, 301, Clean Air Act as amended (42 U.S.C. 7401, 7412, 7414, 7416, 7601).

Source: 50 FR 5194, Feb. 5, 1985, unless otherwise noted.

§61.90 Designation of facilities.

The provisions of this subpart apply to operations at any facility owned or operated by the Department of Energy that emits any radionuclide other than radon-222 and radon-220 into the air, except that this subpart does not apply to disposal at facilities subject to 40 CFR part 191, subpart B or 40 CFR part 192.

§61.91 Definitions.

As used in this subpart, all terms not defined here have the meaning given them in the Clean Air Act or 40 CFR part 61, subpart A. The following terms shall have the following specific meanings:

(a) "Effective dose equivalent" means the sum of the products of absorbed dose and appropriate factors to account for differences in biological effectiveness due to the quality of radiation and its distribution in the body of reference man. The unit of the effective dose equivalent is the rem. For purposes of this subpart, doses caused by radon-222 and its respective decay products formed after the radon is released from the facility are not included. The method for calculating effective dose equivalent and the definition of reference man are outlined in the International Commission on Radiological Protection's Publication No. 26.

(b) "Facility" means all buildings, structures and operations on one contiguous site.

(c) "Radionuclide" means a type of atom which spontaneously undergoes radioactive decay.

(d) "Residence" means any home, house, apartment building, or other place of dwelling which is occupied during any portion of the relevant year.

§61.92 Standard.

Emissions of radionuclides to the ambient air from Department of Energy facilities shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem/yr.

§61.93 Emission monitoring and test procedures.

(a) To determine compliance with the standard, radionuclide emissions shall be determined and effective dose equivalent values to members of the public calculated using EPA approved sampling procedures, computer models CAP-88 or AIRDOS-PC, or other procedures for which EPA has granted prior approval. DOE facilities for which the maximally exposed individual lives within 3 kilometers of all sources of emissions in the facility, may use EPA's COMPLY model and associated procedures for determining dose for purposes of compliance.

(b) Radionuclide emission rates from point sources (stacks or vents) shall be measured in accordance with the following requirements or other procedures for which EPA has granted prior approval:

(1) Effluent flow rate measurements shall be made using the following methods:

(i) Reference Method 2 of Appendix A to part 60 shall be used to determine velocity and volumetric flow rates for stacks and large vents.

(ii) Reference Method 2A of Appendix A to part 60 shall be used to measure flow rates through pipes and small vents.

(iii) The frequency of the flow rate measurements shall depend upon the variability of the effluent flow rate. For variable flow rates, continuous or frequent flow rate measurements shall be made. For relatively constant flow rates only periodic measurements are necessary.

(2) Radionuclides shall be directly monitored or extracted, collected and measured using the following methods:

(i) Reference Method 1 of Appendix A part 60 shall be used to select monitoring or sampling sites.

(ii) The effluent stream shall be directly monitored continuously with an in-line detector or representative samples of the effluent stream shall be withdrawn continuously from the sampling site following the guidance presented in ANSIN13.1-1969 "Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities" (including the guidance presented in Appendix A of ANSIN13.1) (incorporated by reference—see §61.18). The requirements for continuous sampling are applicable to batch processes when the unit is in operation. Periodic sampling (grab samples) may be used only with EPA's prior approval. Such approval may be granted in cases where continuous sampling is not practical and radionuclide emission rates are relatively constant. In such cases, grab samples shall be collected with sufficient frequency so as to provide a representative sample of the emissions.

(iii) Radionuclides shall be collected and measured using procedures based on the principles of measurement described in Appendix B, Method 114. Use of methods based on principles of measurement different from those described in Appendix B, Method 114 must have prior approval from the Administrator. EPA reserves the right to approve measurement procedures.

(iv) A quality assurance program shall be conducted that meets the performance requirements described in Appendix B, Method 114.

(3) When it is impractical to measure the effluent flow rate at an existing source in accordance with the requirements of paragraph (b)(1) of this section or to monitor or sample an effluent stream at an existing source in accordance with the site selection and sample extraction requirements of paragraph (b)(2) of this section, the facility owner or operator may use alternative effluent flow rate measurement procedures or site selection and sample extraction procedures provided that:

(i) It can be shown that the requirements of paragraph (b) (1) or (2) of this section are impractical for the effluent stream.

(ii) The alternative procedure will not significantly underestimate the emissions.

(iii) The alternative procedure is fully documented.

(iv) The owner or operator has received prior approval from EPA.

(4)(i) Radionuclide emission measurements in conformance with the requirements of paragraph (b) of this section shall be made at all release points which have a potential to discharge radionuclides into the air in quantities which could cause an effective dose equivalent in excess of 1% of the standard. All radionuclides which could contribute greater than 10% of the potential effective dose equivalent for a release point shall be measured. With prior EPA approval, DOE may determine these emissions through alternative procedures. For other release points which have a potential to release radionuclides into the air, periodic confirmatory measurements shall be made to verify the low emissions.

(ii) To determine whether a release point is subject to the emission measurement requirements of paragraph (b) of this section, it is necessary to evaluate the potential for radionuclide emissions for that release point. In evaluating the potential of a release point to discharge radionuclides into the air for the purposes of this section, the estimated radionuclide release rates shall be based on the discharge of the effluent stream that would result if all pollution control equipment did not exist, but the facilities operations were otherwise normal.

(5) Environmental measurements of radionuclide air concentrations at critical receptor locations may be used as an alternative to air dispersion calculations in demonstrating compliance with the standard if the owner or operator meets the following criteria:

(i) The air at the point of measurement shall be continuously sampled for collection of radionuclides.

(ii) Those radionuclides released from the facility, which are the major contributors to the

effective dose equivalent must be collected and measured as part of the environmental measurement program.

(iii) Radionuclide concentrations which would cause an effective dose equivalent of 10% of the standard shall be readily detectable and distinguishable from background.

(iv) Net measured radionuclide concentrations shall be compared to the concentration levels in Table 2 of Appendix E to determine compliance with the standard. In the case of multiple radionuclides being released from a facility, compliance shall be demonstrated if the value for all radionuclides is less than the concentration level in Table 2, and the sum of the fractions that result when each measured concentration value is divided by the value in Table 2 for each radionuclide is less than 1.

(v) A quality assurance program shall be conducted that meets the performance requirements described in Appendix B, Method 114.

(vi) Use of environmental measure- ments to demonstrate compliance with the standard is subject to prior approval of EPA. Applications for approval shall include a detailed description of the sampling and analytical methodology and show how the above criteria will be met.

§61.94 Compliance and reporting.

(a) Compliance with this standard shall be determined by calculating the highest effective dose equivalent to any member of the public at any offsite point where there is a residence, school, business or office. The owners or operators of each facility shall submit an annual report to both EPA headquarters and the appropriate regional office by June 30 which includes the results of the monitoring as recorded in DOE's Effluent Information System and the dose calculations required by § 61.93(a) for the previous calendar year.

(b) In addition to the requirements of paragraph (a) of this section, an annual report shall include the following information:

(1) The name and location of the facility.

(2) A list of the radioactive materials used at the facility.

(3) A description of the handling and processing that the radioactive materials undergo at the facility.

(4) A list of the stacks or vents or other points where radioactive materials are released to the atmosphere.

(5) A description of the effluent controls that are used on each stack, vent, or other release point and an estimate of the efficiency of each control device.

(6) Distances from the points of release to the nearest residence, school, business or office and the nearest farms producing vegetables, milk, and meat.

(7) The values used for all other user-supplied input parameters for the computer models (e.g., meteorological data) and the source of these data.

(8) A brief description of all construction and modifications which were completed in the calendar year for which the report is prepared, but for which the requirement to apply for approval to construct or modify was waived under §61.96 and associated documentation developed by DOE to support the waiver. EPA reserves the right to require that DOE send to EPA all the information that normally would be required in an application to construct or modify, following receipt of the description and supporting documentation.

(9) Each report shall be signed and dated by a corporate officer or public official in charge of the facility and contain the following declaration immediately above the signature line: "I certify under penalty of law that I have personally examined and am familiar with the information submitted herein and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment. See, 18 U.S.C. 1001."

(c) If the facility is not in compliance with the emission limits of §61.92 in the calendar year covered by the report, then the facility must commence reporting to the Administrator on a monthly basis the information listed in paragraph (b) of this section, for the preceding month. These reports will start the month immediately following the submittal of the annual report for the year in noncompliance and will be due 30 days following the end of each month. This increased level of reporting will continue until the Administrator has determined that the monthly reports are no longer necessary. In addition to all the information required in paragraph (b) of this section, monthly reports shall also include the following information:

(1) All controls or other changes in operation of the facility that will be or are being installed to bring the facility into compliance.

(2) If the facility is under a judicial or administrative enforcement decree, the report will describe the facilities performance under the terms of the decree.

(d) In those instances where the information requested is classified, such information will be made available to EPA separate from the report and will be handled and controlled according to applicable security and classification regulations and requirements.

(Approved by the Office of Management and Budget under Control Number 2060- 0191.)

§61.95 Recordkeeping requirements.

All facilities must maintain records documenting the source of input parameters including the results of all measurements upon which they are based, the calculations and/or analytical methods used to derive values for input parameters, and the procedure used to determine effective dose equivalent. This documentation should be sufficient to allow an independent auditor to verify the accuracy of the determination made concerning the facility's compliance with the standard. These records must be kept at the site of the facility for at least five years and, upon request, be made available for inspection by the Administrator, or his authorized representative.

§61.96 Applications to construct or modify.

In addition to any activity that is defined as construction under 40 CFR part 61, subpart A, any fabrication, erection or installation of a new building or structure within a facility that emits radionuclides is also defined as new construction for purposes of 40 CFR part 61, subpart A.

(b) An application for approval under §61.07 or notification of startup under §61.09 does not need to be filed for any new construction of or modification within an existing facility if the effective dose equivalent, caused by all emissions from the new construction or modification, is less than 1% of the standard prescribed in §61.92. For purposes of this paragraph the effective dose equivalent shall be calculated using the source term derived using Appendix D as input to the dispersion and other computer models described in §61.93. DOE may, with prior approval from EPA, use another procedure for estimating the source term for use in this paragraph. A facility is eligible for this exemption only if, based on its last annual report, the facility is in compliance with this subpart.

(c) Conditions to approvals granted under §61.08 will not contain requirements for post approval reporting on operating conditions beyond those specified in §61.94.

§61.97 Exemption from reporting and testing requirements of 40 CFR 61.10.

All facilities designated under this subpart are exempt from the reporting requirements of 40 CFR 61.10.

40 CFR 190

PART 190—ENVIRONMENTAL RADIATION PROTECTION STANDARDS FOR NUCLEAR POWER OPERATIONS

Subpart A—General Provisions

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190.01 Applicability.
190.02 Definitions.

Subpart B—Environmental Standards for the Uranium Fuel Cycle

190.10 Standards for normal operations.
190.11 Variances for unusual operations.
190.12 Effective date.

Authority: Atomic Energy Act of 1954, as amended; Reorganization Plan No. 3, of 1970.

Source: 42 FR 2860, Jan. 14, 1977, unless otherwise noted.

Subpart A—General Provisions

§190.01 Applicability.

The provisions of this part apply to radiation doses received by members of the public in the general environment and to radioactive materials introduced into the general environment as the result of operations which are part of a nuclear fuel cycle.

§190.02 Definitions.

(a) "Nuclear fuel cycle" means the operations defined to be associated with the production of electrical power for public use by any fuel cycle through utilization of nuclear energy.

(b) "Uranium fuel cycle" means the operations of milling of uranium ore, chemical conversion of uranium, isotopic enrichment of uranium, fabrication of uranium fuel, generation of electricity by a light-water-cooled nuclear power plant using uranium fuel, and reprocessing of spent uranium fuel, to the extent that these directly support the production of electrical power for public use utilizing nuclear energy, but excludes mining operations, operations at waste disposal sites, transportation of any radioactive material in support of these operations, and the reuse of recovered non-uranium special nuclear and by-product materials form the cycle.

(c) "General environment" means the total terrestrial, atmospheric and aquatic environments outside sites upon which any operation which is part of a nuclear fuel cycle is conducted.

(d) "Site" means the area contained within the boundary of a location under the control of persons possessing or using radioactive material on which is conducted one or more operations covered by this part.

(e) "Radiation" means any or all of the following: Alpha, beta, gamma, or X-rays; neutrons; and high-energy electrons, protons, or other atomic particles; but not sound or radio waves, nor visible, infrared, or ultra-violet light.

(f) "Radioactive material" means any material which spontaneously emits radiation.

(g) "Curie" (Ci) means that quantity of radioactive material producing 37 billion nuclear transformations per second. (One millicurie (mCi)=0.001 Ci.)

(h) "Does equivalent" means the product of absorbed dose and appropriate factors to account for differences in biological effectiveness due to the quality of radiation and its spatial distribution in the body. The unit of dose equivalent is the "rem." (One millirem (mrem)=0.001 rem.)

(i) "Organ" means any human organ exclusive of the dermis, the epidermis, or the cornea.

(j) "Gigawatt-year" refers to the quantity of electrical energy produced at the busbar of a generating station. A gigawatt is equal to one billion watts. A gigawatt-year is equivalent to the amount of energy output represented by an average electric power level of one gigawatt sustained for one year.

(k) "Member of the public" means any individual that can receive a radiation dose in the general environment, whether he may or may not also be exposed to radiation in an occupation associated with a nuclear fuel cycle. However, an individual is not considered a member of the public during any period in which he is engaged in carrying out any operation which is part of a nuclear fuel cycle.

(l) "Regulatory agency" means the government agency responsible for issuing regulations governing the use of sources of radiation or radioactive materials or emissions therefrom and carrying out inspection and enforcement activities to assure compliance with such regulations.

Subpart B—Environmental Standards for the Uranium Fuel Cycle

§190.10 Standards for normal operations.

Operations covered in this subpart shall be conducted in such a manner as to provide reasonable assurance that:

(a) The annual does equivalent does not exceed 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public as the result of exposures to planned discharges of radioactive materials, radon and its daughters excepted, to the general environment from uranium fuel cycle operations and to radiation from these operations.

(b) The total quantity of radioactive materials entering the general environment from the entire uranium fuel cycle, per gigawatt-year of electrical energy produced by the fuel cycle, contains less than 50,000 curies of krypton-85, 5 millicuries of iodine-129, and 0.5 millicuries combined of plutonium-239 and other alpha-emitting transuranic radionuclides with half-lives greater than one year.

§190.11 Variances for unusual operations.

The standards specified in §190.10 may be exceeded if:

(a) The regulatory agency has granted a variance based upon its determination that a temporary and unusual operation condition exists and continued operation is in the public interest, and

(b) Information is promptly made a mater of public record delineating the nature of unusual operating conditions, the degree to which this operation is expected to result in levels in excess of the standards, the basis of the variance, and the schedule for achieving conformance with the standards.

§190.12 Effective date.

(a) The standards in §190.10(a) shall be effective December 1, 1979, except that for doses arising from operations associated with the milling of uranium ore the effective date shall be December 1, 1980.

(b) The standards in §190.10(b) shall be effective December 1, 1979, except that the standards for krypton-85 and iodine-129 shall be effective January 1, 1983, for any such radiation materials generated by the fission process after these dates.

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40 CFR 191

PART 191—ENVIRONMENTAL RADIATION PROTECTION STANDARDS FOR MANAGEMENT AND DISPOSAL OF SPENT NUCLEAR FUEL, HIGH-LEVEL AND TRANSURANIC RADIOACTIVE WASTES

Subpart A—Environmental Standards for Management and Storage

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191.01 Applicability.
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191.03 Standards.
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Subpart B—Environmental Standards for Disposal

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191.17 Alternative provisions for disposal.
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Appendix A—Table for Subpart B
Appendix B—Guidance for Implementation of Subpart B

Authority: The Atomic Energy Act of 1954, as amended; Reorganization Plan No. 3 of 1970; and the Nuclear Waste Policy Act of 1982.

Source: 50 FR 38084, Sept. 19, 1985, unless otherwise noted.

Subpart A—Environmental Standards for Management and Storage

§191.01 Applicability.

This subpart applies to:

(a) Radiation doses received by members of the public as a result of the management (except for transportation) and storage of spent nuclear fuel or high-level or transuranic radioactive wastes at any facility regulated by the Nuclear Regulatory Commission or by Agreement States, to the extent that such management and storage operations are not subject to the provisions of Part 190 of Title 40; and

(b) Radiation doses received by members of the public as a result of the management and storage of spent nuclear fuel or high-level or transuranic wastes at any disposal facility that is operated by the Department of energy and that is not regulated by the Commission or by Agreement States.

§191.02 Definitions.

Unless otherwise indicated in this subpart, all terms shall have the same meaning as in Subpart A of Part 190.

(a) "Agency" means the Environmental Protection Agency.

(b) "Administrator" means the Administrator of the Environmental Protection Agency.

(c) "Commission" means the Nuclear Regulatory Commission.

(d) "Department" means the Department of Energy.

(e) "NWPA" means the Nuclear Waste Policy Act of 1982 (Pub. L. 97-425)

(f) "Agreement State" means any State with which the Commission or the Atomic Energy Commission has entered into an effective agreement under subsection 274b of the Atomic Energy Act of 1954, as amended (68 Stat. 919).

(g) "Spent nuclear fuel" means fuel that has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated by reprocessing.

(h) "High-level radioactive waste," as used in this part, means high-level radioactive waste as defined in the Nuclear Waste Policy Act of 1982 (Pub. L. 97-425).

(i) "Transuranic radioactive waste," as used in this part, means waste containing more than 100 nanocuries of alpha-emitting transuranic isotopes, with half-lives grater than twenty years, per gram of waste, except for;

(1) High-level radioactive wastes;

(2) wastes that the Department has determined, with the concurrence of the Administrator, do not need the degree of isolation required by this part; or

(3) wastes that the Commission has approved for disposal on a case-by-case basis in accordance with 10 CFR Part 61.

(j) "Radioactive wastes," as used in this part, means the high-level and transuranic radioactive waste covered by this part.

(k) "Storage" means retention of spent nuclear fuel or radioactive waste with the intent and capability to readily retrieve such fuel or waste for subsequent use, processing, or disposal.

(l) "Disposal" means permanent isolation of spent nuclear fuel or radioactive waste from the accessible environment with on intent of recovery, whether or not such isolation permits the recovery of such fuel or waste. For example, disposal of waste in a mined geologic repository occurs when all of the shafts to the repository are backfilled and sealed.

(m) "Management" means any activity, operation, or process (except for transportation) conducted to prepare spent nuclear fuel or radioactive waste for storage or disposal, or the activities associated with placing such fuel or waste in a disposal system.

(n) "Site" means an area contained within the boundary of a location under the effective control of persons possessing or using spent nuclear fuel or radioactive waste that are involved in any activity, operation, or process covered by this subpart.

(o) "General environment" means the total terrestrial, atmospheric, and aquatic environments outside sites within which any activity, operation, or process associated with the management and storage of spent nuclear fuel or radioactive waste is conducted.

(p) "Member of the public" means any individual except during the time when that individual is a worker engaged in any activity, operation, or process that is covered by the Atomic Energy Act of 1954, as amended.

(q) "Critical organ" means the most exposed human organ or tissue exclusive of the integumentary system (skin) and the cornea.

§193.03 Standards.

(a) Management and storage of spent nuclear fuel or high-level or transuranic radioactive wastes at all facilities regulated by the Commission or by Agreement States shall be conducted in such a manner as to provide reasonable assurance that the combined annual dose equivalent to any member of the public in the general environment resulting from:

(1) Discharges of radioactive material and direct radiation from such management and storage and

(2) all operations covered by Part 190; shall not exceed 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other critical organ.

(b) Management and storage of spent nuclear fuel or high-level or transuranic radioactive wastes at all facilities for the disposal of such fuel or waste that are operated by the Department and that are not regulated by the Commission or Agreement States shall be conducted in such a manner as to provide reasonable assurance that the combined annual dose equivalent to any member of the public in the general environment resulting from discharges of radioactive material and direct radiation from such management and storage shall not exceed 25 millirems to the whole body and 75 millirems to any critical organ.

§191.04 Alternative standards.

(a) The Administrator may issue alternative standards from those standards established in §191.03(b) for waste management and storage activities at facilities that are not regulated by the Commission or Agreement States if, upon review of an application for such alternative standards:

(1) The Administrator determines that such alternative standards will prevent any member of the public from receiving a continuous exposure of more than 100 millirems per year dose equivalent and an infrequent exposure of more than 500 millirems dose equivalent in a year from all sources, excluding natural background and medical procedures; and

(2) The Administrator promptly makes a matter of public record the degree to which continued operation of the facility is expected to result in levels in excess of the standards specified in §191.03(b).

(b) An application for alternative standards shall be submitted as soon as possible after the Department determines that continued operation of a facility will exceed the levels specified in §191.03(b) and shall include all information necessary for the Administrator to make the determinations called for in §191.04(a).

(c) Requests for alternative standards shall be submitted to the Administrator, U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20450.

§191.05 Effective date.

The standards in this subpart shall be effective on November 18, 1985.

Subpart B—Environmental Standards for Disposal

§191.11 Applicability.

(a) This subpart applies to:

(1) Radioactive materials released into the accessible environment as a result of the disposal of spent nuclear fuel or high-level or transuranic radioactive wastes;

(2) Radiation doses received by members of the public as a result of such disposal; and

(3) Radioactive contamination of certain sources of ground water in the vicinity of disposal systems for such fuel or wastes.

(b) However, this subpart does not apply to disposal directly into the oceans or ocean sediments. This subpart also does not apply to wastes disposed of before the effective date of this rule.

§191.12 Definitions.

Unless otherwise indicated in this subpart, all terms shall have the same meaning as in Subpart A of this part.

(a) "Disposal system" means any combination of engineered and natural barriers that isolate spent nuclear fuel or radioactive waste after disposal.

(b) "Waste," as used in this subpart, means any spent nuclear fuel or radioactive waste isolated in a disposal system.

(c) "Waste form" means the materials comprising the radioactive components of waste and any encapsulating or stabilizing matrix.

(d) "Barrier" means any material or structure that prevents or substantially delays movement of water or radionuclides toward the accessible environment. For example, a barrier may be a geologic structure, a canister, a waste form with physical and chemical characteristics that significantly decrease the mobility of radionuclides, or a material placed over and around waste, provided that the material or structure substantially delays movement of water or radionuclides.

(e) "Passive institutional control" means:

(1) Permanent markers placed at a disposal site,

(2) public records and archives,

(3) government ownership and regulations regarding land or resource use, and

(4) other methods of preserving knowledge about the location, design, and contents of a disposal system.

(f) "Active institutional control" means:

(1) Controlling access to a disposal site by any means other than passive institutional controls;

(2) performing maintenance operations or remedial actions at a site,

(3) controlling or cleaning up releases from a site, or (4) monitoring parameters related to disposal system performance.

(g) "Controlled area" means:

(1) A surface location, to be identified by passive institutional controls, that encompasses no more than 100 square kilometers and extends horizontally no more than five kilometers in any direction from the outer boundary of the original location of the radioactive wastes in a disposal system; and

(2) the subsurface underlying such a surface location.

(h) "Ground water" means water below the land surface in a zone of saturation.

(i) "Aquifer" means an underground geological formation, group of formations, or part of a formation that is capable of yielding a significant amount of water to a well or spring.

(j) "Lithosphere" means the solid part of the Earth below the surface, including any ground water contained within it.

(k) "Accessible environment" means:

(1) The atmosphere;

(2) land surfaces;

(3) surface waters;

(4) oceans; and

(5) all of the lithosphere that is beyond the controlled area.

(l) "Transmissivity" means the hydraulic conductivity integrated over the saturated thickness of an underground formation. The transmissivity of a series of formations is the sum of the individual transmissivities of each formation comprising the series.

(m) "Community water system" means a system for the provision to the public of piped water for human consumption, if such system has at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.

(n) "Significant source of ground water," as used in this part, means;

(1) An aquifer that:

(i) Is saturated with water having less than 10,000 milligrams per liter of total dissolved solids;

(ii) is within 2,500 feet of the land surface;

(iii) has a transmissivity greater than 200 gallons per day per foot, *Provided*, That any formation or part of a formation included within the source of ground water has hydraulic conductivity grater than 2 gallons per day per square foot; and

(iv) is capable of continuously yielding at least 10,000 gallons per day to a pumped or flowing well for a period of at least a year; or (2) an aquifer that provides the primary source of water for a community water system as of the effective date of this subpart.

(o) "Special source of ground water," as used in this part, means those Class I ground waters identified in accordance with the Agency's Ground-Water Protection Strategy published in August 1984 that:

(1) Are within the controlled area encompassing a disposal system or are less than five kilometers beyond the controlled area;

(2) are supplying drinking water for thousands of persons as of the date that the Department chooses a location within that area for detailed characterization as a potential site for a disposal system (e.g., in accordance with section 112(b)(1)(B) of the NWPA); and

(3) are irreplaceable in that no reasonable alternative source of drinking water is available to that population.

(p) "Undisturbed performance" means the predicted behavior of a disposal system, including consideration of the uncertainties in predicted behavior, if the disposal system is not disrupted by human intrusion or the occurrence of unlikely natural events.

(q) "Performance assessment" means an analysis that:

(1) Identifies the processes and events that might affect the disposal system;

(2) examines the effects of these processes and events on the performance of the disposal system; and

(3) estimates the cumulative releases of radionuclides, considering the associated uncertainties, caused by all significant processes and events. These estimates shall be incorporated into an overall probability distribution of cumulative release to the extent practicable.

(r) "Heavy metal" means all uranium, plutonium, or thorium placed into a nuclear reactor.

(s) "Implementing agency," as used in this subpart, means the Commission for spent nuclear fuel or high-level or transuranic waste to be disposed of in facilities licensed by the Commission in accordance with the Energy Reorganization Act of 1974 and the Nuclear Waste Policy Act of 1982, and it means the Department for all other radioactive wastes covered by this part.

§191.13 Containment requirements.

(a) Disposal systems for spent nuclear fuel or high-level or transuranic radioactive wastes shall be designed to provide a reasonable expectation, based upon performance assessments, that the cumulative releases of radionuclides to the accessible environment for 10,000 years after disposal from all significant processes and events that may affect the disposal system shall:

(1) Have a likelihood of less than one chance in 10 of exceeding the quantities calculated according to Table 1 (Appendix A); and

(2) Have a likelihood of less than one chance in 1,000 of exceeding ten times the quantities calculated according to Table 1 (Appendix A).

(b) Performance assessments need not provide complete assurance that the requirements of §191.13(a) will be met. Because of the long time period involved and the nature of the events

and processes of interest, there will inevitable be substantial uncertainties in projecting disposal system performance. Proof of the future performance of a disposal system is not to be had in the ordinary sense of the word in situations that deal with much shorter time frames. Instead, what is required is a reasonable expectation, on the basis of the record before the implementing agency, that compliance with §191.13(a) will be achieved.

§191.14 Assurance requirements.

To provide the confidence needed for long-term compliance with the requirements of §191.13, disposal of spent nuclear fuel or high-level or transuranic wastes shall be conducted in accordance with the following provisions, except that these provisions do not apply to facilities regulated by the Commission (see 10 CFR Part 60 for comparable provisions applicable to facilities regulated by the Commission):

(a) Active institutional controls over disposal sites should be maintained for as long a period of time as is practicable after disposal; however, performance assessments that assess isolation of the wastes from the accessible environment shall not consider any contributions from active institutional controls for more than 100 years after disposal.

(b) Disposal systems shall be monitored after disposal to detect substantial and detrimental deviations from expected performance. This monitoring shall be done with techniques that do not jeopardize the isolation of the wastes and shall be conducted until there are no significant concerns to be addressed by further monitoring.

(c) Disposal sites shall be designated by the most permanent markers, records and other passive institutional controls practicable to indicate the dangers of the wastes and their location.

(d) Disposal systems shall use different types of barriers to isolate the wastes from the accessible environment. Both engineered and natural barriers shall be included.

(e) Places where there has been mining for resources, or where there is a reasonable expectation of exploration for scarce or easily accessible resources, or where there is a significant concentration of any material that is not widely available from other sources, should be avoided in selecting disposal sites. Resources to be considered shall include minerals, petroleum or natural gas, valuable geologic formations, and ground waters that are either irreplaceable because there is no reasonable alternative source of drinking water available for substantial populations or that are vital to the preservation of unique and sensitive ecosystems. Such places shall not be used for disposal of the wastes covered by this part unless the favorable characteristics of such places compensate for their greater likelihood of being disturbed in the future.

(f) Disposal systems shall be selected so that removal of most of the wastes is not precluded for a reasonable period of time after disposal.

§191.15 Individual protection requirements.

Disposal systems for spent nuclear fuel or high-level or transuranic radioactive wastes shall be designed to provide a reasonable expectation the at, for 1,000 years after disposal, undisturbed performance of the disposal system shall not cause the annual dose equivalent from the disposal system to any member of the public in the accessible environment to exceed 25 millirems to the whole body or 75 millirems to any critical organ. All potential pathways (associated with undisturbed performance) from the disposal system to people shall be considered, including the assumption that individuals consume 2 liters per day of drinking water from any significant source of ground water outside of the controlled area.

§191.16 Ground water protection requirements.

(a) Disposal systems for spent nuclear fuel or high-level or transuranic radioactive wastes shall be designed to provide a reasonable expectation that, for 1,000 years after disposal, undisturbed performance of the disposal system shall not cause the radionuclide concentrations averaged over any year in water withdrawn from any portion of a special source of ground water to exceed:

(1) 5 picocuries per liter of radium-226 and radium-228;

(2) 15 picocuries per liter of alpha-emitting radionuclides (including radium-226 and radium-228 but excluding radon); or

(3) The combined concentrations of radionuclides that emit either beta or gamma radiation that would produce an annual dose equivalent to the total body or any internal organ greater than 4 millirems per year if an individual consumed 2 liters per day of drinking water from such a source of ground water.

(b) If any of the average annual radionuclide concentrations existing in a special source of ground water before construction of the disposal system already exceed the limits in §191.16(a), the disposal system shall be designed to provide a reasonable expectation that, for 1,000 years after disposal, undisturbed performance of the disposal system shall not increase the existing average annual radionuclide concentrations in water withdrawn from that special source of ground water by more than the limits established in §191.16(a).

§191.17 Alternative provisions for disposal.

The Administrator may, by rule, substitute for any of the provisions of Subpart B alternative provisions chosen after:

(a) The alternative provisions have been proposed for public comment in the FEDERAL REGISTER together with information describing the costs, risks, and benefits of disposal in accordance with the alternative provisions and the reasons why compliance with the existing provisions of Subpart B appears inappropriate;

(b) A public comment period of at least 90 days has been completed, during which an opportunity for public hearings in affected areas of the country has been provided; and

(c) The public comments received have been fully considered in developing the final version of such alternative provisions.

§191.18 Effective date.

The standards in this subpart shall be effective on November 18, 1985.

[50 FR 38084, Sept. 19, 1985; 40 FR 40003, Oct. 1, 1985]

Appendix A-Table for Subpart B

TABLE 1—RELEASE LIMITS FOR CONTAINMENT REQUIREMENTS

(Cumulative releases to the accessible environment for 10,000 years after disposal)

Radionuclide	Release limit per 1,000 MTHM or other unit of waste (see notes) (curies)
Americium-241 or 243	100
Carbon-14	100
Cesium-135 or -137	1,000
Iodine-129	100
Neptunium-237	100
Plutonium-238, -239, -240, or -242	100
Radium-226	100
Strontium-90	1,000
Technetium-99	10,000
Thorium-230 or -232	10
Tin-126	1,000
Uranium-233, -234, -235, -236, -238	100
Any other alpha-emitting radionuclide with a half-life greater than 20 years	100
Any other radionuclide with a half-life greater than 20 years that does not emit alpha particles	1,000

Application of Table 1

Note 1: *Units of Waste.* The Release Limits in Table 1 apply to the amount of wastes in any one of the following:

(a) An amount of spent nuclear fuel containing 1,000 metric tons of heavy metal (MTHM) exposed to a burnup between 25,000

megawatt-days per metric ton of heavy metal (MWd/MTHM) and 40,000 MWd/MTHM;

(b) The high-level radioactive wastes generated from reprocessing each 1,000 MTHM exposed to a burnup between 25,000 MWd/MTHM and 40,000 MWd/MTHM;

(c) Each 100,000,000 curies of gamma or beta-emitting radionuclides with half-lives greater than 20 years but less than 100 years (for use as discussed in Note 5 or with materials that are identified by the Commission as high-level radioactive waste in accordance with part B of the definition of high-level waste in the NWPA);

(d) Each 1,000,000 curies of other radionuclides (i.e., gamma or beta-emitters with half-lives greater than 100 years or any alpha-emitters with half-lives greater than 20 years) (for use as discussed in Note 5 or with materials that are identified by the Commission as high-level radioactive waste in accordance with part B of the definition of high-level waste in the NWPA); or

(e) An amount of transuranic (TRU) wastes containing one million curies of alpha-emitting transuranic radionuclides with half-lives greater than 20 years.

Note 2: *Release Limits for Specific Disposal Systems.* To develop Release Limits for a particular disposal system, the quantities in Table 1 shall be adjusted for the amount of waste included in the disposal system compared to the various units of waste defined in Note 1. For example:

(a) If a particular disposal system contained the high-level wastes from 50,000 MTHM, the Release Limits for that system would be the quantities in Table 1 multiplied by 50 (50,000 MTHM divided by 1,000 MTHM).

(b) If a particular disposal system contained three million curies of alpha-emitting transuranic wastes, the Release Limits for that system would be the quantities in Table 1 multiplied by three (three million curies divided by one million curies).

(c) If a particular disposal system contained both the high-level wastes from 50,000 MTHM *and* 5 million curies of alpha-emitting transuranic wastes, the Release Limits for that system would be the quantities in Table 1 multiplied by 55:

$$\frac{50{,}000\,MTHM}{1{,}000\,MTHM} + \frac{5{,}000{,}000\,curies\,TRU}{1{,}000{,}000\,curies\,TRU} = 55$$

Note 3: *Adjustments for Reactor Fuels with Different Burnup.* For disposal systems containing reactor fuels (or the high-level wastes from reactor fuels) exposed to an average burnup of less than 25,000 MWd/MTHM or greater than 40,000 MWd/MTHM, the units of waste defined in (a) and (b) of Note 1 shall be adjusted. The unit shall be multiplied by the ratio of 30,000 MWd/MTHM divided by the fuel's actual average burnup, except that a value of 5,000 MWd/MTHM may be used when the average fuel burnup is below 5,000 MWd/MTHM and a value of 100,000 MWd/MTHM shall be used when the average fuel burnup is above 100,000 MWd/MTHM. This adjusted unit of waste shall then be used in determining the Release Limits for the disposal system.

For example, if a particular disposal system contained only high-level wastes with an average burnup of 3,000 MWd/MTHM, the unit of waste for that disposal system would be:

$$1{,}000\,MTHM \times \frac{(30{,}000)}{(5{,}000)} = 6{,}000\,MTHM$$

If that disposal system contained the high-level wastes from 60,000 MTHM (with an average burnup of 3,000 MWd/MTHM), then the Release Limits for that system would be the quantities in Table 1 multiplied by ten:

$$\frac{60{,}000\,MTHM}{6{,}000\,MTHM} = 10$$

which is the same as:

$$\frac{60{,}000\,MTHM}{1{,}000\,MTHM} \times \frac{(5{,}000\,MWd/MTHM)}{(30{,}000\,MWd/MTHM)} = 10$$

Note 4: *Treatment of Fractionated High-Level Wastes.* In some cases, a high-level waste stream from reprocessing spent nuclear fuel may have been (or will be) separated into two or more high-level waste components destined for different disposal systems. In such cases, the implementing agency may allocate the Release Limit multiplier (based upon the original MTHM and the average fuel burnup of the high-level waste stream) among the various disposal systems as it chooses, provided that the total Release Limit multiplier used for that waste stream at all of its disposal systems may not exceed the Release Limit multiplier that would be used if the entire waste stream were disposed of in one disposal system.

Note 5: *Treatment of Wastes with Poorly Known Burnups or Original MTHM.* In some cases, the records associated with particular high-level waste streams may not be adequate to accurately determine the original metric tons of heavy metal in the reactor fuel that created the waste, or to determine the average burnup that the fuel was exposed to. If the uncertainties are such that the original amount of heavy metal or the average fuel burnup for particular high-level waste streams cannot be quantified, the units of waste derived from (a) and (b) of Note 1 shall no longer be used. Instead, the units of waste defined in (c) and (d) of Note 1 shall be used for such high-level waste streams. If the uncertainties in such information allow a range of values to be associated with the original amount of heavy metal or the average fuel burnup, then the calculations described in previous Notes will be conducted using the values that result in the smallest Release Limits, except that the Release Limits need not be smaller than those that would be calculated using the units of waste defined in (c) and (d) of Note 1.

Note 6: *Uses of Release Limits to Determine Compliance with §191.13.* Once release limits for a particular disposal system have been determined in accordance with Notes 1 through 5, these release limits shall be used to determine compliance with the requirements of §191.13 as follows. In cases where a mixture of radionuclides is projected to be released to the accessible environment, the limiting values shall be determined as follows: For each radionuclide in the mixture, determine the ratio between the cumulative release quantity projected over 10,000 years and the limit for that radionuclide as determined from Table 1 and Notes 1 through 5. The sum of such ratios for all the radionuclides in the mixture may not exceed one with regard to §191.13(a)(1) and may not exceed ten with regard to §191.13(a)(2).

For example, if radionuclides A, B, and C are projected to be released in amounts Q_a, Q_b, and Q_c, and if the applicable Release Limits are RL_a, RL_b, and RL_c, then the cumulative releases over 10,000 years shall be limited so that the following relationship exists:

$$\frac{Q_a}{RL_a} + \frac{Q_b}{RL_b} + \frac{Q_c}{RL_c} < 1$$

Appendix B-Guidance for Implementation of Subpart B

[Note: The supplemental information in this appendix is not an integral part of 40 CFR Part 191. Therefore, the implementing agencies are not bound to follow this guidance. However, it is included because it describes the Agency's assumptions regarding the implementation of Subpart B. This appendix will appear in the Code of Federal Regulations.]

The Agency believes that the implementing agencies must determine compliance with §§191.13, 191.15, and 191.16 of Subpart B by evaluating long-term predictions of disposal

system performance. Determining compliance with §191.13 will also involve predicting the likelihood of events and processes that may disturb the disposal system. In making these various predictions, it will be appropriate for the implementing agencies to make use of rather complex computational models, analytical theories, and prevalent expert judgment relevant to the numerical predictions. Substantial uncertainties are likely to be encountered in making these predictions. In fact, sole reliance on these numerical predictions to determine compliance may not be appropriate; the implementing agencies may choose to supplement such predictions with qualitative judgments as well. Because the procedures for determining compliance with Subpart B have not been formulated and tested yet, this appendix to the rule indicates the Agency's assumptions regarding certain issues that may arise when implementing §§191.13, 191.15, and 191.16. Most of this guidance applies to any type of disposal system for the wastes covered by this rule. However, several sections apply only to disposal in mined geologic repositories and would be inappropriate for other types of disposal systems.

Consideration of Total Disposal System. When predicting disposal system performance, the Agency assumes that reasonable projections of the protection expected from all of the engineered and natural barriers of a disposal system will be considered. Portions of the disposal system should not be disregarded, even if projected performance is uncertain, except for portions of the system that make negligible contributions to the overall isolation provided by the disposal system.

Scope of Performance Assessments. Section 191.13 requires the implementing agencies to evaluate compliance through performance assessments as defined in §191.12(q). The Agency assumes that such performance assessments need not consider categories of events or processes that are estimated to have less than one chance in 10,000 of occurring over 10,000 years. Furthermore, the performance assessments need not evaluate in detail the releases from all events and processes estimated to have a greater likelihood of occurrence. Some of these events and processes may be omitted from the performance assessments if there is a reasonable expectation that the remaining probability distribution of cumulative releases would not be significantly changed by such omissions.

Compliance with §191.13. The Agency assumes that, whenever practicable, the implementing agency will assemble all of the results of the performance assessments to determine compliance with §191.13 into a "complementary cumulative distribution function" that indicates the probability of exceeding various levels of cumulative release. When the uncertainties in parameters are considered in a performance assessment, the effects of the uncertainties considered can be incorporated into a single such distribution function for each disposal system considered. The Agency assumes that a disposal system can be considered to be in compliance with §191.13 if this single distribution function meets the requirements of §191.13(a).

Compliance with §§191.15 and 191.16. When the uncertainties in undisturbed performance of a disposal system are considered, the implementing agencies need not require that a very large percentage of the range of estimated radiation exposures or radionuclide concentrations fall below limits established in §§191.15 and 191.16, respectively. The Agency assumes that compliance can be determined based upon "best estimate" predictions (e.g., the mean or the median of the appropriate distribution, whichever is higher).

Institutional Controls. To comply with §191.14(a), the implementing agency will assume that none of the active institutional controls prevent or reduce radionuclide releases for more than 100 years after disposal. However, the Federal Government is committed to retaining ownership of all disposal sites for spent nuclear fuel and high-level and transuranic radioactive wastes and will establish appropriate markers and records, consistent with §191.14(c). The Agency assumes that, as long as such passive institutional controls endure and are understood, they:

(1) can be effective in deterring systematic or persistent exploitation of these disposal sites; and

(2) can reduce the likelihood of inadvertent, intermittent human intrusion to a degree to be determined by the implementing agency. However, the Agency believes that passive institutional controls can never be assumed to eliminate the chance of inadvertent and intermittent human intrusion into these disposal sites.

Consideration of Inadvertent Human Intrusion into Geologic Repositories. The most speculative potential disruptions of a mined geologic repository are those associated with inadvertent human intrusion. Some types of intrusion would have virtually no effect on a repository's containment of waste. On the other hand, it is possible to conceive of intrusions (involving widespread societal loss of knowledge regarding radioactive wastes) that could result in major disruptions that no reasonable repository selection or design precautions could alleviate. The Agency believes that the most productive consideration of inadvertent intrusion concerns those realistic possibilities that may be usefully mitigated by repository design, site selection, or use of passive controls (although passive institutional controls should not be assumed to completely rule out the possibility of intrusion). Therefore, inadvertent and intermittent intrusion by exploratory drilling for resources (other than any provided by the disposal system itself) can be the most severe intrusion scenario assumed by the implementing agencies. Furthermore, the implementing agencies can assume that passive institutional controls or the intruders' own exploratory procedures are adequate for the intruders to soon detect, or be warned of, the incompatibility of the area with their activities.

Frequency and Severity of Inadvertent Human Intrusion into Geologic Repositories. The implementing agencies should consider the effects of each particular disposal system's site, design, and passive institutional controls in judging the likelihood and consequences of such inadvertent exploratory drilling. However, the Agency assumes that the likelihood of such inadvertent and intermittent drilling need not be taken to be greater than 30 boreholes per square kilometer of repository area per 10,000 years for geologic repositories in proximity to sedimentary rock formations, or more than 3 boreholes per square kilometer per 10,000 years for repositories in other geologic formations. Furthermore, the Agency assumes that the consequences of such inadvertent drilling need not be assumed to be more severe than:

(1) Direct release to the land surface of all the ground water in the repository horizon that would promptly flow through the newly created borehole to the surface due to natural lithostatic pressure-or (if pumping would be required to raise water to the surface) release of 200 cubic meters of ground water pumped to the surface if that much water is readily available to be pumped; and

(2) creation of a ground water flow path with a permeability typical of a borehole filled by the soil or gravel that would normally settle into an open hole over time—not the permeability of a carefully sealed borehole.

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40 CFR 192

PART 192—HEALTH AND ENVIRONMENTAL PROTECTION STANDARDS FOR URANIUM AND THORIUM MILL TAILINGS

Subpart A—Standards for the Control of Residual Radioactive Materials from Inactive Uranium Processing Sites

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192.00 Applicability.
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Subpart B—Standards for Cleanup of Land and Buildings Contaminated with Residual Radioactive Materials from Inactive Uranium Processing Sites

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Subpart D—Standards for Management of Uranium Byproduct Materials Pursuant to Section 84 of the Atomic Energy Act of 1954, as Amended

192.30 Applicability.
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Table A to Subpart D

Subpart E—Standards for Management of Thorium Byproduct Materials Pursuant to Section 84 of the Atomic Energy Act of 1954, as Amended

192.40 Applicability.
192.41 Provisions.
192.42 Substitute provisions.
192.43 Effective date.

Authority: Sec. 275 of the Atomic Energy Act of 1954, 42 U.S.C. 2022, as added by the Uranium Mill Tailings Radiation Control Act of 1978, Pub. L. 95-604, as amended.

Source: 48 FR 602, Jan. 4, 1983, unless otherwise noted.

Subpart A—Standards for the Control of Residual Radioactive Materials from Inactive Uranium Processing Sites.

§192.00 Applicability.

This subpart applies to the control of residual radioactive materials at designated processing or depository sites under section 108 of the Uranium Mill Tailings Radiation Control Act of 1978 (henceforth designated "the Act"), and to restoration of such sites following any use of subsurface minerals under section 104(h) of the Act.

§192.01 Definitions.

(a) Unless otherwise indicated in this subpart, all terms shall have the same meaning as in Title I of The Act.

(b) *Remedial* action means any action performed under section 108 of the Act.

(c) *Control* means any remedial action intended to stabilize, inhibit future misuse of, or reduce emissions or effluent from residual radioactive materials.

(d) *Disposal site* means the region within the smallest perimeter of residual radioactive material (excluding cover materials) following completion of control activities.

(e) *Depository site* means a disposal site (other than a processing site) selected under section 104(b) or 105(b) of the Act.

(f) *Curie* (Ci) means the amount of radioactive material that produces 37 billion nuclear transformation per second. One picocurie (pCi) = 10^{-12}Ci.

§192.02 Standards.

Control shall be designed[1] to:

(a) Be effective for up to one thousand years, to the extent reasonably achievable, and in any case, for at least 200 years, and,

(b) Provide reasonable assurance that releases of radon-222 from residual radioactive material to the atmosphere will not:

(1) Exceed an average[2] release rate of 20 picocuries per square meter per second, *or*

(2) Increase the annual average concentration of radon-222 in air at or above any location outside the disposal site by more than one-half picocurie per liter.

Subpart B—Standards for Cleanup of Land and Buildings Contaminated with Residual Radioactive Materials from Inactive Uranium Processing Sites

§192.10 Applicability.

This subpart applies to land and buildings that are part of any processing site designated by the Secretary of Energy under section 102 of the Act. Section 101 of the Act, states, in part, that "processing site" means—

(a) Any site, including the mill, containing residual radioactive materials at which all or substantially all of the uranium was produced for sale to any Federal agency prior to January 1, 1971, under a contract with any Federal agency, except in the case of a site at or near Slick Rock, Colorado, unless—

(1) Such site was owned or controlled as of January 1, 1978, or is thereafter owned or controlled, by any Federal agency, or

(2) A license (issued by the (Nuclear Regulatory) Commission or its predecessor agency under the Atomic Energy Act of 1954 or by a State as permitted under section 274 of such Act) for the production at site of any uranium or thorium product derived from ores is in effect on January 1, 1978, or is issued or renewed after such date; and

(b) Any other real property or improvement thereon which—

(1) Is in the vicinity of such site, and

(2) Is determined by the Secretary, in consultation with the Commission, to be contaminated with residual radioactive materials derived from such site.

§192.11 Definitions.

(a) Unless otherwise indicated in this subpart, all terms shall have the same meaning as defined in Title I of the Act or in Subpart A.

(b) "Land" means any surface or subsurface land that is not part of a disposal site and is not covered by an occupiable building.

(c) "Working Level" (WL) means any combination of short-lived radon decay products in one liter of air that will result in the ultimate emission of alpha particles with a total energy of 130 billion electron volts.

(d) "Soil" means all unconsolidated materials normally found on or near the surface of the earth including, but not limited to, silts, clays, sands, gravel, and small rocks.

§192.12 Standards.

Remedial actions shall be conducted so as to provide reasonable assurance that, *as a result of residual radioactive materials from any designated processing site:*

(a) The concentration of radium-226 in land averaged over any area of 100 square meters shall not exceed the background level by more than—

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[1] Because the standard applies to design, monitoring after disposal is not required to demonstrate compliance.

[2] This average shall apply over the entire surface of the disposal site and over at least a one-year period. Radon will come from both residual radioactive materials and from materials covering them. Radon emissions from the covering materials should be estimated as part of developing a remedial action plan for each site. The standard, however, applies only to emissions from residual radioactive materials to the atmosphere.

(1) 5 pCi/g, averaged over the first 15 cm of soil below the surface, and

(2) 15 pCi/g, averaged over 15 cm thick layers of soil more than 15 cm below the surface.

(b) In any occupied or habitable building—

(1) The objective of remedial action shall be, and reasonable effort shall be made to achieve, an annual average (or equivalent) radon decay product concentration (including background) not to exceed 0.02 WL. In any case, the radon decay product concentration (including background) shall not exceed 0.03 WL, and

(2) The level of gamma radiation shall not exceed the background level by more than 20 microroentgens per hour.

Subpart C—Implementation

§192.20 Guidance for implementation.

Section 108 of the Act requires the Secretary of Energy to select and perform remedial actions with the concurrence of the Nuclear Regulatory Commission and the full participation of any State that pays part of the cost, and in consultation, as appropriate, with affected Indian Tribes and the Secretary of the Interior. These parties, in their respective roles under section 108, are referred to hereafter as "the implementing agencies." The implementing agencies shall establish methods and procedures to provide "reasonable assurance" that the provisions of Subpart A and B are satisfied. This should be done as appropriate through use of analytic models and site-specific analyses, in the case of Subpart A, and for Subpart B through measurements performed within the accuracy of currently available types of field and laboratory instruments in conjunction with reasonable survey and sampling procedures. Theses methods and procedures may be varied to suit conditions at specific sites. In particular:

(a)(1)The purpose of Subpart A is to provide for long-term stabilization and isolation in order to inhibit misuse and spreading of residual radioactive materials, control releases of radon to air, and protect water. Subpart A may be implemented through analysis of the physical properties of the site and the control system and projection of the effects of natural processes over time. Events and processes that could significantly affect the average radon release rate from the entire disposal site should be considered. Phenomena that are localized or temporary, such as local cracking or burrowing of rodents, need to be taken into account only if their cumulative effect would be significant in determining compliance with the standard. Computational models, theories, and prevalent expert judgement may be used to decide that a control system design will satisfy the standard. The numerical range provided in the standard for the longevity of the effectiveness of the control of residual radioactive materials allows for consideration of the various factors affecting the longevity of control and stabilization methods and their costs. These factors have different levels of predictability and may vary for the different sites.

(2) Protection of water should be considered in the analysis for reasonable assurance of compliance with the provisions of §192.02. Protection of water should be considered on a case-specific basis, drawing on hydrological and geochemical surveys and all other relevant data. The hydrologic and geologic assessment to be conducted at each site should include a monitoring program sufficient to establish background ground water quality through one or more upgradient wells, and identify the presence and movement of plumes associated with the tailings piles.

(3) If contaminants have been released from a tailing pile, an assessment of the location of the contaminants and the rate and direction of movement of contaminated ground water, as well as its relative contamination, should be made. In addition, the assessment should identify the attenuative capacity of the unsaturated and saturated zone to determine the extent of plume movement. Judgments on the possible need for remedial or protective actions for groundwater aquifers should be guided by relevant considerations described in EPA's hazardous waste management system (47 FR 32275, July 26, 1982) and by relevant State and Federal Water Quality Criteria for anticipated or existing uses of water over the term of the stabilization. The decision on whether to institute remedial action, what specific action to take, and to what levels an aquifer should be protected or restored should be made on a case-by-case basis taking into account such factors as technical feasibility of improving the aquifer in its hydrogeologic setting, the cost of applicable restorative or protective programs, the present and future value of the aquifer as a water resource, the availability of alternative water supplies, and the degree to which human exposure is likely to occur.

(b)(1) Compliance with Subpart B, to the extent practical, should be demonstrated through radiation surveys. Such surveys may, if appropriate, be restricted to locations likely to contain residual radioactive materials. These surveys should be designed to provide for compliance averaged over limited areas rather than point-by-point compliance with the standards. In most cases, measurement of gamma radiation exposure rates above and below the land surface can be used to show compliance with §192.12(a). Protocols for making such measurements should be based on realistic radium distributions near the surface rather than extremes rarely encountered.

(2) In §192.12(a), "background level" refers to the native radium concentration in soil. Since this may not be determinable in the presence of contamination by residual radioactive materials, a surrogate "background level" may be established by simple direct or indirect (e.g., gamma radiation) measurements performed nearby but outside of the contaminated location.

(3) Compliance with §192.122(b) may be demonstrated by methods that the Department of Energy has approved fur use under Pub. L. 92-314 (10 CFR Part 712), or by other methods that the implementing agencies determine are adequate. Residual radioactive materials should be removed from buildings exceeding 0.03 WL so that future replacement buildings will not pose a hazard [unless removal is not practical—see §192.21(c)]. However, sealants, filtrations, and ventilation devices may provide reasonable assurance of reductions from 0.03 WL to below 0.02 WL. In unusual cases, indoor radiation may exceed the levels specified in §192.12(b) due to sources other than residual radioactive materials. Remedial actions are not required in order to comply with the standard when there is reasonable assurance that residual radioactive materials are not the cause of such an excess.

§192.21 Criteria for applying supplemental standards.

The implementing agencies may (and in the case of subsection (f) shall) apply standards under §192.22 in lieu of the standards of Subpart A or B if they determine that any of the following circumstances exists:

(a) Remedial action required to satisfy Subpart A or B would pose a clear and present risk of injury to workers or to members of the public, notwithstanding reasonable measures to avoid or reduce risk.

(b) Remedial actions to satisfy the cleanup standards for land, §192.12(a), or the acquisition of minimum materials required for control to satisfy §192.02(b), would, notwithstanding reasonable measures to limit damage, directly produce environmental harm that is clearly excessive compared to the health benefits to persons living on or near the site, now or in the future. A clear excess of environmental harm is harm that is long-term, manifest, and grossly disproportionate to health benefits that may reasonably be anticipated.

(c) The estimated cost of remedial action to satisfy §192.12(a) at a "vicinity" site (described under section 101(6)(B) of the Act) is unreasonably high relative to the long-term benefits, and the residual radioactive materials do not pose a clear present or future hazard. The likelihood that buildings will be erected or that people will spend long periods of time at such a vicinity site should be considered in evaluating this hazard. Remedial action will generally not be necessary where residual radioactive materials have been placed semi-permanently in a location where site-specific factors limit their hazard and from which they are costly or difficult to remove, or where only minor quantities of residual radioactive materials are involved. Examples are residual radioactive materials under hard surface public roads and sidewalks, around public sewer lines, or in fence post foundations., Supplemental standards should not be applied at such sites, however, if individuals are likely to be exposed for long periods of time to radiation from such materials at levels above those that would prevail under §192.12(a).

(d) The cost of a remedial action for cleanup of a building under §192.12(b) is clearly

unreasonably high relative to the benefits. Factors that should be included in this judgement are the anticipated period of occupancy, the incremental radiation level would be affected by the remedial action, the residual useful lifetime of the building, the potential for future construction at the site, and the applicability of less costly remedial methods than removal of residual radioactive materials.

(e) There is no known remedial action.

(f) Radionuclides other than radium-226 and its decay products are present in sufficient quantity and concentration to constitute a significant radiation hazard from residual radioactive materials.

§192.22 Supplemental standards.

Federal agencies implementing Subparts A and B may in lieu thereof proceed pursuant to this section with respect to generic or individual situations meting the eligibility requirements of §192.21.

(a) When one or more of the criteria of §192.21(a) through (e) applies, the implementing agencies shall select and perform remedial actions that come as close to meeting the otherwise applicable standard as is reasonable under the circumstances.

(b) When §192.21(f) applies, remedial actions shall, in addition to satisfying the standards of Subparts A and B, reduce other residual radioactivity to levels that are as low as is reasonably achievable.

(c) The implementing agencies may make general determinations concerning remedial actions under this section that will apply to all locations with specified characteristics, or they may make a determination for a specific location. When remedial actions are proposed under this section for a specific location, the Department of Energy shall inform any private owners and occupants of the affected location and solicit their comments. The Department of Energy shall provide any such comments to the other implementing agencies. The Department of Energy shall also periodically inform the Environmental Protection Agency of both general and individual determinations under the provisions of this section.

§192.23 Effective date.

Subparts A, B, and C shall be effective March 7, 1983.

Subpart D—Standards for Management of Uranium Byproduct Materials Pursuant to Section 84 of the Atomic Energy Act of 1954, as Amended

Source: 48 FR 45946, Oct. 7, 1983, unless otherwise noted.

§192.30 Applicability.

This subpart applies to the management of uranium byproduct materials under section 84 of the Atomic Energy Act of 1954 (henceforth designated "the Act"), as amended, during and following processing of uranium ores, and to restoration of disposal sites following any use of such sites under section 83(b)(1)(B) of the Act.

§192.31 Definitions and cross-references.

References in this subpart to other parts of the Code of Federal Regulations are to those parts as codified on January 1, 1983.

(a) Unless otherwise indicated in this subpart, all terms shall have the same meaning as in Title II of the Uranium Mill Tailings Radiation Control Act of 1978, Subparts A and B of this part, or Parts 190, 260, 261, and 264 of this chapter. For the purposes of this subpart, the terms "waste," "hazardous waste," and related terms, as used in Parts 260, 261, and 264 of this chapter shall apply to byproduct material.

(b) *Uranium byproduct material* means the tailings or wastes produced by the extraction or concentration of uranium from any ore processed primarily for its source material content. Ore bodies depleted by uranium solution extraction operations and which remain underground do not constitute "byproduct material" for the purpose of this subpart.

(c) *Control* means any action to stabilize, inhibit future misuse of, or reduce emissions or effluent from uranium byproduct materials.

(d) *Licensed site* means the area contained within the boundary of a location under the control of persons generating or storing uranium byproduct materials under a license issued pursuant to section 84 of the Act. For purposes of this subpart, "licensed site" is equivalent to "regulated unit" in Subpart F of Part 264 of this chapter.

(e) *Disposal site* means a site selected pursuant to section 83 of the Act.

(f) *Disposal area* means the region within the perimeter of an impoundment or pile containing uranium by product materials to which the postclosure requirements of §192.32(b)(1) of this subpart apply.

(g) *Regulatory agency* means the U.S. Nuclear Regulatory Commission.

(h) *Closure period* means the period of time beginning with the cessation, with respect to a waste impoundment, of uranium ore processing operations and ending with completion of requirements specified under a closure plan.

(i) *Closure plan* means the plan required under §264.112 of this chapter.

(j) *Existing portion* means that land surface area of an existing surface impoundment on which significant quantities of uranium byproduct materials have been placed prior to promulgation of this standard.

§192.32 Standards.

(a) *Standards for application during processing operations and prior to the end of the closure period.*

(1) Surface impoundments (except for an existing portion) subject to this subpart must be designed, constructed, and installed in such manner as to conform to the requirements of §264.221 of this chapter, except that at sites where the annual precipitation falling on the impoundment and any drainage area contributing surface runoff to the annual evaporation from the impoundment, the requirements of §264.228(a)(2)(iii)(E) referenced in §264.2221 do not apply.

(2) Uranium byproduct materials shall be managed so as to conform to the ground water protection standard in §264.92 of this chapter, except that for the purposes of this subpart:

(i) To the list of hazardous constituents referenced in §264.93 of this chapter are added to chemical elements molybdenum and uranium,

(ii) To the concentration limits provided in Table 1 of §264.94 of this chapter are added the radioactivity limits in Table A of this subpart,

(iii) Detection monitoring programs required under §264.98 to establish the standards required under §264.92 shall be completed within one (1) year of promulgation,

(iv) The regulatory agency may establish alternate concentration limits (to be satisfied at the point of compliance specified under §264.95) under the criteria of §264.94(b), provided that, after considering practicable corrective actions, these limits are as low as reasonably achievable, and that, in any case, the standards of §264.94(a) are satisfied at all points at a greater distance than 500 meters from the edge of the disposal area and/or outside the site boundary, and

(v) The functions and responsibilities designated in Part 264 of this chapter as those of the " Regional Administrator" with respect to "facility permits" shall be carried out by the regulatory agency, except that exemptions of hazardous constituents under §264.93(b) and (c) of this chapter and alternate concentration limits established under §264.94(b) and (c) of this chapter (except as otherwise provided in §192.32(a)(2)(iv)) shall not be effective until EPA has concurred therein.

(3) Uranium byproduct materials shall be managed so as to conform to the provisions of:

(i) Part 190 of this chapter, "Environmental Radiation Protection Standards for Nuclear Power Operations" and

(ii) Part 440 of this chapter, "Ore Mining and dressing Point Source Category: Effluent Limitations Guidelines and New Source Performance Standards, Subpart C, Uranium, Radium, and Vanadium Ores Subcategory."

(4) The regulatory agency, in conformity with Federal Radiation Protection Guidance (FR, May 18, 1960, pgs. 4402-4403), shall make every effort to maintain radiation doses from radon emissions from surface impoundments of uranium byproduct materials as far below the Federal Radiation Protection Guides as is practicable at each licensed site.

(b) *Standards for application after the closure period.* At the end of the closure period:

(1) Disposal areas shall each comply with the closure performance standard in §264.111 of this chapter with respect to nonradiological hazards

and shall be designed[1] to provide reasonable assurance of control of radiological hazards to

(i) Be effective for one thousand years, to the extent reasonably achievable, and, in any case, for at least 200 years, and,

(ii) Limit releases of radon-222 from uranium byproduct materials to the atmosphere so as to not exceed an average[2] release rate of 20 picocuries per square meter per second (pCi/M^{2}s).

(2) The requirements of §192.32(b)(1) shall not apply to any portion of a licensed and/or disposal site which contains a concentration of radium-226 in land, averaged over areas of 100 square meters, which, as a result of uranium byproduct material, does not exceed the background level by more than:

(i) 5 picocuries per gram (pCi/g), averaged over the first 15 centimeters (CM) below the surface, and

(ii) 15 pCi/g, averaged over 15 cm thick layers more than 15 cm below the surface.

§192.33 Corrective action programs.

If the ground water standards established under provisions of §192.32(a)(2) are exceeded at any licensed site, a corrective action program as specified in §264.100 of this chapter shall be put into operation as soon as is practicable, and in no event later than eighteen (18) months after a finding of exceedance.

§192.34 Effective date.

Subpart D shall be effective December 6, 1983.

[1] The standard applies to design. Monitoring for radon-222 after installation of an appropriately designed cover is not required.

[2] This average shall apply to the entire surface of each disposal area over periods of at least one year, but short compared to 100 years. Radon will come from both uranium byproduct materials and from covering materials. Radon emissions from covering materials should be estimated as part of developing a closure plan for each site. The standard, however, applies only to emissions from uranium byproduct materials to the atmosphere.

TABLE A TO SUBPART D

	pCi/liter
Combined radium-226 and radium-228	5
Gross alpha-particle activity (excluding radon and uranium)	15

Subpart E—Standards for Management of Thorium Byproduct Materials Pursuant to Section 84 of the Atomic Energy Act of 1954, as Amended

Source: 48 FR 45947, Oct. 7, 1983, unless otherwise noted.

§192.40 Applicability.

This subpart applies to the management of thorium byproduct materials under section 84 of the Atomic Energy Act of 1954, as amended, during and following processing of thorium ores, and to restoration of disposal sites following any use of such sites under section 83(b)(1)(B) of the Act.

§192.41 Provisions.

The provisions of Subpart D of this part, including §§192.31, 192.32, and 192.33, shall apply to thorium byproduct material and:

(a) Provisions applicable to the element uranium shall also apply to the element thorium;

(b) Provisions applicable to radon-222 shall also apply to radon-220; and

(c) Provisions applicable to radium-226 shall also apply to radium-228.

(d) Operations covered under §192.32(a) shall be conducted in such a manner as to provide reasonable assurance that the annual dose equivalent does not exceed 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public as a result of exposures to the planned discharge of radioactive materials, radon-220 and its daughters excepted, to the general environment.

§192.42 Substitute provisions.

The regulatory agency may, with the concurrence of EPA, substitute for any provisions of §192.41 of this subpart alternative provisions it deems more practical that will provide at least an equivalent level of protection for human health and the environment.

§192.43 Effective date.

Subpart E shall be effective December 6, 1983.

SECTION 4—UPDATES

SECTION 4. ATOMIC ENERGY ACT AND RELATED LEGISLATION UPDATE

The update section of the Atomic Energy Act and Related Legislation Reference Book generally includes proposed changes to the statutes or regulatory programs. In addition, policy statements, interagency agreements, and other supplementary material are provided when pertinent.

Proposed EPA and NRC Regulatory Changes

Table 4-1 summarizes proposed changes to the Atomic Energy Act (AEA) regulatory program, Table 4-2 summarizes proposed changes to the Uranium Mill Tailings Radiation Control Act (UMTRCA) regulatory program, and Table 4-3 summarizes proposed changes to the Nuclear Waste Policy Act (NWPA) regulatory program as of September 1, 1992. Federal Register citations are provided in the tables for more detailed information.

Additional Guidance

The DOE Orders relevant to the environmental, safety, and health aspects of the Atomic Energy Act are listed in Table 4-4. Brief summaries of pertinent International Commission on Radiological Protection (ICRP) publications that may provide further gguidance may be found in Table 4-5.

Also provided are a copy of a DOE memoradum entitled "Guidance for Implementation of ALARA Requirements for Compliance with DOE 5400 Series Orders: For Interim Use and Comment" and guidance issued in the *Federal Register* on May 28, 1992 entitled "Guidelines for NRC Review of Agreement State Radiation Control Program, 1992."

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TABLE 4-1. SUMMARY OF PROPOSED CHANGES TO AEA REGULATORY PROGRAM

SUBJECT Affected CFR Citations(s)	STATUS[a] DATE (FR citation)	DESCRIPTIVE SUMMARY
Residual Radioactive Materials Cleanup - Radiation Protection Criteria 40 CFR 194	ANPRM 51 FR 22264 6/18/86 Planned NPRM 57 FR 17411 4/27/92	EPA is developing public health and environmental radiation protection criteria for cleanup of residual radioactivity at decommissioned sites. Licensees of the NRC or Agreement State; sites owned or used by DOE, DOD, the former AEC, and the former Manhattan Engineering District; and sites where natural and accelerator-produced radioactive materials have been used would be affected.
Exposure Limits for Transuranics	NPRM 42 FR 60956 11/30/77 Regulatory Agenda 57 FR 17412 4/27/92	EPA proposed interim guidance to federal agencies to limit radiation doses to the general population from transuranic elements present in the environment.
Explanation to Table S-3, Uranium Fuel Cycle Environmental Data 10 CFR 51	NPRM 46 FR 15154 3/4/81 Regulatory Agenda 57 FR 17753 4/27/92	NRC proposed a narrative explanation of the numerical values of Table S-3, "Table of Uranium Fuel Cycle Environmental Data," which appears in the NRC environmental protection regulations. Values for radon-222 and technetium-99 will be added.
Residual Radioactivity Criteria for Unrestricted Release of Lands and Structures 10 CFR 20	NOA 55 FR 6137 2/21/90 Planned NPRM 57 FR 17740 4/27/92	NRC will establish residual radioactive contamination limits that must be met before buildings, structures, equipment, materials, and land may be released and the license terminated.
Criteria for Extraordinary Nuclear Occurrence 10 CFR 140	NPRM 50 FR 13978 4/9/85 Regulatory Agenda 57 FR 17734 4/27/92	NRC is considering revising the criteria for an "extraordinary nuclear occurrence." The changes are designed to avoid the problems encountered by the NRC in applying existing criteria to Three Mile Island.

[a] ANPRM = Advanced Notice of Proposed Rulemaking, NPRM = Notice of Proposed Rulemaking, NOA = Notice of Availability, NOI = Notice of Intent

TABLE 4-1. SUMMARY OF PROPOSED CHANGES TO AEA REGULATORY PROGRAM (Continued)

SUBJECT Affected CFR Citations(s)	STATUS[a] DATE (FR citation)	DESCRIPTIVE SUMMARY
Integrated Schedules for Implementation of Plant Modifications 10 CFR 50	Proposed policy statement 52 FR 45344 11/27/87	NRC issued a proposed policy statement that describes the policy the Commission intends to use to promote voluntary licensee integrated schedules for implementing regulatory requirements and other improvements in nuclear power plants.
Transportation Regulations - Compatibility with IAEA 10 CFR 71	NPRM 53 FR 21550 6/8/88 Corrections 53 FR 23484 6/22/88 Regulatory Agenda 57 FR 17735 4/27/92	NRC proposed to revise its regulations for transportation of radioactive material to make them compatible with those of the IAEA. The basic standards for packaging will remain unchanged, and the transport of low-specific-activity radioactive material is considered. NRC also proposes to include the criteria for approval of packages for air transport of plutonium in 10 CFR 71.
Nuclear Power Plant Structures, Systems, and Components 10 CFR 50	ANPRM 54 FR 9229 3/6/89 Planned NPRM 57 FR 17737 4/27/92	NRC is proposing to develop regulations requiring enhanced acceptance procedures including, but not limited to, receipt inspection and testing of products purchased for use in nuclear power plant structures, systems, and components.
Guidance on Management Controls/Quality Assurance, Requirements for Operation, Chemical Safety, and Fire Protection for Fuel Cycle Facilities	Proposed guidance 54 FR 11590 3/21/89	NRC proposed four branch technical positions on management controls/quality assurance, requirements for operation, chemical safety, and fire protection for fuel cycle facilities.
Import and Export of Radioactive Waste 10 CFR 110	ANPRM 55 FR 4181 2/7/90 NPRM 57 FR 17859 4/28/92	NRC proposed to amend its licensing requirements regarding the import and export of radioactive wastes to conform to U.S. policies to the international voluntary Code of Practice to guide nations in the development and harmonization of policies and laws on the international transboundary movement of radioactive waste.

[a] ANPRM = Advanced Notice of Proposed Rulemaking, NPRM = Notice of Proposed Rulemaking, NOA = Notice of Availability, NOI = notice of Intent

TABLE 4-1. SUMMARY OF PROPOSED CHANGES TO AEA REGULATORY PROGRAM (Continued)

SUBJECT Affected CFR Citations(s)	STATUS[a] DATE (FR citation)	DESCRIPTIVE SUMMARY
U-AVLIS Uranium Enrichment - Permits for Access to Restricted Data 10 CFR 725	NPRM 55 FR 15237 4/23/90 Regulatory Agenda 57 FR 16689 4/27/92	DOE proposed to amend the regulations concerning permits for access to uranium isotope separation restricted data by updating category C-24 to include the U-AVLIS technology for the separation of uranium isotopes and requiring private sector permit applicants to pay $100,000 for an access permit. The purpose of the amendments is to encourage private sector participation in the governments's uranium enrichment program.
Environmental Standards for the Management and Disposal of Spent Nuclear Fuel, HLW, and TRU Radioactive Wastes 40 CFR 191	Planned NPRM 56 FR 54045 10/21/91	EPA will promulgate generally applicable environmental standards for the management and disposal of spent nuclear fuel, high-level and transuranic radioactive wastes to establish limits for the release of radioactive materials to the environment.
Fitness-For-Duty Programs for Category I Fuel Facilities and Shipments 10 CFR 26	Planned NPRM 57 FR 18415 4/27/92	NRC will propose to amend the Commission's fitness-for-duty regulations to include Category I fuel facilities and Category I shipments.
Licenses and Radiation Safety Requirements for Large Irradiators 10 CFR 36	NPRM 55 FR 50008 12/4/90 Regulatory Agenda 57 FR 17747 4/27/92	NRC proposed to establish a new part 36 to specify radiation safety requirements and licensing requirements for the use of licensed radioactive materials in large irradiators.
Physical Protection Requirements - Minor Amendments 10 CFR 70 10 CFR 72 10 CFR 73 10 CFR 75	NPRM 54 FR 33570 8/15/89 Notice 55 FR 7960 3/6/90 Regulatory Agenda 57 FR 17737 4/27/92	NRC proposed to amend its regulations that cover the physical protection of special nuclear materials to correct editorial errors and clarify wording and definitions.

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TABLE 4-1. SUMMARY OF PROPOSED CHANGES TO AEA REGULATORY PROGRAM (Continued)

SUBJECT Affected CFR Citations(s)	STATUS[a] DATE (FR citation)	DESCRIPTIVE SUMMARY
Requirements for Possession of Industrial Devises 10 CFR 31 10 CFR 32	NPRM 56 FR 67011 12/27/91	NRC proposed to amend the regulations for the possession of industrial devices containing byproduct material to require device users to report to the NRC on a periodic basis if the device is still in use or to whom the device has been transferred to assure that devices are not improperly transferred or inadvertently discarded.
Nuclear Plant License Renewal - Environmental Effects 10 CFR 51	ANPRM 55 FR 29964 7/23/90 NOI 55 FR 29967 7/23/90 NPRM 56 FR 47016 9/17/91 NOA 56 FR 47500 9/19/91	NRC proposed to amend its regulations to add provisions concerning the scope of environmental effects which would be addressed by the Commission in conjunction with applications for operating license renewal for nuclear power plants.
Import and Export of Nuclear Equipment and Material 10 CFR 110	Notice 55 FR 53596 12/31/90 Planned NPRM 57 FR 17740 4/27/92	NRC will propose amendments to: (1) permit the expedited import and export of certain nuclear material where no significant proliferation risks are involved, (2) streamline the procedures for public participation in NRC's licensing process, (3) delete from the lists of restricted destinations those countries that signed the Non-Proliferation Treaty, (4) add Nambia to the general license allowing import of their uranium, and (5) make other minor changes. NRC will also propose that the export of heavy water to Canada and low-enriched uranium to EURATON and to Japan for enrichment will no longer require license application review by the Executive Branch.

[a] ANPRM = Advanced Notice of Proposed Rulemaking, NPRM = Notice of Proposed Rulemaking, NOA = Notice of Availability, NOI = Notice of Intent

TABLE 4-1. SUMMARY OF PROPOSED CHANGES TO AEA REGULATORY PROGRAM (Continued)

SUBJECT Affected CFR Citations(s)	STATUS[a] DATE (FR citation)	DESCRIPTIVE SUMMARY
Timeliness in Decommissioning of Material Facilities 10 CFR 30 10 CFR 40 10 CFR 70 10 CFR 72	Planned NPRM 57 FR 17742 4/27/92	NRC will propose to require decontamination and decommissioning of material facilities within a fixed period of time after cessation of operations.
Code and Standards for Nuclear Power Plants - ASME Code 10 CFR 50	NPRM 56 FR 3796 1/31/91 Regulatory Agenda 57 FR 17748 4/27/92	NRC proposed to incorporate by reference the 1986, 1987, and 1988 Addenda, and the 1989 edition of Section III, Division 1, and Section XI, Division 1, with a specified modification, of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code). NRC also proposes to impose augmented examination of reactor vessel shell welds.
Radiation Protection of the Public and Environment 10 CFR 834	Planned NPRM 57 FR 16687 4/27/92	DOE will propose radiation protection requirements for the public and environment for DOE and DOE contractor operations, including a dose limitation system for the protection of the public, requirements for liquid discharges, reporting and monitoring requirements, and residual radioactive material requirements.
	Notice 56 FR 67066 12/27/91	The Defense Nuclear Facilities Safety Board made a recommendation to the Secretary of Energy concerning radiation protection for workers and the general public at DOE defense nuclear facilities.
Decommissioning Recordkeeping and License Termination - Documentation 10 CFR 30 10 CFR 40 10 CFR 70 10 CFR 72	NPRM 56 FR 50524 10/7/91 Regulatory Agenda 57 FR 17750 4/27/92	NRC proposed to require licensees to prepare and maintain additional documentation for the purpose of ensuring proper decontamination and decommissioning procedures.

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TABLE 4-1. SUMMARY OF PROPOSED CHANGES TO AEA REGULATORY PROGRAM (Continued)

SUBJECT Affected CFR Citations(s)	STATUS[a] DATE (FR citation)	DESCRIPTIVE SUMMARY
Radiation Protection for Occupational Workers 10 CFR 835	NPRM 56 FR 64334 12/9/91 Notice 56 FR 67066 12/27/91 Regulatory Agenda 57 FR 16690 4/27/92	DOE proposed primary standards that would be applicable to the control of radiation exposures to occupational workers from normal operations under the control of DOE and DOE contractor personnel.
	Notice 56 FR 67066 12/27/91	The DNFSB made a recommendation to the Secretary of Energy concerning radiation protection for workers and the general public at DOE defense nuclear facilities.
Nuclear Safety Management 10 CFR 830	NPRM 56 FR 64316 12/9/91 Regulatory Agenda 57 FR 16690 4/27/92	DOE proposed the addition of a new part to its regulations establishing a body of rules for DOE contractor and subcontractor activities that will form the basic requirements for ensuring nuclear safety at DOE facilities. The body of rules will include conduct of operations, occurrence reporting, safety analysis and requirements, training, certification, and maintenance.
	Clarification of NPRM 57 FR 20796 5/15/92	DOE issued a notice to clarify the intended scope of the definition of "Nuclear Safety Requirements" in the proposed 10 CFR 820 on a procedural rule for DOE nuclear activities.
Environmental Standards for the Management and Disposal of Spent Nuclear Fuel, HLW, and TRU Radioactive Wastes 40 CFR 191	Planned NPRM 57 FR 17411 4/27/92	EPA will promulgate generally applicable environmental standards for the management and disposal of spent nuclear fuel, high-level and transuranic radioactive wastes to establish limits for the release of radioactive materials to the environment.
Code and Standards for Nuclear Power Plants 10 CFR 50	Planned NPRM 57 FR 17736 4/27/92	NRC will incorporate by reference Subsection IWE, "Requirements for Class MC Components of Light-Water Cooled Power Plants," and Subsection IWL, "Requirements for Class CC Concrete Components of Light-Water Cooled Power Plants," of Section XI of the ASME Code.

[a] ANPRM = Advanced Notice of Proposed Rulemaking, NPRM = Notice of Proposed Rulemaking, NOA = Notice of Availability, NOI = Notice of Intent

TABLE 4-1. SUMMARY OF PROPOSED CHANGES TO AEA REGULATORY PROGRAM (Continued)

SUBJECT Affected CFR Citations(s)	STATUS[a] DATE (FR citation)	DESCRIPTIVE SUMMARY
Emergency Preparedness Regulations 10 CFR 50	Planned NPRM 57 FR 17738 4/27/92	NRC will propose to clarify the linkage between the need for "reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency" indicated in Section 50.47(a) and 16 planning standards outlined in Section 50.47(b). In addition, this rule will clarify the term "range of protective" actions and the issues of monitoring of evacuees, actions for recovery and reentry, notification of the public, evacuation time estimates, and exercise frequency.
	NOA 56 FR 12734 3/27/91 Planned NPRM 57 FR 17738 4/27/92	NRC will propose a rule to amend the regulations concerning those portions of emergency plans which cannot be exercised prior to issuance of a Part 52 combined license. This rulemaking will be accomplished on a "high priority basis."
Primary Reactor Containment Leakage Testing for Water-Cooled Reactors 10 CFR 50	NPRM 51 FR 39538 10/29/86 Regulatory Agenda 57 FR 17747 4/27/92	NRC proposed to update and revise the 1973 criteria for preoperational and periodic pressure testing for leakage of primary containment boundaries of water-cooled power reactors in order to eliminate inconsistencies and obsolete requirements.
Statutory Authority for Purposes of Criminal Enforcement 10 CFR 11 10 CFR 19-21 10 CFR 25-26 10 CFR 30-35 10 CFR 39-40 10 CFR 50 10 CFR 52-55 10 CFR 60-61 10 CFR 70-75 10 CFR 95 10 CFR 110 10 CFR 140 10 CFR 150	NPRM 57 FR 222 1/3/92	NRC proposed to amend its regulations to clarify the applicability of the criminal penalty provisions of the AEA to certain regulations.

[a] ANPRM = Advanced Notice of Proposed Rulemaking, NPRM = Notice of Proposed Rulemaking, NOA = Notice of Availability, NOI = Notice of Intent

TABLE 4-1. SUMMARY OF PROPOSED CHANGES TO AEA REGULATORY PROGRAM (Continued)

SUBJECT Affected CFR Citations(s)	STATUS[a] DATE (FR citation)	DESCRIPTIVE SUMMARY
Decontamination and Decommissioning Integrated Demonstration Strategy	NOA 57 FR 9419 3/18/92	DOE announced the availability of the draft document, "DOE Decontamination and Decommissioning Integrated Strategy," which outlines an approach to providing new and improved technology that will allow for decontamination and decommissioning of shutdown DOE facilities.
Action Plan for Cleanup of Site Decommissioning Management Plan Sites	NOA 57 FR 13389 4/16/92	NRC announced the availability of its action plan which describes the approach the Agency will use to accelerate the cleanup of radiologically contaminated sites listed in NRC's Site Decommissioning Management Plan.
Nuclear Safety Management - Phase II 10 CFR 830	Planned NPRM 57 FR 16688 4/27/92	DOE will propose Phase II rules, applicable to DOE contractor and subcontractor activities, to ensure nuclear safety at DOE facilities. The rules relate to safety concern management, reactor design criteria, seismic and environmental qualifications, fire protection, personnel training, emergency preparedness
Regulatory Guides	NOA 57 FR 20859 5/15/92	NRC issues revisions to three regulatory guides: "Design and Fabrication Code Case Acceptability," "Materials Code Case Acceptability," and "Inservice Inspection Code Case Acceptability."
Physical Protection Requirements at Fixed Sites 10 CFR 73	NPRM 57 FR 22670 5/29/92	NRC proposed to amend its general physical protection requirements for fixed sites to clarify that protection against both radiological sabotage and theft of special nuclear material is not required at all licensed facilities.
Reducing the Regulatory Burden on Nuclear Licensees 10 CFR 20 10 CFR 50	NPRM 57 FR 27187 6/18/92	NRC proposed to amend its regulations to reduce the regulatory burden on nuclear licensees. The amendments address the frequency of reporting information and core cooling system analysis for operating power reactors, clarify and update regulations, and remove unnecessary regulatory requirements.

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TABLE 4-1. SUMMARY OF PROPOSED CHANGES TO AEA REGULATORY PROGRAM (Continued)

SUBJECT Affected CFR Citations(s)	STATUS[a] DATE (FR citation)	DESCRIPTIVE SUMMARY
Nuclear Reactor Event Reporting - Minor Amendments 10 CFR 50	NPRM 57 FR 28642 6/26/92	NRC proposed to amend regulations in 10 CFR 50 to make minor modifications to the current nuclear power reactor event reporting requirements.
Regulatory Guide	NOA 57 FR 30762 7/10/92	NRC announced the availability of Regulatory Guide 8.7, Revision 1, "Instructions for Recording and Reporting Occupational Radiation Exposure Data."
Regulatory Guides	NOA 57 FR 32584 7/22/92	NRC announced the availability of the following Regulatory Guides: (1) Regulatory Guide 8.25, Revision 1, "Air Sampling in the Workplace,"; (2) Regulatory Guide 8.35, "Planned Special Exposures,"; and (3) Appendix X, "Guidance on Complying with New Part 20 Requirements," to Regulatory Guide 10.8, Revision 2, "Guide for the Preparation of Applications for Medical Use Programs."
Regulatory Guides	NOA 57 FR 34792 57 FR 34793 8/6/92	NRC announced the availability of the following two Regulatory Guides: (1) Regulatory Guide 8.34, "Monitoring Criteria and Methods to Calculate Occupational Radiation Doses" and (2) Regulatory Guide 8.36, "Radiation Dose to the Embryo/Fetus."
Petition for Rulemaking - Near Surface Disposal of Waste 40 CFR 61	Notice 57 FR 32743 7/23/92	NRC announced that it had received a petition requesting that NRC amend its regulations in 10 CFR 61 concerning classification of low level radioactive waste to restrict the numbers and types of waste streams which can be disposed of in near-surface disposal facilities.
Detroit Edison Co. Fermi Nuclear Plant - Receipt of Petition 10 CFR 2.206	Notice 57 FR 34984 8/7/92	NRC announced that a petition was submitted to the NRC on 6/22/92 requesting that the license to operate the Detroit Edison Co. Fermi Nuclear Plant, Unit 2 be suspended until certain supervisors are replaced. Assertions have been made that certain security department supervisors lied and falsified documents to the NRC.

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TABLE 4-1. SUMMARY OF PROPOSED CHANGES TO AEA REGULATORY PROGRAM (Continued)

SUBJECT Affected CFR Citations(s)	STATUS[a] DATE (FR citation)	DESCRIPTIVE SUMMARY
Availability and Adequacy of Design Bases Information at Nuclear Power Plants 10 CFR 50	Policy statement 57 FR 35455 8/10/92	NRC issued a policy statement on availability and adequacy of design information at nuclear power plants. This policy statement described the Commission's expectations and future actions with regard to the availability of design information and emphasized the Commission's view that facilities should not be modified without a clear understanding of the applicable engineering design bases.
Guidance on Fire Protection for Fuel Cycle Facilities	Notice 57 FR 35607 8/10/92	NRC published its revised Technical Position on fire protection for fuel cycle facilities to serve as a source of information for applicants and licensees on the features of equipment, facilities, and procedures to be used to provide reasonable assurance of fire safety.

[a] ANPRM = Advanced Notice of Proposed Rulemaking, NPRM = Notice of Proposed Rulemaking, NOA = Notice of Availability

TABLE 4-2. SUMMARY OF PROPOSED CHANGES TO UMTRCA REGULATORY PROGRAM

SUBJECT Affected CFR Citations(s)	STATUS[a] DATE (FR citation)	DESCRIPTIVE SUMMARY
Groundwater Protection Standards for Inactive Uranium Tailings Sites 40 CFR 192	NPRM 52 FR 36000 9/24/87 Regulatory Agenda 57 FR 17412 4/27/92	EPA proposed standards for preventing ground water contamination at inactive uranium processing sites. The rule will replace the ground water provisions of the final rule of 1/5/83 for remedial action.
Uranium Mill Tailings Sites - Remedial Action Program and Annotation of Land Records	NPRM 54 FR 29732 7/14/89 Regulatory Agenda 56 FR 53248 10/21/91	DOE proposed to clarify the obligation of certain states to annotate local land records so as to ensure that furture purchasers of remediated properties will be notified of the extent of the remedial work.
Health and Environmental Standards for Uranium Mill Tailings 40 CFR 192	ANPRM 56 FR 67569 12/31/91	EPA will propose to amend Subpart D to require enforceable closure deadlines and appropriate monitoring for uranium mill tailings disposal sites that are licensed by the NRC or one of its Agreement States.

[a] ANPRM = Advanced Notice of Proposed Rulemaking, NPRM = Notice of Proposed Rulemaking

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TABLE 4-3. SUMMARY OF PROPOSED CHANGES TO NWPA REGULATORY PROGRAM

SUBJECT Affected CFR Citations(s)	STATUS[a] DATE (FR citation)	DESCRIPTIVE SUMMARY
HLW Disposal in Geologic Repositories - EPA and NRC Conforming Amendments 10 CFR 60	NPRM 51 FR 22288 6/19/86 Regulatory Agenda 57 FR 17734 4/27/92	NRC proposed to conform its regulations for disposal of high-level radioactive wastes in geologic repositories to EPA standards of September 19, 1985, as mandated by the NWPA.
Radiation Dose Criteria for Accidents at HLW Geologic Repositories 10 CFR 60	Planned NPRM 57 FR 17739 4/27/92	NRC will propose to amend the regulations concerning radiation dose criteria. A central issue is the development of radiation dose criteria for a postulated accident that DOE would use to establish a limited access area for the high-level waste (HLW) geologic repository. In addition, a number of new definitions would be added.
Definition of Term - High-Level Radioactive Waste 10 CFR 60	Petition for rulemaking 55 FR 51732 12/17/90	The states of Washington and Oregon request that NRC revise the definition of "high-level radioactive waste" so as to establish a framework and standards by which to determine whether reprocessing waste (e.g., certain waste stored at DOE's Hanford site) is high-level radioactive waste.
Training and Qualification of Nuclear Power Plant Personnel 10 CFR 50 10 CFR 52	NPRM 57 FR 537 1/7/92 Regulatory Agenda 57 FR 17741 4/27/92	NRC proposes to require nuclear power plant licensees to establish a safety training program for plant personnel based on a systems approach to training.
OCRWM Training Assistance to State, Tribal, and Local Goverments	NOA 57 FR 8119 3/6/92	The Office of Civilian Radioactive Waste Management announces the availability of its draft strategy for providing training assistance to state, tribal, and local governments through whose jurisdictions DOE plans to transport spent nuclear fuel and HLW.

[a] NPRM = Notice of Proposed Rulemaking, NOA = Notice of Availability

TABLE 4-3. SUMMARY OF PROPOSED CHANGES TO NWPA REGULATORY PROGRAM (Continued)

SUBJECT Affected CFR Citations(s)	STATUS[a] DATE (FR citation)	DESCRIPTIVE SUMMARY
Approved Spent Fuel Storage Casks 10 CFR 72	Planned NPRM 57 FR 17745 4/27/92	NRC will propose to add two additional casks to the current list of four approved spent fuel storage casks certified and listed under 10 CFR 72. A licensee may choose from any of the listed casks to store spent fuel at the reactor site.

[a] NPRM = Notice of Proposed Rulemaking, NOA = Notice of Availability

TABLE 4-4. RELEVANT DOE ORDERS

ORDER NUMBER	ISSUE DATE	SUBJECT
4700.1	3/6/87	Project Management System
5000.3A	5/30/90	Occurrence Reporting and Processing of Operations Information
5400.2A	1/31/89	Environmental Compliance Issue Coordination
5400.3	2/22/89	Hazardous and Radioactive Mixed Waste Program
5400.4	10/6/89	Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Program
5400.5	2/8/90	Radiation Protection of the Public and the Environment
C001*	6/5/90	
5440.1D	2/22/91	Implementation of the National Environmental Policy Act
5480.1B	9/23/86	Environment, Safety, and Health Program for DOE Operations
C001	2/18/88	
C002	1/23/89	
C003	7/20/89	
C004	8/27/90	
5480.3	7/09/85	Safety Requirements for the Packaging and Transportation of Hazardous Materials, Hazardous Substances, and Hazardous Wastes
5480.5	9/23/86	Safety of Nuclear Facilities
5480.6	9/23/86	Safety of DOE-Owned Nuclear Reactors
5480.18A	7/19/91	Accreditation of Performance-Based Training for Category A Reactors and Nuclear Facilities
5482.1B	9/23/86	Environment, Safety, and Health Appraisal Program
5484.1	2/24/81	Environmental Protection, Safety, and Health Protection Information Reporting Requirements
C001	6/29/81	
C002	8/13/81	
C003	11/6/87	
C004	10/17/89	
C005	3/15/90	

*The C001 here indicates a change to this DOE Order. Subsequent changes are denoted by sequential change numbers (e.g., C002, C003, etc.).

TABLE 4-4. RELEVANT DOE ORDERS (Continued)

ORDER NUMBER	ISSUE DATE	SUBJECT
C006	6/29/90	
C007	10/17/90	
5500.3	8/13/81	Reactor and Nonreactor Nuclear Facility Emergency Planning, Preparedness, and Response Program for DOE Operations
5500.4	8/13/81	Public Affairs Policy and Planning Requirements for Emergencies
5530.1	1/28/83	Response to Accidents and Significant Incidents Involving Nuclear Weapons
5610.1	9/11/79	Packaging and Transporting of Nuclear Explosives
5632.2A	2/9/88	Physical Protection of Special Nuclear Material and Vital Equipment
C001	1/17/89	
5633.2	1/29/88	Control and Accountability of Nuclear Materials, Responsibilities, and Authorities
5633.3	2/3/88	Control and Accountability of Nuclear Materials
C001	6/29/90	
5633.4	2/9/88	Nuclear Materials Transactions: Documentation and Reporting
5633.5	5/27/87	Nuclear Materials Reporting and Data Submission Procedures
5634.1A	2/3/88	Facility Approvals, Security Surveys, and Nuclear Material Surveys
5700.6B	9/23/86	Quality Assurance
C001	3/28/90	
5820.2A	9/26/88	Radioactive Waste Management
6430.1A	4/6/89	General Design Criteria

TABLE 4-5. RELEVANT INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION (ICRP) PUBLICATIONS

Publication Number	Year Issued	Title and Brief Summary
25	1977	*Handling and Disposal of Radioactive Materials in Hospitals* Provides general guidance regarding the proper storage, handling, and disposal of unsealed radioactive material in hospitals and medical research establishments. To some extent the Commission believes that the information given may be applicable to other types of laboratories where radioactive substances are used. (Expanded and modified in *ICRP Publication 39.*)
26	1977	*Recommendations of the ICRP* Summarizes the Commission's basic recommendations regarding protective methods for dealing with ionizing radiation.
27	1977	*Problems Involved in Developing an Index of Harm* Examines a variety of occupations in order to assess in a comparative manner the types and frequencies of harmful effects that may result from any given radiation exposure.
28	1978	*Principles and General Procedures for Handling Emergency and Accidental Exposures of Workers* Gives general guidance for the management of workers subjected to uncontrolled exposures (i.e., abnormal exposures)which may be described as either emergency (voluntary) or accidental (involuntary). Medical, physical, and administrative aspects of actions planned in response to emergency and accidental exposures are presented.
29	1979	*Radionuclide Release into the Environment: Assessment of Doses to Man* Shows how deliberate releases of radioactive materials into the environment and actions taken after accidental releases may be conducted in a manner consistent with the recommendations of the Commission. The report also provides information that may be used to mathematically assess predicted radiation doses.
30	1979 - 1982	*Limits for Intakes of Radionuclides by Workers* Recommends Annual Limits for Intakes (ALIs) of radionuclides by workers by taking into account all body tissues that are irradiated following intake of the radioactive material. Due to improved knowledge regarding the retention of radionuclides in body tissues and of the radioactive decay schemes of some radionuclides, some values of ALIs have changed since the earlier recommendations of *ICRP Publication 2. ICRP Publication 30* consists of three parts, each of which has a supplemental volume.
31	1980	*Biological Effects of Inhaled Radionuclides* Evaluates data on the biological effects of inhaled radionuclides. The implications of inhaled plutonium are specifically addressed, as well as those associated with inhaled americium, curium, and einsteinium.

TABLE 4-5. RELEVANT INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION (ICRP) PUBLICATIONS (Continued)

Publication Number	Year Issued	Title and Brief Summary
32	1981	*Limits of Inhalation of Radon Daughters by Workers* Sets limits for exposure to airborne radon gases (^{222}Rn and ^{220}Rn) and their short-lived decay products (radon daughters). Such exposure is particularly an occupational risk of miners, but radon and its daughters are also present in atmospheric and room air.
35	1982	*General Principles of Monitoring for Radiation Protection of Workers* Establishes the general principles on which monitoring programs can be based with both effectiveness and economics in mind.
37	1983	*Cost-Benefit Analysis in the Optimization of Radiation Protection* Takes into account the optimization of radiation protection.
38	1983	*Radionuclide Transformations: Energy and Intensity of Emissions* Provides nuclear transformation data and drawings of associated decay schemes for radionuclides studied in *ICRP Publication 30* (*Limits for Intakes of Radionuclides by Workers*).
39	1984	*Principles for Limiting Exposure of the Public to Natural Sources of Radiation* Proposes new principles for limiting exposures from natural sources of radiation. Advice given in an earlier report (*ICRP Publication 25*) is expanded and significantly modified.
40	1984	*Protection of the Public in the Event of Major Radiation Accidents: Principals of Planning*
41	1984	*Nonstochastic Effects of Ionizing Radiation*
42	1984	*A Compilation of the Major Concepts and Quantities in use by ICRP* Gathers together definitions and explanations of the more important concepts and quantities introduced in earlier ICRP publications. Definitions are not changed and no new material is introduced, but in some instances expansion or clarification of the original explanations has been made.
43	1984	*Principles of Monitoring for the Radiation Protection of the Population* Reassesses the general principles on which monitoring programs should be based in order to make the recommendations consistent with current radiation protection philosophy. Also extends the scope to all types of monitoring outside the workplace.
45	1985	*Quantitative Bases for Developing a Unified Index of Harm* Brings together various types of numerical information that are relevant to basing an index of harm on lengths of time lost through occupational disease and injury.
46	1985	*Radiation Protection Principles for Disposal of Solid Radioactive Waste*

TABLE 4-5. RELEVANT INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION (ICRP) PUBLICATIONS (Continued)

Publication Number	Year Issued	Title and Brief Summary
47	1986	*Radiation Protection of Workers in Mines*
48	1986	*The Metabolism of Plutonium and Related Elements*
49	1986	*Developmental Effects of Irradiation on the Brain of the Embryo and Fetus*
50	1987	*Lung Cancer Risk from Indoor Exposures to Radon Daughters*
51	1987	*Data for Use in Protection against External Radiation*
54	1988	*Individual Monitoring for Intakes of Radionuclides by Workers: Design and Interpretation*
55	1988	*Optimization and Decisionmaking in Radiological Protection*
56	1989	*Age Dependent Doses to Members of the Public from Intake of Radionuclides: Part 1* Describes biokinetic data and the dosimetric models used for calculating age-dependent dose coefficients for intakes of radionuclides by ingestion and inhalation following their release into the environment. Data are presented for the radioisotopes of the following elements: hydrogen, carbon, strontium, zirconium, niobium, ruthenium, iodine, cesium, cerium, plutonium, americium, and neptunium.
58	1989	*RBE [Relative Biological Effectiveness] for Deterministic Effects* Analyzes data on Relative Biological Effectiveness (RBE) values for effects in tissues of experimental animals and man to assess whether or not present dose limits or annual limits are adequate to prevent deterministic effects.
60	1991	*1990 Recommendations of the ICRP* Provides guidance on the fundamental principles on which appropriate radiological protection can be based.
61	1991	*Annual Limitations on Intake of Radionuclides by Workers Based on the 1990 Recommendations* Presents secondary limits for the 1990 Recommendations based on the dosimetric data assembled during the preparation of *Publication 30*, which includes the information contained in *Publication 48*.

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DOE F 1325.8
(10-88)

United States Government **Department of Energy**

memorandum

DATE: March 14, 1991

REPLY TO ATTN OF: EH-232

SUBJECT: Guidance for Implementation of ALARA Requirements for compliance with DOE 5400 Series Orders: For Interim Use and Comment.

TO: Distribution

Order DOE 5400.5, Radiation Protection of the Public and Environment, requires all DOE operations to maintain radiation exposures of the public and environment to levels that are as low as reasonably achievable (ALARA) below the appropriate dose limits. The attached document provides general guidance for the implementation of the ALARA process to protect the public and environment. It supplements the requirements in Orders DOE 5400.1 and DOE 5400.5 and should be used for ALARA programs to control exposures to the public from normal operations and in development of authorized limits for the release of DOE property (lands, buildings, equipment, and so forth) containing residual radioactive material. The guidance is furnished for both interim use and for comment.

Because a successful ALARA program depends largely on professional judgement, the actual ALARA decisions are not subject to compliance review. Rather, the guidance identifies the general requirements for an effective ALARA program. Specific requirements and details are to be contained in ALARA plans approved by DOE line elements. Therefore, general compliance with the orders is achieved by the preparation and implementation of approved plans. Specific compliance with the ALARA requirements of DOE 5400 series Orders should be measured against the plans and their implementation (procedures employed -- not the results) and documentation of the bases for ALARA decisions.

EH intends to review and audit operations to ensure that ALARA programs are in place and are being implemented. Compliance related findings are to be based on the adequacy of the program and staff qualifications and completeness of analyses and documentation.

Comments on this guidance should be directed to the attention of Andrew Wallo, EH-232, FTS-896-4996. Until revised guidance is issued on the basis of comments received and accepted, this guidance should be used in establishing and implementing the ALARA process for protection of the public and environment.

Raymond F. Pelletier
Director
Office of Environmental Guidance

Attachment

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Interim Guidance
March 8, 1991

DOE GUIDANCE ON THE PROCEDURES IN APPLYING THE ALARA PROCESS FOR COMPLIANCE WITH DOE 5400.5

Office of Environmental Guidance
Assistant Secretary
Environment, Safety and Health

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DOE GUIDANCE ON THE PROCEDURES IN APPLYING THE ALARA PROCESS FOR COMPLIANCE WITH DOE 5400.5

A. Background

The Department of Energy Order DOE 5400.5 (Radiation Protection of the Public and Environment, February 1990) reiterated and strengthened a long standing requirement for activities at DOE facilities to maintain all exposures at levels which are as low as is reasonably achievable (ALARA) below the appropriate dose limits. DOE 5400.5 specifically requires the application of the ALARA process for radiation protection of the public and environment. The radiation protection system used in DOE 5400.5 is based on recommendations of the International Commission on Radiological Protection (ICRP). In its Publication No. 26 (1977), the ICRP recommended a system of dose limitations which consisted of three basic principles:

(1) no practice shall be adopted unless its introduction produces a positive net benefit ("justification");

(2) all exposures shall be kept as low as is reasonably achievable, economic and social factors being taken into account ("ALARA" or "optimization"); and

(3) the dose equivalent to individuals shall not exceed the limits recommended for the appropriate circumstances by the Commission ("individual dose limits").

The ICRP system of dose limitations has been adopted essentially universally and DOE has implemented the recommendations through Orders, e.g., DOE 5400.5 and DOE 5480.11.

B. Purpose

This document provides guidance for implementing the requirements of DOE 5400 series Orders which require application of the ALARA process or philosophy (keeping exposures as low as is reasonably achievable). Both DOE Orders and regulations contain requirements for contractors and Program Offices to develop an ALARA program that addresses the impacts of doses to the public and releases of radioactive material to the environment. This ALARA program is to be described in the Environmental Protection Implementation Plan (EPIP) for each site and, depending on the detail contained in the EPIP, might also be described in a separate ALARA Plan. The DOE Orders and

regulations recognize that the ALARA decisions require consideration of a broad range of technical and social considerations and recommend that the basis for ALARA judgments be documented. This guidance addresses the requirements and provides a logical and deliberate procedure by which those personnel who are charged with providing radiation protection can arrive at ALARA decisions. The guidance should also provide the basis on the required ALARA plans can be prepared by contractors and approved by DOE line elements.

C. Definition

"As Low As is Reasonably Achievable" (ALARA) is a phrase used to describe an approach to radiation protection by which exposures (both individual and collective to the work force and the general public) and releases of radioactive material to the environment are managed and controlled to levels as low as is reasonably achievable below applicable dose limits. The objective of the ALARA process is not the attainment of a particular dose level, but rather the attainment of the lowest practicable dose level after taking into account social, technical, economic, practical, and public policy considerations.

D. Radiological Assumptions

There is no data from exposures of humans to quantify the dose to risk (or health-effect) relationship for doses in the regime that ranges from background exposure levels to doses at the limits selected by DOE. For radiation protection purposes, DOE assumes that there is a linear proportionality between dose and risk (e.g., the probability of radiationinduced health effects) at all dose levels encountered in the work-place and in the environment[1]. DOE believes that it is prudent to adopt this assumption and requires that it be used for DOE radiation protection purposes and when comparing and evaluating radiation protection alternatives for protection of the public and the environment for ALARA or other purposes. For ALARA applications, the use of "average" or typical characteristics for evaluating potential doses to exposed populations are also recommended. Irrespective of the age or the gender of the persons exposed, average doses to organs or tissues, average risk coefficients, and typical values for food and drink intakes and metabolic

[1]DOE is in the process of completing review of dose to risk conversion factors including the recommendations of BEIR V, BEIR IV, and UNSCEAR 88, in order to recommend a general value to use to compare effective dose equivalent to health effects in environmental analyses. In the interim, a factor between 4 and 5 fatal cancers per 10,000 person-rem may be used for doses in the range of, and below, the DOE dose limit. The value is within the range of values that the new data would suggest and equivalent to the value used by NRC and EPA in recent regulations (NRC 1990, NRC 1991, EPA 1989). This assumed value may not be appropriate for conducting risk evaluations for the purpose of assessing impacts from actual exposures.

parameters for "reference man" should be used[2]. ALARA evaluations should be expressed in terms of the total effective dose equivalent (ede) which is the sum of the ede from external exposures and the committed ede from radionuclides taken into the body during the same exposure time-interval.

E. Factors and Issues

This guidance provides a procedure that will aid in optimizing resource allocations for radiological safety and protection and systemize and clarify "good ALARA practices." ALARA applications are broad, ranging from day-to-day "routine" operations to those related to the design or modification of major facilities. In some instances, the evaluations can be done by expressing all factors in terms of monetary units to strike a balance or effect a trade-off between exposures and protection measures (cost-benefit analysis). However, frequently one finds that not all important factors can be readily expressed in monetary units and expressing some factors in terms of monetary units is arbitrary. For example, the monetary value placed on a unit of collective effective dose commitment has not been established based on a consensus criteria. DOE does not recognize or endorse any particular value for the monetary value of a unit of collective dose. Specific values have been assumed in previous DOE guidance or in guidance from other Federal agencies, however, those values should only be used for comparison purposes or for sensitivity analyses.

Two components of the cost factor for units of collective effective dose commitment have been recognized, — one based on health considerations (i.e., the risk and cost of serious health effects) and one based on other factors which are difficult to identify and to quantify (i.e., perceptions such as risk-aversion to radiation or radioactive material at any level). Additional confounding factors complicate the rationale, e.g., costs or other impacts and benefits may be accrued to a population other than the one receiving the exposure. Other techniques (e.g., multi-attribute utility analyses) can permit the less quantifiable factors, such as social and other factors, to enter into the decision making process.

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[2]It is noted that DOE recommends the use of the linear dose to risk assumption and average parametric assumptions for planning purposes and for evaluating potential exposures for use in the ALARA process and other environmental evaluations. However, these assumptions may not be applicable or appropriate when assessing the risks from actual exposures or the effects of exposures to accidental releases or conducting scientific studies (e.g., epidemiology). For instance, in assessing possible health-effects that might be associated with an actual exposure the magnitude of the exposures might be much greater than the dose limit selected for radiation protection purposes and beyond the dose range where a linear relationship might reasonably be expected to apply. At very high doses (beyond threshold dose values), non-stochastic health-effects might be expected and these are not related to dose in a linear manner. Further, when quantitative estimates of risk are evaluated in epidemiologic studies, it might be appropriate to consider the exposed group and determine if specific age, gender, or other factors are important in making the risk assessments.

Among the more difficult issues to evaluate are those which deal with very low levels of exposure from man-made sources in the environment, e. g., exposures which result in individual and collective doses that are a small fraction of those from naturally occurring sources. Widespread, chronic, very low dose levels might be delivered over very long time intervals (e.g., over many generations) to many people over a very large geographical area.

Because of the uncertainties and difficulty in comparing these factors, it is critical that qualified professionals be responsible for making ALARA judgments. As an example, the time and duration of exposures to the affected individuals or population and the likelihood or probability of occurrence of the exposure scenarios evaluated in the analyses should be considered and appropriately balanced when the alternatives are weighed. It is appropriate, for instance, to give more importance to likely near-term doses than to plausible but unlikely future exposures. In general it is reasonable to weight doses that are increasingly uncertain lower than those that are not. Similarly, equal collective doses resulting from individual doses that are a significant fraction of the dose limit may be considered more important than collective doses resulting from individual doses that are very small compared to the dose limit. [This is recommended because the linear dose-risk assumption is believed to be conservative. Therefore, given the option, the higher doses to individuals should be avoided.]

Another issue is the selection of a time-interval for evaluating doses from radionuclides taken into the body by inhalation, ingestion, or absorption. Presently, a 50-year time-interval is recommended by authorities for dose evaluations. This permits the use of dose-conversion tables presently available. Further, few radionuclides would contribute to the total dose received beyond 50 years, in any case. Dose conversion tables which differentiate by age, gender, and other characteristics of the recipient, can be anticipated within the next few years.

These and other issues, such as (1) the unrestricted use of property or (2) the release of items containing low levels of residual radioactive material which have associated low risk levels which are below regulatory concern and exempt from regulatory control, are currently being considered by national and international authorities and as data or recommendations are available, DOE guidance will be provided.

F. Procedures

The basic question to be answered in the implementation of the ALARA process is "Have I done all that I can reasonably do to reduce the radiation

doses?" Although the goal of ALARA is primarily radiation dose reduction, hazardous non-radioactive materials also might be components of the waste stream effluent or could be introduced by some of the optional treatments used to reduce the radiological components. Therefore, the risks associated with these materials must be factored into ALARA determinations. It is important to maintain cognizance of the overall impacts of any decision.

There are many "tools" or determinations which can be used in gathering data concerning ALARA. Many of these techniques are explained in varied detail in the references provided in this guidance. Some of these determinations can range from quite complex procedures — such as a quantified cost-benefit analysis, to qualitative evaluations — such as multiattribute utility analyses with weighing factors and scaling factors. Others may be rudimentary and be based on a fundamental understanding and commitment to the ALARA principle, common sense, sound judgment, etc., rather than formal quantitative techniques, may be all that is required. Activities which involve low doses are more likely to be based on judgmental decisions. In cases where dose increments are very low compared to the dose limits, the social and political considerations often will be the dominant factors in arriving at the ALARA decision.

The level of effort or resources used to obtain detailed information to support the ALARA decision should be commensurate with the magnitude of the potential doses and costs. A structured procedure, which could be used to evaluate either the ALARA or "Best Available Technology" (BAT) alternatives (as required in DOE 5400.5 for treatment of certain liquid waste streams prior to release), is illustrated in Figure 1. The principal difference between the ALARA process and the BAT selection is that the ALARA process includes consideration of doses, whereas the BAT selection considers the source term, but not potential exposures to the source. A sensitivity analysis is useful in both ALARA and BAT evaluations because it can provide information on the robustness of the results. Specific steps are presented in Table 1.

It is emphasized that this is a flexible process and the effort should be proportional to the potential benefits. The boundaries between each of the steps will not always be clear-cut: some may proceed in parallel or may need repeating. The overall impact of the alternatives considered might also control the detail and level of effort assigned to individual steps. If the difference in doses and costs associated with the various options is small, the cost of a detailed ALARA review might not be warranted. Similarly, if the difference in dose increments is large and the cost difference is small, or vice versa, the decision of alternatives could be obvious and very detailed analyses are not justified. However, when costs, doses, and other impacts vary significantly,

Table 1 STEPS LEADING TO AS LOW AS REASONABLY ACHIEVABLE LEVELS

Step 1: Define the Objective and Scope of the Issue to be Analyzed

State the objective of the project or proposal in terms which do not prejudge the means by which the objective is to be achieved. Specify the radiological protection factors to be included and those non-radiological protection factors to be brought into consideration.

Step 2: Identify Protection Options

Generate options for achieving the objective: the aim is to find options which are both practicable and environmentally acceptable. This step provides a strong incentive to consider not only obvious solutions, but also innovative alternatives. It also includes the elimination of impractical options.

Step 3: Estimate the Performance of the Options for Each Factor

Analyze these options to identify the advantages and disadvantages of each option. Use quantitative and qualitative methods when each are appropriate. Incorporate judgmental criteria explicitly.

Step 4: Analytical Solution

Present the results of the quantitative analysis of factors. Present the results of the evaluation concisely and objectively and in a format that can highlight the advantages and disadvantages of each option. Do not combine the results of different measurements and forecasts if this would obscure information which is important to the decision.

Step 5: Result of Optimization

Select the preferred option from the feasible options. The choice will depend on the weight given to the environmental impacts and associated risks and to the costs involved. Decision makers should be able to demonstrate that the preferred option does not involve unacceptable consequences to the environment. Include consideration of all relevant factors whether treated quantitatively or qualitatively, together with judgement on relative weighing and the results of sensitively analyses to select the recommended radiological optimum.

Step 6: Decision

Take account of the results of optimization and any non-radiological factors and make the decision. Scrutinize closely the proposed detailed design or operating procedures to ensure that no pollution or hazards have been overlooked. It is good practice to have the scrutiny done by individuals who are independent of the original team.

Step 7: Implement and Monitor

Monitor the achieved performance against the desired targets, especially those for environmental quality. Do this to establish whether the assumptions in the design are correct and to provide feedback for future development of proposals and designs.

Throughout Steps 1 to 7: Maintain an Audit Trail

Record the basis for any choices or decisions through all of these stages; i.e., the assumptions used, the details of evaluation procedures, the reliability and origins of the data, the affiliations of those involved in the analytical work and a record of those taking the decision. Record, if possible, the reasons for any departure from the recommended optimum.

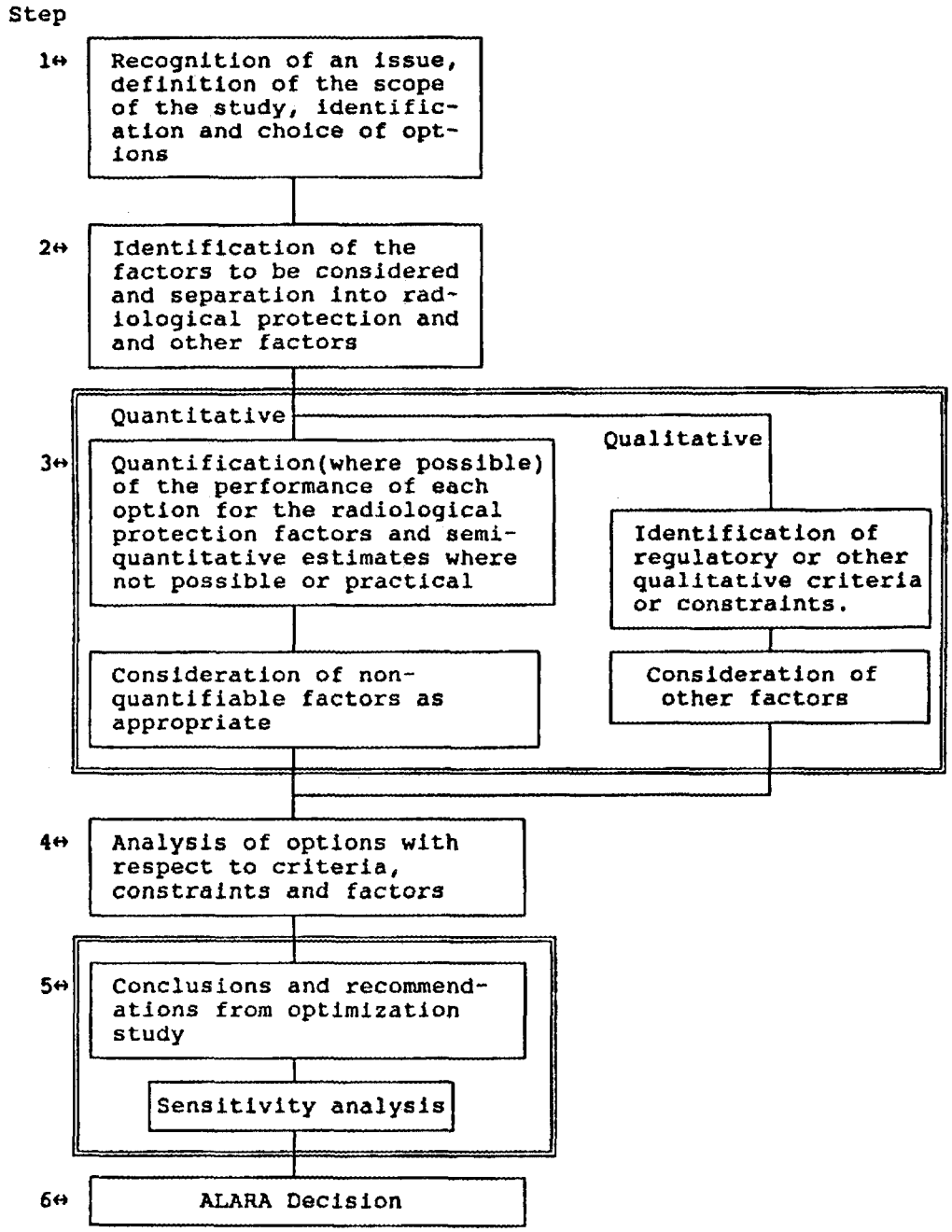

FIGURE 1. STRUCTURED APPROACH TO ALARA DECISIONMAKING.

more detailed analyses are needed. However, whether the analyses is quantitative or qualitative it is essential that it be documented.

G. Requirements

1. ALARA Program The DOE contractor or operating organization at each DOE facility where activities routinely involve radiation or radioactive materials is required, by Order DOE 5400.5, to have an ALARA program which addresses the impact of the operations on the public and the environment. [Order DOE 5480.11 addresses application of the ALARA requirement for workers.] The ALARA program consists of: (a) a policy statement and commitment from management to the ALARA philosophy and process[3]; (b) a designated organizational responsibility, authority, and structure for implementing the ALARA program; (c) a systematic evaluation of the operations at the site to identify those activities which are responsible for the exposures of the public and workers and releases of radioactive material; and (d) a procedure by which the operations or activities will be analyzed to determine whether they are being performed in a manner that will ensure that the radiological impacts are ALARA. One acceptable procedure for selecting the ALARA choice from alternatives is presented above, in Section F "Procedures." Other procedures also might be acceptable. The ALARA Plan or, if appropriate, the Environmental Protection Implementation Plan (EPIP) must describe the site ALARA program and contain details of the procedures being used to implement it.

The ALARA program shall be reviewed and approved by the appropriate Program Office and the ALARA program shall be summarized or described in the site EPIP or be contained in a specific ALARA Plan if the information in the EPIP is general. The ALARA program and plan should be reviewed by the DOE contractor or operating organization as necessary, but at least every 3 years, to identify: (a) changes which have occurred in the facility, operations, or activities which might have altered the relative importance of the releases or exposures; (b) alternatives to the operations or activities which were not considered previously; and (c) operational information on the performance of the selected equipment or process that could alter the decision on choice among alternatives.

[3]In addition to the policy statement which should be reaffirmed on a regular basis, management should consider incentive programs for individuals that suggest ALARA related improvements in process operations or even in the implementation of the ALARA programs as part of their commitment to ALARA.

Consideration should be given to providing an in-house audit system to evaluate the effectiveness of the ALARA program and to ensure that improvements are implemented to strengthen it.

2. ALARA Plan The DOE contractor or operating organization is required to have an ALARA plan which presents the requirements for the records of the ALARA evaluations and other activities and information which were considered in the decision for selecting the alternative judged to be ALARA and the rationale leading to the selection. The plan should specify procedures by which ALARA activity records will be kept current and readily available for use by the staff. The records should be organized in a manner so that appropriate sections can be readily located to demonstrate compliance with the ALARA program. The plan should encourage coordination and cooperation with other DOE and other organizations in sharing of information on analyses, costs, operations, maintenance, technical evaluations of alternatives, etc.

The ALARA plan should identify general areas which should be considered in making ALARA decisions: societal, technological, economic, and public policy considerations. A checklist of more specific factors also should be provided. As a minimum, the checklist should include: (a) the dose to the maximally exposed member of the general public; (b) the collective effective dose commitment to the population within 50 miles of the site[4]; (c) the alternative processes (such as alternative treatments of discharge streams, operating methods, or controls); (d) the individual and collective doses for each process alternative; (e) the costs for each process alternative; (f) the changes in costs and impacts among process alternatives; (g) the anticipated changes in doses to workers; and (h) non-radiological impacts.

DOE 5400.5 requires reporting to DOE line management and EH when certain reporting limits are exceeded. Consistent with these requirements, the ALARA plans should include procedures for notifying EH if potential doses resulting from a decision to implement a specific ALARA alternative exceeds 10 mrem ede to any member of the public in a year or a collective EDE of 100 person-rem in a year.

ALARA analyses and evaluations sometimes require considerable staff skills and competence in several disciplines. The ALARA Plan should describe a training program to ensure the availability of appropriate staff capabilities to

[4] The 50-mile limitation is a guideline intended for evaluating the impact of exposures of persons in the immediate environs to effluents. However, the 50-mile distance might not be appropriate for evaluating potential exposures by other than primaary exposure modes. For instance, the collective dose resulting from the release of property with residual contamination by radioactive material might require consideration of a different population group. Similarly, contamination of agricultural areas might, through distribution of affected food stuff, impact populations outside the 50-mile radius.

provide the necessary analyses and evaluations. An incentive program for employees has been shown to be successful in implementing ALARA programs.

3. Compliance Demonstration of compliance with the ALARA requirements of DOE 5400.5 may be provided by:

a. A documented current description of the site ALARA Program, reviewed and approved by the appropriate Program Office[5] and a statement of commitment to use of the ALARA process;

b. A documented current ALARA Program Plan describing procedures by which the individual ALARA evaluations and judgments will be made and the documentation of the procedures;

c. A description of the training program provided to ensure staff capabilities to perform ALARA evaluations; and

d. A file containing current records of all formal ALARA evaluations and decisions, including the rationale for the ALARA judgments, indicating that the ALARA plan is being implemented. The records should demonstrate that sufficient information was assembled and considered to support the ALARA decisions.

[5]If the decscription of the ALARA program in the EPIP is sufficiently detailed, the ALARA program approval requirement may be satisfied through the approval of the EPIP. However, if it is not, program offices may opt to approve an ALARA plan.

H. Bibliography

Many references have appeared on the subject of optimization as applied to radiation protection. Several of them were originated by the ICRP and most of the others by various international organizations which have attempted to apply the principles. Selected ALARA references are given below.

"Implications of Commission Recommendations that Doses be Kept As Low As Readily Achievable," (ICRP Publication 22) 1973.

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"BEPO and ALARA," Radiological Protection Bulletin. No 96, October 1988.

"Royal Commission on Environmental Pollution, Twelfth Report — Best Practicable Environmental Option," HMSO, CM 310 (1988).

Webb, G.A.M. [of the British National Radiation Protection Board] "A Report on the Work of the ICRP Task Group" NEA ad hoc meeting, March 1988.

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"Health Physics Manual of Good Practices for Reducing Radiation Exposures to Levels that are As Low As Reasonably Achievable," PNL-6577, June 1988.

"A Manual for Implementing Residual Radioactive Material Guidelines," Chapter 5, DOE/CH/8901, 1989.

Other references discussed in this guidance include:

"Health Effects of Exposure to Low Levels of Ionizing Radiation" (BEIR V), National Research Council, National Academy Press, 1990.

"Sources, Effects, and Risks of Ionizing Radiation," UNSCEAR 88, United Nations Scientific Committee on the Effects of Ionizing Radiation, 1988.

"Health Risk of Radon and Other Internally Deposited Alpha Emitters" (BEIR IV), National Academy of Sciences, National Research Council, 1988.

"National Emission Standards for Hazardous Air Pollutants," U.S. Code of Federal Regulations Title 40 Part 61 as revised in the Federal Register December 15, 1989, and Volume I background documentation, U.S. EPA, 1989.

"NRC Approves Policy Statement on Radiation Levels to be Considered for Exemptions," with associated policy statement, U.S. Nuclear Rcgulatory Commission, June 27, 1990.

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Guidelines for NRC Review of Agreement State Radiation Control Programs, 1992

(May 28, 1992; 57 FR 22495-22503)

Introduction

Section 274 of the Atomic Energy Act was enacted by the Congress in 1959 to recognize the interests of the States in atomic energy, to clarify the respective responsibilities of State and Federal Governments, and to provide a mechanism for States to enter into formal agreements with the Atomic Energy Commission (AEC), and later the Nuclear Regulatory Commission (NRC), under which the States assume regulatory authority over by-product, source, and small quantities of special nuclear materials, collectively referred to as agreement materials. The mechanism by which the NRC discontinues and the States assume regulatory authority over agreement materials is an Agreement between the Governor of a State and the Commission. Before entering into an Agreement, the Governor is required to certify that the State has a regulatory program that is adequate to protect the public health and safety. In addition, the Commission must perform an independent evaluation and make a finding that the State's program is adequate from the health and safety standpoint and compatible with the Commission's regulatory program.

Current Guidelines

In 1981, the Commission published a major revision of the guide for review of Agreement State programs (earlier revisions reflected primarily minor and editorial changes). These Guidelines constitute Commission policy in the form of a document entitled "Guidelines for NRC Review of Agreement State Radiation Control Programs." This document provides guidance for evaluation of operating Agreement State programs based on over 20 years of combined AEC- NRC experience in administering the Agreement State program. In 1985, Commission staff initiated minor updating, clarifying and editorial changes reflecting the experience gained with the 1981 policy statement. Those changes were promulgated in June 1987.

In 1988, the Commission staff initiated revisions to the Review Guidelines to improve reviews of State regulatory programs for the disposal of low-level radioactive waste. The revised document will be used by NRC in its review of those State programs which regulate the disposal of low-level radioactive waste in permanent disposal facilities. It will also be used to strengthen the review of State programs which regulate other aspects of radioactive waste management, such as packaging, treatment, storage and transportation.

The "Guidelines" contain six sections, each dealing with one of the essential elements of a radiation control program (RCP) which are: Legislation and Regulations, Organization, Management and Administration, Personnel, Licensing, and Compliance. Each section contains (a) a summary of the general significance of the program element, (b) indicators which address specific functions within the program element, and (c) guidelines which delineate specific objectives or operational goals under each indicator.

Categories of Indicators

The indicators listed in this document cover a wide range of program functions, both technical and administrative. It should be recognized that the indicators, and the guidelines under each indicator, are not of equal importance in terms of the fundamental goal of a radiation control program, i.e., protection of the public health and safety. Therefore, the indicators are categorized in terms of their importance to the fundamental goal of protecting the public health and safety. Two categories are used.

Category I—Direct Bearing on Health and Safety. Category I Indicators (and the Program Elements of which they are a part) are:

- Legal Authority (Legislation and Regulations)

- Status and Compatibility of Regulations (Legislation and Regulations)
- Quality of Emergency Planning (Management and Administration)
- Technical Quality of Licensing Actions (Licensing)
- Adequacy of Product Evaluations (Licensing)
- Status of Inspection Program (Compliance)
- Inspection Frequency (Compliance)
- Inspectors' Performance and Capability (Compliance)
- Response to Actual and Alleged Incidents (Compliance)
- Enforcement Procedures (Compliance)

These indicators address primary program functions which directly relate to the State's ability to protect the public health and safety. If significant problems exist in one or more Category I indicator areas, then the need for improvements may be critical. Legislation and regulations together form the foundation for the entire program establishing the framework for the licensing and compliance program. The technical review of license applications is the initial step in the regulatory process. The evaluation of applicant qualifications, facilities, equipment, and procedures by the regulatory agency is essential to assure protection of the public from radiation hazards associated with the proposed activities. Assuring that licensees fulfill the commitments made in their applications and that they observe the requirements set forth in the regulations are the objectives of the compliance program. The essential elements of an adequate compliance program are (1) the conduct of onsite inspections of licensee activities, (2) the performance of these inspections by competent staff, and (3) the taking of appropriate enforcement actions. Another very important factor is the ability to plan for, respond effectively to, and investigate radiation incidents.

Category II—Essential Technical and Administrative Support. Category II Indicators (and the Program Elements of which they are a part) are:

- Location of Radiation Control Program Within State Organization. (Organization)
- Internal Organization of Radiation Control Program. (Organization)
- Legal Assistance. (Organization)
- Technical Advisory Committees. (Organization)
- Contractual Assistance. (Organization)
- Budget. (Management and Administration)
- Laboratory Support. (Management and Administration)
- Administrative Procedures. (Management and Administration)
- Management. (Management and Administration)
- Office Equipment and Support Services. (Management and Administration)
- Public Information. (Management and Administration)
- Qualifications of Technical Staff. (Personnel)
- Staffing Level. (Personnel)
- Staff Supervision. (Personnel)
- Training. (Personnel)
- Staff Continuity. (Personnel)
- Licensing Procedures. (Licensing)
- Inspection Procedures. (Compliance)

- Inspection Reports. (Compliance)
- Confirmatory Measurements. (Compliance)

These indicators address program functions which provide essential technical and administrative support for the primary program functions. Good performance in meeting the guidelines for these indicators is essential in order to avoid the development of problems in one or more of the primary program functions, i.e., those that fall under Category I indicators. Category II indicators frequently can be used to identify underlying problems that are causing, or contributing to, difficulties in Category I indicators.

It is the NRC's intention to use these categories in the following manner. In reporting findings to State management, the NRC will indicate the category of each comment made. If no significant Category I comments are provided, this will indicate that the program is adequate to protect the public health and safety and is compatible with the NRC's program. If one or more significant Category I comments are provided, the State will be notified that the program deficiencies may seriously affect the State's ability to protect the public health and safety and that the need for improvement in particular program areas is critical. The NRC would request an immediate response. If, following receipt and evaluation, the State's response appears satisfactory in addressing the significant Category I comments, the staff may offer findings of adequacy and compatibility as appropriate or defer such offering until the State's actions are examined and their effectiveness confirmed in a subsequent review. If additional information is needed to evaluate the State's actions, the staff may request the information through follow-up correspondence or perform a follow-up or special, limited review. NRC staff may hold a special meeting with appropriate State representatives. No significant items will be left unresolved over a prolonged period. If the State program does not improve or if additional significant Category I deficiencies have developed, a staff finding that the program is not adequate will be considered and the NRC may institute proceedings to suspend or revoke all or part of the Agreement in accordance with Section 274(j) of the Act. The Commission will be informed of the results of the reviews of the individual Agreement State programs and copies of the review correspondence to the States will be placed in the NRC Public Document Room.

Category II comments concern functions and activities which support the State program and therefore would not be critical to the State's ability to protect the public. The State will be asked to respond to these comments and the State's actions will be evaluated during the next regular program review.

It should be recognized that the categorization pertains to the significance of the overall indicator and not to each of the guidelines within that indicator. For example, "Technical Quality of Licensing Actions" is a category I indicator. The review of license applications for the purpose of evaluating the applicant's qualifications, facilities, equipment, and procedures is essential to assuring that the public health and safety is being protected. One of the guidelines under this indicator concerns prelicensing visits. The need for such visits depends on the nature of the specific case and is a matter of judgment on the part of the licensing staff. The success of a State program in meeting the overall objective of the indicator does not depend on liberal adherence to each recommended guideline.

The "Guidelines for NRC Review of Agreement State Radiation Control Programs" will be used by the NRC staff during its onsite reviews of Agreement State programs. At least once each year, there will be onsite communication between the NRC staff and each State either as a result of a routine review or a review site visit. A routine review is a total assessment of each Agreement State program and is conducted at least biennially. A review visit is a trip to the Agreement State to assess the State program. Additional contacts may also be made through special or follow-up reviews.

In making a finding of adequacy, the NRC considers areas of the State program which are critical to protection of the public health and safety. For example, a State that is not carrying out its inspection program, or fails to respond to significant radiological incidents would not be considered to have a program adequate to protect the public health and safety. Basic radiation protection standards, such as exposure limits, also directly affect the State's ability to protect public health and safety. The NRC feels that it is important to strive for a high degree of uniformity in technical definitions and terminology, particularly as related to units

of measurement and radiation dose. Maximum permissible doses and levels of radiation and concentrations of radioactivity in unrestricted areas as specified in 10 CFR part 20 are considered to be important enough to require States to be essentially equivalent in this area in order to protect public health and safety. Certain procedures, such as those involving the licensing of products containing radioactive material intended for interstate commerce, also require a high degree of uniformity. If no serious performance problems are found in an Agreement State program and if its standards and program procedures are compatible with the NRC program, a finding of adequacy and compatibility is made.

It should be noted that the categories of indicators, and the significance thereof, apply equally to the regulation of uranium and thorium recovery and associated wastes; low-level radioactive waste management; as well as the overall radiation control program. Any differences in the guidelines for review of uranium mill tailings programs or low-level waste programs are specified within the individual program elements.

Program Element: Legislation and Regulations

The effectiveness of any State radiation control program (RCP) is dependent upon the underlying authority granted the RCP in State legislation, and implemented in the State regulations. Regulations provide the foundation upon which licensing, inspection, and enforcement decisions are made. Regulations also provide the standards and rules by which the licensee must operate. Periodic revisions are necessary to reflect changing technology, improved knowledge, current recommendations by technical advisory groups, and consistency with NRC regulations. Procedures for providing input to the NRC on proposed changes to NRC regulations are necessary to assure consideration of the State's interests and requirements. The public and, in particular, affected classes of licensees should be granted the opportunity and time to comment on rule changes.

Indicators and Guidelines

Legal Authority (Category I)

- Clear statutory authority should exist, designating a State radiation control agency and providing for promulgation of regulations, licensing, inspection and enforcement.
- States regulating uranium or thorium recovery and associated wastes pursuant to the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA) must have statutes enacted to establish clear authority for the State to carry out the requirements of UMTRCA.
- States regulating the disposal of low-level radioactive waste in permanent disposal facilities must have statutes that provide authority for the issuance of regulations for low-level waste management and disposal. The statutes should also provide regulatory program authority and provide for a system of checks to demonstrate that conflicts of interest between the regulatory function and the development and operational functions shall not occur.[1]

Status and Compatibility of Regulations (Category I)

- The State must have regulations essentially identical to 10 CFR part 19, part 20 (radiation dose standards, effluent limits, waste manifest rule and certain other parts), part 61 (technical definitions and requirements, performance objectives, financial assurances) and those required by UMTRCA, as implemented by part 40.
- The State should adopt other regulations to maintain a high degree of uniformity with NRC regulations.

[1] The level of separation (e.g., separate agencies) should be determined for each State individually.

- For those regulations deemed a matter of compatibility by NRC, State regulations should be amended as soon as practicable but no later than 3 years.
- The RCP has established procedures for effecting appropriate amendments to State regulations in a timely manner, normally within 3 years of adoption by NRC.
- Opportunity should be provided for the public to comment on proposed regulation changes (Required by UMTRCA for uranium mill regulation.)
- Pursuant to the terms of the Agreement, opportunity should be provided for the NRC to comment on draft changes in State regulations.

Program Element: Organization

The effectiveness of any State RCP may be dependent upon its location within the overall State organizational structure. The RCP should be in a position to compete effectively with other health and safety programs for budget and staff. Program management must have access to individuals or groups which establish health and safety program priorities. The RCP should be organized to achieve a high degree of efficiency in supervision, work functions, and communications.

Indicators and Guidelines

Location of Radiation Control Program Within State Organization (Category II)

- The RCP should be located in a State organization parallel with comparable health and safety programs. The Program Director should have access to appropriate levels of State management.
- Where regulatory responsibilities are divided between State agencies, clear understandings should exist as to division of responsibilities and requirements for coordination.

Internal Organization of Radiation Control Program (Category II)

- The RCP should be organized with the view toward achieving an acceptable degree of staff efficiency, place appropriate emphasis on major program functions, and provide specific lines of supervision from program management for the execution of program policy.
- Where regional offices or other government agencies are utilized, the lines of communication and administrative control between these offices and the central office (Program Director) should be clearly drawn to provide uniformity in licensing and inspection policies, procedures and supervision.

Legal Assistance (Category II)

- Legal staff should be assigned to assist the RCP or procedures should exist to obtain legal assistance expeditiously. Legal staff should be knowledgeable regarding the RCP program, statutes, and regulations.

Technical Advisory Committees (Category II)

- Technical Committees, Federal Agencies, and other resource organizations should be used to extend staff capabilities for unique or technically complex problems.

- A State Medical Advisory Committee should be used to provide broad guidance on the uses of radioactive drugs in or on humans. The Committee should represent a wide

spectrum of medical disciplines. The Committee should advise the RCP on policy matters and regulations related to use of radioisotopes in or on humans.

- Procedures should be developed to avoid conflict of interest, even though Committees are advisory. This does not mean that representatives of the regulated community should not serve on advisory committees or not be used as consultants.

Contractual Assistance (Category II)

- Because of the diversity and complexity of low-level radioactive waste disposal licensing and regulation, States regulating the disposal of low- level radioactive waste in permanent disposal facilities should have procedures and mechanisms in place for acquisition of technical and vendor services necessary to support these functions that are not otherwise available within the RCP.
- The RCP should avoid the selection of contractors which have been selected to provide services associated with the LLW facility development or operations.

Program Element: Management and Administration

State RCP management must be able to meet program goals through strong, direct leadership at all levels of supervision. Administrative procedures are necessary to assure uniform and appropriate treatment of all regulated parties. Procedures for receiving information on radiological incidents, emergency response, and providing information to the public are necessary. Procedures to provide feedback to supervision on status and activities of the RCP are necessary. Adequate facilities, equipment and support services are needed for optimum utilization of personnel resources. Laboratory support services should be administered by the RCP or be readily available through established administrative procedures.

In order to meet program goals, a State RCP must have adequate budgetary support. The total RCP budget must provide adequate funds for salaries, travel costs associated with the compliance program, laboratory and survey instrumentation and other equipment, contract services, and other administrative costs. The program budget must reflect annual changes in the number and complexity of applications and licenses, and the increase in costs due to normal inflation.

Indicators and Guidelines

Quality of Emergency Planning (Category I)

- The State RCP should have a written plan in response to incidents at licensee facilities which takes into account such incidents as spills, overexposures, transportation accidents, fire or explosion, theft, etc.
- The plan should define the responsibilities and actions to be taken by State agencies. The plan should be specific as to persons responsible for initiating response actions, conducting operations and cleanup.
- Emergency communication procedures should be adequately established with appropriate local, county, and State agencies. Plans should be distributed to appropriate persons and agencies. NRC should be provided the opportunity to comment on the plan while in draft form.
- The plan should be reviewed annually by Program staff for adequacy and to determine that content is current. Periodic drills should be performed to test the plan.

Budget (Category II)

- Operating funds should be sufficient to support program needs such as staff travel necessary to the conduct of an effective compliance program, including routine inspections, follow-up or special inspections (including pre-licensing visits), and responses to incidents and other emergencies, instrumentation and other equipment to support the RCP, administrative costs in operating the program including rental charges, printing costs, laboratory services, computer and/or word processing support, preparation of correspondence office equipment, hearing costs, etc., as appropriate. States regulating the disposal of low-level radioactive waste facilities should have adequate budgetary resources to allow for changes in funding needs during the LLW facility life cycle. After appropriations, the sources of program funding should be stable and protected from competition from or invasion by other State programs.
- Principal operating funds should be from sources which provide continuity and reliability, i.e., general tax, license fees, etc. Supplemental funds may be obtained through contracts, cash grants, etc.

Laboratory Support (Category II)

- The RCP should have laboratory support capability in house, or readily available through established procedures, to conduct bioassays, analyze environmental samples, analyze samples collected by inspectors, etc. on a priority established by the RCP.
- In addition, States regulating the disposal of low-level radioactive waste facilities in permanent disposal facilities should have access to laboratory support for radiological and non-radiological analyses associated with the licensing and regulation of low-level waste disposal, including soils testing, testing of environmental media, testing of engineering properties of waste packages and waste forms, and testing of other engineering materials used in the disposal of low-level radioactive waste. Access to laboratory support should be available on an "as needed" basis for nonradiological analyses to confirm licensees' and applicants' programs and conditions for nonradiological testing should be prescribed in plans or procedures.

Administrative Procedures (Category II)

- The RCP should establish written internal policy and administrative procedures to assure that program functions are carried out as required and to provide a high degree of uniformity and continuity in regulatory practices. These procedures should address internal processing of license applications, inspection policies, decommissioning and license termination, fee collection, contacts with communication media, conflict of interest policies for employees, exchange-of-information and other functions required of the program. Administrative procedures are in addition to the technical procedures utilized in licensing, and inspection and enforcement.

Management (Category II)

- Program management should receive periodic reports from the staff on the status of regulatory actions (backlogs, problem cases, inquiries, regulation revisions).
- RCP management should periodically assess workload trends, resources and changes in legislative and regulatory responsibilities to forecast needs for increased staff, equipment, services and funding.
- Program management should perform reviews of selected license cases handled by each reviewer and document the results. Complex licenses (major manufacturers, low-level

radioactive waste disposal facilities, large scope- Type A Broad, potential for significant releases to the environment) should receive second party review (supervisory, committee, consultant). Supervisory review of inspections, reports and enforcement actions shall also be performed.

- For the implementation of very complex licensing actions, such as initial license review, license renewals and licensing actions associated with a low-level radioactive waste disposal facility, there should be an overall Project Manager responsible for the coordination and compilation of the diverse technical reviews necessary for the completion of the licensing action. The Project Manager should have training or experience in one or more of the main disciplines related to the technical reviews which the Project Manager will be coordinating such as health physics, engineering, earth science or environmental science.
- When regional offices or other government agencies are utilized, program management should conduct periodic audits of these offices.

Office Equipment and Support Services (Category II)

- The RCP should have adequate secretarial and clerical support. Automatic typing and Automatic Data Processing and retrieval capability should be available to larger (greater than 300-400 licenses) programs. Similar services should be available to regional offices, if utilized.
- States should have a license document management system that is capable of organizing the volume diversity of materials associated with licensing and inspection of radioactive materials.
- Professional licensing, inspection, and enforcement staff should not be used for fee collection and other clerical duties.

Public Information (Category II)

- Inspection and licensing files should be available to the public consistent with State administrative procedures. It is desirable, however, that there be provisions for protecting from public disclosure proprietary information and information of a clearly personal nature.
- Opportunity for public hearings should be provided in accordance with UMTRCA and applicable State administrative procedure laws during the process of major licensing actions associated with UMTRCA and low-level radioactive waste in permanent disposal facilities.

Program Element: Personnel

The RCP must be staffed with a sufficient number of trained personnel. The evaluation of license applications and the conduct of inspections require staff with in-depth training and experience in radiation protection and related subjects. In addition, in States regulating low-level radioactive waste facilities, the RCP should be staffed with individuals with training and experience in engineering, earth science, and environmental science. The staff must be adequate in number to assure licensing, inspection, and enforcement actions of appropriate quality to assure protection of the public health and safety. Periodic training of existing staff is necessary to maintain capabilities in a rapidly changing technological environment. Program management personnel must be qualified to exercise adequate supervision in all aspects of a State radiation control program.

Indicators and Guidelines

Qualifications of Technical Staff (Category II)

- Professional staff should have bachelor's degree or equivalent training in the physical and/or life sciences. Additional training and experience in radiation protection for senior personnel including the director of the radiation protection program should be commensurate with the type of licenses issued and inspected by the State. For States regulating uranium mills and mill tailings, staff training and experience should also include hydrology, geology, and structural engineering.[2] For programs which regulate the disposal of low-level radioactive waste in permanent facilities, staff training and experience should include civil or mechanical engineering, geology, hydrology, and other earth science, and environmental science. In both types of materials, staff training and experience guidelines apply to available contractors and resources in State agencies other than the RCP.

- Written job descriptions should be prepared so that professional qualifications needed to fill vacancies can be readily identified.

Staffing Level (Category II)

- Professional staffing level should be approximately 1-1.5 person-years per 100 licenses in effect. The RCP must not have less than two professionals available with training and experience to operate the RCP in a way which provides continuous coverage and continuity. The two professionals available to operate the RCP should not be supervisory or management personnel.
- For States regulating uranium mills and mill tailings, current indications are that 2-2.75 professional person-years of effort, including consultants, are needed to process a new mill license (including in situ mills) or major renewal, to meet requirements of Uranium Mill Tailings Radiation Control Act of 1978.
- States which regulate the disposal of low-level radioactive waste in permanent disposal facilities should allow a baseline RCP staff effort of 3-4 professional technical person-years (in addition to the two professionals for the basic RCP indicated in the first bullet of this indicator). However, in some cases, the level of site activity may be such that a lower level is adequate, particularly if contractor support is on call. In any event, staff resources should be adequate to conduct inspections on a routine basis during operations of the LLW facility, including inspection of incoming shipments and licensee site activities and to respond to emergencies associated with the site. During periods of peak activity additional staff or specialty consultants should be available on a timely basis.

Staff Supervision (Category II)

- Supervisory personnel should be adequate to provide guidance and review the work of senior and junior personnel.
- Senior personnel should review applications and inspect licenses independently, monitor work of junior personnel, and participate in the establishment of policy.
- Junior personnel should be initially limited to reviewing license applications and inspecting small programs under close supervision.

[2] Additional guidance is provided in the Criteria for Guidance of States and NRC in Discontinuance of NRC Regulatory Authority and Assumption Thereof by States Through Agreement (46 FR 7540, 36969, and 48 FR 33376).

Training (Category II)

- Senior personnel should have attended NRC core courses in licensing orientation, inspection procedures, medical practices and industrial radiography practices.
- The RCP should have a program to utilize specific short courses and workshops to maintain an appropriate level of staff technical competence in areas of changing technology.
- The RCP staff should be afforded opportunities for training that is consistent with the needs of the program.

Staff Continuity (Category II)

- Staff turnover should be minimized by combinations of opportunities for training, promotions, and competitive salaries.
- Salary levels should be adequate to recruit and retain persons of appropriate professional qualifications. Salaries should be comparable to similar employment in the geographical area.
- The RCP organization structure should be such that staff turnover is minimized and program continuity maintained through opportunities for promotion. Promotion opportunities should exist from junior level to senior level or supervisory positions. There also should be opportunity for periodic salary increases compatible with experience and responsibility.

Program Element: Licensing

It is necessary in licensing by-product, source, and special nuclear materials that the state regulatory agency obtain information about the proposed use of nuclear materials, facilities and equipment, training and experience of personnel, and operating procedures appropriate for determining that the applicant can operate safely and in compliance with the regulations and license conditions. An acceptable licensing program includes: preparation and use of internal licensing guides and policy memoranda to assure technical quality in the licensing program (when appropriate, such as in small programs, NRC Guides may be used); consultation and prelicensing inspection of complex facilities (e.g., waste disposal sites, mills, irradiators, etc.); and the implementation of administrative procedures to assure documentation and maintain adequate files and records.

Indicators and Guidelines

Technical Quality of Licensing Actions (Category I)

- The RCP should assure that essential elements of applications have been submitted to the agency, and that these elements meet current regulatory guidance for describing the isotopes and quantities to be used, qualifications of persons who will use material, facilities and equipment, and operating and emergency procedures sufficient to establish the basis for licensing actions. Additionally, in States which regulate the disposal of low-level radioactive waste in permanent disposal facilities, the RCP should assure that essential elements of waste disposal applications meet State licensing requirements for waste product and volume, qualifications of personnel facilities and equipment, operating and emergency procedures, financial qualifications and assurances, closure and decommissioning procedures and institutional arrangements in a manner sufficient to establish a basis for licensing action. Licensing activities should be adequately documented including safety evaluation reports, product certifications or similar documentation of the license review and approval process.

- Prelicensing visits should be made for complex and major licensing actions.
- Licenses should be clear, complete, and accurate as to isotopes, forms, quantities, authorized uses, and permissive or restrictive conditions.
- The RCP should have procedures for reviewing licenses prior to renewal to assure that supporting information in the file reflects the current scope of the licensed program.

Adequacy of Product Evaluations (Category I)

- RCP evaluations of manufacturers or distributor's data on sealed sources and devices outlined in NRC, State or appropriate ANSI Guides should be sufficient to assure integrity and safety for users.
- The RCP should review manufacturer's information in labels and brochures relating to radiation health and safety, assay, and calibration procedures for adequacy.
- Approval documents for sealed source or device designs should be clear, complete and accurate as to isotopes, forms, quantities, uses, drawing identifications and permissive or restrictive conditions.
- Approval documents for radioactive waste packages, solidification and stabilization media, or other vendor products used to treat radioactive waste for disposal should be complete and accurate as to the use, capabilities, limitations, and site specific restrictions associated with each product.

Licensing Procedures (Category II)

- The RCP should have internal licensing guides, checklist, and policy memoranda consistent with current NRC practice.
- In States which regulate the disposal of low-level radioactive waste in permanent disposal facilities, the RCP should have program specific licensing guides, plans and procedures for license review and policy memoranda which relate to specific aspects of waste disposal. The program should include the preparation of safety evaluation reports, product certifications, or similar documentation of license review and approval process.
- License applicants (including applicants for renewals) should be furnished copies of applicable guides and regulatory positions.
- The present compliance status of licensees should be considered in licensing actions.
- Under the NR Exchange-of-Information program, evaluation sheets, service licenses, and licenses authorizing distribution to general licensees should be submitted to NRC on a timely basis.
- Standard license conditions comparable with current NRC standard license conditions should be used to expedite and provide uniformity in the licensing process.
- Files should be maintained in an orderly fashion to allow fast, accurate retrieval of information and documentation of discussions and visits.

Program Element: Compliance

- Periodic inspections of licensed operations are essential to assure that activities are being conducted in compliance with regulatory requirements and consistent with good safety practices. The frequency of inspections depends on the amount and the kind of material, the type of operation licensed, and the results of previous inspections. The capability of maintaining and retrieving statistical data on the status of the compliance

program is necessary. The regulatory agency must have the necessary legal authority for prompt enforcement of its regulations. This may include, as appropriate, administrative remedies, orders requiring corrective action, suspension or revocation of licenses, the impounding of materials, and the imposing of civil or criminal penalties.

Indicators and Guidelines

Status of Inspection Program (Category I)

- State RCP should maintain an inspection program adequate to assess licensee compliance with State regulations and license conditions. The inspection program in all States should provide for the inspection of licensee's waste generation activities under the State's jurisdiction.
- In States which regulate the disposal of low-level radioactive waste in permanent disposal facilities, the RCP should include provisions for pre- operational, operational, and post-operational facility inspections. The inspections should cover all program elements which are relevant at the time of the inspection and be performed independently of any resident inspector program. In addition, inspections should be conducted on a routine basis during the operation of the LLW facility, including inspection of incoming shipments and licensee site activities.
- The RCP should maintain statistics which are adequate to permit Program Management to assess the status of the inspection program on a periodic basis. Information showing the number of inspections conducted, the number overdue, the length of time overdue and the priority categories should be readily available.
- At least semiannual inspection planning should be done for the number of inspections to be performed, assignments to senior vs. junior staff, assignments to regions, identification of special needs and periodic status reports. When backlogs occur, the program should develop and implement a plan to reduce the backlog. The plan should identify priorities for inspections and establish target dates and milestones for assessing progress.

Inspection Frequency (Category I)

- The RCP should establish an inspection priority system. The specific frequency of inspections should be based upon the potential hazards of licensed operations, e.g., major processors, and industrial radiographers should be inspected approximately annually, smaller or less hazardous operations may be inspected less frequently. The minimum inspection frequency, including initial inspections, should be no less than the NRC system.

Inspectors' Performance and Capability (Category I)

- Inspectors should be competent to evaluate health and safety problems and to determine compliance with State regulations. Inspectors must demonstrate to supervision an understanding of regulations, inspection guides, and policies prior to independently conducting inspections.
- For the inspection of complex licensed activities such as permanent low-level radioactive waste disposal facilities, a multidisciplinary team approach is desirable to assure a complete compliance assessment.
- The compliance supervisor (may be RCP manager) should conduct annual field evaluations of each inspector to assess performance and assure application of appropriate and consistent policies and guides.

Response to Actual and Alleged Incidents (Category I)

- Inquiries should be promptly made to evaluate the need for onsite investigations.
- Onsite investigations should be promptly made of incidents requiring reporting to the Agency in less than 30 days. (10 CFR 20.403 types.)
- For those incidents not requiring reporting to the Agency in less than 30 days, investigations should be made during the next scheduled inspection.
- Onsite investigations should be promptly made of non-reportable incidents which may be of significant public interest and concern, e.g., transportation accidents.
- Investigations should include in-depth reviews of circumstances and should be completed on a high priority basis. When appropriate, investigations should include reenactments and time-study measurements (normally within a few days). Investigation (or inspection) results should be documented and enforcement action taken when appropriate.
- State licensees and the NRC should be notified of pertinent information about any incident which could be relevant to other licensed operations (e.g., equipment failure, improper operating procedures).
- Information on incidents involving failure of equipment should be provided to the agency responsible for evaluation of the device for an assessment of possible generic design deficiency.
- The RCP should have access to medical consultants when needed to diagnose or treat radiation injuries. The RCP should use other technical consultants for special problems when needed.

Enforcement Procedures (Category I)

- Enforcement Procedures should be sufficient to provide a substantial deterrent to licensee noncompliance with regulatory requirements. Provisions for the levying of monetary penalties are recommended.
- Enforcement procedure letters should be issued within 30 days following inspections and should employ appropriate regulatory language clearly specifying all items of noncompliance and health and safety matters identified during the inspection and referencing the appropriate regulation or license condition being violated.
- Enforcement letters should specify the time period for the licensee to respond indicating corrective actions and actions taken to prevent recurrence (normally 20-30 days). The inspector and compliance supervisor should review licensee responses.
- Licensee responses to enforcement letters should be promptly acknowledged as to adequacy and resolution of previously unresolved items.
- Written procedures should exist for handling escalated enforcement cases of varying degrees.
- Impounding of material should be in accordance with State administrative procedures.
- Opportunity for hearings should be provided to assure impartial administrative of the radiation control program.

Inspection Procedures (Category II)

- Inspection guides consistent with current NRC guidance, should be used by inspectors to assure uniform and complete inspection practices and provide technical guidance in

the inspection of licensed programs. NRC Guides may be used if properly supplemented by policy memoranda, agency interpretations, etc.

- Written inspection policies should be issued to establish a policy for conducting unannounced inspections, obtaining corrective action, following up and closing out previous violations, interviewing workers and observing operations, assuring exit interviews with management, and issuing appropriate notification of violations of health and safety problems.
- Procedures should be established for maintaining licensees' compliance histories.
- Oral briefing of supervisors or the senior inspector should be performed upon return from non-routine inspections.
- For States with separate licensing and inspection staffs, procedures should be established for feedback of information to license reviews.

Inspection Reports (Category II)

- Findings of inspections should be documented in a report describing the scope of inspections, substantiating all items of noncompliance and health and safety matters, describing the scope of the licensees' programs, and indicating the substance of discussions with licensee management and licensee's response.
- Report should uniformly and adequately document the result of inspections including confirmatory measurements, status of previous noncompliance and identify areas of the licensee's program which should receive special attention at the next inspection. Reports should show the status of previous noncompliance and the results of confirmatory measurements made by the inspector.

Confirmatory Measurements (Category II)

- Confirmatory measurements should be sufficient in number and type to ensure the licensee's control of materials and to validate the licensee's measurements. In States which regulate the disposal of low-level radioactive waste in permanent disposal facilities, access to testing should be available on an "as needed" basis for confirming licensees' and applicants' programs for measurements related to nonradiological aspects of facility operations such as soils and materials testing and environmental sampling and analysis to demonstrate compliance with 10 CFR part 61 or compatible Agreement State regulations and ensure facility performance. Conditions for nonradiological testing should be prescribed in plans or procedures.
- RCP instrumentation should be adequate for surveying license operations (e.g., survey meters, air samples, lab counting equipment for smears, identification of isotopes, etc).
- RCP instrumentation should include the following types: GM Survey Meter, 0-50 mr/hr; Ion Chamber Survey Meter, several r/hr; micro-R-Survey meter; Neutron Survey Meter, Fast and Thermal; Alpha Survey Meter, 0-1000,000 c/m; Air Samplers, Hi and Lo Volume; Lab Counters, Detect 0.001 uC/wipe; Velometers; Smoke Tubes; Lapel Air samplers.
- Instrument calibration services or facilities should be readily available and appropriate for instrumentation used. Licensee equipment and facilities should not be used unless under a service contract. Exceptions for other State Agencies, e.g., a State University, may be made.
- Agency instruments used for surveys and confirmatory measurements should be calibrated within the same time interval as required of the licensee being inspected.