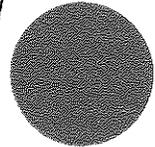


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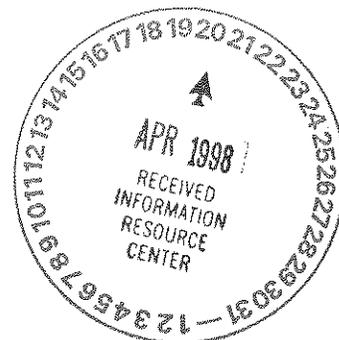
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DOE/OR/02-1677&D2

**Remedial Design Work Plan
for the Surface Impoundments Operable Unit,
Oak Ridge National Laboratory,
Oak Ridge, Tennessee**



CLEARED FOR

PUBLIC RELEASE p.c.

**Remedial Design Work Plan
for the Surface Impoundments Operable Unit,
Oak Ridge National Laboratory,
Oak Ridge, Tennessee**

Date Issued—March 1998

Prepared by
Jacobs EM Team
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Oak Ridge, Tennessee
under contract DE-AC05-93OR22028

Prepared for
U.S. Department of Energy
Office of Environmental Management

PREFACE

This *Remedial Design Work Plan for the Surface Impoundments Operable Unit, Oak Ridge National Laboratory, Oak Ridge, Tennessee* (DOE/OR/02-1677&D2) was prepared in accordance with requirements under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 to present the plan for remedial design based on the selected remedy. Publication of the D1 document met the Federal Facility Agreement (DOE 1992) milestone of November 1, 1997. Publication of this D2 document meets the extended date of March 16, 1998 for responding to regulator comments on the D1 document. This work was performed under Work Breakdown Structure 1.4.12.6.1.01 (Cost Center Activity Data Sheet 3322, "Surface Impoundments Design Documents and Design Studies"). Information in this document comprises the remedial design work plan for implementing the selected remedy summarized in the *Record of Decision for the Surface Impoundments Operable Unit, Oak Ridge National Laboratory, Oak Ridge, Tennessee* (DOE/OR/02-1630&D2). This document identifies the design documents to be submitted for regulator information and approval; defines the schedule for submittal, review, and approval; and lists the applicable or relevant and appropriate requirements for the remedial actions of the selected remedy, which involves removal, treatment, and disposal of sediment and surface water from the subject impoundments.

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ACRONYMS AND ABBREVIATIONS

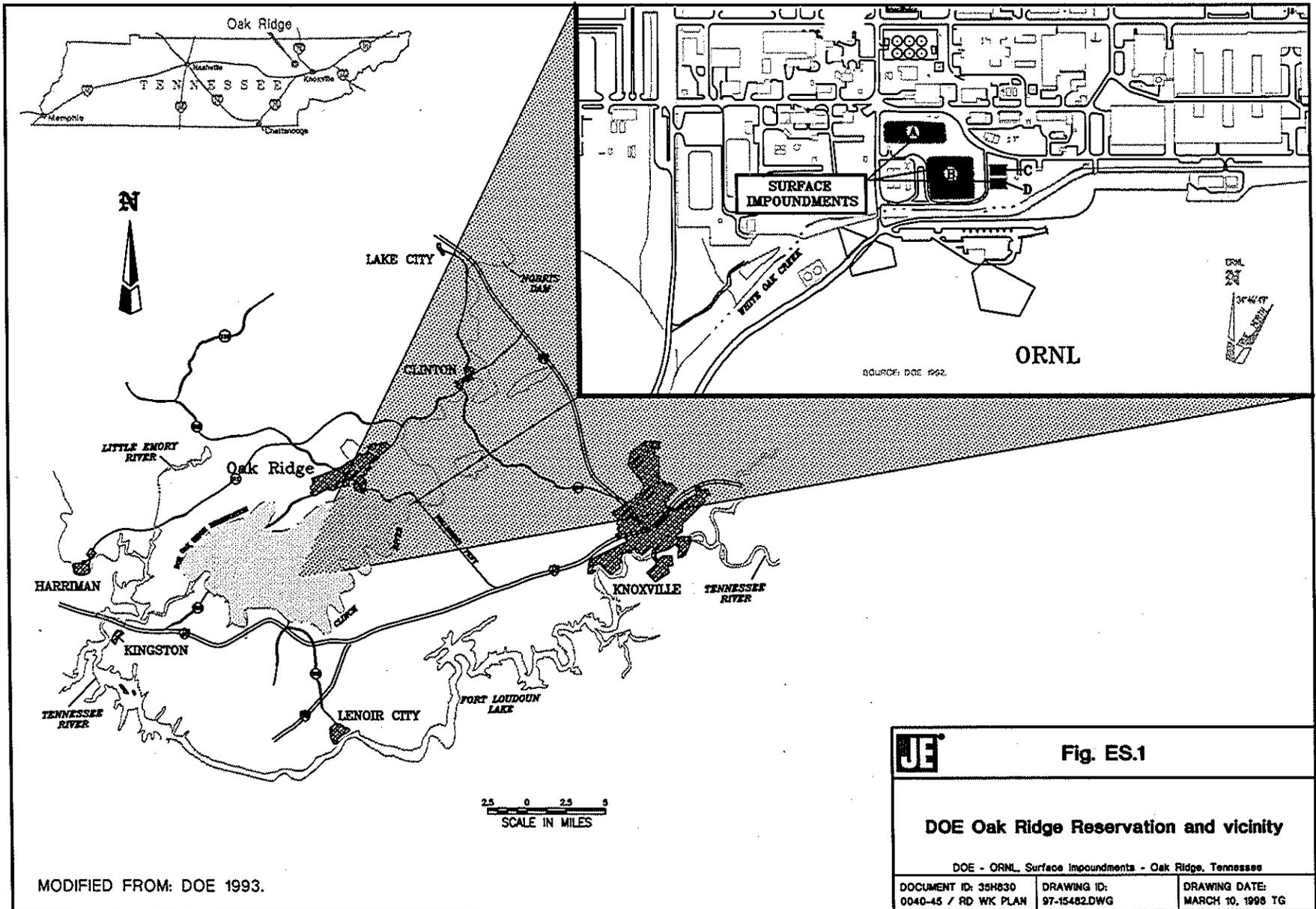
ARAR	applicable or relevant and appropriate requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ft	foot
m	meter
NPDES	National Pollutant Discharge Elimination System
ORNL	Oak Ridge National Laboratory
ppm	parts per million
RAWP	remedial action work plan
RCRA	Resource Conservation and Recovery Act of 1976
RDR	remedial design report
RDWP	remedial design work plan
RFP	request for proposal
ROD	record of decision
SIOU	Surface Impoundments Operable Unit
TDEC	Tennessee Department of Environment and Conservation
TSCA	Toxic Substances Control Act of 1976
WAC	waste acceptance criteria

EXECUTIVE SUMMARY

The *Remedial Design Work Plan for the Surface Impoundments Operable Unit, Oak Ridge National Laboratory, Oak Ridge, Tennessee* has been prepared by the Jacobs Environmental Management Team for the U.S. Department of Energy (DOE) per the *Remedial Design Work Plan Annotated Outline* (DOE 1997a). Surface Impoundments Operable Unit (SIOU) is in the Bethel Valley watershed of Oak Ridge National Laboratory on the DOE Oak Ridge Reservation in Oak Ridge, Tennessee (Fig. ES.1). The sediment and water in the four impoundments (Impoundments A, B, C, and D) are continuing sources of groundwater contamination and, subsequently, surface water contamination in White Oak Creek. The sediment, which is maintained under water through institutional controls, is a potential future source of airborne contamination that could pose risks to the public off of Oak Ridge Reservation. This project will remove, treat, and dispose of sediment and incidental soils and treat surface water from the impoundments within SIOU.

A remedial investigation/feasibility study (DOE 1995) analyzed the site and developed a range of remediation alternatives. An engineering study (Energy Systems 1996) provided additional characterization of the sediments from Impoundments A and B and developed information regarding stabilization and solidification of the sediment. A proposed plan (DOE 1997b) was issued to the public June 1997 identifying Alternative 6—removal, treatment, and disposal—as the preferred alternative. A record of decision (DOE 1997c) identifying Alternative 6 as the selected remedy was approved September 24, 1997. Additional sampling of Impoundments C and D according to a plan with regulator concurrence to determine whether Resource Conservation and Recovery Act of 1976 or Toxic Substances Control Act of 1976 requirements are triggered has been completed.

The remaining remedial design process involves (1) preparation and regulator approval of a Stage 1 (transferring waste from Impoundments C and D to Impoundment B) remedial design report and associated remedial action work plan (RAWP); (2) execution of a remediation contract for Stage 1 actions; (3) preparation of a request for proposals, evaluation of proposals, and execution of a design/build remediation contract for Stage 2 actions (remediation of Impoundments A and B); and (4) preparation and regulator approval of a Stage 2 remedial design report and associated RAWP for removal, treatment, and disposal of waste from Impoundments A and B.



JE		Fig. ES.1
DOE Oak Ridge Reservation and vicinity		
DOE - ORNL, Surface Impoundments - Oak Ridge, Tennessee		
DOCUMENT ID: 35H830 0040-45 / RD WK PLAN	DRAWING ID: 97-15482.DWG	DRAWING DATE: MARCH 10, 1998 TG

MODIFIED FROM: DOE 1993.

1. INTRODUCTION

Surface Impoundments Operable Unit (SIOU) is in the Bethel Valley watershed and consists of Impoundment A (3524), Impoundment B (3513), and Impoundments C and D (3539 and 3540). SIOU is in the south-central part of the Oak Ridge National Laboratory (ORNL) main plant area north of White Oak Creek in Oak Ridge, Tennessee.

The purpose of this project is to reduce risk through remediation of the four surface impoundments. Media specifically included in the scope of this project are surface water and sediment in the impoundments that resulted from liquid waste treatment. U.S. Department of Energy (DOE) anticipates that the impoundments will be excavated to 0.03 m (0.1 ft) below the as-built elevation of the floor of the impoundment excluding bedrock and riprap. Depths of subimpoundment soil removal will be specified in the remedial action work plans (RAWPs). These incidental soils that may be encountered during sediment and water remediation will be handled appropriately. Groundwater and residual soil contamination within the boundaries of SIOU will be addressed under the Bethel Valley watershed record of decision (ROD).

The remedial design process follows approval of the ROD September 24, 1997. As discussed in the ROD, remediation will be performed in two stages: Stage 1, transferring waste from Impoundments C and D to Impoundment B, and Stage 2, remediation of Impoundments A and B. This remedial design work plan (RDWP) establishes the schedule for the documents to be submitted by DOE to U.S. Environmental Protection Agency (EPA) and Tennessee Department of Environment and Conservation (TDEC) regarding the design of the SIOU remediation actions and lists the applicable or relevant and appropriate requirements (ARARs) that will be implemented by that design. The documents to be submitted are (1) this RDWP (for approval); (2) a Stage 1 remedial design report (RDR) and associated RAWP (for approval); (3) a request for proposal (RFP) and a remediation contract for Stage 2 actions (for information); and (4) a Stage 2 RDR and associated RAWP (for approval).

The nature of the work involves removal, treatment, and disposal of low-level radioactive waste. Post-ROD sampling and analysis of Impoundments C and D is complete. The analysis documented by Rose et al. (1998) confirms that the waste is not hazardous [under Resource Conservation and Recovery Act of 1976 (RCRA)] or toxic [under Toxic Substances Control Act of 1976 (TSCA)] waste. Following is a brief summary of the major work tasks.

Stage 1—Relocation of waste from Impoundments C and D to Impoundment B: Stage 1 of the SIOU project includes relocation of the sediment and surface water from

Impoundments C and D to Impoundment B and backfilling Impoundments C and D to provide a staging area for remediation of the larger impoundments.

Stage 2—Remediation of Impoundments A and B. Removal, treatment, and disposal of waste from Impoundments A and B will be performed by a vendor in accordance with a negotiated contract based on a proposal submitted in response to an RFP. Remedial actions may include the following:

- removal of water and sediment from impoundments;
- pretreatment of water, if necessary, to meet the waste acceptance criteria (WAC) of the Process Waste Treatment Plant and discharge of the water to this existing treatment system, which will discharge treated water through existing permitted National Pollutant Discharge Elimination System (NPDES) outfalls;
- treatment of sediment and any incidental soil removed with the sediment at a treatment plant designed to meet the WAC of the designated off-site disposal facility;
- transportation of treated waste to and disposal in the designated facility;
- backfill of the impoundments with clay or stone as needed; and
- demobilization and restoration of the site for DOE-controlled industrial use.

2. APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS DISCUSSION

The selected remedy will meet all ARARs listed in Appendix A. Sections 2.1–2.3 provide an overview of how ARARs will be incorporated into the remedial design. A crosswalk in each RAWP will tie each ARAR to the design requirements in the associated RDR implementing that ARAR, designate the future submittal that will address the ARAR, or justify why an ARAR identified in the ROD is no longer pertinent to this project.

2.1 LOCATION-SPECIFIC ARARs

Location-specific requirements set restrictions on the concentration of hazardous substances or the conduct of activities solely because they are in special locations. The only condition or resource present on or near SIOU that would trigger location-specific ARARs is that SIOU is located within an historic district. The mitigation requirements associated with cultural resources and consultation with the State Historic Preservation Office have already been satisfied.

2.2 CHEMICAL-SPECIFIC ARARs

Chemical-specific requirements set health- or risk-based concentration limits or discharge limitations in various environmental media for specific hazardous substances, pollutants, or contaminants. These requirements generally set protective cleanup levels for the chemicals of concern in the designated media or indicate a safe level of discharge that may be incorporated when considering a specific remedial activity. There are no contaminant-specific cleanup levels specified for SIOU.

There are chemical-specific ARARs for SIOU that limit radionuclide emissions during and after remediation. The RDRs shall describe containment, filtration, and air monitoring that will meet the chemical-specific ARARs identified in Appendix A.

2.3 ACTION-SPECIFIC ARARs

Performance, design, or other action-specific requirements set controls or restrictions on particular kinds of activities associated with remedial actions. The following text summarizes the action-specific ARARs triggered by various types of activities anticipated during implementation of this remedial action.

Surface Water Control. Compliance with the substantive requirements of the NPDES permitting process for stormwater discharges during construction activities (*Rules of the Tennessee Department of Environment and Conservation*, Chap. 1200-4-10-.05) will be required. The RDRs will detail good site planning and best management practices to control stormwater discharges.

Fugitive Emissions. To ensure compliance with the ORNL site air permit and to meet the substantive requirements of fugitive dust emissions per Rules of the TDEC 1200-3-8-.01, dust suppression measures combined with ambient air monitoring stations will be included as a best management approach in the RDRs.

Treatment of Surface Water Removed from SIOU. It is anticipated that all waters permanently removed from the impoundments during remedial activities will be sent to the existing Process Waste Treatment Plant. Process Waste Treatment Plant effluent is discharged to the Nonradiological Wastewater Treatment Plant, which operates under the ORNL NPDES permit. Stage 1 actions will transfer water between impoundments; however, no water will be permanently removed. The RDR for Stage 2 will provide details regarding any water treatment required to meet the Process Waste Treatment Plant WAC.

Treatment and Stabilization of Sediments. Sampling and analysis performed in accordance with a regulator-approved plan has confirmed that polychlorinated biphenyl concentrations in Impoundments C and D are < 50 ppm and wastes from those impoundments do not exhibit hazardous characteristics. Therefore, the ARARs regarding treatment and stabilization of waste regulated under TSCA and RCRA are no longer pertinent for Impoundments C and D. Based on prior sampling results, there are no TSCA or RCRA ARARs pertaining to Impoundments A and B in the ROD.

Stabilization of sediments and incidental soils will involve requirements for physically stabilizing the wastes so that the waste can meet WAC of the selected disposal facilities.

Closure of Impoundments. The SIOU scope includes removal and treatment of the sediments and surface water in the impoundments. The ROD states that residual contamination of surrounding media will be addressed as part of the Bethel Valley watershed project and institutional controls will remain in place for SIOU until superseded by the Bethel Valley watershed ROD. Remediation of incidental soils is included only as necessary to support remediation of the sediments. Contaminated subsoils surrounding the impoundments will be addressed and included with actions for other subsoils as part of the Bethel Valley watershed project. Thus, requirements for closure with waste in place, while relevant, are not appropriate. The portions of the requirements for clean closure listed in Appendix A would be relevant and appropriate.

The Stages 1 and 2 RDRs will provide details of sediment and soil removal that will ensure that sediment is removed to the greatest extent practicable. DOE anticipates that the impoundments will be excavated to an elevation of 0.03 m (0.1 ft) below the as-built elevation of the floor of the impoundment, excluding bedrock and riprap. Any risk to on-SIOU receptors from residual contamination will be addressed by post-remedial action institutional controls or by the actions implemented per the Bethel Valley watershed ROD.

Transportation of Waste for Disposal. U.S. Department of Transportation requirements specifying the waste packaging, identification, and transportation requirements that will meet the ARARs in Appendix A and the ROD will be described in the Stages 1 and 2 RDRs.

Off-Site Disposal of Low-Level Wastes. The RDRs will identify the disposal site(s) that will receive waste generated from SIOU remedial actions. Per 40 *Code of Federal Regulations* 300.440(a)(4), EPA will determine the acceptability of the facilities selected for disposal of Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) wastes.

An off-SIOU facility licensed for disposal of radiological waste and approved by EPA to accept CERCLA waste will be used for sediment disposition. The wastes must also meet the WAC of the disposal facility.

Management of Secondary Waste from Decontamination of Equipment. All decontamination water will meet Process Waste Treatment Plant WAC and will be discharged to that facility.

Protection of the Public through Institutional Controls. Institutional controls will remain in place for SIOU until superseded by the Bethel Valley watershed ROD. DOE Order 5400.5, "Radiation Protection of the Public and the Environment," Chapter IV, requires administrative (institutional) controls for long-term management in areas containing residual radioactivity above guidance levels based on dose limits in the DOE Order.

3. REMEDIAL DESIGN OBJECTIVES

The objective of the remedial design is to provide detailed, unambiguous specifications of the cleanup actions at SIOU as required by the ROD.

The removal, treatment, and disposal actions necessary for implementation of this remedial action will be accomplished through Stage 1, relocation of waste from Impoundments C and D to Impoundment B, and Stage 2, removal, treatment, transportation, and disposal of wastes from Impoundments A and B.

4. REMEDIAL DESIGN SCHEDULE

The ROD for SIOU (DOE 1997e) was signed on September 24, 1997. A post-ROD sampling plan for Impoundments C and D was submitted and regulators concurred with the plan November 25, 1997. Sampling was completed and a results report (Rose et al. 1998) was issued in March 1998. This D2 RDWP meets the DOE-, TDEC-, and EPA-approved submittal date of March 16, 1998. Table 1 lists key dates in the proposed schedule for remedial design and remedial action for SIOU. Federal Facility Agreement milestone dates are shown in bold. Other dates are provided for context, but they do not represent firm deliverable dates.

Table 1. Remedial design schedule, SIOU, ORNL, Oak Ridge, Tennessee

Item	Date
Regulator approval of RD work plan, D2 (this plan)	April 6, 1998
<i>Stage 1--Relocate waste from Impoundments C and D</i>	
Submit RDR and RAWP, D1	March 31, 1998 ^a
Regulator comments due	April 13, 1998
Submit RDR and RAWP, D2	April 29, 1998
Regulator approval	May 13, 1998
Procurement	June 12, 1998
Fieldwork	July 1, 1998-September 18, 1998 ^b
<i>Stage 2--Remediate Impoundments A and B</i>	
Design/build contractor procurement	April 1, 1998-October 2, 1998
Contractor presentation of design	February 12, 1999
Submit RDR and RAWP, D1	April 21, 1999
Regulator comments due	July 26, 1999
Submit RDR and RAWP, D2	September 28, 1999
Regulator approval	October 27, 1999
Factory fabrication of treatment system	October 28, 1999-January 27, 2000
Fieldwork	January 28, 2000-March 9, 2001

^aMilestone date is June 30, 1998.

^bMeets milestone of starting remediation 15 months after ROD approval (December 24, 1998).

ORNL = Oak Ridge National Laboratory
 RAWP = remedial action work plan
 RD = remedial design

RDR = remedial design report
 ROD = record of decision
 SIOU = Surface Impoundments Operable Unit

5. REFERENCES

- DOE (U.S. Department of Energy). 1997a. *Remedial Design Work Plan Annotated Outline*, DOE/OR/01-1077, Rev. 0. Prepared by the Document Content and Response Committee, approved 7/31/97. Oak Ridge, TN.
- DOE. 1997b. *Proposed Plan for Surface Impoundments Operable Unit, Waste Area Grouping 1, Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/02-1427&D3/R1. Oak Ridge, TN.
- DOE. 1997c. *Record of Decision for the Surface Impoundments Operable Unit, Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/02-1630&D2. Oak Ridge, TN.
- DOE. 1995. *Remedial Investigation/Feasibility Study for Surface Impoundments Operable Unit, Waste Area Grouping 1, Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/02-1346&D2. Oak Ridge, TN.
- Energy Systems (Lockheed Martin Energy Systems, Inc.). 1996. *Engineering Support Studies Report - Geotechnical and Treatability Results for the Technical Work Plan for Surface Impoundments Operable Unit Engineering Support Studies*, X-OE-791. Energy Systems, ORNL, Environmental Restoration Program, Oak Ridge, TN.
- Rose, D. A., M. E. Murray, K. S. Brown, W. Winton, R. A. Dean, R. H. Coe III, 1998. *Results of the Radiological and Chemical Characterization of Surface Impoundments 3539 and 3540 at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, (ORNL/RASA-98/4). Energy Systems, ORNL, Environmental Restoration Program, Oak Ridge, TN.

APPENDIX A

**APPLICABLE OR RELEVANT AND APPROPRIATE
REQUIREMENTS LISTING**

Table A.1. ARARs and TBCs for remedial action at SIOU, ORR, Oak Ridge, Tennessee

Action	Requirement	Prerequisites	Citation
<i>Location-specific</i>			
	Action(s) that will affect such resources must adhere to the DOE/ORO Programmatic Agreement (May 6, 1994). When alteration or destruction of the resource is unavoidable, steps must be taken to minimize or mitigate the impacts and to preserve data and records of the resource	Any action that will impact historic or archaeological resources— applicable	National Historic Preservation Act of 1966 (16 USC 470a-w) EO 11593 36 CFR 800 DOE/ORO Programmatic Agreement (May 6, 1994) (TBC)
<i>Chemical-specific</i>			
Control of radionuclide emissions	Exposures to members of the public from all radiation sources released into the atmosphere shall not cause an EDE to be > 10 mrem (0.1 mSv)/year	Point source discharge of radionuclides into the ambient air from a DOE facility— applicable	40 CFR 61.92 Rules of the TDEC 1200-3-11-.08
	Radiological emission measurements must be performed at all release points with a potential to discharge radionuclides into the air in quantities that could cause an EDE in excess of 1% of the standard (0.1 mrem/year). All radionuclides that could contribute > 10% of the standard (1 mrem/year) for the release point shall be measured		40 CFR 61.93 Rules of the TDEC 1200-3-11-.08
Protection of the public	DOE will carry out all DOE activities to ensure that radiation doses to individuals are ALARA	Release of radionuclides into the environment— TBC	DOE Order 5400.5(I.4) 10 CFR 834 (proposed)
	Exposures to members of the public from all radiation sources shall not cause an EDE to be > 100 mrem (1 mSv)/year		DOE Order 5400.5(II.1a) 10 CFR 834 (proposed)
<i>Action-specific</i>			
Surface water control	Implement good site planning and best management practices to control stormwater discharges including: • documentation of best management practices in a stormwater control plan or equivalent	Control of stormwater discharges associated with construction activities at industrial sites that result in a disturbance of > 5 acres of total land area. For those sites with < 5 acres affected— relevant and appropriate	40 CFR 122 Rules of the TDEC 1200-4-10-.05

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Table A.1. (continued)

Action	Requirement	Prerequisites	Citation
	<ul style="list-style-type: none"> • minimal clearing for grading • removal of vegetation cover only within 20 days of construction • weekly erosion control inspections and maintenance • control measures to detain runoff • discharges that do not cause erosion 		
Fugitive emissions from excavation activities	Take reasonable precautions to prevent particulate matter from becoming airborne; no visible emissions are permitted beyond property boundary lines for more than 5 minutes/hour or 20 minutes/day. Potential nonpoint sources of fugitive emissions are included in the plantwide fugitive emissions plan	Nonpoint source air emissions—applicable	Rules of the TDEC 1200-3-8-.01
Characterization/management of excavated wastes, PPE and other secondary wastes streams generated during remediation	A person who generates solid waste must determine whether that waste is hazardous using various methods, including application of knowledge of hazardous characteristics of the waste based on information about the materials or processes used	Wastes generated during activities potentially contaminated with RCRA-characteristic waste—applicable to secondary wastes from remediation of Impoundments C and D if further sampling indicates the wastes are RCRA-characteristic	40 CFR 262.11 Rules of the TDEC 1200-1-11-.03(1)(b)
	All RCRA-restricted waste generated during remedial activities must be treated to meet LDRs before land disposal		40 CFR 268.40 Rules of the TDEC 1200-1-11-.10(3)(a)
	LLW generators must characterize and segregate LLW from uncontaminated waste and otherwise minimize the amount of LLW generated. Subsequent management of LLW must be in accordance with DOE Order 5820.2A	Generators of LLW—TBC	DOE Order 5820.2A(III.3)

Table A.1. (continued)

Action	Requirement	Prerequisites	Citation
Treatment of RCRA-characteristic waste	Must treat to meet LDRs for those RCRA-characteristic wastes	Wastes that are determined to be RCRA-characteristic wastes— applicable to remediation of Impoundments C and D if further sampling indicates the wastes are RCRA-characteristic	40 CFR 268
	Where a treatment technology specified in 40 CFR 268 is not appropriate to the waste, the generator may apply for a treatability variance to comply with LDRs	Hazardous wastes (soils) for which the technology specified in 40 CFR 268 is inappropriate— applicable to remediation of Impoundments C and D if further sampling indicates the wastes are RCRA-characteristic	40 CFR 268.44
Treatment of contaminated soil and sediment to meet the disposal requirements of 40 CFR 761.60(a)(4)	The regional administrator may approve an alternate disposal method that can achieve a level of performance equivalent to incineration or high-efficiency boilers	Disposal of PCB-contaminated soil and sediment— applicable to remediation of Impoundments C and D if further sampling indicates the wastes contain PCBs above 50 ppm	40 CFR 761.60(e)
Tank requirements for treatment	Ensure that existing and new tanks have sufficient structural strength and are compatible with the waste to prevent collapse or rupture	Storage or treatment of RCRA-characteristic waste in a tank— applicable to treatment of Impoundments C and D wastes if further sampling indicates the wastes are RCRA-characteristic	40 CFR 264.191-192 Rules of the TDEC 1200-1-11-.06(10)(b)-(c)
	Ensure that waste is compatible with the tank material unless the tank is protected by a liner or by other means		40 CFR 264.191 Rules of the TDEC 1200-1-11-.06(10)(b)
	Provide tanks with secondary containment and controls to prevent overfilling and maintain sufficient freeboard in open tanks to prevent overtopping by wave action or precipitation		40 CFR 264.193-194 Rules of the TDEC 1200-1-11-.06(10)(d)-(e)
	Inspect the following: overfilling control, control equipment, monitoring data, waste level (for uncovered tanks), tank condition, aboveground portions of tanks (to assess their structural integrity), and the area surrounding the tank (to identify signs of leakage)		40 CFR 264.195 Rules of the TDEC 1200-1-11-.06(10)(f)

Table A.1. (continued)

Action	Requirement	Prerequisites	Citation
	Repair any corrosion, crack, or leak		40 CFR 264.196 Rules of the TDEC 1200-1-11-.06(10)(g)
	At closure, remove all hazardous waste and hazardous waste residues from tanks, discharge control equipment, and discharge confinement structures		40 CFR 264.197(a) Rules of the TDEC 1200-1-11-.06(10)(h)
Closure of impoundments	Remove or decontaminate all waste residues, contaminated containment system components (liners, etc.), contaminated subsoils, and structures and manage them as hazardous wastes	Closure of surface impoundments—relevant and appropriate to closure of Impoundments C and D if further sampling indicates the wastes are RCRA-characteristic	40 CFR 264.228(a)(2)(1) Rules of the TDEC 1200-1-11-.06(11)
Transportation to disposal facility	The waste must meet packaging, labeling, marking, placarding, and pretransport requirements in accordance with DOT regulations	Transportation of hazardous and radioactive materials above exempt quantities— applicable	49 CFR 171, 172, 173, 174, 177, 178, and 179 DOE Order 460.1 (TBC)
	Waste must meet packaging requirements based on the maximum activity of radioactive material in a package	Packaging of radioactive materials above exempt quantities for public transport— applicable	49 CFR 173.431 49 CFR 173.433 49 CFR 173.435 49 CFR 173.411
	Waste must be marked with hazardous waste marking, generator name and address, and the manifest docket number	Transportation of hazardous waste in containers of 110 gal or less— applicable to transport of Impoundments C and D wastes if further sampling indicates the wastes are RCRA-characteristic	40 CFR 262.32(b) Rules of the TDEC 1200-1-11-.03(4)
	Shipment must be manifested according to 40 CFR 262 and 263	Transportation of hazardous waste for off-site treatment, storage, or disposal— applicable to transport of Impoundments C and D wastes if further sampling indicates the wastes are RCRA-characteristic	40 CFR 262 Subpart B 40 CFR 263 Subpart B Rules of the TDEC 1200-1-11-.03 and 1200-1-11-.04
	Generators must certify before shipment that the waste meets the waste acceptance criteria of the receiving facility	Waste shipped from one field organization to another for disposal— TBC	DOE Order 5820.2A(III)

Table A.1. (continued)

Action	Requirement	Prerequisites	Citation
	LLW must be disposed of on site; if off-site disposal is required due to lack of capacity, disposal must be to a DOE facility	Shipments of LLW—TBC	DOE Order 5820.2A
	Off-site disposal of LLW to a commercial facility requires an exemption from the on-site disposal requirements of DOE Order 5820.2A; requests for exemption must be approved by the DOE ORO. Must meet DOE Order and implementing procedural requirements for off-site shipments	Shipments of LLW—TBC	DOE Order 5820.2A

ALARA = as low as reasonably achievable
 ARAR = applicable or relevant and appropriate requirement
 CFR = *Code of Federal Regulations*
 DOE = U.S. Department of Energy
 DOT = U.S. Department of Transportation
 EDE = effective dose equivalent
 EO = Executive Order
 gal = gallon
 > = greater than
 < = less than
 LDR = land disposal restriction
 LLW = low-level (radioactive) waste
 mrem = millirem

mSv = millisievert
 ORO = Oak Ridge Operations
 ORR = Oak Ridge Reservation
 % = percent
 PCB = polychlorinated biphenyl
 PPE = personal protective equipment
 ppm = parts per million
 RCRA = Resource Conservation and Recovery Act of 1976
 SIOU = Surface Impoundments Operable Unit
 TBC = to be considered
 TDEC = Tennessee Department of Environment and Conservation
 USC = *United States Code*