Management System: Worker Safety and Health		
Program Description: Worker Safety and Health Program		
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Executive Summary

The Worker Safety and Health program description (WSHPD) describes ORNL's approach to the development, management, and implementation of the worker safety and health program at ORNL. This program description documents the ORNL processes for compliance with worker safety and health regulatory requirements, including 10 CFR 851, *Worker Safety and Health Program*, and provides cross-references to implementing systems, programs, and subject areas. The program description describes how ORNL integrates worker safety and health requirements with other related worker protection activities and the ORNL Integrated Safety Management System (ISMS) program description. The program description illustrates the ORNL framework for effective worker protection and the integration of safety and health related functional areas including construction safety, fire protection, explosives safety, pressure safety, firearms safety, industrial hygiene, biological safety, occupational medicine, motor vehicle safety, and electrical safety.

The information in this program description is intended to provide the reader with an understanding of the overall approach to worker safety and health and to show how worker safety and health requirements flow down to workers. Appendix A contains a crosswalk of requirements from 10 CFR 851 and the respective implementing documents at ORNL. Workers use the implementing documents referenced in Appendix A for specific requirements. This program description was developed with the active participation of ORNL management, laboratory staff, health and safety subject matter experts, and Atomic Trades and Labor Council representatives, and with the close coordination of the Department of Energy (DOE) ORNL Site Office (OSO) and the DOE Office of Science. Procedures, program descriptions, management system descriptions, subject areas, and other documents listed in this program description are not incorporated by reference, or made a part of this document.

1.0 Introduction

ORNL is the largest science and energy national laboratory in the DOE system. Managed since April 2000 by UT-Battelle, a partnership of the University of Tennessee (UT) and Battelle Memorial Institute, ORNL was established in 1943 as a part of the secret Manhattan Project. During the 1950s and 1960s, ORNL became an international center for the study of nuclear energy and related research in the physical and life sciences. The 1970s led to an expansion of ORNL's research programs into the areas of energy production, transmission, and conservation. By the turn of the century the laboratory supported the nation with a peacetime science and technology mission that was just as important, but very different from, the days of the Manhattan Project. Today, ORNL is an international leader in a range of scientific areas that support the DOE's mission. The laboratory's six major mission roles include neutron science, energy, high-performance computing, systems biology, materials science at the nanoscale, and national security.

The laboratory has a staff of approximately 4,500 individuals and annually hosts approximately 3,200 guest researchers who spend two weeks or longer in Oak Ridge.[1] The fiscal year (FY) 2016 total operating budget for ORNL exceeds $1.5 billion.[1] ORNL is located in the southwest corner of DOE's Oak Ridge Reservation (ORR), a reserve of approximately 34,000 acres of federally owned lands within Anderson and Roane counties in eastern Tennessee. ORNL buildings contain a total of 4,256,064 square feet on 4,400 acres of land.

UT-Battelle's fundamental approach to worker safety and health at ORNL is exemplified through its commitment to providing a safe and healthful workplace, assuring work is performed in accordance with applicable requirements, and maintaining a strong safety culture that is further described in 2014 Battelle publication, *The Safe Conduct of Research.*

[1] The number of employees, visitors and budget represented are consistent with information available from the ORNL website at submittal of this updated document in May 2016.

2.0 Worker Safety and Health Program Description (WSHPD)

2.1 Purpose

The purpose for this program description is to describe the following:

- Approach for worker safety and health that reduces or prevents occupational injuries, illnesses, and accidental losses by providing ORNL employees and subcontractors with a safe and healthful workplace
- Worker safety and health processes that govern the conduct of activities and operations at DOE-owned or –leased facilities
- Integration of the worker safety and health program with other ORNL systems and programs
- ORNL processes to comply with the worker safety and health requirements and any compliance order issued by the Department of Energy Secretary pursuant to 10 CFR 851

2.2 Scope

It is UT-Battelle's intent to apply this program description and deploy a single worker safety and health program to ORNL employees and subcontract personnel. The ORNL WSHPD describes how worker safety and health requirements are implemented and managed, including 10 CFR 851 and its referenced standards. ORNL staff, visitors, guests and subcontractors are expected to comply with the requirements described in the WSHPD, executed through SBMS policies and procedures and subcontracts, when performing ORNL work activities. This program description also demonstrates the methodology used by ORNL staff at DOE facilities not managed by ORNL when the host facility does not have a DOE-approved worker safety and health program.

While the ORNL WSHPD applies broadly to ORNL work activities as described above, the provisions of 10 CFR 851 do not directly apply to the following:

- Work at a DOE site that is regulated by the Occupational Safety and Health Administration
- Work at a DOE site that is operated under the authority of the Director, Naval Nuclear Propulsion, pursuant to Executive Order 12344, as set forth in Public Law 98 –525, 42 U.S.C. 7158 note
- Radiological hazards or nuclear explosives operations to the extent regulated by 10 CFR Parts 20, 820, 830 or 835
- Transportation to or from a DOE site
- Work at a DOE site that is not in furtherance of a DOE mission (work that would be done by a subcontractor at any other location in the same manner)

This includes, but is not limited to the following:

- Activities by foodservice vendors such as subcontracted cafeteria operators and staff
- Activities by suppliers of commercial items
- Activities by subcontractors that are providing installation, operation and maintenance services for commercial items (e.g., X-Ray technicians, machine tool technicians, fax/copier technicians, repair services for equipment under warranty, training activities for equipment operation)

- Work that is not performed at a DOE-owned or -leased site
- Activities by DOE personnel
- Activities by Army Corps of Engineers personnel
- Activities by other DOE Prime contractors and their subcontractors that are not managed under the ORNL prime contract
- Activities by employees of other government agencies or government corporations (e.g., Tennessee Valley Authority (TVA), Tennessee Department of Environment and Conservation, the City of Oak Ridge, Anderson and Roane Counties)
- Visitors, students, visiting scientists, research partners, post-doctoral students/scientists, users and others which are not under contract with UT-Battelle
- Construction of facilities that are on property that has been deeded to third parties
- Landlord personnel (including the landlord's contractors and non-DOE lessees) at leased facilities, including, but not limited to, the following facilities:
  - National Transportation Research Center (NTRC)
  - Shipping/receiving and surplus sales on Union Valley Road
  - Office space in Commerce Park in Oak Ridge
  - Third-party owned facilities at ORNL (i.e., Buildings 5200, 5300, 5600, 5700, 5800, the Science and Technology Research Park and the Joint Institutes)
  - Short-term rentals (e.g., Pollard Auditorium)

2.3 Approval of the Worker Safety and Health Program Description

ORNL submits this WSHPD to the DOE ORNL Site Office Manager for review and approval. The approved document is available to all employees and subcontractors via the ORNL Standards-Based Management System (SBMS) program descriptions.

2.4 Worker Safety and Health Program Description Updates

ORNL submits updates to the WSHPD when there is a significant change or addition to the program. An updated WSHPD or a letter stating that no program description update was necessary is to be submitted annually. The updates incorporate any changes to the program description, any new workplace safety and health standards directed by DOE, consistent with the requirements of the Rule and contractual requirements.

3.0 Flow Down of Safety and Health Requirements at ORNL

3.1 Overview of the Standards-Based Management System (SBMS) Process

ORNL adheres to applicable federal and state worker protection requirements. ORNL recognizes that compliance with worker protection requirements must be fully integrated into work planning and execution. The UT-Battelle necessary and sufficient Work Smart Standards (WSS) process is followed for evaluation of environment, safety and health (ES&H) risks based on the work, determining appropriate requirements for risk mitigation, and integrating requirements into the laboratory's SBMS. The ORNL SBMS translates laws, DOE directives (i.e., orders, manuals, notices), contractual requirements, and regulatory requirements into laboratory-wide procedures and exhibits that are current, accurate, and relevant to work being performed at ORNL. The SBMS is the vehicle that ORNL uses to flow worker protection requirements into work control documents and then to workers. The SBMS process is depicted in Figure 1.

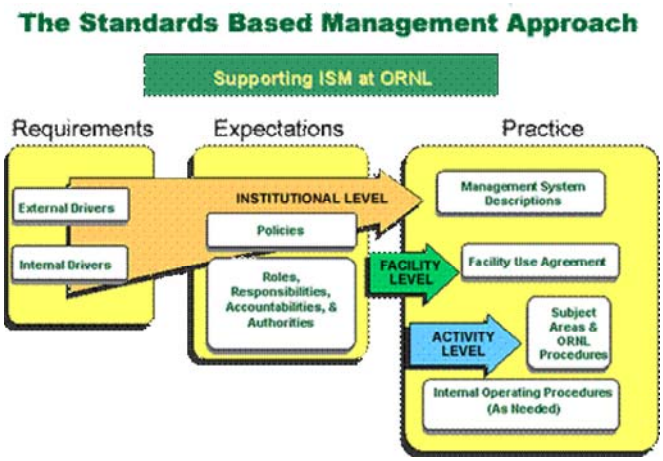

Figure 1: SBMS Process

Management systems establish the processes that workers use to plan work, follow safety and health requirements, and be safe at work. Management system descriptions identify requirements that apply to an area and translate these requirements into internal processes that ORNL staff use to perform their work. Program descriptions are developed when required to further describe these processes. Management systems contain subject areas that describe the process to follow to assure worker safety and health requirements are satisfied.

Laboratory-level information governing work is developed to serve ORNL activities. Activity- or staff-level information is tailored to meet the needs and hazards of the specific work. Line management may determine that it is appropriate to develop an internal operating procedure to more finely tailor applicable risk mitigation strategies to the particular risk of the work being performed. The internal operating procedures are bounded by the requirements established by the laboratory-level documents. Internal operating procedures may also include task- or group-specific procedures used to implement management system processes. Task- or group-specific procedures typically impact only a specific organization, or have a limited audience. The issuing organization verifies that operating procedures are current and that they are based on and not in conflict with the governing standards.

3.2 Management Systems

3.2.1 Primary Worker Safety and Health Management Systems

ORNL's two primary management systems that integrate worker protection requirements into work planning and execution include the Worker Safety and Health (WSH) management system and the Work/Project Planning and Control (WPPC) management system. The Worker Safety and Health management system is the mechanism for flowing down occupational safety and health requirements including the OSHA standards and 10 CFR 851, and interprets

these requirements for staff and translates the requirements in subject areas. The Worker Safety and Health management system description describes the management system's purpose, ownership, requirements and drivers, customers, outputs, system operations, and responsibilities. This management system (WSH), along with several others, provides input on requirements and work controls to the WPPC management system. The WPPC provides tools and processes to help staff recognize and integrate requirements applicable to a defined work activity, identify and evaluate the associated hazards and risks, ensure appropriate work controls are in place and workers are prepared to implement them prior to work execution, and solicit feedback at all stages of the process for the purpose of ensuring work is performed safely and in compliance with requirements and customer expectations. Feedback is escalated to the WSH management system owner (MSO) as appropriate.

Elements of other management systems support the flow down of ORNL's worker safety and health requirements as described in Appendix A. Specifically, these management systems include the following:

- Acquisition Management system provides support for purchasing services and materials, equipment, and supplies for ORNL operations and programs and managing government-owned property in the custody of the contractor or subcontractors.
- Emergency Management system provides comprehensive emergency preparedness and response planning and ensures the necessary services are available to respond effectively to emergencies.
- Engineering management system provides processes and standards that appropriately consider and/or are compliant with codes and regulations.
- Integrated Performance Management system describes ORNL's approach to utilizing business planning and assessments and to providing feedback and improvement information to ORNL staff. The IPMS also describes the ORNL Contractor Assurance System.
- Occupational Medicine management system describes the services provided by the ORNL Health Services Division (HSD) to the various ORNL management systems and associated processes.
- Quality management system describes the policy and procedure requirements needed to control and improve the various processes at ORNL. The Quality management system includes the Safety and Security Regulatory Compliance Assurance Program which describes the process used at ORNL to fulfill the noncompliance determination and reporting guidelines associated with the enforcement policies of the DOE nuclear/radiological safety, worker safety and health, and classified information security rules.
- Training and Qualification management system provides staff of UT-Battelle with the knowledge and skills necessary to perform their jobs safely, effectively and efficiently with minimal supervision.

Figure 2 depicts the interactions between the primary and supporting management systems.

Figure 2 : Interaction of Worker Safety and Health with Supporting Management Systems

3.3 Flow Down of Requirements to Subcontractors

Under its prime contract with DOE, ORNL uses subcontractors to acquire supplies and services to accomplish a portion of its contract scope. Unless the subcontractor provides its own DOE-approved worker safety and health program documents specified in the governing subcontract, ORNL subcontractors working on-site will work under ORNL's approved Worker Safety and Health Program.

ORNL determines which Worker Safety and Health Program (WSHP) requirements are applicable to the subcontract scope, and those requirements flow down via the subcontract to the subcontractor. Subcontractors are required to flow applicable worker safety and health requirements to lower tier subcontractors. The subcontract contains a provision to terminate the subcontractor for inadequate safety performance.

Depending on the scope of work and its complexity, offerors may be required to submit a description of their approach to safety and health performance as part of their bid proposal. When appropriate, ORNL may approve subcontractor's safety programs such as lockout/tagout, excavation/penetration and respiratory protection for implementation. Offerors may also be required to submit additional safety and health information including past performance information that will be used to evaluate their proposal.

At the discretion of ORNL, subcontractors that maintain a DOE-approved worker safety and health program document under 10 CFR 851 may use portions or all of that document to demonstrate compliance with ORNL requirements under the ORNL WSHPD.

3.4 Coordination with Other DOE Prime Contractors

Multiple contractors at a covered workplace are required by 10 CFR 851 to coordinate with each other to establish clear roles, responsibilities and procedures to assure the safety and health of workers at multi-contractor workplaces. At ORNL's main campus, UT-Battelle and other DOE prime contractors perform work in furtherance of a DOE mission.[2] ORNL also operates and manages a limited number of facilities at the Y-12 National Security Complex, managed and operated by Consolidated Nuclear Services, L.L.C. (CNS) for the National Nuclear Security Administration (NNSA).

UT-Battelle has entered into Coordination Agreements with the other DOE prime contractors performing work at ORNL and the Y-12 National Security Complex to define roles and responsibilities and stop work authority to ensure the safety and health of workers. A listing of these Coordination Agreements can be found in Appendix G. The Coordination Agreements require that each contractor is responsible for the safety and health of its employees and they will follow their company's worker safety and health program and implementing procedures, unless otherwise designated in a separate agreement. When employees of one prime contractor work in the facilities owned or managed by another prime contractor, the work will be performed under the worker safety and health plan of the company that has management responsibility for the facility unless otherwise designated in a separate agreement. Each contractor has the responsibility to inform other contractors and their employees of hazards that they may encounter in facilities operated by the respective contractor. Finally, the Coordination Agreements reinforce that every employee at a covered workplace has stop work authority regardless of the contractor performing the work.

[2]The DOE prime contractors performing work at ORNL's main campus are Isotek Systems, LLC; URS/CHRM Oak Ridge (UCOR) LLC; National Strategic Protective Services; North Wind Solutions, LLC; Halycon, LLC; and Johnson Controls, Inc. Additional changes to this list of prime contractors are expected over the next few years. The complete set of coordination agreements is maintained by the UT-Battelle Legal Directorate and available upon request.

3.5 Process for Developing Equivalencies Where Allowed by Codes or Standards

A number of health and safety codes and standards, including National Fire Protection Association (NFPA) standards, allow for the designation of an authority having jurisdiction (AHJ). For example, NFPA 70 defines the AHJ as "the organization, office, or individual responsible for approving equipment, materials, and installation, or a procedure." NFPA 1 more globally defines the AHJ as "…an organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure." In general, NFPA codes and standards contain several provisions that allow the AHJ to approve alternatives that provide equivalent levels of protection, i.e., "equivalencies" to the levels provided by the standard.

The ORNL worker safety and health program recognizes the responsibility of designated ORNL AHJs to resolve implementation issues and approve equivalencies related to fire protection and electrical safety/design as allowed by codes and standards. The ORNL chief engineer has appointed separate AHJs for fire protection and electrical safety based on qualifications and experience required for those positions. Both AHJ positions have an appointment letter from the chief engineer. The ORNL AHJs may delegate to other qualified individuals such powers as necessary for the proper administration and enforcement of the ORNL fire protection and electrical safety programs. As appropriate, the ORNL AHJs consult with the AHJ for DOE OSO.

3.5.1 Fire Protection AHJ

The DOE OSO fire protection AHJ retains full authority in fire protection and life safety matters. However, OSO has recognized different performance levels of fire protection AHJ decision making responsibilities and activities are necessary to execute DOE fire protection program activities driven by DOE Order 420.1C, *Facility Safety*. As such, and as documented in the September 5, 2013 DOE OSO *Letter of Technical Direction Concerning Fire Protection*, OSO delegates the fire protection AHJ activities below to the UT-Battelle AHJ for fire protection. It is understood that, in some cases, this authority may be further delegated to appropriate subject matter experts (SMEs) within the framework of a DOE Order 420.1C compliant Fire Protection Program.

- Activities/responsibilities that may be further delegated include the following:
  - Issue permits.
  - Review and approve construction documents and shop drawings.
  - Review and approve facility modifications as they relate to fire protection and life safety.
  - When required by the building code or standard, review and approve the installation and acceptance testing of new fire protection and life safety features.
  - Perform fire safety acceptance inspections for approval of occupancy of new facilities or those having undergone major modifications.
  - Interpret fire protection requirements in building and fire codes.

- Activities/responsibilities that are not further delegated include the following:
  - Review and recommend approval of the fire department Baseline Needs Assessment.
  - Forward to DOE for concurrence, determinations for not performing a Fire Hazard Analysis (FHA) for new facilities.
  - Determine applicability of the National Fire Protection Association (NFPA) codes and standards to site activities.
  - Recommend the OSO AHJ consider concurrence with equivalent approaches to, and exemptions from, DOE directives. If in agreement, OSO will forward the request to the Program Secretarial Office (PSO) for approval.
  - Recommend the OSO AHJ approve significant equivalent approaches and alternative methods to NFPA, International Building Code (IBC), International Fire Codes (IFC), and DOE-STD-1066-12 requirements. Significant conditions are determined through the contractor's Request for Fire Protection Engineering Approval process (Category 1, Imminent and Category 2, Serious, conditions).
  - Approve moderate field compliance conditions, equivalent approaches, and alternative methods to NFPA, IBC, IFC, and DOE-STD-1066-12 requirements, after conditions are determined through the contractors Request for Fire Protection Engineering Approval process (Category3, Moderate conditions).
  - Approve minor field compliance conditions, equivalent approaches, and alternative methods to NFPA, IBC, IFC, and DOE-STD-1066-12 requirements. Minor conditions are determined through the contractor's Request for Fire Protection Engineering Approval process (Category 4, Less-Serious, and Category 5, Non-Serious, conditions).

Contractor Fire Protection AHJ determinations are documented and available for review. Project and work control related support, reviews, and approvals (typically performed by fire protection engineers [FPEs]) are documented as required by the specific project or work activity procedures.

Contractor AHJ responsibilities are exercised by an individual who is experienced in the field of fire protection. The contractor submits the qualification of contractor fire protection AHJ to OSO.

3.5.2 Electrical AHJ

The ORNL electrical AHJ has the responsibility for interpreting the National Electrical Code (NEC) rules, approving equipment and materials, and granting the special permission contemplated in a number of the NEC rules. The AHJ may waive specific requirements in the NEC or permit alternative methods where it is assured that equivalent objectives can be achieved by establishing and maintaining effective safety. In such event that new products, construction, or materials not available at the time the NEC is adopted need to be used, the AHJ may permit the use of the products, construction methods, or materials that comply with the most recent previous edition of the NEC included in the ORNL contract.

4.0 Worker Safety and Health Program

4.1 Management Responsibilities

4.1.1 Place of Employment Free of Recognized Hazards

The 10 CFR 851, *Worker Safety and Health Program* requires ORNL and ORNL sub-contractors and lower-tier subcontractors, to provide a place of employment that is free from recognized hazards that are causing or have the potential to cause death or serious physical harm to workers. This provision is addressed through this program description and the Worker Safety and Health Policies for ORNL. As part of the Policies, ORNL has adopted the following principles:

- Provide a safe and healthy workplace by developing and implementing work processes and equipment that abate hazards.
- Maintain a culture where individuals performing work understand and support the concept that all injuries are preventable.
- Comply with applicable requirements for performing work and work-related activities on and off site, including requirements in ORNL's Standards-Based Management System.

4.1.2 Policies, Goals, and Objectives

ORNL strives to fulfill the commitment to provide a safe and healthful workplace to its employees and subcontractors through the establishment of laboratory-wide worker safety and health policies. These policies serve as the guiding principles that provide overall direction for the organization in regard to worker protection, and the creation, measurement, and refinement of goals and objectives that contribute to the continuous improvement of worker safety and health. The UT-Battelle Worker Safety and Health Policies for Oak Ridge National Laboratory (ORNL) establish high level commitments to worker safety and health at ORNL. The worker safety and health commitments set forth in this program description are put into practice through the establishment of requirements by the ORNL Standards-Based Management System (SBMS).

4.1.3 Integrated Safety Management System

The ORNL approach to integrating ES&H requirements into the processes for planning and conducting work at ORNL is conveyed in the Integrated Safety Management System (ISMS) program description. The ISMS program description describes the systems, processes, and programs for accomplishing work safely and provides the road map of the systems that make up ORNL's ISMS Program. ORNL carries out the requirements of ISMS by way of a comprehensive, non-redundant, and integrated set of management systems contained within SBMS. The integrated processes of these management systems apply controls tailored to work being performed at ORNL. The strategy ensures that work processes incorporate ES&H considerations into each work element as a natural part of conducting it.

4.1.4 Qualified Worker Protection Staff

ORNL seeks to attract, hire, develop and retain the most qualified worker protection professionals to assist management and line organizations in meeting worker safety and health goals and objectives. The hiring of certified professionals and management support of the attainment of certifications by current staff is one way that ORNL ensures the quality of the worker safety and health Program. ORNL employs highly qualified professionals including certified safety professionals (CSPs), certified industrial hygienists (CIHs), professional engineers (PEs), and fire protection engineers (FPEs). Other staff that have credentials in hazardous material management, training, transportation, and other disciplines are also available to support the worker safety and health program.

ORNL Roles, Responsibilities, Accountabilities, and Authorities (also known as "R2A2s") provide a clear communication of management expectations through assignment of one or more roles for each employee, and the responsibilities, accountabilities, and authorities associated with each role. Although not all staff members who support the worker safety and health program have professional society certifications, all have been selected using the human resources processes for hiring, transfer and/or promotion for their knowledge, experience, and ability to provide first-class safety and health support to the laboratory. The Staff R2A2 includes responsibilities to 1) keep capabilities and qualifications current, including completing required training for assigned tasks and work location; and 2) assume personal ownership of technical/professional development and, with immediate supervision, develop and manage career goals.

4.1.5 Accountability

ORNL subscribes to the philosophy that line management is responsible for safety. However, it is clear that management needs support when implementing the worker safety and health program. ORNL holds management, staff and subcontractors accountable for worker safety and health and each has a significant role in implementing this program. It is ORNL's expectation that employees and subcontractors will follow the requirements set forth in SBMS or appropriate contract language and use specified work controls to prevent occupational injury and illness. ORNL holds employees accountable for adherence to worker safety and health requirements including properly using personal protective equipment (PPE). Management communicates expectations of individual roles and responsibilities through the UT-Battelle Human Resources Policies for Oak Ridge National Laboratory (ORNL) and assignment of workers to one or more roles and these expectations form the basis of employee goals and performance evaluations.

ORNL R2A2s also form an understanding between staff and their supervisors regarding performance expectations, based on staff's roles. Roles define the functions that individuals play in the organization. ORNL R2A2s include personal accountability for safety and everyone has an R2A2. Accountabilities state that personnel will be held answerable to a specific position/individual for fulfilling a responsibility for which they have authority to act. Authorities identify decision-making powers and controls required to fulfill responsibilities without concurrence or approval of others.

The R2A2s communicate management and staff responsibilities for safety. However, it is recognized that technical expertise in health and safety (H&S) disciplines such as industrial hygiene, fire protection, and occupational safety is required to achieve excellent performance. For that reason, qualified H&S professionals are part of the operating teams that support work planning and verify that work is performed safely, and other H&S professionals provide independent overview of ORNL operations. Each organization performing potentially hazardous work has "field-deployed" H&S staff assigned to support operations. This staff, which may also be assigned the role of division safety officer (DSO), is available to help with project planning, address questions or concerns raised by managers or staff, and help in the performance of management self-assessments. While line management is responsible for ensuring work activities are performed safely, the DSO is responsible for assisting line management in the identification and evaluation of work place hazards and development of measures for their control.

Similarly, worker protection performance goals and objectives for subcontractors are established and contained in contract documents. Subcontractors are held accountable for worker protection performance through contract provisions that include the option to remove subcontractor's employees or termination of the subcontract.

4.1.6 Worker Involvement

Active involvement of workers is sought so that workers, regardless of their position, can use their knowledge and expertise in work planning, execution and feedback. Worker involvement is identified in the Integrated Safety Management System program description as a guiding principle of the ORNL ISMS Program. The Worker Safety and Health management system and the Work/Project Planning and Control management system provide mechanisms to involve workers in the development of the worker safety and health program goals, objectives, and performance measures and in the identification and control of hazards in the workplace. Workers are guaranteed the right to participate in worker protection activities on official time.

The expectations for ORNL staff members are defined in the laboratory's R2A2. Staff members are expected to do the following:

- Comply with applicable laboratory policies, standards and procedures.
- Identify hazards.
- Stop unsafe work.

The organizational culture of research facilities also incorporates a healthy safety culture, founded on a collective commitment to put safety first. This commitment applies to everyone in the organization, from the laboratory director to the individual contributor. No one is exempt from the obligation to ensure protection of people, the environment, and the facility. The 2014 Battelle publication, The Safe Conduct of Research, articulates the principles that form the basis for a strong safety culture.

1. Everyone is personally responsible for ensuring safe operations.
2. Leaders value the safety legacy they create in their discipline.
3. Staff raises safety concerns because trust permeates the organization.
4. Cutting-edge science requires cutting-edge safety.
5. A questioning attitude is cultivated.
6. Learning never stops.
7. Hazards are identified and evaluated for every task, every time.
8. A healthy respect is maintained for what can go wrong.

Workers are encouraged to become involved in safety and health matters related to their work, and their input is welcomed. Staff can provide input regarding worker safety and health in a variety of ways, including the following:

- Be involved with work team(s).
- Initiate informal communications with their immediate manager, the project managers with whom they work, senior staff in their line management, and the bargaining-unit can also confer with their Atomic Trades Labor Council (ATLC) H&S representative if needed.
- Contact support staff such as H&S professionals, facility operations and laboratory space managers;
- Develop laboratory-level (SBMS) requirements, work packages, and research safety summaries. Teams of user representatives are formed to develop SBMS procedures and guidelines, and participant concurrence is required before the documents can be officially issued.
- Attend staff meetings conducted as various organizational levels.
- Submit information via laboratory-level processes such as SBMS and the Staff Concerns Program subject area.
- Participate in accident investigations and critiques.
- Participate in safety committees.

ORNL maintains processes for encouraging and acting on employee suggestions for improving worker safety and health. Web-based tools are available to enable workers to easily report safety concerns. Mechanisms are provided to give feedback as appropriate.

The Worker Safety and Health (WSH) MSO is responsible for continuously improving the performance of the management system by assessing system performance and by addressing performance and implementation issues identified from customer feedback, staff suggestions, and other assessment

activities. The MSO uses these same inputs to develop annual goals, objectives and performance measures which are documented in the WSH Management System Business Plan as an appendix to the ES&H Directorate Business Plan. The annual planning and budget guidance includes key issues and focus areas, including worker safety, for all organizations to address in their annual business planning efforts.

4.1.7 Labor Organizations

As with all activities, ORNL encourages employee participation in the health and safety process. ORNL formed a working group to guide and assist laboratory management in the implementation of the worker safety and health program requirements. The working group was comprised of a cross-section of employees. Membership of the working group included safety and health subject matter experts, research staff, operations personnel, management and union representatives.

ORNL provided the Atomic Trades and Labor Council (ATLC) timely notice of the development and implementation of the WSHPD in writing and through regularly scheduled meetings. ORNL made the approved WSHPD, as well as future updates, available to the ATLC through the Standards-Based Management System link to program descriptions available to all employees.

Additionally, management made presentations to the represented workforce to help educate them on the worker safety and health program requirements, enforcement provisions, variance requests, and overall worker rights as described in this program description.

4.1.8 Access to Information

ORNL is committed to objectively and effectively communicating worker safety and health information. Ensuring worker access to information relevant to the worker safety and health program is recognized as a critical management responsibility. To that end ORNL includes links to relevant safety information on the ORNL Homepage which is available to all employees, visitors and guests.

ORNL Policy guarantees that workers have the right of access to the following:

- DOE safety and health publications
- Worker safety and health program
- Standards, controls, and procedures applicable to the covered workplace
- Safety and health poster that informs the worker of relevant rights and responsibilities
- Limited information on any recordkeeping log (OSHA Form 300)
- DOE Form 5484.3 (equivalent to OSHA Form 301) that contains the employee's name as the injured or ill worker

Workers are notified of the results of all monitoring including when monitoring results indicate a worker may have been overexposed to hazardous materials. Workers have the right to observe monitoring or measuring of hazardous materials and have the results of their own exposure monitoring. Authorized representatives may accompany DOE officials assigned to investigate the nature and extent of compliance with worker health and safety requirements. Workers have the right to request and receive results of inspections and accident investigations through supervision.

4.1.9 Report Events, Hazards and Concerns

Workers are encouraged to report without reprisal job-related injuries and illnesses, incidents, hazards and concerns and make recommendations about appropriate ways to control hazards. As a core function of the ORNL ISMS Program, the feedback and improvement processes emphasize assessments and feedback on the adequacy of controls and the continual improvement of the programs and processes that form ISM. The Worker Safety and Health management system owner is responsible for ensuring that information related to injuries, illnesses, incidents, hazards and concerns is analyzed for trends and lessons learned.

Workers have the right to express concerns related to worker safety and health. The ORNL commitment to promoting open communication among all staff (employees and non-employees) and to ensuring the prompt identification, reporting, and resolution of staff concerns is embodied in the Staff Concerns Program subject area. That subject area provides a method to report concerns with anonymity and workers' rights to report safety matters without reprisal is also guaranteed. ORNL will not tolerate retaliation and encourages and even expects employees to raise concerns. Staff members are encouraged to work within their line organizations toward resolving concerns. However, when concerns or issues arise that are not solvable through the normal line-organization channels or functional areas, or staff are uncomfortable with other channels, they may contact the ORNL Staff Concerns Program coordinator who ensures that the concerns are heard and given consideration by those in the appropriate roles. The ORNL Staff Concerns Program provides for the prompt evaluation, resolution and follow-up with staff members for issues and recommendations reported.

In addition to the mechanisms provided through the ORNL management systems, workers who believe they are being denied the rights to report events, hazards and/or concerns or who believe they are subject to reprisals for attempting to exercise these rights may file an employee concern using the DOE Employee Concerns Program. Workers are notified of this right to file a concern with DOE through training, the prominent display of the DOE Worker Protection Poster and the Concerns Program.

The Safety Concerns Program is a web-based safety suggestion system that provides another avenue for employees to report health and safety concerns and/or suggestions to management for timely resolution with the same protection of anonymity (if requested) and workers' rights guaranteed.

4.1.10 Regular Communications

ORNL is committed to objectively and fully communicating health and safety information to staff, subcontractor personnel, our customers, applicable stakeholders, and the public. Communications about workplace safety and health issues are an important aspect of the Worker Safety and Health management system. The ORNL Home Page features a Safety and Security section with links to safety processes and information that includes the ORNL Safety First website which provides general safety information, safety statistics, safety tools, and safety contacts. Committees such as the Joint Management/Labor Safety Committee afford an important opportunity for management and workers to communicate face-to-face on safety and health matters. In addition to these processes, ORNL regularly produces a number of publications that feature safety and health matters including the director's messages. The laboratory director has required all levels of management to perform safety talks focused on safety communications with staff.

4.1.11 Stop Work Authority

ORNL requires workers to stop work or decline to perform an assigned task based on a reasonable belief that the task poses an imminent risk of death, serious physical harm, or other serious hazard to workers, in circumstances where the worker believes there is insufficient time to utilize normal hazard reporting and abatement procedures. The Stop Work subject area describes the steps for staff to issue a Stop-Work Order when an unsafe act, activity, or condition creates an **imminent danger** situation. The Stop Work subject area also describes the process for restarting work after a stop work order has been issued. For situations where imminent danger is not present, staff may use the Staff Concerns Program and/or informal discussions with line and facility/laboratory space management for reporting and resolving issues or conditions of lesser hazards such as:

- That work has not been previously analyzed for hazards;
- Changes are made to the processes or procedure that may impact their safety; or
- Work conditions that may cause dangerous circumstances to them or other workers.

4.1.12 Inform Workers of Rights

Workers are informed of their safety and health rights and responsibilities through multiple means including training, safety and health information links provided at the ORNL Homepage, this program description, and the posting of the DOE-designed Worker Protection Poster in the workplace where it is accessible to all workers. The bargaining-unit also has the current collective bargaining agreement (Safety & Health Article XIII).

4.2 Workers Rights and Responsibilities

4.2.1 Participate in Activities

ORNL is committed to continuous improvement in gaining participation and engagement of all staff. Workers are guaranteed the right to participate in worker protection activities on official time. For a detailed discussion of the efforts see section 4.1.6 Worker Involvement.

4.2.2 Access to Information

ORNL is committed to providing all relevant information to its staff, managers, and subcontractors. The SBMS and laboratory home pages, tools and processes are all open to any worker that has a need for the information. All staff has access to the Web, links on the ORNL homepage, and worker safety and health program information maintained by the Safety Services Division. If workers are not able to find or access information on their own, they can always request information through their supervision.

4.2.3 Notified when Monitoring Indicates Overexposure

Staff and subcontractors are notified when monitoring indicates a potential overexposure. This is specifically implemented through a procedure in the Occupational Hazard Controls subject area.

4.2.4 Observe Monitoring

Staff and subcontractors have the opportunity to observe monitoring or measuring of hazardous materials and have the results of their own exposure monitoring. This is specifically implemented through a procedure in the Occupational Hazard Controls subject area.

4.2.5 Representative Accompany Physical Inspection

During any physical inspection conducted by DOE, an employee representative (which includes the ATLC Health and Safety Representative) will be notified of the inspection and is open to participate and to accompany the inspection team. The ORNL Safety and Security Regulatory (SSR) Office and Coordinator will serve as the liaison office to DOE for any physical inspections conducted and will ensure that employee representatives are notified of the option to participate and accompany the inspection team.

4.2.6 Request and Receive Results of Inspections and Investigations

ORNL staff and managers can request and receive the results of inspections and investigations, provided that information protection requirements are maintained. Staff members may contact their manager, supervisor, DSO, or Safety Services Division representative to obtain such information.

4.2.7 Express Concerns Related to Worker Safety & Health

ORNL is committed to resolving concerns related to worker safety and health in a timely manner. The programs available to workers and staff are defined in detail in section 4.1.9 Report Events, Hazards and Concerns.

4.2.8 Decline to Perform Assigned Task Based on Risk

All workers have the responsibility under the R2A2: Staff to 1) perform work effectively, efficiently, safely and securely in support of the Laboratory Agenda and organizational goals and objectives; 2) notify their group leader/supervisor, laboratory space manager, or complex facility manager if potential hazards, environmental concerns, exceedances of Facility Use Agreement operational boundaries, and unsafe conditions (or practices in work) are identified at work site, and implementing or suggesting controls to minimize risk; and 3) issue cease work activity directions for tasks assigned based on risk. For additional information, see section 4.1.9 Report Events, Hazards and Concerns.

4.2.9 Stop Work Authority

All workers have stop work authority. The SBMS Stop Work subject area defines the safety rights and responsibilities of staff and other workers. For additional information, see section 4.1.9 Report Events, Hazards and Concerns.

4.3 Hazard Identification and Assessment

The analysis of designs, the evaluation of operations and procedures, the identification of existing and potential workplace hazards and the assessment of the risk of associated worker injury or illness are key elements in ORNL's strategy of providing operational requirements to make processes more efficient and safe. Line management is responsible and accountable to understand the hazards and issues associated with work execution. A broad spectrum of H&S support infrastructure is available to assist managers with hazard identification and assessment. Worker involvement in hazard identification and assessment is sought through involving workers in job planning walk downs, active participation in pre- and post- job briefs, development of activity hazards analysis, and contribution of feedback and suggestions. The product of this multi-disciplinary hazard identification and assessment reflects the integration of ISMS principles by the ORNL management systems and is evident in work planning documents for research and development (R&D) activities as well as operations and maintenance.

Operations and procedures are analyzed and reviewed at the institutional, facility and activity level. Institutional hazards guide the need for and operation of management systems. Facility level hazards are analyzed through formal processes such as safety analysis reports, assessment documents, un-reviewed safety question determinations, un-reviewed safety issues, work permits, job hazard evaluation, and design reviews for facility modification or construction. Activity level hazards associated with proposed work to be performed by ORNL staff are identified through Work/Project Planning and Control management system's Work Control subject area. The Acquisition Management system provides a similar process for subcontract support. Requisitioners identify potential hazards associated with the scope of work. Regardless of hazard level, the requisitioning process requires a review by a designated ES&H reviewer and appropriate requirements to be included in the subcontract.

Each of the work control processes described for hazard identification and assessment establishes and maintains complete and accurate records for hazard inventory information, hazard assessments, exposure assessments and exposure controls.

4.3.1 Closure Facility Hazards

Closure facilities that will be permanently closed, demolished or subject to title transfer represent special circumstances and require flexibility in addressing hazards. When hazard identification and assessment in closure facilities identifies hazards that cannot be or should not be promptly corrected, ORNL will implement appropriate abatement or mitigating controls and seek ORNL DOE Site Office approval. See Appendix E for a current listing of closure facility hazards and controls.

4.4 Hazard Prevention and Abatement

Hazard prevention and abatement is an integral component of the ORNL Worker Safety and Health Program. The ORNL process for hazard prevention and abatement system protects workers from exposure to current and future workplace hazards and embodies the core functions of the ORNL ISM Program. ORNL management systems provide staff with the information needed to effectively prevent and abate hazards. Laboratory-wide procedures for hazard prevention and abatement are presented in the following subject areas and subject area procedures:

- Occupational Hazard Controls subject area
- Work Control subject area
- Propose and Accept Work procedure
- Implement ISM in Research and Development procedure

- Implement Work Control for Operations, Maintenance and Services procedure
- Implement ISM for Other Work procedure
- Maintain ISM in Laboratory Space procedure

ORNL provides for controls to be incorporated in the appropriate facility design or procedure development when hazards are identified either in the facility design or the development of procedures. This incorporation of controls into facility design or procedure development is accomplished through implementation of the ORNL ISMS Program and the management systems for Work/Project Planning & Control, Integrated Facility Management, and Worker Safety and Health. The laboratory-wide procedure for development of procedures is contained in the Document Management subject area.

The prompt implementation of abatement actions is a salient component of the ORNL Policy and UT-Battelle Worker Safety and Health Policies for Oak Ridge National Laboratory (ORNL) and attests the commitment to meeting the objective of the ORNL ISMS Program's core function of providing feedback and continually improving programs and processes. Hazards identified through hazard assessment are appropriately mitigated before work can begin; therefore there is no prioritization of abatement actions based on risk necessary. The direct technical assistance provided to line management through ES&H subject matter experts further ensures the timely and risk prioritized implementation of abatement actions. The selection of hazard controls is based on the following hierarchy:

- Elimination or substitution
- Engineering controls
- Work practices and administrative controls
- Personal protective equipment

Hazards are considered when purchasing equipment, products, and services.

4.5 Training and Information

ORNL is committed to ensure workers are appropriately trained in safety and health hazards and worker protection. Line management is responsible to ensure that staff is technically competent to perform their assigned duties. ORNL establishes clear roles and responsibilities which are then translated into training and qualification requirements. Laboratory-wide training processes are delivered and implemented through the Training and Qualification management system. Appropriately trained personnel participate in the work control process and training and qualification requirements are identified for persons participating in specific work activities.

4.6 Recordkeeping and Reporting

ORNL is committed to the accurate and objective reporting of worker safety and health information. Established processes manage required records and reports. Consequential outputs of these processes include but are not limited to the following:

- Maintenance of hazard inventory information, hazard assessments, exposure measurements, and controls
- Reporting and trending of injury and illness reports consistent with DOE Order 231.1B, Environment, Safety and Health Reporting, June 27, 2011 (Change 1 approved November 28, 2012) [1]
- Identifying and communicating lessons learned
- Preventing the concealment or destruction of records

These recordkeeping and reporting processes are supported by key operating and business practices that prescribe laboratory-wide procedures for recordkeeping and reporting. Technical expertise and support related to worker safety and health recordkeeping requirements is provided.

Each of the work control processes described for hazard identification and assessment establishes and maintains complete and accurate records for hazard inventory information, hazard assessments, exposure assessments and exposure controls. Information concerning non-compliances or potential non-compliances to the requirements of 10 CFR 851 will not be concealed or destroyed consistent with the requirements in the Safety and Security Regulatory (SSR) Program subject area.

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[1]DOE O 231.1B, *Environment, Safety and Health Reporting*, approved June 27, 2011 cancels DOE M 231.1-1A Chg 2 which is specifically referenced in 10 CFR 851.27. (DOE O 231.1B, Change 1 approved November 28, 2012)

Appendix A
Crosswalk of 10 CFR 851 Requirements to ORNL Implementing Documents

10 CFR 851 Section	General Requirements	ORNL Implementing Documents
10 a	**(a)** With respect to a covered workplace for which a contractor is responsible, the contractor must: **(a)(1)** Provide a place of employment that is free from recognized hazards that are causing or have the potential to cause death or serious physical harm to workers.; And **(a)(2)** Ensure that work is performed in accordance with: **(a)(2)(i)** All applicable requirements of this part; and **(a)(2)(ii)** With the worker safety and health program for that workplace.	Worker Safety and Health Program Description (WSHPD) UT-Battelle "Worker Safety and Health" Policies for Oak Ridge National Laboratory (ORNL)
10 b	**(b)** The written worker safety and health program must describe how the contractor complies with the: **(b)(1)** Requirements set forth in Subpart C of this part that are applicable to the hazards associated with the contractor's scope of work; and **(b)(2)** Any compliance order issued by the Secretary pursuant to §851.4.	WSHPD Safety and Security Regulatory (SSR) Program subject area
11 a	**(a)** Preparation and submission of worker safety and health program. By February 26, 2007, contractors must submit to the appropriate Head of DOE Field Element for approval a written worker safety and health program that provides the methods for implementing the requirements of Subpart C of this part. **(a)(1)** If a contractor is responsible for more than one covered workplace at a DOE site, the contractor must establish and maintain a single worker safety and health program for the covered workplaces for which the contractor is responsible. **(a)(2)** If more than one contractor is responsible for covered workplaces, each contractor must: **(a)(2)(i)** Establish and maintain a worker safety and health program for the workplaces for	WSHPD Integrated Safety Management System program description (ISMPD)

	which the contractor is responsible; and **(a)(2)(ii)** Coordinate with the other contractors responsible for work at the covered workplaces to ensure that there are clear roles, responsibilities and procedures to ensure the safety and health of workers at multi-contractor workplaces. **(a)(3)(i)** The worker safety and health program must describe how the contractor will: (i) Comply with the requirements set forth in Subpart C of this part that are applicable to the covered workplace, including the methods for implementing those requirements; and **(a)(3)(ii)** Integrate the requirements set forth in Subpart C of this part that are applicable to a covered workplace with other related site-specific worker protection activities and with the integrated safety management system.	
11 b	**b(b)** DOE evaluation and approval. The Head of DOE Field Element must complete a review and provide written approval of the contractor's worker safety and health program, within 90 days of receiving the document. The worker safety and health program and any updates are deemed approved 90 days after submission if they are not specifically approved or rejected by DOE earlier. **(b)(1)** Beginning May 25, 2007, no work may be performed at a covered workplace unless an approved worker safety and health program is in place for the workplace. **(b)(2)** Contractors must send a copy of the approved program to the Assistant Secretary for Environment, Safety and Health. **(b)(3)** Contractors must furnish a copy of the approved worker safety and health program, upon written request, to the affected workers or their designated representatives.	N/A
11 c	**(C)** Updates. **(c)(1)** Contractors must submit an update of the worker safety and health program to the appropriate Head of DOE Field Element, for review and approval whenever a significant change or addition to the program is made, or a change in contractors occurs. **(c)(2)** Contractors must submit annually to DOE either an updated worker safety and health program for approval or a letter stating that no changes are necessary in the currently approved worker safety and health program. **(c)(3)** Contactors must incorporate in the worker safety and health program any changes, conditions, or workplace safety and health standards directed by DOE consistent with the requirements of this part and DEAR 970.5204-2, Laws, Regulations and DOE Directives (December, 2000) and associated contract clauses.	WSHPD ISMPD
11 d	**(d)** Labor Organizations. If a contractor employs or supervises workers who are represented for collective bargaining by a labor organization, the contractor must: **(d)(1)** Give the labor organization timely notice of the development and implementation of the worker safety and health program and any updates thereto; and **(d)(2)** Upon timely request, bargain concerning implementation of this part, consistent with the Federal labor laws.	WSHPD
12 a	Contractors must implement the requirements of this part.	WSHPD
12 b	Nothing in this part precludes a contractor from taking any additional protective action that is determined to be necessary to protect the safety and health of workers.	N/A
13 a	Contractors must achieve compliance with all the requirements of Subpart C of this part, and their approved worker safety and health program no later than May 25, 2007. Contractors may be required to comply contractually with the requirements of this rule before February 9, 2007.	N/A
13 b	In the event a contractor has established a written safety and health program, an Integrated Safety Management System (ISMS) description pursuant to the DEAR Clause, or an approved Work Smart Standards (Work Smart Standards) process before the date of issuance of the final rule, the Contractor may use that program, description, or process as the worker safety and health program required by this part if the appropriate Head of the DOE Field Element approves such use on the basis of written documentation provided by the contractor that identifies the specific portions of the program, description, or process, including any additional requirements or implementation methods to be added to the existing program, description, or process, that satisfy the requirements of this part and that provide a workplace as safe and healthful as would be provided by the requirements of this part.	N/A
13 c	Nothing in this part shall be construed to limit or otherwise affect contractual obligations of a contractor to comply with contractual requirements that are not inconsistent with the requirements of this part.	N/A
20 a	**(a)** Management responsibilities. Contractors are responsible for the safety and health of their workforce and must ensure that contractor management at a covered workplace: **(a)(1)** Establish written policy, goals, and objectives for the worker safety and health program; **(a)(2)** Use qualified worker safety and health staff (e.g. CIH, CSP) to direct and manage the program; **(a)(3)** Assign worker safety and health program responsibilities, evaluate personnel	WSHPD UT-Battelle "Worker Safety and Health" Policies for Oak Ridge National Laboratory (ORNL) UT-Battelle "Human Resources" Policies for Oak Ridge National Laboratory (ORNL)

	performance, and hold personnel accountable for worker safety and health performance; **(a)(4)** Provide mechanisms to involve workers and their elected representatives in the development of the worker safety and health program goals, objectives, and performance measures and in the identification and control of hazards in the workplace; **(a)(5)** Provide workers with access to information relevant to the worker safety and health program; **(a)(6)**Establish procedures for workers to report without reprisal job-related fatalities, injuries, illnesses, incidents, and hazards and make recommendations about appropriate ways to control these hazards; **(a)(7)** Provide prompt response to such reports and recommendations; **(a)(8)** Provide for regular communication with workers about workplace safety and health matters; **(a)(9)** Establish procedures to permit workers to stop work or decline to perform an assigned task because of a reasonable belief that the task poses an imminent risk of death, serious physical harm, or other serious hazard to workers, in circumstances where the workers believe that there is insufficient time to utilize normal hazard reporting and abatement procedures; and **(a)(10)** Inform workers of their rights and responsibility by the appropriate means, including posting the DOE-designated Worker Protection Poster in the workplace where it is accessible to all workers.	Roles, Responsibilities, Accountabilities, and Authorities Staff Concerns Program subject area Injuries and Illnesses subject area Event Reporting and Follow Up subject area Stop Work subject area
20 b	**(b)** Worker rights and responsibilities Workers must comply with the requirements of this part, including the worker safety and health program, which are applicable to their own actions and conduct. Workers at a covered workplace have the right, without reprisal, to: **(b)(1)** Participate in activities described in this section on official time; **(b)(2)** Have access to: **(b)(2)(i)** DOE safety and health publications; **(b)(2)(ii)** The worker safety and health program for the covered workplace; **(b)(2)(iii)** The standards, controls, and procedures applicable to the covered workplace; (b)(2)(iv)The safety and health poster that informs the worker of relevant rights and responsibilities; **(b)(2)(v)** Limited information on any recordkeeping log (OSHA Form 300). Access is subject to Freedom of Information Act requirements and restrictions; and **(b)(2)(vi)** The DOE Form 5484.3 (the DOE equivalent to OSHA Form 301) that contains the employee's name as the injured or ill worker; **(b)(3)** Be notified when monitoring results indicate the worker was overexposed to hazardous materials**;** **(b)(4)** Observe monitoring or measuring of hazardous agents and have the results of their own exposure monitoring**;** **(b)(5)** Have a representative authorized by employees accompany the Director or his authorized personnel during the physical inspection of the workplace for the purpose of aiding the inspection. When no authorized employee representative is available, the Director or his authorized representative must consult, as appropriate, with employees on matters of worker safety and health; **(b)(6)** Request and receive results of inspections and accident investigations; **(b)(7)** Express concerns related to worker safety and health; **(b)(8)** Decline to perform an assigned task because of a reasonable belief that, under the circumstances, the task poses an imminent risk of death or serious physical harm to the worker coupled with a reasonable belief that there is insufficient time to seek effective redress through normal hazard reporting and abatement procedures; and **(b)(9)** Stop work when the worker discovers employee exposures to imminently dangerous conditions or other serious hazards; provided that any stop work authority must be exercised in a justifiable and responsible manner in accordance with procedures established in the approved worker safety and health program.	WSHPD Industrial Hygiene program description Safety and Security Regulatory Compliance Assurance Program program description UT-Battelle "Worker Safety and Health" Policies for Oak Ridge National Laboratory (ORNL) Event Reporting and Follow Up subject area Critiques and Investigations subject area Staff Concerns Program subject area Issues Management and Analysis subject area Injuries and Illnesses subject area Stop Work subject area Occupational Hazard Controls subject area
21 Hazard identification and assessment		
21 a	**(a)** Contractors must establish procedures to identify existing and potential workplace hazards and assess the risk of associated workers injury and illness. Procedures must include methods to: **(a)(1)** Assess worker exposure to chemical, physical, biological, or safety workplace hazards through appropriate workplace monitoring; **(a)(2)** Document assessment for chemical, physical, biological, and safety workplace hazards using recognized exposure assessment and testing methodologies and using of accredited and certified laboratories; **(a)(3)** Record observations, testing and monitoring results; **(a)(4)** Analyze designs of new facilities and modifications to existing facilities and equipment for potential workplace hazards; **(a)(5)** Evaluate operations, procedures, and facilities to identify workplace hazards; **(a)(6)** Perform routine job activity-level hazard analyses; **(a)(7)** Review site safety and health experience information; and **(a)(8)** Consider interaction between workplace hazards and other hazards such as radiological hazards.	Worker Safety and Health management system Industrial Hygiene program description Work Control subject area Issues Management and Analysis subject area Design subject area Occupational Hazard Controls subject area
21 b	**(b)** Contractors must submit to the Head of DOE Field Element a list of closure facility hazards and the established controls within 90 days after identifying such hazards. The Head of DOE Field Element, with concurrence by the Cognizant Secretarial Officer, has 90 days to accept the closure facility hazard controls or direct additional actions to either: **(b)(1)** Achieve technical compliance; or **(b)(2)** Provide additional controls to protect the workers.	WSHPD Infrastructure Asset Management subject area
21 c		

	Contractors must perform the activities identified in paragraph (a) of this section, initially to obtain baseline information and as often thereafter as necessary to ensure compliance with the requirements in this Subpart.	Industrial Hygiene program description Work Control subject area Occupational Hazard Controls subject area
22 Hazard prevention and abatement		
22 a	**(a)** Contractors must establish and implement a hazard prevention and abatement process to ensure that all identified and potential hazards are prevented or abated in a timely manner. **(a)(1)** For hazards identified either in the facility design or during the development of procedures, controls must be incorporated in the appropriate facility design or procedure. **(a)(2)** For existing hazards identified in the workplace, contractors must: **(a)(2)(i)** Prioritize and implement abatement actions according to the risk to workers; **(a)(2)(ii)** Implement interim protective measures pending final abatement; and **(a)(2)(iii)** Protect workers from dangerous safety and health conditions.	Worker Safety and Health management system Work Control subject area Issues Management and Analysis subject area Document Management subject area Design subject area
22 b	**(b)** Contractors must select hazard controls based on the following hierarchy: **(b)(1)** Elimination or substitution of the hazards where feasible and appropriate; **(b)(2)** Engineering controls where feasible and appropriate; **(b)(3)** Work practices and administrative controls that limit worker exposures; and **(b)(4)** Personal protective equipment.	Worker Safety and Health management system Work Control subject area
22 c	**(c)** Contractors must address hazards when selecting or purchasing equipment, products, and services.	Purchasing Supplies and Services subject area
23 Safety and health standards		
23 a	**(a)** Contractors must comply with the following safety and health standards that are applicable to the hazards at their covered workplace:	N/A
23 a	**(a)(1)** 10 CFR 850, "Chronic Beryllium Disease Prevention Program."	Chronic Beryllium Disease Prevention Program (CBDPP) program description Beryllium subject areaS
23 a	**(a)(2)** Title 29 CFR, Parts 1904.4 through 1904.11, 1904.29 through 1904.33; 1904.44, and 1904.46, "Recording and Reporting Occupational Injuries and Illnesses."	Injuries and Illnesses subject area
23 a	**(a)(3)** Title 29 CFR, Part 1910, "Occupational Safety and Health Standards," excluding 29 CFR 1910.1096, "Ionizing Radiation."	Worker Safety and Health management system
23 a	**(a)(4)** 29 CFR 1915, Shipyard Employment	Standard is not applicable to ORNL.
23 a	**(a)(5)** 29 CFR 1917, Marine Terminals	Standard is not applicable to ORNL.
23 a	**(a)(6)** 29 CFR 1918, Safety and Health Regulations for Longshoring.	Standard is not applicable to ORNL.
23 a	**(a)(7)** 29 CFR 1926, Safety and Health Regulations for Construction.	Worker Safety and Health Management System Acquisition Management System Description
23 a	**(a)(8)** 29 CFR 1928, Occupational Safety and Health Standards for Agriculture.	Subject Area: Work Control Chemical Safety Management program description Subject Area: Chemical Safety ORNL/M-808 "On-site Transportation Safety Document" LSD-ADM-002 "Training and Qualification for F&O General

		Equipment and Farm Tractor Operators"
23 a	**(a)(9)** American Conference of Governmental Industrial Hygienists (ACGIH), "Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices," (2005) (incorporated by reference, see §851.27) when the ACGIH Threshold Limit Values (TLVs) are lower (more protective) than permissible exposure limits in 29 CFR 1910. When the ACGIH TLVs are used as exposure limits, contractors must nonetheless comply with the other provisions of any applicable expanded health standard found in 29 CFR 1910.	Industrial Hygiene Program Description Respiratory Protection Program Description Subject Area: Respiratory Protection Subject Area: Chemical Safety Subject Area: Occupational Hazard Controls
23 a	**(a)(10)** American National Standards Institute (ANSI) Z88.2, "American National Standard for Respiratory Protection," (1992) (incorporated by reference, see §851.27).	Respiratory Protection Program Description Subject Area: Respiratory Protection
23 a	**(a)(11)** ANSI Z136.1, "Safe Use of Lasers," (2000) (incorporated by reference, see §851.27).	Subject Area: Lasers
23 a	**(a)(12)** ANSI Z49.1, *Safety in Welding, Cutting and Allied Processes* section 4.3 and E4.3 (1999*).*	Subject Area: Personal Protective Equipment Subject Area: Welding, Burning and Hot Work Subject Area: Occupational Hazard Controls
23 a	**(a)(13)** National Fire Protection Association (NFPA) 70, "National Electrical Code," (2005) (incorporated by reference, see §851.27).	Subject Area: Electrical Safety Subject Area: Lockout/Tagout UT-T-ELEC-003 Inspection & Testing Electrical Safety Equipment UT-T-ELEC-006 Electrical Power System Administration and Operation UT-T-ELEC-007 Safety & Safety Equipment - Power System UT-T-ELEC-011 Inspection of Switchyards & Substations UT-T-ELEC-001 Utility Pole Installation UT-T-ELEC-002 Power Distribution Work Permit UT-ELEC-ROD-001 Diesel Generator Classification Record of Decision UT-ELEC-SR-001 Generator Monthly Preventive Maintenance / Post Maintenance Test Work Instructions UT-ELEC-SR-002 Generator Weekly Preventive Maintenance Work Instruction
23 a	**(a)(14)** NFPA 70E, "Standard for Electrical Safety in the Workplace," (2004) (incorporated by reference, see §851.27).	Subject Area: Electrical Safety Subject Area: Lockout/Tagout
23 a	**(b)** Nothing in this part must be construed as relieving a contractor from complying with any additional specific safety and health requirement that it determines to be necessary to protect the safety and health of workers.	WSHPD
24 Functional areas		

24 a	**(a)** Contractors must have a structured approach to their worker safety and health program which at a minimum, include provisions for the following applicable functional areas in their worker safety and health program: construction safety; fire protection; firearms safety; explosives safety; pressure safety; electrical safety; industrial hygiene; occupational medicine; biological safety; and motor vehicle safety.	WSHPD
24 b	**(b)** In implementing the structured approach required by paragraph (a) of this section, contractors must comply with the applicable standards and provisions in Appendix A of this part, entitled "Worker Safety and Health Functional Areas."	WSHPD
25 Training and Information		
25 a	**(a)** Contractors must develop and implement a worker safety and health training and information program to ensure that all workers exposed or potentially exposed to hazards are provided with the training and information on that hazard in order to perform their duties in a safe and healthful manner.	Subject Area: Training and Certification of Staff Subject Area: Work Control
25 b	**(b)** The contractor must provide: **(b)(1)** Training and information for new worker before or at the time of initial assignment to a job involving exposure to a hazard; **(b)(2)** Periodic training as often as necessary as often as necessary to ensure that workers are adequately trained and informed; and **(b)(3)** Additional training when safety and health information or a change in workplace conditions indicates that a new or increased hazard exists.	Subject Area: Training and Certification of Staff Subject Area: Work Control
25 c	**(c)** Contractors must provide training and information to workers who have worker safety and health program responsibilities that is necessary for them to carry out those responsibilities.	Subject Area: Training and Certification of Staff Subject Area: Work Control
26 Recordkeeping and reporting		
26 a	**(a)** Recordkeeping. Contractors must: **(a)(1)** Establish and maintain complete and accurate records of all hazard inventory information, hazard assessments, exposure measurements, and exposure controls. **(a)(2)** Ensure that the work-related injuries and illnesses of its workers and subcontractor workers are recorded and reported accurately and consistent with DOE Manual 231.1-1A, Environment, Safety and Health Reporting Manual, September 9, 2004 (incorporated by reference, see §851.27). **(a)(3)** Comply with the injury and illness recordkeeping and reporting sections of the health standards in 851.23 unless otherwise directed in DOE Manual 231.1-1A. **(a)(4)** Not conceal nor destroy any information concerning non-compliance or potential noncompliance with the requirements of this part.	Safety Services Division IOP 01-031, Injury/Illness Investigation Reporting and Recordkeeping Subject Area: Work Control Subject Area: Records Management Subject Area: Safety and Security Regulatory Program
26 b	**(b)** Reporting and investigation. Contractors must: **(b)(1)** Report and investigate accidents, injuries & illnesses; and **(b)(2)** Analyze related data for trends and lessons learned (reference DOE Order 225.1A, Accident Investigations, November 26, 1997).	Subject Area: Injuries and Illnesses Subject Area: Event Reporting and Follow-Up Subject Area: Issues Management and Analysis Subject Area: Critiques and Investigations
27 Reference sources		
27 a	**(a)** Materials incorporated by reference. **(a)(1)** General. The following standards which are not otherwise set forth in part 851 are incorporated by reference and made a part of part 851. The standards listed in this section have been approved for incorporation by reference by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. **(a)(2)** Availability of standards. The standards incorporated by reference are available for inspection at: **(a)(2)(i)** National Archives and Records Administration (NARA). For more information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/ federal_register/ code_of_federal_regulations/ ibr_locations.html **(a)(2)(ii)** U.S. Department of Energy, Office of Environment, Safety and Health, Forrestal Building, 1000 Independence Ave., SW., Washington, DC 20585. **(a)(2)(iii)** American National Standards Institute Headquarters, 25 West 43rd Street, New York, NY 10036. Telephone number: 12-642-4980, or go to: http://www.ansi.org. **(a)(2)(iv)** National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169. Telephone: 617-770-3000, or go to: http://www.nfpa.org. **(a)(2)(v)** American Conference of Governmental Industrial Hygienist (ACGIH), 1330 Kemper Meadow Drive, Cincinnati, OH 45240. Telephone number 513-742-2020, or go to: http://www.acgih.org. **(a)(2)(vi)** American Society of Mechanical Engineers (ASME), P.O. Box 2300 Fairfield, NJ 07007. Telephone: 800-843-2763, or got to: http://www.asme.org.	N/A
27 b	**(b)** List of standards incorporated by reference	N/A

27 b	**(b)(1)** ANSI Z88.2, American National Standard Practices for Respiratory Protection, 1992.	Respiratory Protection Program Description Subject Area: Respiratory Protection
27 b	**(b)(2)** ANSI Z136.1, Safe Use of Lasers, 2000.	Subject Area: Lasers
27 b	**(b)(3)** ANSI Z49.1, Safety in Welding, Cutting and Allied Processes, 1999.	Subject Area: Personal Protective Equipment Subject Area: Welding, Burning and Hot Work Subject Area: Occupational Hazard Controls
27 b	**(b)(4)** NFPA 70, National Electrical Code, 2005.	Subject Area: Electrical Safety Subject Area: Lockout/Tagout UT-T-ELEC-003 Inspection & Testing Electrical Safety Equipment UT-T-ELEC-006 Electrical Power System Administration and Operation UT-T-ELEC-007 Safety & Safety Equipment - Power System UT-T-ELEC-011 Inspection of Switchyards & Substations UT-T-ELEC-001 Utility Pole Installation UT-T-ELEC-002 Power Distribution Work Permit UT-ELEC-ROD-001 Diesel Generator Classification Record of Decision UT-ELEC-SR-001 Generator Monthly Preventive Maintenance / Post Maintenance Test Work Instructions UT-ELEC-SR-002 Generator Weekly Preventive Maintenance Work Instruction
27 b	**(b)(5)** NFPA 70E, Electrical Safety in the Workplace, 2004.	Subject Area: Electrical Safety Subject Area: Lockout/Tagout
27 b	**(b)(6)** ACGIH TLVs & BERs (2005).	Industrial Hygiene Program Description Respiratory Protection Program Description Subject Area: Respiratory Protection Subject Area: Occupational Hazard Controls
27 b	**(b)(7)** ASME Boilers & Pressure Vessel Code	Subject Area: Pressure Vessels and Related Components Subject Area: Occupational Hazard Controls Note: ASME BPVC Section III (Nuclear Power Plant Components) and Section XI (Rules for In-service Inspection of Nuclear Power Plant Components) are not applicable at ORNL.
27 b	**(b)(8)** ASME B31 ASME Code for Pressure Piping	Subject Area: Design

27 b	**(b)(8)(i)** B31.1-2001-Power Piping, and B31.1a-2002-Addenda to ASME B31.1-2001;	Subject Area: Welding, Burning and Hot Work Subject Area: Design
27 b	**(b)(8)(ii)** B31.2-1968-Fuel Gas Piping;	Subject Area: Design
27 b	**(b)(8)(iii)** B31.3-2002-Process Piping;	Subject Area: Welding, Burning and Hot Work Subject Area: Design
27 b	**(b)(8)(iv)** B31.4-2002-Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids;	Not applicable to ORNL
27 b	**(b)(8)(v)** B31.5-2001-Refrigeration Piping and Heat Transfer Components, and B31.5a-2004, Addenda to ASME B31.5-2001;	Subject Area: Welding, Burning and Hot Work Subject Area: Design
27 b	**(b)(8)(vi)** B31.8-2003-Gas Transmission and Distribution Piping Systems;	Subject Area: Welding, Burning and Hot Work Subject Area: Design
27 b	**(b)(8)(vii)** B31.8S-2001-Managing System Integrity of Gas Pipelines;	Not applicable to ORNL
27 b	**(b)(8)(viii)** B31.9-1996-Building Services Piping;	Subject Area: Design
27 b	**(b)(8)(ix)** B31.11-2002-Slurry Transportation Piping Systems; and	Not applicable to ORNL
27 b	**(b)(8)(x)** B31G-1991-Manual for Determining Remaining Strength of Corroded Pipelines.	Subject Area: Design
27 b	**(b)(9)** Reference Sources - DOE M 231.1-1A	Subject Area: Injuries and Illnesses Subject Area: Event Reporting and Follow-Up
27 b	**(b)(10)** DOE M 440.1-1, DOE Explosives Safety Manual, 1996	Subject Area: Explosives
Appendix A Worker Safety & Health Functional Areas		
App A.1 Construction Safety		
App A.1 a	**(a)** For each separately definable construction activity (e.g., excavations, foundations, structural steel, roofing) the construction contractor must: **(a)(1)** Prepare and have approved by the construction manager an activity hazard analysis prior to commencement of affected work. Such analyses must: **(a)(1)(i)** Identify foreseeable hazards and planned protective measures; **(a)(1)(ii)** Address further hazards revealed by supplemental site information (e.g., site characterization data, as-built drawings) provided by the construction manager; **(a)(1)(iii)** Provide drawings and/or other documentation of protective measures for which applicable Occupational Safety and health Administration (OSHA) standards require preparation by a Professional engineer or other qualified professional, and **(a)(1)(iv)** Identify competent persons required for workplace inspections of the construction activity, where required by OSHA standards. **(a)(2)** Ensure workers are aware of foreseeable hazards and the protective measures described within the activity analysis prior to beginning work on the affected activity. **(a)(3)** Require that workers acknowledge being informed of the hazards and protective measures associated with assigned work activities. Those workers failing to utilize appropriate protective measures must be subject to the construction contractor's disciplinary process.	Construction Safety Functional Area Description in WSHPD Acquisition Management System Description
App A.1 b	**(b)** During periods of active construction (i.e., excluding weekends, weather delays, or other periods of work inactivity), the construction contractor must have a designated representative on the construction worksite who is knowledgeable of the project's hazards and has full authority to Act on behalf of the construction contractor. The contractor's designated representative must make frequent and regular inspections of the construction worksite to identify and correct any instances of noncompliance with project safety and health requirements.	Construction Safety Functional Area Description in WSHPD Acquisition Management System Description

App A.1 c	**(c)** Workers must be instructed to report to the construction contractor's designated representative, hazards not previously identified or evaluated. If immediate corrective action is not possible or the hazard falls outside of project scope, the construction contractor must immediately notify affected workers, post appropriate warning signs, implement needed interim control measures, and notify the construction manager of the action taken. The contractor or the designated representative must stop work in the affected area until appropriate protective measures are established.	Construction Safety Functional Area Description in WSHPD Acquisition Management System Description
App A.1 d	**(d)** The construction contractor must prepare a written construction project safety and health plan to implement the requirements of this section and obtain approval of the plan by the construction manager prior to commencement of any work covered by the plan. In the plan, the contractor must designate the individual(s) responsible for on-site implementation of the plan, specify qualifications for those individuals, and provide a list of those project activities for which subsequent hazard analyses are to be performed. The level of detail within the construction project safety and health plan should be commensurate with the size, complexity and risk level of the construction project. The content of this plan need not duplicate those provisions that were previously submitted and approved as required by §851.11.	Construction Safety Functional Area Description in WSHPD Acquisition Management System Description
App A.2 Fire Protection		
App A.2 a	**(a)** Contractors must implement a comprehensive fire safety and emergency response program to protect workers commensurate with the nature of the work that is performed. This includes appropriate facility and site-wide fire protection, fire alarm notification and egress features, and access to a fully staffed, trained, and equipped emergency response organization that is capable of responding in a timely and effective manner to site emergencies.	Fire Protection Functional Area Description in WSHPD Subject Area: Fire Protection, Prevention & Control Subject Area: Emergency Preparedness and Response Subject Area: Spill Response and Discovery of Unsafe Chemical Conditions
App A.2 b	**(b)** An acceptable fire protection program must include those fire protection criteria and procedures, analyses, hardware and systems, apparatus and equipment, and personnel that would comprehensively ensure that the objective in paragraph 2(a) of this section is met. This includes meeting applicable building codes and National Fire Protection Association codes and standards.	Fire Protection Functional Area Description in WSHPD Subject Area: Fire Protection, Prevention & Control
App A.3 Explosives Safety		
App A.3 a	**(a)** Contractors responsible for the use of explosive materials must establish and implement a comprehensive explosives safety program.	Explosives Safety Functional Area Description in WSHPD Subject Area: Explosives
App A.3 b	**(b)** Contractors must comply with the policy and requirements specified in the DOE Manual 440.1-1A, DOE Explosives Safety Manual, Contractor Requirements Document (Attachment 2), January 9, 2006 (incorporated by reference, see §851.27). A Contractor may choose a successor version, if approved by DOE.	Explosives Safety Functional Area Description in WSHPD Subject Area: Explosives
App A.3 c	**(c)** Contractors must determine the applicability of the explosives safety directive requirements to research and development laboratory type operations consistent with the DOE level of protection criteria described in the explosives safety directive.	Explosives Safety Functional Area Description in WSHPD Subject Area: Explosives
App A.4 Pressure Safety		
App A.4 a	**(a)** Contractors must establish safety policies and procedures to ensure that pressure systems are designed, fabricated, tested, inspected, maintained, repaired, and operated by trained and qualified personnel in accordance with applicable and sound engineering principles.	Pressure Safety Functional Area Description in WSHPD Subject Area: Pressure Vessels and Related Components
App A.4 b	**(b)** Contractors must ensure that all pressure vessels, boilers, air receivers, and supporting piping systems conform to: **(b)(1)** The applicable American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (2004); sections I through section XII including applicable Code Cases (incorporated by reference, see § 851.27). **(b)(2)** The applicable ASME B31 (Code for Pressure Piping) standards as indicated below; and or as indicated in paragraph (b)(3) of this section: **(b)(2)(i)** B31.1-2001-Power Piping, and B31.1a-2002-Addenda to ASME B31.1- 2001 (incorporated by reference, see §§ 851.27); **(b)(2)(ii)** B31.2-1968-Fuel Gas Piping (incorporated by reference, see § 851.27); **(b)(2)(iii)** B31.3-2002-Process Piping (incorporated by reference, see § 851.27); (**b)(2)(iv)** B31.4-2002-Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids (incorporated by reference, see § 851.27); **(b)(2)(v)** B31.5-2001-Refrigeration Piping and Heat Transfer Components, and B31.5a-2004, Addenda to ASME B31.5-2001	Pressure Safety Functional Area Description in WSHPD Subject Area: Pressure Vessels and Related Components Subject Area: Work Control Subject Area: Design *Note: See comments under 851.27 above for ORNL applicability to these codes.*

	(incorporated by reference, see § 851.27); **(b)(2)(vi)** B31.8-2003-Gas Transmission and Distribution Piping Systems (incorporated by reference, see § 851.27); **(b)(2)(vii)** B31.8S-2001-Managing System Integrity of Gas Pipelines (incorporated by reference, see § 851.27); **(b)(2)(viii)** B31.9-1996-Building Services Piping (incorporated by reference, see § 851.27); **(b)(2)(x)** B31G-1991-Manual for Determining Remaining Strength of Corroded Pipelines (incorporated by reference, see § 851.27). **(b)(3)** The strictest applicable state and local codes.	
App A.4 c	**(c)** When national consensus codes are not applicable (because of pressure range, vessel geometry, use of special materials, etc.), contractors must implement measures to provide equivalent protection and ensure a level of safety greater than or equal to the level of protection afforded by the ASME or applicable state or local code. Measures must include the following: **(c)(1)** Design drawings, sketches, and calculations must be reviewed and approved by a qualified independent design professional (i.e., professional engineer). Documented organizational peer review is acceptable. **(c)(2)** Qualified personnel must be used to perform examinations and inspections of materials, in-process fabrications, nondestructive tests, and acceptance test. **(c)(3)** Documentation, traceability, and accountability must be maintained for each pressure vessel or system, including descriptions of design, pressure conditions, testing, inspection, operation, repair, and maintenance.	Pressure Safety Functional Area Description in WSHPD Subject Area: Pressure Vessels and Related Components Subject Area: Work Control Subject Area: Design
App A.5 Firearms safety		
App A.5 a	**(a)** A contractor engaged in DOE activities involving the use of firearms must establish firearms safety policies and procedures for security operations, and training to ensure proper accident prevention controls are in place. **(a)(1)** Written procedures must address firearms safety, engineering and administrative controls, as well as personal protective equipment requirements. **(a)(2)** As a minimum, procedures must be established for: **(a)(2)(i)** Storage, handling, cleaning, inventory, and maintenance of firearms and associated ammunition; **(a)(2)(ii)** Activities such as loading, unloading, and exchanging firearms. These procedures must address use of bullet containment devices and those techniques to be used when no bullet containment device is available; **(a)(2)(iii)** Use and storage of pyrotechnics, explosives, and/or explosive projectiles; **(a)(2)(iv)**Handling misfires, duds, and unauthorized discharges; **(a)(2)(v)** Live fire training, qualification, and evaluation activities; **(a)(2)(vi)**Training and exercises using engagement simulation systems; **(a)(2)(vii)** Medical response at firearms training facilities; and **(a)(2)(viii)** Use of firing ranges by personnel other than DOE or DOE contractor protective forces personnel.	Firearms Safety Functional Area Description in WSHPD Subject Area: Work Control Subject Area: Explosives
App A.5 b	**(b)** Contractors must ensure that personnel responsible for the direction and operation of the firearms safety program are professionally qualified and have sufficient time and authority to implement the procedures under this section.	N/A
App A.5 c	**(c)** Contractors must ensure that firearms instructors and armorers have been certified by the Safeguards and Security National Training Center to conduct the level of activity provided. Personnel must not be allowed to conduct activities for which they have not been certified.	N/A
App A.5 d	**(d)** Contractors must conduct formal appraisals assessing implementation of procedures, personnel responsibilities, and duty assignments to ensure overall policy objectives and performance criteria are being met by qualified personnel.	
App A.5 e	**e)** Contractors must implement procedures related to firearms training, live fire range safety, qualification, and evaluation activities, including procedures requiring that: **(e)(1)** Personnel must successfully complete initial firearms safety training before being issued any firearms. Authorization to remain in armed status will continue only if the employee demonstrates the technical and practical knowledge of firearms safety semiannually; **(e)(2)** Authorized armed personnel must demonstrate through documented limited scope performance tests both technical and practical knowledge of firearms handling and safety on a semi-annual basis; **(e)(3)** All firearms training lesson plans must incorporate safety for all aspects of firearms training task performance standards. The lesson plans must follow the standards set forth by the Safeguards and Security Central Training Academy's standard training programs; **(e)(4)** Firearms safety briefings must immediately precede training, qualifications, and evaluation activities involving live fire and/or engagement simulation systems; **(e)(5)** A safety analysis approved by the Head of DOE Field Element must be developed for the facilities and operation of each live fire range prior to implementation of any new training, qualification, or evaluation activity. Results of these analyses must be incorporated into procedures, lesson plans, exercise plans, and limited scope performance tests; **(e)(6)** Firing range safety procedures must be conspicuously posted at all range facilities;	N/A

	and **(e)(7)** Live fire ranges, approved by the Head of DOE Field Element, must be properly sited to protect personnel on the range, as well as personnel and property not associated with the range.	
App A.5 f	**(f)** Contractors must ensure that the transportation, handling, placarding, and storage of munitions conform to the applicable DOE requirements	N/A
App A.6 Industrial Hygiene		
App A.6	Contractors must implement a comprehensive industrial hygiene program that includes at least the following elements:	
App A.6 a	**(a)** Initial or baseline surveys and periodic resurveys and/or exposure monitoring as appropriate of all work areas or operations to identify and evaluate potential worker health risks;	Industrial Hygiene Functional Area Description in WSHPD Industrial Hygiene Program Description Subject Area: Occupational Hazard Controls
App A.6 b	**(b)** Coordination with planning and design personnel to anticipate and control health hazards that proposed facilities and operations would introduce;	Industrial Hygiene Program Description Subject Area: Occupational Hazard Controls
App A.6 c	**(c)** Coordination with cognizant occupational medical, environmental, health physics, and work planning professionals;	Industrial Hygiene Program Description Subject Area: Occupational Hazard Controls
App A.6 d	**(d)** Policies and procedures to mitigate the risk from identified and potential occupational carcinogens;	Industrial Hygiene Program Description Subject Area: Occupational Hazard Controls Subject Area: Asbestos Subject Area: Lead Subject Area: Chemical Safety
App A.6 e	**(e)** Professionally and technically qualified industrial hygienists to manage and implement the industrial hygiene program; and	Subject Area: Training and Certification of Staff
App A.6 f	**(f)** Use of respiratory protection equipment tested under the DOE Respirator Acceptance Program for Supplied-air Suits (DOE Technical Standard-1167-2003) when National Institute for Occupational Safety and Health-approved respiratory protection does not exist for DOE tasks that require such equipment. For security operations conducted in accordance with Presidential Decision Directive 39, U.S. POLICY ON COUNTER TERRORISM, use of Department of Defense military type masks for respiratory protection by security personnel is acceptable.	Subject Area: Respiratory Protection
App A.7 Biological safety		
App A.7 a	**(a)** Contractors must establish and implement a biological safety program that: **(a)(1)** Establishes an Institutional Biosafety Committee (IBC) or equivalent. The IBC must: **(a)(1)(i)** Review any work with biological etiologic agents for compliance with applicable Centers for Disease Control and Prevention (CDC), National Institutes of Health (NIH), World Health Organization (WHO), and other International, Federal, State, and local guidelines and assess the containment level, facilities, procedures, practices, and training and expertise of personnel; and **(a)(1)(ii)** Review the site's security, safeguards, and emergency management plans and procedures to ensure they adequately consider work involving biological etiologic agents. **(a)(2)** Maintains an inventory and status of biological etiologic agents, and provide to the responsible field and area office, through the laboratory IBC (or its equivalent), an annual status report describing the status and inventory of biological etiologic agents and the biological safety program. **(a)(3)** Provides for submission to the appropriate Head of DOE Field Element, for review and concurrence before transmittal to the Centers for Disease Control and Prevention (CDC), each Laboratory Registration/Select Agent Program registration application package requesting registration of a laboratory facility for the purpose of transferring, receiving, or handling biological select agents. **(a)(4)** Provides for submission to the appropriate Head of DOE Field Element, a copy of each CDC Form EA-101, Transfer of Select Agents, upon initial submission of the Form EA-101 to a vendor or other supplier requesting or ordering a biological select agent for transfer, receipt, and handling in the registered facility. Submit to the appropriate Head of DOE Field Element the completed copy of the Form EA-101, documenting final disposition and/or destruction of the select agent, within 10 days of completion of the Form EA-101. **(a)(5)** Confirms that the site safeguards and security plans and emergency management programs address biological etiologic agents, with particular emphasis on biological select agents.	Biological Safety Functional Area Description in WSHPD Subject Area: Biohazards Charter: Institutional Biosafety Committee Occupational Medical Program Description

	(a)(6) Establishes an immunization policy for personnel working with biological etiologic agents based on the evaluation of risk and benefit of immunization.	
App A.7 b	**(b)** [Reserved]	N/A
App A.8 Occupational Medicine		
App A.8 a	**(a)** Contractors must establish and provide comprehensive occupational medicine services to workers employed at a covered work place who: **(a)(1)** Work on a DOE site for more than 30 days in a 12-month period; or **(a)(2)** Are enrolled for any length of time in a medical or exposure monitoring program required by this rule and/or any other applicable Federal, State or local regulation, or other obligation.	Occupational Medicine Functional Area Description in WSHPD Occupational Medical Program Description
App A.8 b	**(b)** The occupational medicine services must be under the direction of a graduate of a school of medicine or osteopathy who is licensed for the practice of medicine in the state in which the site is located.	Occupational Medicine Functional Area Description in WSHPD Occupational Medical Program Description
App A.8 c	**(c)**Occupational medical physicians, occupational health nurses, physician's assistants, nurse practitioners, psychologists, employee assistance counselors, and other occupational health personnel providing occupational medicine services must be licensed, registered, or certified as required by Federal or State law where employed.	Occupational Medicine Functional Area Description in WSHPD Occupational Medical Program Description
App A.8 d	**(d)** Contractors must provide the occupational medicine providers access to hazard information by promoting its communication, coordination, and sharing among operating and environment, safety, and health protection organizations. **(d)(1)** Contractors must provide the occupational medicine providers with access to information on the following: **(d)(1)(i)** Current information about actual or potential work-related site hazards (chemical, radiological, physical, biological, or ergonomic); **(d)(1)(ii)** Employee job-task and hazard analysis information, including essential job functions; **(d)(1)(iii)** Actual or potential work-site exposures of each employee; and **(d)(1)(iv)** Personnel actions resulting in a change of job functions, hazards or exposures. **(d)(2)** Contractors must notify the occupational medicine providers when an employee has been absent because of an injury or illness for more than 5 consecutive workdays (or an equivalent time period for those individuals on an alternative work schedule); **(d)(3)** Contractors must provide the occupational medicine provider information on, and the opportunity to participate in, worker safety and health team meetings and committees; **(d)(4)** Contractors must provide occupational medicine providers access to the workplace for evaluation of job conditions and issues relating to workers' health.	Occupational Medicine Functional Area Description in WSHPD Occupational Medical Program Description Subject Area: Work Control Subject Area: Attendance
App A.8 e	**(e)** A designated occupational medicine provider must: **(e)(1)** Plan and implement the occupation medicine services; and **(e)(2)** Participate in worker protection teams to build and maintain necessary partnerships among workers, their representatives, managers, and safety and health protection specialists in establishing and maintaining a safe and healthful workplace.	Occupational Medicine Functional Area Description in WSHPD Occupational Medical Program Description
App A.8 f	**(f)** A record, containing any medical, health history, exposure history, and demographic data collected for the occupational medicine purposes, must be developed and maintained for each employee for whom medical services are provided. All occupational medical records must be maintained in accordance with Executive Order 13335, Incentives for the Use of Health Information Technology. **(f)(1)** Employee medical, psychological, and employee assistance program (EAP) records must be kept confidential, protected from unauthorized access, and stored under conditions that ensure their long-term preservation. Psychological records must be maintained separately from medical records and in the custody the designated psychologist in accordance with 10 CFR 712.38(b)(2). **(f)(2)** Access to these records must be provided in accordance with DOE regulations implementing the Privacy Act and the Energy Employees Occupational Illness Compensation Program Act.	Occupational Medicine Functional Area Description in WSHPD Occupational Medical Program Description
App A.8 g	**(g)** The occupational medicine services provider must determine the content of the worker health evaluations, which must be conducted under the direction of a licensed physician, in accordance with current sound and acceptable medical practices and all pertinent statutory and regulatory requirements, such as the Americans with Disabilities Act. **(g)(1)** Workers must be informed of the purpose and nature of the medical evaluations and tests offered by the occupational medicine provider. **(g)(1)(i)** The purpose, nature and results of evaluations and tests must be clearly communicated verbally and in writing to each worker provided testing; **(g)(1)(ii)** The communication must be documented in the worker's medical record; and **(g)(2)** The following health evaluations must be conducted when determined necessary by	Occupational Medicine Functional Area Description in WSHPD Occupational Medical Program Description Subject Area: Attendance

	the occupational medicine provider for the purpose of providing initial and continuing assessment of employee fitness for duty. **(g)(2)(i)** At the time of employment entrance or transfer to a job with new functions and hazards, a medical placement evaluation of the individual's general health and physical and psychological capacity to perform work will establish a baseline record of physical condition and assure fitness for duty. **(g)(2)(ii)** Periodic, hazard-based medical monitoring or qualification-based fitness for duty evaluations required by regulations and standards, or as recommended by the occupational medicine services provider, will be provided on the frequency required. **(g)(2)(iii)** Diagnostic examinations will evaluate employee's injuries and illnesses to determine work-relatedness, the applicability of medical restrictions, and referral for definitive care, as appropriate. **(g)(2)(iv)** After a work-related injury or illness or an absence due to any injury or illness lasting 5 or more consecutive workdays (or an equivalent time period for those individuals on an alternative work schedule), a return to work evaluation will determine the individual's physical and psychological capacity to perform work and return to duty. **(g)(2)(v)** At the time of separation from employment, individuals shall be offered a general health evaluation to establish a record of physical condition.	
App A.8 h	**(h)**The occupational medicine provider must monitor ill and injured workers to facilitate their rehabilitation and safe return to work and to minimize lost time and its associated costs. **(h)(1)** The occupational medicine provider must place an individual under medical restrictions when health evaluations indicate that the worker should not perform certain job tasks. The occupational medicine provider must notify the worker and contractor management when employee work restrictions are imposed or removed.	Occupational Medicine Functional Area Description in WSHPD Occupational Medical Program Description
App A.8 i	**(i)** Occupational medicine provider physician and medical staff must, on a timely basis, communicate results of health evaluations to management and safety and health protection specialists to facilitate the mitigation of worksite hazards.	Occupational Medicine Functional Area Description in WSHPD Occupational Medical Program Description
App A.8 j	**(j)**The occupational medicine provider must include measures to identify and manage the principal preventable causes of premature morbidity and mortality affecting worker health and productivity. **(j)(1)**The contractor must include programs to prevent and manage these causes of morbidity when evaluations demonstrate their cost effectiveness. **(j)(2)** Contractors must make available to the occupational medicine provider appropriate access to information from health, disability, and other insurance plans (de-identified as necessary) in order to facilitate this process.	Occupational Medicine Functional Area Description in WSHPD Occupational Medical Program Description
App A.8 k	**(k)**The occupational medicine services provider must review and approve the medical and behavioral aspects of employee counseling and health promotional programs, including the following types: **(k)(1)** Contractor-sponsored or contractor supported EAPs; **(k)(2)** Contractor-sponsored or contractor supported alcohol and other substance abuse rehabilitation programs; and **(k)(3)**Contractor-sponsored or contractor supported wellness programs. **(k)(4)**The occupational medicine services provider must review the medical aspects of immunization programs, blood-borne pathogens programs, and bio-hazardous waste programs to evaluate their conformance to applicable guidelines. **(k)(5)** The occupational medicine services provider must develop and periodically review medical emergency response procedures included in site emergency and disaster preparedness plans. The medical emergency responses must be integrated with nearby community emergency and disaster plans.	Occupational Medicine Functional Area Description in WSHPD Occupational Medical Program Description
App A.9 Motor Vehicle Safety		
App A.9 a	**(a)** Contractors must implement a motor vehicle safety program to protect the safety and health of all drivers and passengers in Government-owned or -leased motor vehicles and powered industrial equipment (i.e., fork trucks, tractors, platform lift trucks, and other similar specialized equipment powered by an electric motor or an internal combustion engine).	Motor Vehicle Safety Functional Area Description in WSHPD Subject Area: Commercial Motor Vehicle Procedure: Perform Hoisting and Rigging
App A.9 b	**(b)**The contractor must tailor the motor vehicle safety program to the individual DOE site or facility, based on an analysis of the needs of that particular site or facility.	Motor Vehicle Safety Functional Area Description in WSHPD Subject Area: Commercial Motor Vehicle
App A.9 c	**(c)** The motor vehicle safety program must address, as applicable to the contractor's operations: **(c)(1)** Minimum licensing requirements (including appropriate testing and medical qualification) for personnel operating motor vehicles and powered industrial equipment; **(c)(2)** Requirements for the use of seat belts and provision of other safety devices; **(c)(3)**Training for specialty vehicle operators;	Subject Area: Commercial Motor Vehicle Subject Area: Vehicles and Motor Equipment, Managing Subject Area: Signage and Displays Subject Area: Substance Abuse Subject Area: Employee Discipline

	(c)(4) Requirements for motor vehicle maintenance and inspection; **(c)(5)** Uniform traffic and pedestrian control devices and road signs; **(c)(6)** On-site speed limits and other traffic rules; **(c)(7)** Awareness campaigns and incentive programs to encourage safe driving; and **(c)(8)** Enforcement provisions.	
App A.10 Electrical Safety		
App A.10	Contractors must implement a comprehensive electrical safety program appropriate for activities at their site. This program must meet the applicable electrical safety code and standards referenced in 851.23.	Electrical Safety Functional Area Description in WSHPD Subject Area: Electrical Safety Subject Area: Lockout Tagout
App A.11 Nanotechnology Safety		
App A.11	Reserved	
App A.12 Workplace Violence Prevention		
App A.12	Reserved	

Appendix B
Applicable Worker Safety and Health Requirements

10 CFR 851, *Worker Safety and Health Program*, dated February 9, 2006 has a number of dated standards and regulations specifically in 10 CFR 851.23, Safety and Health Standards and 10 CFR 851.27, Reference Sources. The preamble discusses this issue on pages 6896-6897 where it is stated that incorporation of any future changes to those standards into 10 CFR 851 could only be accomplished through appropriate rulemaking procedures. Additionally, 851.23(b) states:

> *Nothing in this part must be construed as relieving a contractor from complying with any additional specific safety and health requirement that it determines to be necessary to protect the safety and health of workers.*

UT-Battelle will document an evaluation of each new edition to the cited standards and regulations in 10 CFR 851 utilizing the Work Smart Standards (WSS) process and determine if these non-legally binding requirements should be incorporated into the ORNL Worker Safety and Health Program through modifications to SBMS documents.
The following health and safety standards contained in 10 CFR 851.23 are applicable to work performed under UT-Battelle's prime contract with DOE.

1. 10 CFR 850, *Chronic Beryllium Disease Prevention Program*
2. 29 CFR 1904.4 through 1904.11, 1904.29 through 1904.33 and 1904.44 and 1904.46, *Recordkeeping and Reporting Occupational Injuries and Illnesses*
3. 29 CFR 1910, *Occupational Safety and Health Standards*, excluding 29 CFR 1910.1096, *Ionizing Radiation*
4. 29 CFR 1926, *Safety and Health Regulations for Construction*
5. 29 CFR 1928, *Occupational Safety and Health Standards for Agriculture*
6. American Conference of Governmental Industrial Hygienists (ACGIH) *Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices* (2005) when TLVs are lower than permissible exposure limits in 29 CFR 1910
7. American National Standards Institute (ANSI) Z88.2, *American National Standard for Respiratory Protection* (1992)
8. ANSI Z136.1, *Safe Use of Lasers* (2000)
9. ANSI Z49.1, *Safety in Welding, Cutting and Allied Processes* section 4.3 and E4.3 (1999*)*.
10. National Fire Protection Association (NFPA) 70, *National Electrical Code* (2005)
11. NFPA 70E, *Standard for Electrical Safety in the Workplace* (2004)

The following additional health and safety standards incorporated by reference contained in 10 CFR 851.27 are applicable to work performed under UT-Battelle's prime contract with DOE.

1. ANSI Z88.2, *American National Standard for Respiratory Protection* (1992)
2. ANSI Z136.1, *Safe Use of Lasers* (2000)
3. ANSI Z49.1, *Safety in Welding, Cutting and Allied Processes* section 4.3 and E4.3 (1999*)*
4. National Fire Protection Association (NFPA) 70, *National Electrical Code* (2005)
5. NFPA 70E, *Standard for Electrical Safety in the Workplace* (2004)
6. ACGIH *Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices* (2005) when TLVs are lower than permissible exposure limits in 29 CFR 1910
7. American Society of Mechanical Engineers (ASME) *Boilers and Pressure Vessel Code*, Sections I through XII including applicable Code Cases [1]
8. ASME B31, Code for Pressure Piping as follows:
   a. B31.1 - Power Piping, and B31.1a - Addenda
   b. B31.2 - Fuel Gas Piping
   c. B31.3 - Process Piping
   d. B31.5 - Refrigeration Piping and Heat Transfer Components, and B31.5a - Addenda
   e. B31.8 - Gas Transmission and Distribution Piping Systems
   f. B31.9 - Building Services Piping
   g. B31G - Manual for Determining Remaining Strength of Corroded Pipelines
9. DOE O.231.1.B. *Environment, Safety and Health Reporting*, approved June 27, 2011; Chg 1 approved November 28, 2012[2]
10. DOE Manual 440.1-1A, *DOE Explosives Safety Manual*, Contractor Requirements Document (Attachment 2), January 9, 2006

[1]ASME Codes are periodically revised and updated making previous editions either obsolete or not applicable. Therefore, the current versions of the ASME Boiler and Pressure Vessel Code sections 1 through XII and the various ASME B31 Codes for Pressure Piping are applicable.
[2]DOE O 231.1B, *Environment, Safety and Health Reporting*, approved June 27, 2011; Chg 1 November 28, 2012 cancels DOE M 231.1-1A Chg 2 which is specifically referenced in 10 CFR 851.27

Note: The following listing of the generally applicable codes and standards for worker safety and health in the area of fire safety is provided in the Fire Protection, Prevention, and Control Subject Area. It should be noted that the applicability of NFPA codes and standards is determined based on specific facility conditions and operations. Therefore, the list of generally applicable codes and standards does not apply universally across all UT-Battelle managed ORNL facilities. The ORNL Fire Protection Engineering organization, in conjunction with the ORNL Authority Having Jurisdiction (AHJ) for fire protection, makes determinations on the application and implementation of NFPA codes and standards consistent with the scope and applicability provisions of each code and standard.

1. NFPA 1, *Fire Code*

2. NFPA 2, *Hydrogen* Technologies *Code*
3. NFPA 10, *Standard for Portable Fire Extinguishers*
4. NFPA 12, *Carbon Dioxide Extinguishing Systems*
5. NFPA 13, *Standard for the Installation of Sprinkler Systems*
6. *NFPA 13R, Standard for Sprinkler Systems in Residential Occupancies*
7. NFPA 14, *Standpipe and Hose Systems*
8. NFPA 15, *Water Spray Fixed Systems*
9. NFPA 17, *Standard for Dry Chemical Extinguishing Systems*
10. NFPA 17A, *Standard for Wet Chemical Extinguishing Systems*
11. NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection Service*
12. NFPA 22, *Water Tanks for Private Fire Protection*
13. NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances*
14. NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*
15. NFPA 30, *Flammable and Combustible Liquids Code*
16. NFPA 30A, *Motor Fuel Dispensing Facilities*
17. NFPA 30B, *Aerosol Products, Manufacture, and Storage*
18. NFPA 33, *Spray Application Using Flammable or Combustible Materials*
19. NFPA 34, *Dipping and Coating Processes Using Flammable or Combustible Liquids*
20. NFPA 37, *Stationary Combustion Engines and Gas Turbines*
21. NFPA 45, *Fire Protection for Laboratories Using Chemicals*
22. NFPA 51, *Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes*
23. NFPA 51B, *Cutting Welding and Other Hot Work*
24. NFPA 52, *Vehicular Fuel Systems*
25. NFPA 54, *National Fuel Gas Code*
26. NFPA 55, *Compressed Gases and Cryogenic Fluids*
27. *NFPA 56, Fire and Explosion Prevention During Cleaning and Purging of Flammable Gas Piping Systems*
28. NFPA 58, *Liquefied Petroleum Gas Code*
29. *NFPA 68, Explosion Protection by Deflagration Venting*
30. NFPA 70, *National Electrical Code*
31. NFPA 70E, *Electrical Safety in the Workplace*
32. NFPA 72, *National Fire Alarm Code*
33. NFPA 75, *Protection of Information Technology Equipment*
34. *NFPA 76, Standard for the Fire Protection of Telecommunications Facilities*
35. NFPA 77, *Static Electricity*
36. NFPA 79, *Electrical Standard for Industrial Machinery*
37. NFPA 80, *Fire Doors and Fire Windows*
38. NFPA 80A, *Recommended Practice for Protection of Buildings from Exterior Fire Exposures*
39. NFPA 85, *Boiler and Combustion Systems Hazards*
40. NFPA 86, *Oven and Furnaces*
41. NFPA 88A, *Parking Structures*
42. NFPA 90A, *Installation of Air-Conditioning and Ventilating Systems*
43. NFPA 90B, *Installation of Warm Air Heating and Air-Conditioning Systems*
44. NFPA 91, *Exhaust Systems for Air Conveying of Gases, etc.*
45. NFPA 92, *Standard for Smoke Control Systems*
46. NFPA 96, *Ventilation Control and Fire Protection of Commercial Cooking Equipment*
47. NFPA 99, *Health Care Facilities Code*
48. NFPA 101, *Life Safety Code*
49. NFPA 101A, *Alternative Approaches to Life Safety*
50. NFPA 102, *Grandstands, Folding and Telescoping Seating, Tents, and Membrane Structures*
51. NFPA 105, *Smoke Door Assemblies and Other Opening Protectives*
52. NFPA 110, *Emergency and Standby Power Systems*
53. NFPA 111, *Stored Electrical Energy Emergency and Standby Power Systems*
54. NFPA 115, *Laser Fire Protection*
55. NFPA 204, *Smoke and Heat Venting*
56. NFPA 211, *Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances*
57. NFPA 214, *Standard on Water-Cooling Towers*
58. NFPA 220, *Types of Building Construction*
59. NFPA 221, *Standard for High Challenge Fire Walls, Fire Walls and Fire Barrier Walls*
60. NFPA 232, *Protection of Records*
61. NFPA 241, *Standard for Safeguarding Construction, Alteration, and Demolition Operations*
62. NFPA 318, *Protection of Semiconductor Fabrication Facilities*
63. NFPA 400, *Hazardous Materials Code*
64. NFPA 472, *Standard for Professional Competence of Responders to Hazardous Materials Incident*
65. NFPA 473, *Standard for Competencies for EMS Personnel Responding to Hazardous Materials Incidents*
66. NFPA 484, *Standard for Combustible Metals*
67. NFPA 495, *Explosives Material Code*
68. NFPA 505, *Powered Industrial Trucks Including Type Designations, Areas of Use, Maintenance, and Operations*
69. NFPA 520, *Subterranean Spaces*
70. NFPA 654, *Prevention of Fire and Dust Explosions from Manufacturing Combustible Particulate Solids*
71. NFPA 664, *Fire and Explosions in Wood Processing and Woodworking Facilities*
72. NFPA 704, *Identification of Hazardous Materials*
73. NFPA 750, *Standard on Water Mist Fire Protection Systems*
74. NFPA 780, *Installation of Lightning Protection Systems*
75. NFPA 801, *Standard for Fire Protection for Facilities Handling Radioactive*
76. NFPA 820, *Fire Protection in Wastewater Treatment and Collection Facilities*
77. NFPA 853, *Stationary Fuel Cell Power Systems*
78. NFPA 901, *Standard Classifications for Incident Reporting and Fire Protection Data*
79. NFPA 914, *Fire Protection Historic Structures*
80. NFPA 1001, *Standard for Fire Fighter Professional Qualifications*
81. NFPA 1002, *Standard on Fire Apparatus Driver/Operator Professional Qualifications*
82. NFPA 1006, *Standard for Rescue Technician Professional Qualifications*
83. NFPA 1021, *Standard for Fire Officer Professional Qualifications*
84. NFPA 1026, *Standard for Incident Management Personnel Professional Qualifications*
85. NFPA 1041, *Standard for Fire Service Instructor Professional Qualifications*
86. NFPA 1051, *Standard for Wildland Firefighting Personnel Professional Qualifications*
87. NFPA 1071, *Standard for Emergency Vehicle Technician Professional Qualifications*
88. NFPA 1143, *Standard for Wildland Fire Management*
89. NFPA 1144, *Standard for Reducing Structure Ignition Hazards from Wildland Fire*
90. NFPA 1403, *Standard on Live Fire Training Evolutions*
91. NFPA 1404, *Standard for Fire Service Respiratory Protection Training*

92. NFPA 1407, *Standard for Training Fire Service Rapid Intervention Crews*
93. NFPA 1410, *Standard on Training for Initial Emergency Scene Operations*
94. NFPA 1451, *Standard for a Fire and Emergency Service Vehicle Operations Training Program*
95. NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*
96. NFPA 1521, *Standard for Fire Department Safety Officer*
97. NFPA 1561, *Standard on Emergency Services Incident Management System*
98. NFPA 1581, *Standard on Fire Department Infection Control Program*
99. NFPA 1582, *Standard on Comprehensive Occupational Medical Program for Fire Departments*
100. NFPA 1583, *Standard on Health-Related Fitness Programs for Fire Fighters*
101. NFPA 1584, *Standard on the Rehabilitation Process for Members During Emergency Operations and Training Exercises*
102. NFPA 1620, *Recommended Practice for Pre-Incident Planning*
103. NFPA 1670, *Standard on Operations and Training for Technical Search and Rescue Incidents*
104. NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments*
105. NFPA 1801, *Standard on Thermal Imagers for the Fire Services*
106. NFPA 1851, *Standard on Selection, Care, and Maintenance of Structural Fire Fighting Protective Ensembles*
107. NFPA 1852, *Standard on Selection, Care, and Maintenance of Open-Circuit Self-Contained Breathing Apparatus (SCBA)*
108. NFPA 1855, *Standard on Selection, Care, and Maintenance of Protective Ensembles for Technical Rescue Incidents*
109. NFPA 1901, *Standard for Automotive Fire Apparatus*
110. NFPA 1911, *Standard for Service Tests of Fire Pump Systems on Fire Apparatus*
111. NFPA 1912, *Standard for Fire Apparatus Refurbishing*
112. NFPA 1917, *Standard for Automotive Ambulances*
113. NFPA 1932, *Standard on Use, Maintenance, and Service Testing of Fire Department Ground Ladders*
114. NFPA 1936, *Standard on Powered Rescue Tool Systems*
115. NFPA 1951, *Standard on Protective Ensembles for Technical Rescue Incidents*
116. NFPA 1961, *Standard on Fire Hose*
117. NFPA 1962, *Standard for the Inspection, Care, and Use of Fire Hose, Couplings, and Nozzles and the Service Testing of Fire Hose*
118. NFPA 1963, *Standard for Fire Hose Connections*
119. NFPA 1964, *Standard for Spray Nozzles*
120. NFPA 1965, *Fire Hose Appliances*
121. NFPA 1971, *Standard on Protective Ensemble for Structural Fire Fighting*
122. NFPA 1975, *Standard on Station/Work Uniforms for Fire and Emergency Services*
123. NFPA 1977, *Standard on Protective Clothing and Equipment for Wildland Fire Fighting*
124. NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire and Emergency Services*
125. NFPA 1982, *Personal Alert Safety Systems*
126. NFPA 1983, *Standard on Fire Service Life Safety Rope and System Components*
127. NFPA 1989, *Standard on Breathing Air Quality of Fire and Emergency Services Respiratory Protection*
128. NFPA 1994, *Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents*
129. NFPA 1999, *Standard on Protective Clothing for Emergency Medical Operations*
130. NFPA 2001, *Clean Agent Fire Extinguishing Systems*
131. NFPA 2112, *Flame Resistant Garments for Protection of Industrial Personnel*
132. NFPA 2113, *Selection, Care, Use and Maintenance of Flame Resistant Garments for Protection of Industrial Personnel*

Appendix C
Functional Area Descriptions

C.1 Construction Safety

The purpose of the ORNL Construction Safety Program is to provide a framework for identifying and controlling the potential hazards associated with the execution of construction activities. The ORNL Construction Safety Program supports line management actions to provide workers with a safe and healthful work environment and maintain compliance with applicable worker safety and health requirements including 29 CFR 1926, *Safety and Health Regulations for Construction*. This is achieved by:

- Demonstrating management commitment to safety and health.
- Evaluating operations, procedures, facilities and equipment to identify hazards.
- Implementing hazard elimination and/or hazard control measures.
- Ensuring appropriate emergency response planning is performed to ensure the availability of rescue and treatment for injured workers.
- Training personnel to recognize hazards and to execute safe work practices.
- Maintaining appropriate documentation of injuries, exposures and abatement actions.

The Construction Safety functional area description applies to activities which are DOE-funded construction projects subcontracted to provide remodeling, demolition or new construction services.

For DOE-funded construction subcontracts, the environmental, safety, and health expectations are formally communicated to construction subcontractors in contract terms, conditions and specifications. The Acquisition Management System Description describes the procedures and guidance for purchasing supplies and services including identifying health and safety requirements in Subcontract Technical Specifications. The latest version of the ORNL Terms and Conditions for Construction are incorporated into each subcontract and are available from the Procurement web site. Health and safety requirements are determined from the scope of work to be performed, the identification of hazards and controls to be implemented are reviewed by an organization-specified health and safety reviewer to ensure appropriate requirements are included. The construction subcontractor may be required to submit an H&S program for approval by ORNL or adopt a project-specific health and safety program already approved.

Construction subcontractor requirements for activity-level hazard analysis, making employees aware of hazards and protective measures prior to beginning work, worker acknowledgement of awareness and disciplinary process are implemented through the contract requirements. . If unanticipated hazards are encountered during the construction process and immediate corrective actions are not possible, the construction contractor will immediately notify affected workers, post appropriate warning signs, implement needed interim control measures, and notify the construction manager of the action taken. Technical support for the development of activity or job hazard analysis is provided for by the Worker Safety and Health Management System. The analysis of operations and procedures that include assessment and documentation of worker exposure to chemical, physical, biological, and safety workplace hazards through appropriate monitoring are key elements of a hazard identification and assessment process.

As part of the construction safety process, the construction subcontractor designates a person to be responsible for enforcement of safety rules and regulations. This person shall have the experience and authority to stop work if the safety and health of a worker is in danger. The designated person shall also perform and document safety inspections and facilitate the correction of safety deficiencies.

C.2 Fire Protection

The ORNL Fire Protection (FP) Program provides a comprehensive fire safety and emergency response program to protect worker safety and health. This includes appropriate facility and site-wide fire protection; fire alarm notification and egress features; facility assessment program; fire protection inspection, testing and maintenance program; and access to a fully staffed, trained, and equipped emergency response organization that is capable of responding in a timely and effective manner to ORNL emergencies.

All ORNL work activities covered under this Worker Safety and Health program description are subject to the provisions of the ORNL Fire Protection Program. Service subcontractors performing work at ORNL must comply with this program as outlined in the terms and conditions of their contract with UT-Battelle. The ORNL Fire Protection Program is also applicable to the operational aspects of UT-Battelle leased facilities. Jurisdiction for leased facilities remains with the local municipality or code enforcement authority.

The elements of the fire protection program are described in the Fire Protection, Prevention and Control Subject Area. Specific requirements can be found in the SBMS Subject Area for Fire Protection, Prevention, and Control and other Subject Areas including Emergency Preparedness and Response, Spill Response and Discovery of Shock Sensitive Materials, and Welding, Burning, and Hot Work. Procedures within these Subject Areas are used to implement these requirements. The ORNL Fire Department has developed and follows a set of Operating Procedures and Work Instructions to further implement the associated requirements.

A listing of the generally applicable codes and standards for worker safety and health in the area of fire safety is provided in Appendix B. It should be noted that the applicability of NFPA codes and standards is determined based on specific facility conditions and operations. Therefore, the list of generally applicable codes and standards does not apply universally across all ORNL facilities. The ORNL Fire Protection Engineering organization, in conjunction with the ORNL AHJ, makes determinations on the application and implementation of NFPA codes and standards consistent with the scope and applicability provisions of each code and standard.

A code of record has not been established for a vast majority of ORNL's pre-1997 facilities. Many ORNL facilities are decades old and have undergone modifications to support changes and focus of various DOE missions. Without having a defined code of record for many facilities, ORNL has elected to apply the chemical limits [Maximum Allowable Quantities (MAQs)] associated with "current" operational codes to the extent practicable. ORNL established the 1999 Standard Building Codes along with applicable NFPA Codes the baseline code requirements for setting chemical inventory limits for all existing facilities that do not have a defined code of record. The currently applicable edition of the International Building Code along with applicable NFPA Codes and Standards as adopted in the UT-Battelle Work Smart Standards will be implemented as the baseline (Code of Record) for new and future facilities and for facilities or portions thereof undergoing major modification.

ORNL has one existing DOE Approved Exemption that falls within the scope of worker safety and health. It deals with a means-of-egress issue where the common path of travel is in excess of the code permitted distance. Based on discussions with DOE OSO, it was determined that the nature of this exemption is deemed de minimis in the context of compliance with 10 CFR 851 and therefore will not be reprocessed as 10 CFR 851 variances. All known and previously approved existing Exemptions and Equivalencies associated with the Fire Protection Program at ORNL are available for annual review.

See Appendix H for a summary of the variance applications submitted for Fire Protection requirements contained or referenced in 10 CFR 851.

C.3 Explosives Safety

The purpose of the ORNL Explosives Safety Program is to provide a framework for identifying and controlling the potential hazards with the handling, storage, and use of explosives. The ORNL Explosives Safety Program supports line management actions to provide workers with a safe and healthful work environment and maintain compliance with applicable worker safety and health requirements. However, the ORNL explosives-related activities are such that a comprehensive explosives site plan is not warranted.

Explosive safety requirements at ORNL apply to activities in the R&D environment involving potential exposure to explosives during the conduct of planned work. Unlike many of the typical industrial hazards that are more common to the ORNL work environment, the use of explosive material or components/devices containing explosives is both uncommon and infrequent. While there are other activities, e.g., construction or maintenance-related, security, etc., that may require the use of explosives/explosive-containing devices; their use is even less frequent than those for R&D. ORNL has developed a process for the safe receipt, storage and use of explosives.

Work Control subject area establishes the framework of implementing ISM principles through required procedures for managing and controlling work at ORNL. Two of the three listed categories of work (i.e. M&O, and R&D), encompass employee's activities involving potential exposure to a wide range of hazards, but specifically include the use of explosives.

In the event an activity will require the use of or possible exposure to explosives/explosive materials, information concerning all of the required program elements is provided in the Subject Area for Explosives. The applicable OSHA, NFPA, and other related standards provide the underlying foundation for the program, with the bulk of those requirements contained in the various exhibits. An added, yet notable feature of the program is a front-end "hold-point" that requires pre-review and approval by site Security, Transportation Safety, and Safety representatives to obtain explosives for a specified use even before the material can be ordered and brought on site.

C.4 Pressure Safety

The purpose of the ORNL Pressure Safety Program is to ensure that pressure systems are designed, fabricated, tested, inspected, maintained, repaired, and operated by trained and qualified personnel in accordance with applicable and sound engineering principles. ASME Boiler and Pressure Vessel Code and applicable ASME B31 provide the underlying foundation for the pressure vessel program elements. For pressure systems not falling under the ASME codes, measures to provide equivalent protection and ensure a level of safety greater than or equal to the level of protection afforded by the ASME or applicable state or local code are to be used.

This functional area description applies to both activities in M&O and R&D involving pressure systems. The pressure systems can be stand-alone systems or integral to a larger operational system or manufactured component. These systems are often designed and fabricated on-site or purchased as fabricated components or manufactured products.

The Subject Areas for Pressure System Safety and Pressure Vessels and Related Components provides the framework for implementing the ORNL Pressure Safety Program. Procedures describe the process for designing, testing, acquiring, installing, operating, maintaining, inspecting, repairing or altering, reactivating and removing from service pressure systems, vessels and components. The ASME B31 series codes applicable to infrastructure related pressure system designs are referenced in the Design Subject Area.

ORNL research activities occasionally require the purchase of machines and equipment which contain integrated pressure vessels manufactured to the European Union Pressure Equipment Directive (EU PED) which is considered equivalent to the ASME Boiler and Pressure Vessel Code. ORNL accepts these vessels as meeting the requirements of 10 CFR 851 Appendix A, Section 4(c).

See Appendix H for a summary of the variance application submitted for Pressure Safety requirements contained or referenced in 10 CFR 851.

C.5 Firearms Safety

The Worker Safety and Health Rule provides that "a contractor engaged in DOE activities involving the use of firearms must establish firearm safety policies and procedures for *security operations*, and training to ensure proper accident prevention controls are in place." [Emphasis added.] UT-Battelle does not have contractual responsibility for security operations at ORNL that involve the use of firearms. Another DOE prime contractor to DOE OSO is responsible for security operations at ORNL that involve the use of firearms.

While the Rule requires the DOE contractors responsible for security operations to have a program that meets 10 CFR § 851, Appendix A. Section 5, it is silent on the occasional use of firearms in research and development. The Preamble to the Final Rule does note that the "other use of firearms for research (e.g., material testing) or for activities like the capture and study of wildlife, also could create conditions that warrant the application of Appendix A section 5(a) firearms safety provisions." Research and development activities at ORNL occasionally involve the use of firearms solely for research purposes. However, the activities are such that a firearms safety program required by Section 5(a) is not warranted.

The Work Control subject area establishes the framework for implementing firearms safety requirements for research activities at ORNL. In order for firearms to be used in R&D activities at ORNL, the hazard analysis is required to contain several elements of reviews and approvals, e.g. a division-level procedure specific to the planned use of the firearm(s), a reference to the applicable requirements in the Explosives subject area, and a completed and authorized "Explosives Request Authorization",

Form ORNL-153. Additionally, any division-level procedure governing the non-security use of a firearm for R&D activities is required to address safety concerns/issues, and the required type/level of personal protective equipment (PPE) and hazard controls.

C.6 Industrial Hygiene

The ORNL Industrial Hygiene (IH) Program reduces the risk of work related disease or illness through proactive anticipation, recognition, evaluation and control of workplace environmental hazards or stresses. The IH Program supports line management actions to provide staff and visitors with a safe and healthy work environment and maintain compliance with applicable worker safety and health requirements.

Work activities covered under this WSHP document are subject to the provisions of the ORNL IH program. Subcontractors performing work at ORNL must comply with this program as outlined in the terms and conditions of their contract with ORNL.

The Industrial Hygiene Program Description describes the purpose and implementation of IH program elements at the laboratory. The IH program captures the following eleven elements :

- Initial or baseline surveys of all work areas or operations to identify and evaluate potential worker health risks.
- Provide support to planning and design personnel for new/modified facilities and work operations to anticipate and control health hazards associated with proposed facilities and operations.
- Initiate periodic resurveys and/or exposure monitoring as appropriate.
- Conduct/document exposure assessment for chemical, physical (non-radiological), and biological agents/stressors using peer recognized exposure assessment methodologies and use of American Industrial Hygiene Association accredited industrial hygiene laboratories.
- Develop and provide Line Management with recommendations for appropriate engineering, administrative, work practice, and/or personal protective control methods to limit hazardous exposures to acceptable levels.
- Worker education, training, and involvement.
- Multi-disciplinary involvement with occupational medical, environmental, health physics, and work planning professionals.
- Use of respiratory protection equipment tested under the DOE Respirator Acceptance Program when National Institute for Occupational Safety and Health-approved respiratory protection does not exist for DOE tasks.
- Procedures to mitigate the risk from identified and potential occupational carcinogens.
- Use of appropriate industrial hygiene standards.
- Professionally and technically qualified industrial hygienists to manage and implement the industrial hygiene program.

Program elements are implemented through a number of subject areas such as Chemical Safety, Respiratory Protection, and Lasers as indicated in the crosswalk matrix in Appendix A.

Due to the dynamic nature of R&D and support activities at ORNL, line management with support from health and safety professionals, utilize the Work Control Subject Area to evaluate proposed work activities and make a determination if exposure monitoring is required. Many areas of the laboratory have used the Work Control documentation as a formal baseline survey to document exposure data. The laboratory is using a documented risk-based approach to determine if additional exposure monitoring is required.

C.7 Biological Safety

The ORNL Biological Safety Program defines requirements for performing work that involves biological hazards including research with biological etiological agents. The ORNL Institutional Biosafety Committee (IBC) is established by ORNL under the Biohazards Subject Area as a special purpose committee instituted in response to the *National Institutes of Health (NIH) Guidelines for Research Involving Recombinant DNA Molecules* (NIH Guidelines, 59 CFR 34496, July 5, 1994, and subsequent amendments) and pertinent DOE requirements. The membership of the Institutional Biosafety Committee (IBC) meets the requirements set forth in Section IV-B-2-a-(1) of the NIH Guidelines, including members from the public. In addition to the membership defined by the NIH Guidelines, the ORNL IBC includes a member of the DOE site or field office staff.

The ORNL IBC participates in the review and development of requirements and instructions set forth in the Biohazards Subject Area for working with biological materials and provides review, approval, and oversight of biological research activities that are Risk Group 2 and above. Research activities at ORNL that fall under the purview of the IBC include but are not limited to areas such as recombinant DNA; use of Risk Group 2, 3, or 4 biological etiologic agents; and select agent and toxin research. Work with biological etiological agents is a subset of the research activities reviewed and approved by the ORNL IBC. ORNL is not currently authorized by any regulatory agency or by DOE to perform work with Risk Group 3 or 4 agents or toxins.

The ORNL IBC uses a graded approach to perform review, approval, and oversight of the following:

- Projects involving recombinant DNA in accordance with the responsibilities defined in NIH Guidelines, Section IV-B-2, *Institutional Biosafety Committee.*
- Projects involving the use of Risk Group 2, 3, or 4 biological etiologic agents, for compliance, as applicable, with appropriate Centers for Disease Control (CDC) and Prevention, NIH, World Health Organization (WHO), and other international, federal, state and local guidelines in accordance with 10 CFR 851.
- Projects involving select agents and toxins, as defined by 42 CFR 73 *, Possession, Use and Transfer of Select Agents and Toxins* , Final Rule, (March 18, 2005) and 7 CFR 331 and 9 CFR 121, *Agricultural Bioterrorism Protection Act of 2002, Possession, Use and Transfer of Biological Agents and Toxins,* Final Rule (March 18, 2005).

The IBC review process includes a formal, documented review of all submitted protocols for compliance, as applicable, with requirements specified in Section III, *Experiments Covered by NIH Guidelines,* of the NIH Guidelines and relevant CDC and WHO guidelines. The IBC reviews each research protocol, determines appropriate requirements within published guidelines, and evaluates compliance. Each project review includes an independent assessment performed by the IBC of the appropriate containment levels, procedures, facilities, practices, training, and expertise of personnel involved in recombinant DNA research or research with biological etiologic agents. IBC approval of research protocols and activities which fall under the purview of the IBC is required prior to start of work. In an additional screening measure, through the hazard analysis process, the IBC Chair and the IBC security subject matter expert perform a review of all hazard analyses that indicate planned research activities will include select agents and toxins, dead or alive. Additional biological research activities that do not require IBC review or approval are screened and reviewed through the ORNL Research Hazard Analysis and Control System and Research Safety Summaries. These include research with Risk Group 1 biological materials or recombinant DNA activities that are exempt from IBC review per Section III-F, Exempt Experiments, of the NIH Guidelines.

The ORNL Occupational Medicine program follows CDC guidelines and recommendations concerning immunizations and evaluates personal medical conditions unique to each individual as part of the evaluation of risk and benefit of immunization and medical surveillance of research staff. The IBC conducts periodic laboratory tours as part of the start-up review process for projects

C.8 Occupational Medicine

The ORNL Occupational Medicine Program is designed to assist management in protecting staff from health related work hazards and applying preventive medicine measures toward the optimal health of staff through professional medical evaluation, treatment, and guidance.

The ORNL Occupational Medicine Program provides occupational medicine services to UT-Battelle employees in accordance with the requirements of 10 CFR 851, Appendix A.8. *Occupational Medicine* including services to:

- Ensure the good health of UT-Battelle employees and their placement in work they can perform with an acceptable degree of efficiency without endangering the health and safety of themselves or others.
- Provide professional guidance in matters of occupational health and safety. Aid in protecting individual's health in work carried out at ORNL.
- Promote medical care and rehabilitation of ill or injured employees.

Subcontractors are responsible for providing occupational medical services to their employees as specified in 10 CFR 851, Appendix A, Section 8, *Occupational Medicine*. Opinions stated by the DOE Office of General Counsel have clarified that DOE prime contractors are not required to flow down requirements contained in 10 CFR 851 to their subcontractors. However, UT-Battelle has determined that for ORNL subcontractors to successfully implement the requirements for a comprehensive occupational medicine program requires that we facilitate through specifications in the terms and conditions of their subcontract with ORNL. Coordination with the ORNL health and safety program, including occupational medicine, occurs when appropriate to ensure that important health and safety data is shared as necessary. UT-Battelle performs oversight of subcontractor performance to the terms and conditions in accordance with contract clauses.

Implementation of the ORNL Occupational Medical Program is the responsibility of the ORNL Site Occupational Medical Director (SOMD). The SOMD has developed and implemented a written Occupational Medical Program Plan detailing the methods and procedures used to implement the program requirements in accordance with 10 CFR 851, Appendix A, Section 8, *Occupational Medicine*. The SOMD also serves as the medical director for the ORNL Emergency Medical Service (EMS) provided by the fire department. The program requirements are detailed in the Occupational Medicine Program Description.

See Appendix H for a summary of the variance application submitted for Occupational Medicine requirements contained or referenced in 10 CFR 851.

C.9 Motor Vehicle Safety

The ORNL motor vehicle safety program is implemented primarily through the Vehicles, Managing and Commercial Motor Vehicle Subject Areas. The ORNL motor vehicle safety program ensures compliance through the following program elements:

- Licensing and Operator Qualifications
- Operation Requirements
- Vehicle Maintenance
- Accident/Incident Reporting
- Enforcement Provisions

The program applies to drivers and passengers in government-owned or leased motor vehicles and powered industrial equipment (i.e., fork trucks, tractors, platform lift trucks, and other similar specialized equipment powered by an electric motor or an internal combustion -engine). The motor vehicle safety program is tailored to motor vehicle operations and activities performed by ORNL staff. This program addresses minimum licensing requirements, use of seat belts and other safety devices, training for specialty vehicle operators, requirements for motor vehicle maintenance and inspection, uniform traffic and pedestrian control devices and road signs, speed limits and other traffic rules, awareness campaigns and incentive programs and enforcement provisions.

C.10 Electrical Safety

The ORNL Electrical Safety Program provides a framework for identifying and controlling electrical hazards that are present in the workplace. The applicable OSHA, NFPA, and other related design and testing standards provide the underlying foundation for those electrical program elements. The electrical safety program applies to activities in M&O, R&D, and the office environment involving potential exposure to electrical hazards.

The Work Control subject area establishes the framework for implementing electrical safety at ORNL. Information concerning electrical safety, rules, and work practices are addressed by the Electrical Safety and Lockout/Tagout (LO/TO) Subject Areas. Within the Lockout/Tagout and Electrical Safety Subject Areas reside individual procedures containing required steps and information to help staff identify and protect themselves from electrical hazards. At ORNL the preferred method for controlling electrical (and other) forms of hazardous energy is by completely de-energizing or releasing the stored energy once an isolation point(s) are identified. The Electrical Safety subject area provides requirements for those cases where pre-job planning determines that electrical hazards cannot be eliminated (by a LO/TO, complete outage, etc.). Provisions for controlling hazards in the performance of on or near energized work are outlined in a dedicated procedure with emphasis placed on analyzing and controlling potential shock and arc-flash hazards, along with the proper type/level of PPE and associated work controls. A new procedure for inspecting and approving non-listed electrical equipment has been added to the Electrical Safety subject area. The emphasis of this procedure is establishing and maintaining a process where employees who have received training developed by Underwriters Laboratories, Inc. (UL) will inspect electrical equipment to determine its listing and continued use.

The ORNL Chief Engineer is designated as the ORNL Code Authority and has the responsibility for appointing the ORNL AHJ. The ORNL Electrical AHJ has the responsibility for making interpretations of the National Electrical Code (NEC) rules, for deciding on the approval of equipment and materials, and for granting the special permission contemplated in a number of the NEC rules. The AHJ may waive specific requirements in the NEC or permit alternative methods where it is assured that equivalent objectives can be achieved by establishing and maintaining effective safety. In such event that new products, construction, or materials not available at the time the NEC is adopted and need to be used, the AHJ may permit the use of the products, construction methods, or materials that comply with the most recent edition of the NEC. The ORNL Electrical AHJ consults with the DOE OSO Electrical AHJ as appropriate.

Appendix D
List of Offsite and Leased Facilities

Regardless of the location of these facilities, activities and operations conducted by ORNL in these facilities will be in accordance with ORNL's worker safety and health program. Work performed by ORNL employees in these facilities will be done in accordance with ORNL's Work Planning and Control Management System. However, consistent with DOE guidance, construction work performed by the building landlord, including tenant improvements, is not covered under ORNL's worker safety and health program or 10 CFR 851.

Facility	**ORNL Activities**
Buildings 9201-2 at the Y-12 National Security Complex	Former research facility. Currently, minimal staff occupancy.
American Museum of Science and Energy	Public science and energy museum.
1055 Commerce Park Drive, Suite 100	International Thermonuclear Experimental Reactor (ITER) Program
Building 2040 (1100 Bethel Valley Road) National Energy Security Center	Offices

115 Union Valley Road	Shipping and Receiving, Surplus Sales, ITER Storage
115 Coal Yard Road	Excessing and Surplus Sales
National Transportation Research Center (NTRC)	Transportation research and development
National Transportation Research Center II (NTRC II) 2370 Cherahala Drive	Transportation research and development
Joint Institute for Computational Sciences (JICS) (5100)	Computational science laboratories, offices, conference areas
Joint Institute for Biological Sciences (JIBS) (1520)	Laboratories, offices
Joint Institute for Heavy Ion Research (6008)	Offices, conference areas
Joint Institute for Neutron Sciences (JINS) (8630)	Laboratories, offices
Multi-program Research Facility* (5300)	Computational sciences, offices, light laboratories
Computational Sciences Facility* (5600)	Offices, computing space
Research Office Building* (5700)	Offices
Engineering Technology Facility* (5800)	Materials and Engineering research
Office of Scientific and Technical Information (OSTI) 1 Science.gov Way Oak Ridge, TN	Records storage, Records Retention, ORNL Data Center, NTRC Bay 4
102 Grand 104 NE 3rd Street, Suite 2008 Grand Rapids, MN	Energy and Environmental Sciences Directorate laboratories and offices
93 Palladium Way Oak Ridge, TN	Carbon Fiber materials research
Grove Center Storage (121 Robertsville Road, Oak Ridge, TN)	Storage
Spruce Project Field Trailer	Office, Storage
1362 Yarnell Station Blvd, Knoxville, TN	Residential home (energy research)
Battelle Memorial Institute	Washington and Arlington Offices
Hardin Valley Storage 10241 Hardin Valley Rd.	NTRC Storage
2040 Parking Lot	Gravel Parking Area

Appendix E
Closure Facility Hazards Identification

In accordance with 10 CFR 851.21 (b), ORNL has established a process both to identify closure facility hazards and controls, and to submit to DOE closure facility hazards and controls within 90 days of identifying those hazards. This provision provides ORNL flexibility in addressing hazards in facilities that are or will be permanently closed, demolished or subject to title transfer. DOE defines a Closure Facility as “a facility that is non-operational and is, or is expected to be permanently closed and/or demolished, or title to which is expected to be transferred to another entity for reuse.”

When ORNL determines that a facility is classified as excess and is considered a closure facility, the Excess Facilities Manager plans for and manages the facility per the requirements of SBMS and other applicable requirements. A newly identified closure facility will be initially assessed for hazards and an ongoing Surveillance and Maintenance (S&M) Plan will be developed for the facility. Each closure facility will be reviewed periodically as appropriate to document changes in the facility's condition and for the identification of hazards around or within the facility. The Excess Facility Assessment Checklist is used to document the results of walk-downs. Team members prior to conducting facility walk-downs will review the previous walk-down checklists. Any mitigation or management action previously implemented will be revisited and confirmed as being effective, adequate, or still necessary. Applicable ES&H and work control requirements will be followed during these facility reassessments or during other entries into the facilities. It is the responsibility of the Excess Facilities Manager to commission and organize a multi-discipline team consisting of all necessary personnel to address the requirements.

In general, the facilities will be posted and entry will be controlled using job specific hazard controls applied through the SBMS work control process. Each facility may have several hazards identified, which require mitigation or management. A list of typical hazards found in excessed facilities is in the table below. These hazards can be classified into four categories: physical hazards, chemical hazards, radiological hazards, and biological hazards.

Typical Hazard Found in Closed Facility	General measures for all excess facilities is to control access through locked doors, signage, and flagging to prevent entry by the general site population
Physical Hazards	
Lighting and emergency lighting out of service	If all areas to be accessed do not have adequate light, appropriate compensatory measures will be taken.
Tripping hazards	Uneven floor surfaces, tie-down bolts from removed equipment, and other tripping hazards may exist. Administrative and physical controls will be used to mitigate tripping hazards.
Ventilation system is out of service	• For entry into confined spaces, ORNL Directives and Guidance for confined space entry will be followed. • Appropriate work controls will be established in provide facility ventilation if required for maintenance functions.
Fire exit doors may be blocked or stuck. Exits are not marked with lighted exit signs	Appropriate work controls will be established to provide egress paths and lighting.
Fire alarm and suppression systems are out of service, and fire extinguishers removed	In the event of a fire normal response will occur by calling the ORNL emergency telephone number at 911 for fixed phones (call Y-12 PSS or ORNL LSS for cellular phones). Appropriate work controls will be established for maintenance functions within a facility.
Facility activity, fire loading, and chemical inventory limits	Prior to placing a facility into the excess category, ORNL Space Return Criteria will be met which specifies requirements for vacating a space.
Evidence of water intrusion, structural damage or degradation	Appropriate work controls will be specified prior to entry to mitigate hazards associated with structural damage.
Remote/seldom visited location	Appropriate compensatory measures will be taken to assure safety of personnel entering excess facilities at remote locations.
Chemical Hazard	
Potential Beryllium (Be), Lead (Pb), asbestos, and cadmium (Cd) contamination	Appropriate work controls will be established when performing maintenance in areas where chemical hazards exist.
Radiological Hazard	
Radiological Hazards	All radiological areas are posted. Posted radiological areas will not be entered without an approved Work Plan specifying radiological controls.
Biological Hazard	
Biological hazards from insects, birds, rodents, snakes, and animals	The facility will be posted to prevent unapproved access. Activities performed in the facility will be controlled per the SBMS work control process.

Roles and Responsibilities

When facilities are identified as Closure Facilities, they will be added to the list and an initial assessment will be conducted to evaluate the facility for hazards. Should new hazards be identified, 10 CFR 851 requires the contractor to submit to the Head of the DOE Field Element a list of the closure facility hazards and proposed controls within 90 days. Walk-downs on excess facilities will be conducted as appropriate based on facility conditions and hazards. The Excess Facilities Manager will determine the frequency of surveillance walk-down requirements for each facility. Follow up walk-downs are conducted using a graded approach based on the initial assessment. Work plans will be developed to mitigate and/or manage hazards; for most excess facilities this means controlling access to the facility. With access control, the closure facility hazards only pose a risk to workers who have a need to access the facility (such as annual S&M activities). The hazards for these workers will be controlled by using the site's work control process. For large or complex facilities; walk-downs will be conducted with a multi-discipline team including any ES&H personnel necessary for identifying any new hazards and assuring the safety of the public, ORNL employees, and the environment.

A current listing of excess facilities, closure facilities, annual work plan requirements, actions associated with planned facility assessments, and newly identified hazards will be maintained by the Excess Facilities Manager.

Appendix F
DOE-Approved Worker Safety and Health-Related Equivalencies and Exemptions Granted Prior to Promulgation (February 9, 2006) of 10 CFR 851

Request Number (Yr-Bldg-No.-Type-Desc*)	Approval Date	Building / Area	Title
1995-6000-01-EX-LS	03-10-95	6000	Common Path of Travel in Room C-109
1994-3025M-01-EQ-LS	05-23-94	3025M	NFPA 101, *Life Safety Code*

			Means of Egress Arrangement from the Second & Third Floors NFPA 101, *Life Safety Code*
2003-1005-01-EQ-LS, FDA	10-24-03	1005	Automatic Shutdown of Induct Smoke Detectors NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilation Systems*

Appendix G
Coordination Agreements with other DOE Prime Contractors[1]

Coordination Agreement Number	Parties	Title of Agreement
CA-UTB-2015045	North Wind Solutions, LLC	Implementation of 10 C.F.R. Part 851, Worker Safety and Health Program
CA-UTB-2013014	National Strategic Protective Services, LLC (NSPS) and UT-Battelle, LLC	Implementation of 10 C.F.R. Part 851, Worker Safety and Health Program
CA-UTB-2013015	Halcyon, LLC and UT-Battelle, LLC	Implementation of 10 C.F.R. Part 851, Worker Safety and Health Program
TBD	Consolidated Nuclear Services, LLC (CNS)	Under review.
CA-UTB-2007020	Isotek Systems, LLC and UT-Battelle, LLC	Implementation of 10 C.F.R. Part 851, Worker Safety and Health Program
CA-UTB-2011-001	URS/CH2M Oak Ridge, LLC and UT-Battelle, LLC	Implementation of 10 C.F.R. Part 851, Worker Safety and Health Program
CA-UTB-2009016	Johnson Controls, Inc. and UT-Battelle, LLC	Implementation of 10 C.F.R. Part 851, Worker Safety and Health Program
CA-UTB-2009073	Oak Ridge Associated Universities (ORAU)	Implementation of 10 C.F.R. Part 851, Worker Safety and Health Program

[1]Additional changes to this list of prime contractors are expected over the next few years. The complete set of coordination agreements is maintained by the UT-Battelle Prime Contracts Division and available upon request.

Appendix H
Summary of Variance Requests

Title Of Variance Request	Type Of Variance	Scope Of Variance	Rationale For Variance
Inspection of Pressure Vessels per ASME Boiler and Pressure Vessel Code	Temporary	The American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code does not have an "equivalency" process as established and recognized in many of the National Fire Protection Association (NFPA) standards. Unlike the NFPA, the ASME Boiler and Pressure Vessel Code does not provide the implementation flexibility that permits the use of alternate methods where alternate methods provide equivalent protection. Therefore, UT-Battelle, LLC (UT-Battelle) is seeking a temporary variance from the following sections of 10 CFR 851 for inspection of pressure vessels at Oak Ridge National Laboratory (ORNL): 10 CFR 851.27(b)(7), ASME Boiler and Pressure Vessel Code (2004)	When UT-Battelle assumed operational responsibility for ORNL, only the AMSE Boiler and Pressure Vessel Code Section VIII was included in its Prime Contract No. DE-AC05-00OR22725 with the Department of Energy. (DOE) The portion of DOE Order 440.1A on pressure safety was not included in the ORNL prime contract. A comprehensive pressure vessel safety program did not exist at ORNL. An Implementation Plan was developed by UT-Battelle in early 2004 to implement the new contract requirements and establish a comprehensive pressure vessel safety program. All actions identified in the action plan have been completed and a letter to cancel this variance request was submitted to the DOE on May 10, 2013.

		10 CFR 851 Appendix A(4)(b)(1), ASME Boiler and Pressure Vessel Code (2004)	
Chemical Inventories and Fire Barriers in Buildings 4500N and 4500S	Temporary	UT-Battelle is seeking a variance request from the following 10 CFR 851 standards for chemical inventories and fire barriers in Buildings 4500N and 4500S at Oak Ridge National Laboratory (ORNL): 10 CFR 851.Appendix A.2, *Fire Protection.* Applicable codes and standards in this area include: • NFPA 1, *Uniform Fire Code* (specifically see Chapter 60), • NFPA 45, *Standard on Fire Protection for Laboratories Using Chemicals* • NFPA 55, *Standard for the Storage, Use, and Handling of Compressed Gases and Cryogenic Fluids in Portable and Stationary Containers, Cylinders, and Tanks* • NFPA 80, *Standard for Fire Doors and Fire Windows* • NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems* • Standard Building Code (and Standard Fire Prevention Code), 1999 (for existing/aging facilities) • International Building and Fire Codes, (for new/future construction and major modifications)	Many of the facilities at ORNL were constructed during the 1950s, including Buildings 4500N and 4500S. Over the years, Buildings 4500N and 4500S have been used to house a variety of research divisions. Modifications have been made to both buildings in the past 50 years to accommodate changes in research mission. Configuration control of all changes has not been maintained. Hence, fire barriers have not been maintained to establish defined hazardous material control areas in accordance with applicable building codes. Research laboratory quantities of a diverse range of chemicals and other potentially hazardous materials have always been used in Buildings 4500N and 4500S Current research projects continue to use chemicals, but generally, in reduced quantities. Chemical inventories are required to be maintained within limits or maximum allowable quantities as defined by applicable building and fire codes and referenced standards. Fire barriers are required to be maintained and are often integral to managing chemical inventories. Funding was secured and a new research facility (Building 4100) was constructed to house many of the research operations previously located in Buildings 4500N and 4500S. The 2011 occupancy of Building 4100 has provided much needed laboratory and chemical storage capacity and is providing options for the remaining chemical users in Buildings 4500N and 4500S. Renovation plans for these facilities are coordinated to address chemical management issues and fire barrier deficiencies. While relocating some operations to Building 4100 has resulted in significant improvement related to the chemical inventory issue, the temporary variance request continues to be needed until associated reuse plans are completed and implemented. Fire barrier deficiencies and the remaining chemical exceedances will be addressed as the referenced reuse plans are finalized and funded.
Chemical Inventories and Fire Barriers in Balance of Laboratory Buildings	Temporary	UT-Battelle is seeking a variance request from the following 10 CFR 851 standards for chemical inventories and fire barriers in Balance of Laboratory Buildings at ORNL: 10 CFR 851. Appendix A.2, *Fire Protection.* Applicable codes and standards in this area include: • NFPA 1, *Uniform Fire Code* (specifically see Chapter 60), • NFPA 45, *Standard on Fire Protection for Laboratories Using Chemicals* • NFPA 55, *Standard for the Storage, Use, and Handling of Compressed Gases and Cryogenic Fluids in Portable and Stationary Containers, Cylinders, and Tanks* • NFPA 80, *Standard for Fire Doors and Fire Windows* • NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems* • Standard Building Code (and Standard Fire Prevention Code), 1999 (for existing/aging facilities)[1] • International Building and Fire Codes, (for new/future construction and major modifications)	Many of the facilities at ORNL were constructed during the 1950s. Modifications have been made to most buildings in the past 50 years to accommodate changes in research mission. Configuration control of all changes has not always been maintained, fire barriers have not been fully maintained in accordance with applicable building codes and hazardous material control areas were not always defined or maintained. Research laboratory quantities of chemicals and other potentially hazardous materials have been used in many of the Balance of Laboratory buildings and are still needed for today's research operations. Chemical inventories are required to be maintained within limits or maximum allowable quantities as defined by applicable building and fire codes and referenced standards. Fire barriers are required to be maintained to help ensure hazardous material control areas are established and defined for the storage of chemical inventory. UT-Battelle assumed management responsibility for ORNL in April 2000 and has since determined that legacy issues exist related to compliance with these codes and standards. A campus-wide revitalization effort was undertaken that includes the construction of new facilities that meet current standards, as well as efforts to bring legacy facilities into compliance. For Balance of Laboratory buildings that are not being replaced, a three-phased project plan has been developed to bring the fire barriers in these facilities into compliance with 10 CFR 851, Appendix A.2, Fire Protection. Phase I of the project is complete and included the identification of required fire barriers and the distribution of building drawings that clearly show the location and fire resistance rating of the fire barriers. Phase II was completed in 2012 and included the performance of a thorough condition assessment of all required fire barriers and the issuance of a Fire Barrier Condition Assessment Report (FBCAR) for each building. The FBCARs documented the status of each required fire barrier and associated components. Phase III is the

			recurring inspection, testing and maintenance of fire barriers in 106 facilities. The Phase III effort was implemented in April 2009 in accordance with the ORNL SBMS Implementation Plan. The temporary variance request from the relevant requirements in 10 CFR 851 continues to be needed as planned (through 2018) as major fire barrier deficiencies and the remaining chemical inventory exceedances are prioritized and addressed.
Flow Down of Occupational Medicine Requirements to Subcontractors	Permanent	UT-Battelle is seeking a permanent variance from the Occupational Medicine requirements for ORNL subcontractors contained in Appendix A to 10 CFR 851 - Worker Safety and Health Functional Areas. Appendix A, Section 8, Occupational Medicine contains extensive requirements for establishing and providing comprehensive occupational medicine services to workers employed at a covered work place who: (1) work on a DOE site for more than 30 days in a 12-month period; or (2) are enrolled for any length of time in a medical or exposure monitoring program required by this rule and/or any other applicable Federal, State or local regulation or other obligation. The specific requirements within Appendix A.8 which UT-Battelle seeks relief from flow down to subcontractors are: • 8(d) including 8(d)(1), 8(d)(1)(i), 8(d)(1)(ii), 8(d)(1)(iii), 8(d)(1)(iv) • 8(d)(2) • 8(d)(3) • 8(d)(4) • 8(e) • 8(e)(2) • 8(h) • 8(i) • 8(j) • 8(j)(1) • 8(j)(2) • 8(k) • 8(k)(1) • 8(k)(2) • 8(k)(3) • 8(k)(4) • 8(k)(5)	UT-Battelle is fully implementing the requirements of 10 CFR 851, Appendix A.8, Occupational Medicine for prime contractor employees and is protective against identified hazards. The subject of this variance request is the implementation of the occupational medicine requirements for ORNL subcontractors, at all sub tier levels, for the Appendix A.8 requirements which do not relate to hazard-specific medical surveillance. Given the magnitude and complexity of the implementation issues, UT-Battelle is unable to comply with the flow down of the full suite of occupational medicine requirements to subcontractors until DOE provides clear direction, better defines applicability, and some negotiation of change in scope and additional resources is accomplished. Until that time, ORNL will continue to flow down prudent OSHA-required medical surveillance requirements to subcontractors at all levels when the potential for exposures to hazards is identified.

[1]In 2005, UT-Battelle established the 1999 Standard Building Code as the Code of record (for managing chemical inventory limits) for existing ORNL facilities that do not have a defined Code of Record. For clarification, the 1999 Standard Building Code was used only to establish the baseline Maximum Allowable Quantities (MAQs) for existing facilities.

List of Acronyms

AHJ	Authority Having Jurisdiction
ASME	American Society of Mechanical Engineers
ATLC	Atomic Trades and Labor Council
BNA	Baseline Needs Assessment
CDC	Centers for Disease Control
CFR	Code of Federal Regulations
CIHs	Certified Industrial Hygienists
CNMS	Center for Nanophase Materials Sciences
CSPs	Certified Safety Professionals
DNA	Deoxyribonucleic Acid
DOE	Department of Energy
DSO	Division Safety Officer

ES&H	Environment Safety and Health
FHA	Fire Hazard Analysis
FP	Fire Protection
FY	Fiscal Year
H&S	Health and Safety
HSD	Health Services Division
IBC	Institutional Biosafety Committee
IH	Industrial Hygiene
ISM	Integrated Safety Management
ISMPD	Integrated Safety Management Program Description
ISMS	Integrated Safety Management System
IT&M	Inspection, Testing, and Maintenance
LO/TO	Lockout/Tagout
M&O	Maintenance and Operations
MAQ	Maximum Allowable Quantity
MSO	Management System Owner
NEC	National Electrical Code
NFPA	National Fire Protection Association
NIH	National Institute of Health
NNSA	National Nuclear Security Administration
NTRC	National Transportation Research Center
OGC	Office of General Counsel
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
OSHA	Occupational Safety and Health Administration
OSO	ORNL Site Office, Department of Energy (DOE)
PAAA	Price Anderson Amendments Act
PE	Professional Engineer
PPE	Personal Protective Equipment
PSO	Program Secretarial Office
R&D	Research and Development
R2A2s	Roles, Responsibilities, Accountabilities, and Authorities
RO	Responsible Official
SBMS	Standards-Based Management System

SNS	Spallation Neutron Source
SOMD	Site Occupational Medical Director
SRID	Standards/Requirements Identification Documents
TVA	Tennessee Valley Authority
UT	University of Tennessee
UT-Battelle	UT-Battelle, LLC
WHO	World Health Organization
WSH	Worker Safety and Health
WSHP	Worker Safety and Health Program
WSHPD	Worker Safety and Health Program Description
WSS	Work Smart Standards

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