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Sandia National Laboratories

Integrated Safety Management System Description

PG470252
Revision 9

SANDIA NATIONAL LABORATORIES
INTEGRATED SAFETY MANAGEMENT SYSTEM DESCRIPTION APPOVAL

Revision 9

Revision Date: _____

_____ _____
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Revision History

Revision	Effective Date	Summary of Changes
1	11/12/2010	1. Editorial changes a. Removed CPR from acronym list b. Added POMC to acronym list c. Re-arranged and/or changed wording in some sentences and paragraphs to improve flow d. Many minor editorials - e.g., commas, acronyms, article usage, wording and phrase suggestions from reviewers, sentence combinations e. Corrected missing and improperly located acronym definitions f. Re-ordered bullets in 2nd paragraph of 2.3 to improve information flow g. In 2nd-to-last paragraph of 2.3, changed name of department responsible for developing the ISMS effectiveness review report to Integrated Safety Management and Assurance Department h. Corrected years to FY 11, FY 10, and FY 09 where needed i. Replaced Figure 3, Performance Assurance System, with current graphic j. Added following sentence at end of 3.4.2, Job Safety Analysis (JSA): "See 4.2 Analyze Hazards for additional information." k. Removed the phrase, "As stated within the Corporate Process Requirement (CPR) document CPR400.1.2, ISMS Description, the" from the second paragraph of 3.5.1 l. In several places, discussed and referenced more clearly corporate policies, processes, and procedures m. In several places, changed "Division ES&H Teams," which is out of date, to ES&H SMEs and/or ES&H coordinators as appropriate n. In several places, changed "Executive Safety Council" to "Laboratory Leadership Team" o. In 4.1.1, changed the link that had pointed to the FY1 0 PEP to now point to the FY11 PEP. p. In 4.1 .2.1, changed Project Management Standards, which no longer exist, to Corporate procedure ME100.3.2 Manage Projects Throughout Their Lifecycle 2. Other changes a. In 3.1, acknowledged ISO 14001 certification, and in 4.5.3.5, the resultant periodic ISO 14001 audits b. In 3.1, included pollution prevention and ES&H targets in Figure 2 c. Included discussion in 3.3 of the corporate assurance system and the ES&H assurance system, including new figure describing the ES&H assurance system d. Added following sentence at end of 3.4.3, Authorization Basis: "SSO approval is normally required before starting or restarting any hazard category (HC)-1, -2, or -3 DOE nuclear facility or activity." e. Removed outdated 3.5.4.2 with regard to LIWG, in light of the recent decision to stop LIWG as it currently exists and restructure. Inserted in its place the following: "The ES&H Line Implementation Working Group (LIWG) is chartered by the ES&H and Emergency Management Director. The current LIWG has been halted and is in the process of major restructure. The future and role of LIWG will be developed and its outcome resolved during FY1 0." f. Revised second paragraph of 4.1.1 to describe the FY11 PEP rather than the FY10 PEP

		g. In third paragraph of 4.1.1, revised item 5 to correct the role DOE HQ plays with regard to the PEP, and added new item 6, which contains some information that was previously in item 5, and states that DOE/NNSA/SSO approves the PEP. h. In 4.1.1, Added the following below Figure 7 PEP Development: "In addition to the PEP objectives with their associated measures and targets, additional specific safety performance objectives, measures, and commitments are developed by Sandia and DOE/NNSA/SSO, which set expectations with regard to ISMS implementation and performance. These are discussed in more detail in 4.5.5.1 Safety Performance Objectives, Measures, and Commitments." i. Added the following to the 4th paragraph of 4.2: "Sandia documents its environmental aspects, impacts, controls, and performance in the Annual Site Environmental Report." j. Third paragraph of 4.3 Control Hazards - Separated paragraph into two paragraphs and included, in the first, information about the appropriate hierarchy of hazard controls. k. In 4.5.1, removed reference to the executive safety council, referring instead to the LL T. Included that ES&H metrics are available on the ES&H Dashboard. Removed 5th paragraph that discussed the biweekly ES&H report, which no longer exists. In its place, inserted a paragraph discussing the ES&H Communications website. l. Last paragraph of 4.5.2, removed references (2) to the Sandia Assurance Review Board (SARB), which no longer exists. Included reference to the Quarterly ES&H Policy Area Management Assurance Report (MAR). Replaced 2nd instance of the SARB with "ES&H Management." m. First paragraph of 4.5.3.5 External Assessments, removed "periodic" from the fourth and fifth bullets, because these external assessments conducted by personnel affiliated with DOE HQ are no longer periodic. n. In Section 4.5.3.5- Included HS-63 (Emergency Management), and clarified that facility representatives (FRs) provide oversight only for nuclear facilities. o. Section 4.5.4 Issues Management, removed discussion about the issues management review committee, because this committee no longer exists. Its activities have been assumed by the ES&H Council. p. Revised section 4.5.5.1 Safety Performance Objectives, Measures, and Commitments (POMCs), which discusses the POMCs described by DOE M 450.4-1. Changed to remove references to the POMCs being in the PEP, and instead described that these POMCs are described in Attachment 2 of the annual ISMS Effectiveness Review. In the same paragraph, changed reference to "bi-weekly" meetings of Sandia and SSO managers to "monthly" meetings. q. Added the following to 4.5.5.2 Monitoring Data: "The ES&H Dashboard has been continually enhanced to provide current status at a glance of the various ES&H metrics and current ratings, with mouse-over capabilities to allow users to drill down to additional information, data, and evidence and to view control charts or create custom charts." Also in this section replaced the FY09 dashboard view illustration with an FY1 0 dashboard view illustration.
2	11/12/2011	1. Editorial changes a. Updated broken Hyperlinks b. Updated organization title changes c. Updated section title changes d. Removed deleted references

		e. Updated changed references 2. Other changes a. Changed the listed SME contact from Al Bendure to Heidi Herrera b. Added the 2011 track change list hyperlink c. Deleted LIWG Section 3.5.4.2
3	11/21/2012	Implemented annual updates.
4	11/6/2013	Implemented annual updates.
5	11/6/2014	Implemented annual updates.
6	11/2/2015	Implemented annual updates.
7	11/2/2016	Implemented annual updates.
8	11/20/2017	1. Implemented annual updates. Updated Prime Contract information; changed references from Lockheed Martin to Honeywell Inc. 2. Changed the listed SME contact to Mike Starr.
9	11/1/2018	1. Updated references to NTESS and the Prime Contract for correctness and consistency. 2. Changed all references for Corporate Policy System policies, processes, and procedures to the new Laboratory Policy System policies and processes and the new ES&H Manual chapters. 3. Updated text throughout to reflect new content in the Laboratory Policy System. 4. Added content to introduce the Laboratory Operating System, the Laboratory Policy System, and the Sandia Management Model. 5. Added the following Figures, "Sandia ISMS" and "Management tiers." This information was added to reflect new processes. 6. Deleted references to the Sandia Management System and the Corporate Policy System. 7. Deleted Table 1, "Relationship of ISMS Core Functions to Environmental Activities" and Table 2, "General examples of worker involvement in safety management." This information is covered by the Environmental Management System and Integrated Effectiveness Review. 8. Deleted the following Figures, "Project Flowchart," "Facility classification flowchart," and "Sample ES&H Dashboard view." This information is covered at a high level within the document and changed to reflect current processes. 9. Changed the listed SME contact from Mike Starr to Cynthia Rivera.

List of Acronyms

Acronym	Definition
AIS	Assurance Information System
CFR	Code of Federal Regulations
CSSP	Contract-Specific Safety Plan
DEAR	DOE Acquisition Regulation
DOE	U.S. Department of Energy
ES&H	Environment, Safety, and Health
ISMS	Integrated Safety Management System
ISO	International Organization for Standardization
JSA	Job Safety Analysis
NEPA	National Environmental Policy Act
NNSA	National Nuclear Security Administration
NTESS	National Technology & Engineering Solutions of Sandia, LLC
OMBO	Overhead Management Budget Office
PEMP	Performance Evaluation Measurement Plan
PHS	Primary Hazard Screening
SCR	Sandia contracting representatives
SDR	Sandia delegated representative
SFO	Sandia Field Office
SNL/CA	Sandia National Laboratories, California
SNL/NM	Sandia National Laboratories, New Mexico
SME	Subject Matter Experts
TWD	Technical Work Document
WSHP	Worker Safety and Health Program

1.0 Introduction

Personnel at Sandia National Laboratories (hereinafter referred to as Sandia) comply with U.S. Department of Energy (DOE) P 450.4A, Chg 1, *Integrated Safety Management Policy*, and implement an Integrated Safety Management System (ISMS) to ensure safe operations. Sandia personnel integrate safety into management and work practices at all levels so that missions are accomplished while protecting Members of the Workforce, the public, and the environment. As a result, safety is effectively integrated into all facets of work planning and execution. Thus, the management of safety functions becomes an integral part of mission accomplishment and meets the requirements outlined in the DOE Acquisition Regulation (DEAR) 970.5223-1, *Integration of Environment, Safety, and Health into Work Planning and Execution* clause incorporated into the Prime Contract.

The DEAR 970.5223-1, *Integration of Environment, Safety, and Health into Work Planning and Execution* clause requires DOE contractors to manage and perform work in accordance with a documented Safety Management System that fulfills conditions of the DEAR clause, at a minimum. For purposes of this clause, safety encompasses environment, safety, and health, including pollution prevention and waste minimization.

Note: Throughout this document, "safety" is used synonymously with environment, safety, and health (ES&H) to encompass protection of Members of the Workforce, the public, and the environment.

1.1 Purpose

The DEAR 970.5223-1, *Integration of Environment, Safety, and Health into Work Planning and Execution* clause articulates the institutional requirements for all operations, on and off Sandia- controlled premises. This issue of PG470252, *Integrated Safety Management Description*, fulfills the requirement. In cases where work is performed at another site with a DOE-approved ISM program, these ISM requirements are superseded by that site's program. Overall, Sandia personnel are committed to performing work safely and ensuring the protection of Members of the Workforce, the public, and the environment as described in ESH001, *Environment, Safety, and Health Policy*.

The controlled copy of this document is filed with the Customer Funded Records Center and is posted on the ES&H Center 600 Controlled Documents website.

1.2 Background

Sandia National Laboratories is a multi-mission laboratory managed and operated by National Technology & Engineering Solutions of Sandia, LLC (NTESS), a wholly owned subsidiary of Honeywell International Inc., for DOE under contract DE-NA0003525. NTESS supports a total workforce of approximately 13,000; as of September 2018. This includes full-time, limited-term, exempt, and nonexempt (bargaining unit) Members of the Workforce, including students and postdocs.

Sandia personnel operate laboratories, testing facilities, and offices at multiple sites around the United States and participate in research collaborations around the world. Sandia's executive management offices and larger laboratory complex are located in Albuquerque, New Mexico, within the boundaries of Kirtland Air Force Base. A second principal laboratory complex is in Livermore, California. In addition, there are primary operations or facilities at the Tonopah Test Range in Nevada; the Kauai Test Facility in Hawaii; in Carlsbad, New Mexico; at Oliktok Point in Alaska; in Washington D.C.; and in Amarillo, Texas. In addition, Sandia personnel conduct operations at non-Sandia controlled premises.

2.0 Integrated Safety Management

2.1 Integrated Safety Management System Core Functions

The five core ISMS functions, as delineated in DOE G 450.4-1C, *Integrated Safety Management System Guide*, provide the necessary structure for all work that could potentially affect Members of the Workforce, the public, and the environment.

- **Define the scope of work**. Missions are translated into work, expectations are set, tasks are identified and prioritized, and resources are allocated.
- **Analyze the hazards**. Hazards associated with the work are identified, analyzed, and categorized.
- **Develop and implement hazard controls**. Applicable safety standards and requirements are identified and agreed upon, controls to prevent/mitigate hazards are identified, the safety envelope is established, and controls are implemented.
- **Perform work within controls**. Readiness is confirmed and work is performed safely.
- **Provide feedback and continuous improvement**. Feedback information on the adequacy of controls is gathered; opportunities for improving the definition and planning of work are identified and implemented.

These functions are applied in a continuous cycle with the degree of rigor appropriate to the work activity and the hazards involved. The interactions and relationships among site-, facility-, and activity-level operations are illustrated in Figure 1.

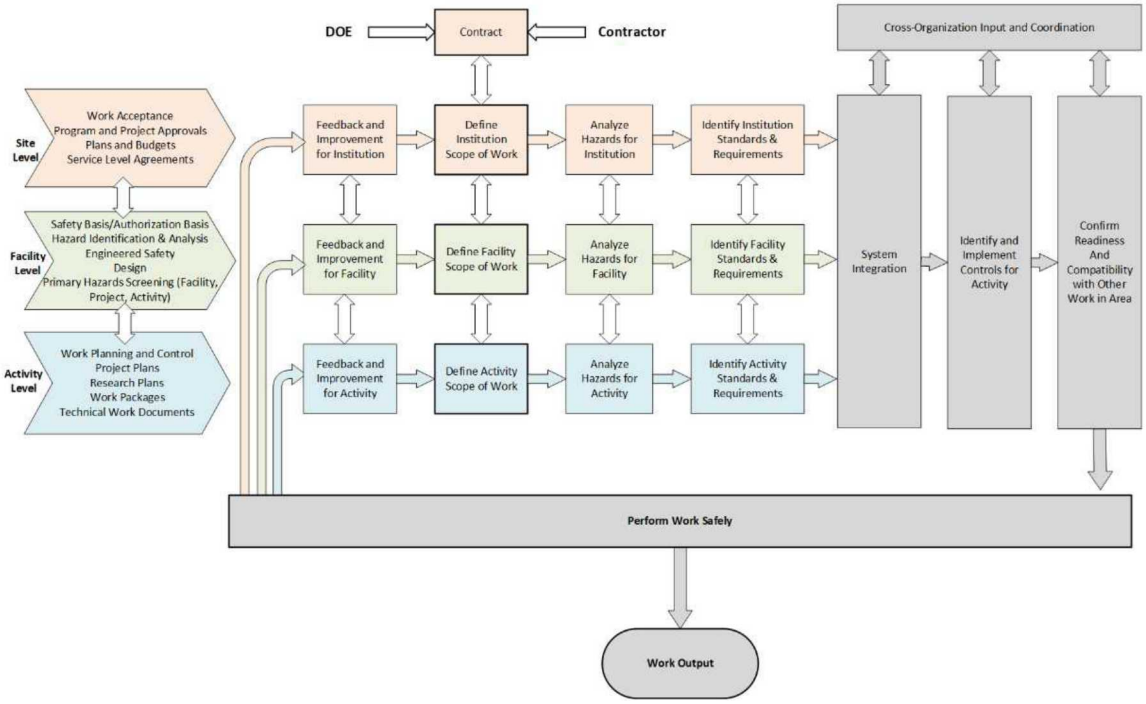

Figure 1. Sandia ISMS

2.2 Integrated Safety Management Guiding Principles

The DEAR clause requires Sandia personnel to ensure that the seven ISMS guiding principles are implemented. The principles are as follows:

- **Line management responsibility for safety.** Line management is directly responsible for the protection of the workers, the public, and the environment.
- **Clear roles and responsibilities.** Clear and unambiguous lines of authority and responsibility for ensuring safety are established and maintained at all organizational levels within the Department and its contractors.
- **Competence commensurate with responsibilities.** Personnel possess the experience, knowledge, skills, and abilities that are necessary to discharge their responsibilities.
- **Balanced priorities.** Resources are effectively allocated to address safety, programmatic, and operational considerations. Protecting Members of the Workforce, the public, and the environment is a priority whenever activities are planned and performed.
- **Identification of safety standards and requirements.** Before work is performed, the associated hazards are evaluated and an agreed-upon set of safety standards and requirements are established which, if properly implemented, will provide adequate assurance that Members of the Workforce, the public, and the environment are protected from adverse consequences.
- **Hazard controls tailored to work being performed.** Administrative and engineering controls to prevent and mitigate hazards are tailored to the work being performed and its associated hazards.
- **Operations authorization.** The conditions and requirements to be satisfied for operations to be initiated and conducted are clearly established and agreed upon.

In order to continuously improve the Sandia safety culture, the following four areas are to be focused on in concert with the guiding principles to enhance the effective implementation of ISMS:

- **Individual attitude and responsibility for safety.** Every Member of the Workforce accepts responsibility for safe mission performance. Individuals demonstrate a questioning attitude by challenging assumptions, investigating anomalies, and considering potential adverse consequences of planned actions. All Members of the Workforce are mindful of work conditions that may impact safety, and assist each other in preventing unsafe acts or behaviors.
- **Operational excellence.** Organizations achieve sustained, high levels of operational performance, encompassing all DOE and contractor activities to meet mission, safety, productivity, quality, environmental, and other objectives. High reliability is achieved through a focus on operations, quality decision making, open communications, deference to expertise, and systematic approaches to eliminate or mitigate error-likely situations.
- **Oversight for performance assurance.** Competent, robust, periodic, and independent oversight is integrated as an essential source of feedback, verifying that expectations are being met and opportunities for improvement are being identified. Performance-assurance activities verify whether standards and requirements are being met. Performance assurance

through conscious, directed, and independent reviews at all levels brings fresh insights and observations to be considered for continuous safety and performance improvement.

- **Organizational learning for performance improvement.** Organizations demonstrate excellence in performance monitoring, problem analysis, solution planning, and solution implementation. Organizations encourage openness and trust, and cultivate a continual learning environment.

The Sandia Leadership Team has set standards and expectations that institutionalize the guiding principles of ISMS through a variety of mechanisms, including, but not limited to, the Laboratories strategic plan, the Laboratory Policy System, the Laboratory Operating System, the performance management system, and the procedures and practices for performance of work. Site-wide safety programs (e.g., fire protection and emergency planning) and site-level programs (e.g., radiological protection, environmental protection, industrial hygiene, and industrial safety) govern site, facility, and activity-level work. In addition, senior leadership establishes expectations each year that target safety culture improvements, and performance is monitored and assessed through mechanisms such as the management review and assurance processes.

3.0 Flow Down and Integration of Integrated Safety Management System Requirements

PRM001, *Policy and Requirements Management Policy* describes the establishment and maintenance of the Laboratory Policy System which serves to flow down the Prime Contract requirements into policies and processes. NTESS flows the requirements of ISMS from the Prime Contract to Members of the Workforce through the Laboratory Policy System's Environment, Safety and Health (ES&H) policy category. ISMS requirements are transmitted to ES&H program owners (e.g., the Radiation Protection Program, the Confined Space Program, or the Electrical Safety Program) and line organizations. Applicable ES&H-related laws, regulations, and DOE directives for Members of the Workforce to follow during the planning and execution of work are detailed in ESH001, *Environment, Safety, and Health Policy*. NTESS implements its ISMS through the process delineated in ESH001.1, *Integrate ES&H into Work Planning and Execution.* In addition, the Sandia ISMS is inclusive of additional requirements in ES&H standalone manual(s); the MN471022, *ES&H Manual;* and, other ES&H documents such as ES&H program (PG) documents, e.g., PG470246, *10 CFR 851 Worker Safety and Health Program (WSHP)*, describes the methodology for meeting the requirements of 10 Code of Federal Regulations (CFR) 851, *Worker Safety and Health Program.*

Personnel such as ES&H subject matters experts (SMEs), ES&H coordinators, interdisciplinary teams at Sandia National Laboratories, California (SNL/CA), and various safety committees help to implement ES&H strategies.

3.1 Quality Assurance

QA001, *Quality Assurance Policy* defines requirements for implementing work in accordance with DOE O 414.1D, Admin Chg 1, *Quality Assurance* and 10 CFR 830, *Nuclear Safety Management*, Subpart A, "Quality Assurance Requirements." The ten quality assurance criteria are applied to all Sandia work and are implemented with a graded approach.

Sandia's Quality Assurance Program is the framework of interrelated policies, processes, and resources used to manage work, including management functions, structure, and information used to plan, execute, and monitor work. The Quality Assurance Program Description outlines the Plan-Do-Check-Act quality principles that guide the orderly and effective completion of work. Quality management (as well as safety management and safeguards and security management) is integrated into work by executing the actions specified in the Laboratory Policy System, performing work to deliver exceptional results, and evaluating activities and results for improvement.

NTESS measures performance against each criterion. As an example, Criterion 5, "Performance/Work Processes," paragraph 1, "Perform work consistent with technical standards, administrative controls, and other hazard controls adopted to meet regulatory or contract requirements, using approved instructions, procedures, or other appropriate means," is applied to all work via implementation of ISMS through the Laboratory Policy System, ES&H Policy category.

3.1.1 Laboratory Operating System

The Laboratory Operating System is a combination of behaviors, processes, and tools used to execute work and, therefore implement ISMS. The operating system reflects the major functions performed by all Members of the Workforce, including management, to operate effectively and deliver customer value. The Laboratory Operating System ensures long-term customer confidence as intent is to drive improvements in performance, achieve efficiencies to enhance mission work, and satisfy DOE and National Nuclear Security Administration (NNSA) contractor assurance requirements. The Laboratory Operating System is applied through six enablers:

- Strategy deployment
- Data-driven and visual management
- Tiered accountability
- Problem solving and continuous improvement
- User-centered design
- Velocity innovation development

Sandia management is committed to increasing the capacity to learn, innovate, and respond to rapid internal and external environment changes. The Laboratory Operating System ensures that Sandia personnel can continue to provide leading-edge solutions to solve increasingly complex national security problems. An effective operating system is essential to:

- Enable coordinated action across multiple people and groups
- Reduce time and waste by creating the "how" to get something done
- Create predictability and stability of behaviors and results
- Provide a teachable and constant approach
- Enable scalability and portability

3.1.1.1 Tiered Accountability

Tiered accountability, one of the six enablers for applying the Laboratory Operating System, was instituted in the fourth quarter of 2017. Managers at all levels hold daily and weekly stand-up meetings with their direct reports to:

- Enable quick information sharing up and down the organization
- Make organizational performance visible and reinforce accountability
- Identify and escalate issues to obtain needed support
- Ensure the group is focused on the right work priorities

Other aims of tiered accountability meetings are to improve communication and employee engagement, identify problems so they can be resolved quickly, and enable decision making at the right levels. As the process matures, this practice will provide Sandia leadership the opportunity to:

- Establish a venue for managing the things that matter most to the team

- Recognize accomplishments
- Model desired behaviors
- Demonstrate good coaching skills, using active listening and inquiry to deepen understanding and ensure rapid and effective resolution of the team's issues (solving what is in each leader's span of control or escalating items that require a higher-level review)

The term *tiered* refers to the levels of an organization. This structure is designed for information to flow both up and down the tiers as warranted. There are five management tiers at Sandia (Figure 2):

- Tier 5 meetings are at the Labs director and deputy Labs director level, attended by their direct reports.
- Tier 4 meetings are at the associate Labs director level, attended by their direct reports.

  Note: Directors for the following centers: Strategic Plans and Policies Center, ES&H Center, and Independent Audit, Ethics & Business Conduct Center are included as part of the Tier 4/5 deployment as direct reports to Tier 5.

  Support personnel from functional organizations such as ES&H, Business Operations, Human Resources, and Security should also attend.
- Tier 3 meetings are at the center director level, attended by their direct reports.
- Tier 2 meetings are at the group senior manager level, attended by their direct reports.
- Tier 1 meetings are at the department manager level, attended by all direct reports. (Team leads are included in Tier 1 meetings.)

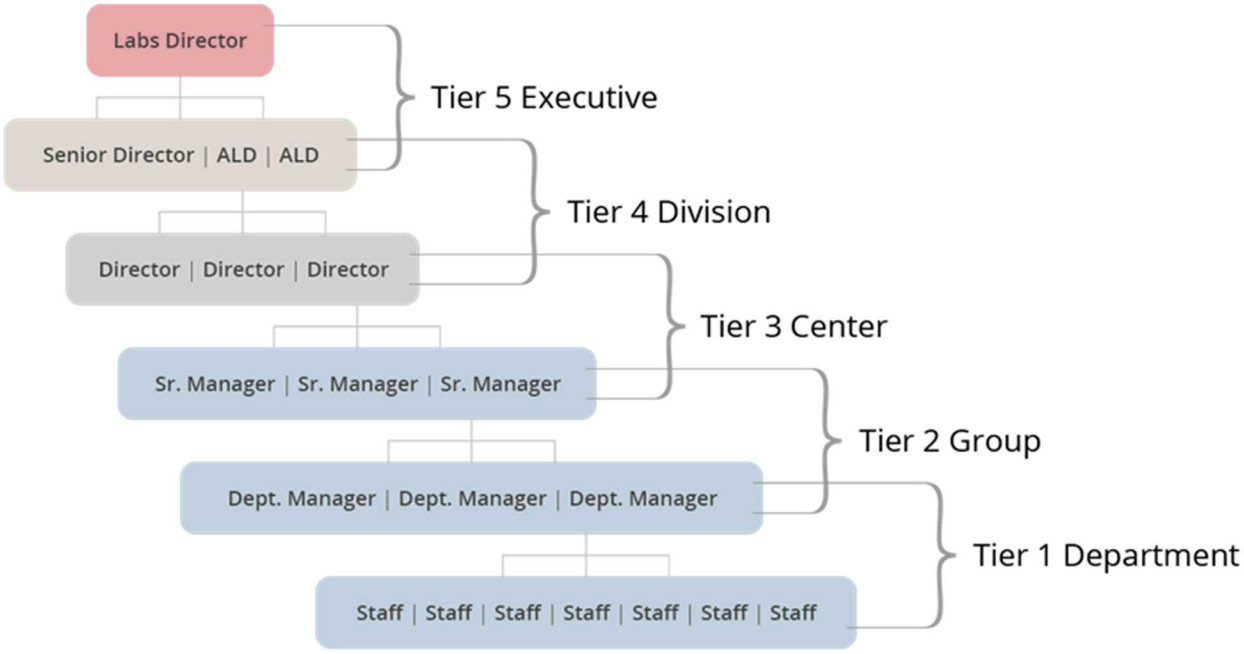

Figure 2. Management tiers

3.1.2 Laboratory Policy System

The Laboratory Policy System flows down requirements from the Prime Contract to Members of the Workforce. Under the ES&H Policy category, the ESH001, *Environment, Safety, and Health Policy* details that the Sandia ISMS program comprises the ESH001.1, *Integrate Environment, Safety, and Health into Work Planning and Execution* process, ES&H standalone manual(s), the MN471022, *ES&H Manual*, and other ES&H documents such as program (PG) documents. Specifically, these requirements ensure implementation of ISMS into all work activities.

The Laboratory Policy System contains the policies and processes that govern how Sandia personnel do work. It is the system of record for all corporate-level requirements.

The Laboratory Policy System works by simplifying the structure, streamlining and integrating the content, and improving the user interface for accessing the requirements. The system is built on the RSA Archer governance, risk, and compliance platform with a web-based front end providing the user interface. The Laboratory Policy System is structured by topical categories rather than being organized according to ownership, making it easier for the user to find information. Policies are streamlined to contain only requirements and the processes detail the implementation of those requirements. This design enhances integration across multiple policy categories for specific requirements to create an end-to-end approach, avoiding the need to jump from one policy category to another.

The Laboratory Policy System leverages the functionality provided by the RSA Archer platform to streamline and automate the administration of policy and process content. As designed, the workflow delivers, notifies, and tracks Laboratory Policy System-related tasks such as policy changes and relocations. This ensures that the appropriate parties are notified and aware of any actions needed to complete a task, ultimately reducing the amount of time required to complete tasks related to administration of the Laboratory Policy System.

3.1.3 Sandia Management Model

The Sandia Management Model, an interactive website, describes the mission, vision, and values, and is intended to be viewed by a broad audience for a comprehensive understanding of how NTESS is structured to manage work and assure success. The goal is to ensure that all divisions operate effectively, efficiently, safely, securely, and in compliance with regulations and constraints, while improving quality and value to the customer. The Sandia Management Model illustrates the structure that allows the Laboratory Operating System to achieve an engaged workforce, operational effectiveness, and customer value.

3.2 Environmental Management System

DOE O 436.1, *Departmental Sustainability* was established to ensure that site sustainability is at the forefront of environmental goals for excellence. DOE O 436.1 requires certification or conformance to International Organization for Standardization (ISO) 14000 (ISO 14001), *Environmental Management Systems – Requirements with Guidance for Use*. NTESS meets this requirement through third-party certification. Sandia National Laboratories, New Mexico (SNL/NM) and SNL/CA sites

received their initial ISO 14001 certifications in June 2009 and September 2006, respectively, with recertification occurring every three years. These independent certifications were combined in April 2015 into one multi-site certification to streamline the process and maximize efficient use of corporate resources. Sandia is certified to the ISO 14001:2015 standard as of May 2018.

As part of ISMS, PG470222, *Environmental Management System Manual*, describes the Sandia Environmental Management System, provides guidance to the workforce about their environmental responsibility, and documents how Members of the Workforce adhere to the ISO 14001 standard. The Environmental Management System provides an integrated approach for management and Members of the Workforce to identify and manage environmental risks, and is conducted in accordance with ISO 14001.

The requirement for an Environmental Management System flows down from requirements in the Prime Contract, including ISMS and DOE O 436.1, through Laboratory Policy System to Members of the Workforce. At the division and center levels, ES&H coordinators analyze activity-specific aspects and impacts and develop environmental management objectives and targets. These objectives and targets are aligned with DOE required goals presented in Sandia's Site Sustainability Plan in order to implement sustainable practices for enhancing environmental, energy, and transportation management performance.

3.3 Planning for Work

ESH001, *Environment, Safety, and Health Policy* specifies that the Sandia ISMS comprises the*;* ESH001.1, *Integrate Environment, Safety, and Health into Work Planning and Execution* process; ES&H standalone manual(s); the MN471022, *ES&H Manual*; and other ES&H documents such as program (PG) documents. The Sandia PG470252, *Integrated Safety Management System Description* is the overarching DOE-approved document describing how Members of the Workforce use the guiding principles, five core functions and the four supplemental safety culture elements in a continual cycle.

Planning for work is an iterative process; work design and controls are modified as needed from the initial setting of strategic targets through day-to-day operations. By integrating work controls, quality assurance, and life-cycle management with safety management, Members of the Workforce strive to achieve maximum safety and environmental protection with minimum risk. These efforts are integrated through the following Laboratory policies:

- CA001, *Enterprise Risks, Opportunities, Issues Management Policy*
- CA002, *Performance Monitoring Policy*
- ESH001, *Environment, Safety, and Health Policy*
- QA001, *Quality Assurance Policy*

3.3.1 Primary Hazard Screening and Hazards Analysis

The primary hazard screening (PHS) is used to identify hazards as well as to classify facilities, operations and activities based on hazard impact. The classification determines any additional actions or documentation required to meet safety basis requirements. The PHS will define operating

limits and a safety envelope, including authorized types and quantities of radiological materials. Accordingly, the PHS is required to be reviewed to ensure reflecting current operations.

A PHS is completed through the PHS module software. The PHS is the minimum safety basis documentation (providing reasonable assurance that a DOE facility can be operated in a manner that adequately protects Members of the Workforce, the public, and the environment). All facilities, operations, and activities conducted by Members of the Workforce are covered under a PHS, including off-site activities.

Based on user input to a series of questions, the PHS identifies:

- High-level (primary) hazards (e.g., chemicals, toxic gases, or explosives)
- Some, but not all, controls (e.g., ventilation, lockout/tagout, personal protective equipment, or respirators)

  Note: This is not a list of all controls that may be necessary for the given activities. A hazard analysis and/or industrial hygiene exposure assessment may also identify controls.
- A hazard categorization for the activities
- Facility hazard classification (i.e., office occupancy, standard industrial hazard, low hazard, moderate hazard, high industrial hazard, accelerator, or nuclear)

For the hazards and controls identified, the PHS describes:

- Requirement documents (such as Laboratory Policy System) that must be reviewed to determine specific requirements applicable to the work
- Corporate-required training
- Action and warning messages that highlight key requirements
- Hazards and activities that require additional ES&H SME involvement

When applicable, a hazard analyses (HA) and other safety basis documents are components of the safety envelope (see Section 4.3.1) for activities covered by the PHS. A hazard analysis, using the PHS HA module, is not required for business occupancy (office) or standard industrial hazard classification facilities, operations and activities. When required to prepare a HA, can complete either through the PHS HA module or by preparing a hazard analysis. The hazard analysis may be required to verify and document the following:

• Low-hazard classification with hazards requiring controls to keep a facility or operation from a higher hazard classification
• Potential impacts from operations to receptors located in non-Sandia-controlled areas
• Final nuclear facility hazard categorization

Every PHS is reviewed, at a minimum, by the author/preparer, ES&H coordinator, a PHS team member, and the responsible department manager. Various ES&H SMEs may also be required to review the PHS, based on how the questions are answered; logic embedded in the PHS software

drives the need for additional reviewers. An author or preparer may also designate additional reviewers. Additional PHS reviewer roles includes the following expertise:

- Accelerator safety
- Air quality
- Aviation safety
- Biosafety
- Ecology
- Emergency planning
- Environmental compliance
- Explosives safety
- Fire protection
- Hazardous waste and mixed waste
- Industrial facility safety
- Industrial hygiene
- Laser safety
- National Environmental Policy Act (NEPA) compliance
- Nuclear safety
- Radiation protection
- Radioactive waste
- Toxic substances

3.3.2 National Environmental Policy Act Module Checklist

The MN471022, *ES&H Manual* includes a chapter on "NEPA, Cultural Resources, and Historic Properties." Members of the Workforce use the NEPA module software to complete a checklist for a proposed project, including facilities, operations and activities. The checklist discusses the project along with its potential to affect the environment and/or impact on cultural resources. This includes detailing hazards from the project, listing any project requirements such as whether permit(s) are necessary, and presenting any mitigation for potential environmental impacts while ensuring appropriate regulatory requirements are met.

Following the completion of a checklist, its review will determine whether the proposed project is within the operating limits and whether it requires additional NEPA documentation. Key areas for potential environmental impacts analysis include:

- Air emissions
- Asbestos
- Clearing, excavation, land disturbance

- Energy and water use
- Environmental restoration
- Exposure (chemical, radiation, noise)
- Historical, cultural, and archeological resources
- Liquid effluents
- Microorganisms and biologicals
- Nanomaterials
- Protected species
- Transport
- Use and storage (chemicals, petroleum/fuel, explosives, pesticides/herbicides
- Waste (solid, hazardous, radioactive, mixed)
- Wildland fire danger

3.3.3 Work Planning and Control

A separate chapter for Work Planning and Control in the MN471022, *ES&H Manual* incorporates MN471021, *Work Planning and Control Criteria for Safe Design and Operations* for activity-level work. Work planning and control is based on six overarching principles:

- Implement a safe-by-design intent.
- Understand the technical basis of the operation.
- Identify and control energy sources.
- Define unacceptable consequences.
- Take a risk-assessment approach.
- Use a positive verification process to ensure that the specified controls are in place and effective.

These principles are applied via critical thinking to ensure the most effective identification and control of potential hazards. Work planning and control functions are implemented throughout project activities, ensuring that ES&H requirements are met in all relevant operations. These activities ensure that appropriate work planning is performed to meet ISMS requirements.

The causes, consequences, and controls associated with a hazard are analyzed and documented. As the PHS initiates a review of the hazards, a more detailed analysis is necessary to ensure safety for activity-level work.

The work planning and control process requires completion of a hazard analysis for planned work. Members of the Workforce apply a systematic, proactive method to identify where and how failure might occur. This analysis is also used to assess the impact of different failures on a system to provide information on specific failure modes and identify single-point failures.

This analysis is accomplished on a new or existing system design using recognized technical standards appropriate to the task. The MN471022, *ES&H Manual* incorporates MN471021, *Work Planning and Control Criteria for Safe Design and Operations* into the "Work Planning and Control" chapter and references two sources that describe various failure-mode techniques and their best application: (1) ANSI/ASSE Standard Z590.3, *Prevention through Design: Guidelines for Addressing Occupational Risks in Design and Redesign Processes,* and (2) the Center for Chemical Process Safety's *Guidelines for Hazard Evaluation Procedures.*

A safety case is prepared to summarize the hazards, results of the hazard analysis, subsequent identified controls, and residual risk, which presents the case for accepting any residual risk, for management approval. The safety case is then used to flow information into specific activity-level work documents, such as TWDs and JSAs.

A job safety analysis (JSA) identifies and analyzes hazards and controls associated with activity-level work. The JSA documents specific and unique hazards and then prescribes mitigating controls, applying a hierarchy of controls (Section 4.3). Technical work documents (TWDs), which are generally how-to documents, describe the identified activity-level work hazards along with their associated work controls. Work planning and control is depicted in visual format in Figure 3**Error! Reference source not found.**.

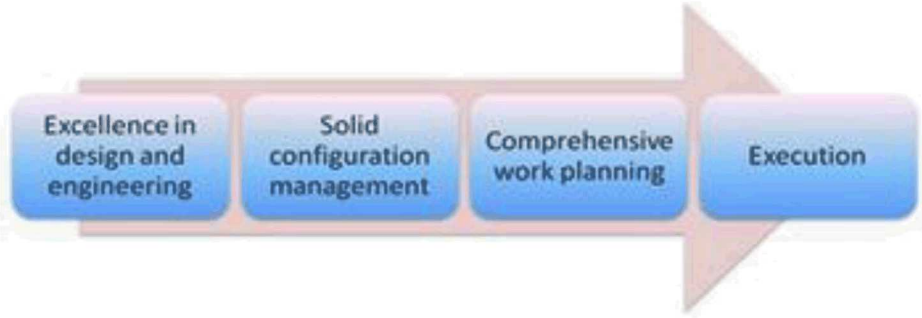

Figure 4. Work planning and control

The JSA is completed for task(s) and should include relevant task steps, potential hazards encountered at each step, and the controls implemented at each step. The JSA is used during activity-level work planning to review each step of an operation for critical steps (those which, if performed improperly, will cause irreversible harm or significantly affect facility operation) and to identify specific hazards at each step to ensure that appropriate controls are in place. The work planner and the planning team manage the JSA process. The JSA may exist as a stand-alone document or may be incorporated into an operating procedure or work instruction.

3.3.4 Authorization Basis

The authorization basis process results in a set of documents that define how activities, and operations, and facilities control hazards within the bounds of regulatory requirements and acceptable risk. Examples of documents that collectively constitute an authorization basis include: a documented safety analysis; a safety assessment document; a technical safety requirements or similar document; an unreviewed safety question determination or other document(s) generated for

maintaining the authorization basis; a safety evaluation report; NEPA documents and environmental permits; the Corporate Emergency Plan; the Site-Wide Environmental Impact Statement; and, explosives safety site plans. These documents have various approval authorities, including DOE, the U.S. Department of Defense, and the State of New Mexico.

Safety basis documents are part of an authorization basis and the readiness approach is determined by the hazard classification. ESH001.1, *Integrate ES&H into Work Planning and Execution,* defines the requirement necessary to perform formal readiness reviews before the start or restart of an activity, operation, or facility. Further, the "Primary Hazard Screening – Safety Basis," "Safety Basis: Accelerators," "Safety Basis: Moderate Hazard and High-Hazard," and "Safety Basis: Nuclear" chapters in the MN471022, *ES&H Manual* incorporate the MN471017, *Safety Basis Manual* and delineate specific requirements for maintaining safety basis documents, provides details regarding required documentation, and identifies the authorization authority by hazard classification.

3.4 Organizational Structure, Roles, and Responsibilities

ESH001, *Environment, Safety, and Health Policy*, describes the roles, responsibilities, accountabilities, and authorities for managers, Members of the Workforce including SMEs and space owners, and ES&H councils and committees. Performing work safely depends on active involvement, communication, and participation in planning, executing, and evaluating work. Management is responsible for creating and maintaining an environment that involves Members of the Workforce in all five core ISMS functions.

3.4.1 Performing Work on Non-Sandia-Controlled Premises

NTESS has the legal responsibility to ensure the safety and health of Members of the Workforce regardless of the location of their work activity. When Sandia personnel perform work activities on non-Sandia-controlled premises that are controlled by another DOE contractor with a DOE-approved worker safety and health program (WSHP) and ISMS program, planning and performance of the work activity is conducted in accordance with:

- The DOE contractor WSHP and ISMS documents
- Any procedures or agreements that integrate Sandia WSHP and ISMS requirements with those of the DOE contractor responsible for the premises at which the work activity is to be performed. If such procedures or agreements are made, then they are to be agreed to by Sandia personnel and the host site contractor organization. This direction is provided by ESH001, *Environment, Safety, and Health Policy*, which requires compliance with ESH001.1, *Integrate ES&H into Work Planning and Execution*, and by ISCM001.9, *Administer a Subcontract.*

The interface with the Nuclear Weapons Production Complex is defined in the technical business practice document TBP-901, *Integrated Safety Process for Nuclear Weapons Operations and Facilities.*

When Members of the Workforce perform work activities on non-Sandia-controlled premises (e.g., foreign countries or U.S. Department of Defense sites) where no DOE-approved ISMS exist, then such work activities are planned and performed in accordance with Sandia's ISMS program requirements and the host site-specific worker safety and health requirements. However, procedures

or agreements that integrate Sandia's WSHP with the host site-specific worker safety and health requirements may be appropriate where the parties determine the modification is more protective for the safety and health of Members of the Workforce, the public, and/or the environment.

3.4.2 Visitors Performing Work on Sandia-Controlled Premises

Hosts are responsible for ensuring that visitors performing work on Sandia-controlled premises meet all the requirements of the space to be visited and the activities to be performed, including training on ISMS requirements. ES&H responsibilities for visitors are outlined in ESH001, *Environment, Safety, and Health Policy*.

3.4.3 Subcontractors

Subcontractors are subject to Sandia business rules in accordance with the terms of their contracts. Provisions within the statement or scope of work and in embedded terms and conditions require subcontractors performing work on Sandia-controlled premises to comply with applicable federal, state, and local requirements, including DEAR 970.5223-1, *Integration of Environment, Safety, and Health into Work Planning and Execution.*

On-site (i.e., granted access to any DOE-controlled site, including Sandia-controlled premises) contractors are categorized as follows:

- **Contract-specific safety plan (CSSP) contractors.** Contractors who perform their work under a CSSP that has been developed by the contractor in response to requirements in the statement of work or elsewhere in the agreement and has been reviewed and accepted by the Sandia delegated representative (SDR), center ES&H coordinator or designee, and ES&H customer support team, as appropriate.
- **Corporate ES&H full-set contractors.** Contractors who perform their work in compliance with all corporate ES&H requirements identified as applying to Members of the Workforce. These contractors receive support services from ES&H departments and programs in varying degrees as defined by the specific contract. Staff augmentation contractors are corporate ES&H full set contractors. Contractors providing consultant, engineering, and other professional services are usually included in this type of contract.
- **Minimal hazard contractors.** Contractors who perform their work in a typical office environment and who will only access offices, conference rooms, and common areas of Sandia-controlled premises. These contractors perform nonhazardous functions under the direct visual and verbal control of an authorized escort, and are only granted access to nonhazardous areas. This level of access may include tours of laboratory facilities, but does not include any hands-on work in those laboratory facilities.

The flow down of ISMS requirements to subcontractors performing work on Sandia-controlled premises is illustrated in Figure 5. As shown in the figure, the process begins during development of a new requisition to procure subcontractor services. The processes for Members of the Workforce follow to ensure subcontractors identify, assess and control hazards are detailed in ISCM001.5, *Purchase Requisition and Purchase Order*, and ISCM001.9, *Administer a Subcontract.*

Sandia contracting representatives (SCRs), Sandia Delegated Representatives (SDRs), requestors, and managers of both SCRs and SDRs are responsible for overseeing contractor compliance with contract requirements. This includes requirements contained within a contractor-provided CSSP. ES&H program SMEs and ES&H coordinators support SDRs and SCRs in their oversight responsibility.

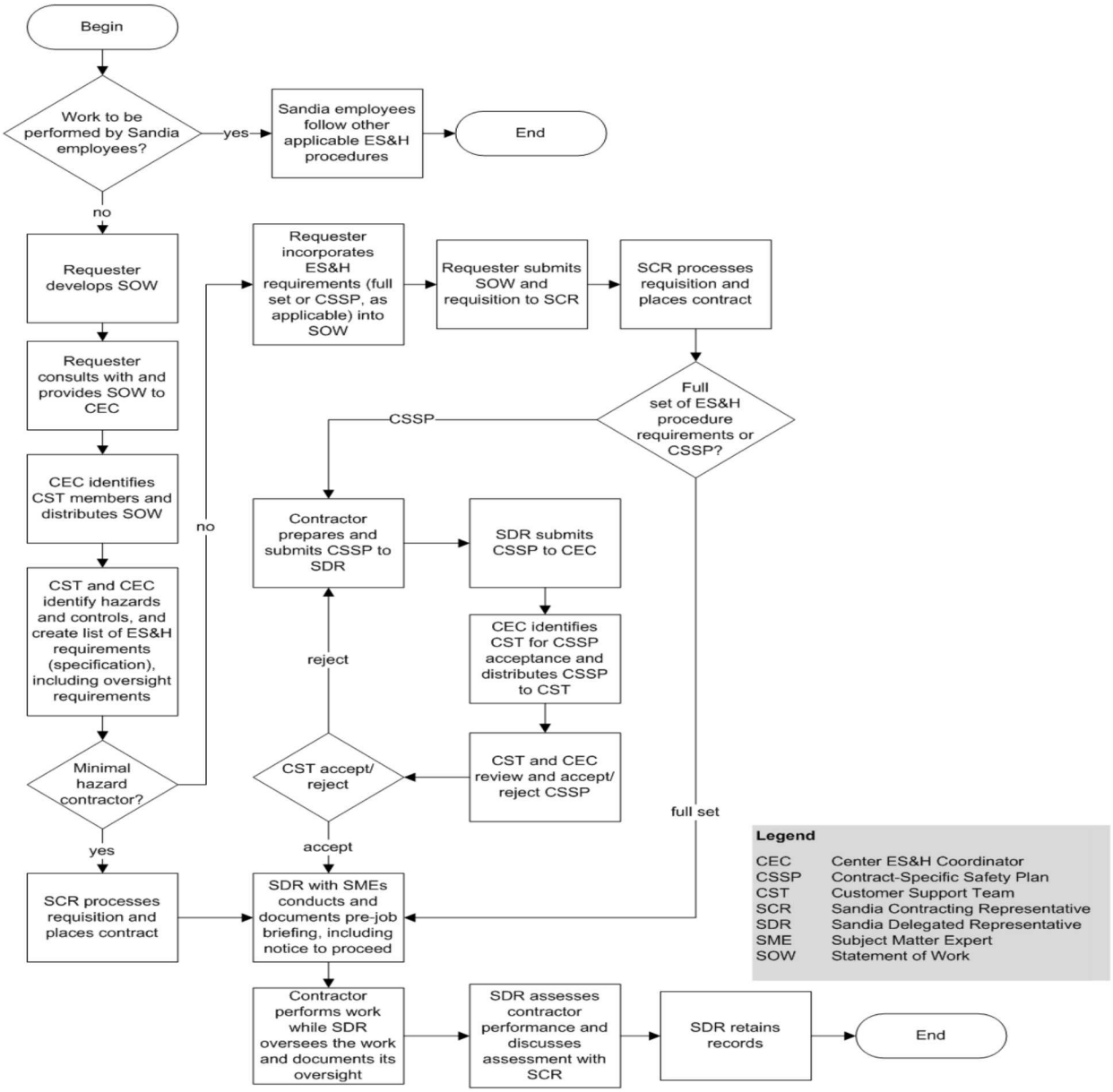

Figure 5. Flow down of ISMS to subcontractors performing work on Sandia-controlled premises

Other contractors include individuals performing work on Sandia-controlled premises who are employees of another DOE prime (or management and operating) contractor. This type of contractor is required to develop and submit a written safety and health program document to their respective DOE contact for approval; the plan must be in accordance with 10 CFR 851.11, *Development and approval of worker safety and health program*. These contractors are exempt from the flow-

down process presented in Figure 5 because they have their own DOE-approved WSHP. Contractor employees under this contract category receive no services from Sandia's ES&H programs except in response to work-related injuries and illnesses. If DOE requests Members of the Workforce to manage non-NTESS employees who work for another prime contractor, then that contractor's WSHP document must be submitted to the SCR and SDR for review. Following DOE/NNSA Sandia Field Office (SFO) approval, the SCR is notified of the authorization to proceed with the contract.

3.4.4 Line Organizational Work

The Laboratory Policy System states the requirements that line organizations must implement for accomplishing their work. Additional tools and teams enhance the ability to comply with the requirements.

3.4.4.1 Supervisory Tools

Managers use self-assessments to ensure that operations are in accordance with ISMS requirements; work is adequately covered by the PHS, hazard analysis, JSA, and other required supplemental documentation; a proactive approach is taken to safety; and safety performance is continuously improved. Self-assessments may be followed by a formal readiness review, which is a disciplined, systematic, documented, performance-based verification of the readiness of personnel, procedures, processes, facilities, equipment, management systems, and controls to safely start or restart and then continue operations. A readiness review is *not* a process to "get ready" for starting or restarting a facility or operation.

3.4.4.2 Environment, Safety, and Health Coordinators and Subject Matter Experts

Division and center ES&H coordinator roles, responsibilities, accountabilities, and authorities are standardized to provide consistency throughout Sandia. A standard training and qualifications program has been developed and implemented.

In addition, ES&H SMEs are involved during work planning and execution performed by a line organization. While the line organization is accountable for decisions, the SMEs are available to help ensure that ES&H issues are identified and appropriate options for solutions are incorporated throughout work planning and execution.

3.4.4.3 Interdisciplinary Teams

Interdisciplinary teams include SMEs from all ES&H disciplines. The SMEs meet with researchers, facility engineers, and functional program managers to evaluate ES&H hazards and define methods to control them. Interdisciplinary team members review proposed projects and programs and any major project and program changes. Team members provide requirements, recommendations, and assistance to the project and program owners.

3.4.4.4 Nuclear Safety Committees

The Nuclear Criticality Safety Committee functions in an advisory capacity to provide safety oversight at SNL/NM regarding the transportation, use, and storage of nuclear materials with criticality potential, except those located in Technical Area V. Committee members also provide internal safety reviews to management to help assure that nuclear materials with criticality potential (i.e., fissile materials) are used in a safe manner and in compliance with DOE regulations.

The Nuclear Facilities Safety Committee performs safety reviews at reactor and nonreactor nuclear facilities in Technical Area V, and reports to the associate Laboratories director of the managing organization. Committees that report to the Nuclear Facilities Committee include the following:

- Annular Core Research Reactor Committee
- Radiological and Criticality Safety Committee
- Sandia Pulsed Reactor Committee

To ensure safety, these committee members review processes, procedures, and operations that fall within their scope. Recommendations and action items are communicated through meeting minutes and implemented by Sandia management, as applicable.

3.4.4.5 Environment, Safety, and Health Committees

Several safety committees are chartered to facilitate and support implementation and improvement of ES&H programs. In addition, the Sandia Leadership Team reviews ES&H performance, concerns, and corrective actions monthly in the Executive Safety Committee meeting. This committee includes the associate Laboratories directors, general counsel, and the deputy Laboratories director and is chaired by the Laboratories Director. The Board of Managers Safety Oversight Subcommittee also reviews ES&H performance, concerns, and corrective actions quarterly. Program-specific safety committees include:

- Committee on Electrical Safety
- Explosives Safety Committee
- Joint Firearms Safety Committee
- Joint Union/Management Safety Committee
- Pressure Safety Committee
- Radiation Protection Safety Council
- SNL/CA Institutional Biosafety Committee

3.4.5 Training

ES&H training requirements for many work activities ensure that Members of the Workforce possess the experience, knowledge, skills, and abilities that are necessary to discharge their responsibilities. Relevant training is provided by ES&H personnel and the Talent Management & Development Center. Sandia managers value and practice continuous learning, and encourage

additional educational experiences to improve knowledge, skills, and abilities. The Laboratory Policy System fully supports workforce training and development.

3.4.5.1 Human Resources and Workforce Management

HR001, *Implement a Strategic Workforce Planning Approach Policy*, provides a strategic approach to balancing short-term hiring actions and revenue and cost projections with long-term strategies and objectives. The Senior Leadership Team sets the strategies and objectives. An operational staffing plan is based on the Senior Leadership Team's strategic intent along with approved revenue and cost projections for the next two years. The process enables division personnel to review and engage in the distributed headcount projections provided by program management centers. It is NTESS policy to attract and acquire, develop, reward, and retain a diverse and world-class workforce (HR002, *Acquire Talent Policy*). The workforce is enabled with an efficient, inclusive work environment that promotes the health, well-being, and productivity of all. This workforce strategy and Human Resources policies enable the achievement of the NTESS business strategy. Human Resources performance is evaluated and benchmarked to foster continuous improvement. Furthermore, HR001, *Implement a Strategic Workforce Planning Approach Policy*, is administered in a cost-effective manner that is consistent with the spirit and letter of contractual requirements, including laws, regulations, and DOE directives; collective bargaining agreements; and sound business practices.

3.4.5.2 Workforce Development

As directed by HR003, *Employee Development Policy*, managers assess their organization and employee capabilities, assess compliance training requirements, and then take appropriate actions to ensure that training and professional development needs meet current strategic and long-term future work requirements. The policy aligns with the strategic objective to advance an exceptional work environment that enables and inspires employees in service to our nation by creating the most efficient and effective operational environment. The policy applies to all Sandia organizations, all management elements, all Sandia sites, and all employees required to participate in learning and development activities.

4.0 Implement the Five Core Functions of the Integrated Safety Management System

4.1 Define the Scope of Work

At the institutional level, the first core ISMS function, Define the Scope of Work, involves translating the mission into work (i.e., setting expectations, prioritizing tasks, and allocating resources). This is accomplished through the Laboratory Operating System, which reflects the major functions performed by Sandia personnel as well as the management structure and the management information system used to plan, execute, and monitor work.

For activity-level work, for example, Define the Scope of Work includes describing the work scope completely and comprehensively, comparing work to established operational and administrative boundaries (e.g., the safety envelope), having line managers formally accept work, and scheduling work as appropriate and necessary. Details are found in MN471022, *ES&H Manual*, "Work Planning and Control" chapter which incorporates MN471021, *Work Planning and Control Criteria for Safe Design and Operations*, as required by ESH001.1, *Integrate ES&H into Work Planning and Execution.*

4.1.1 Set Expectations

The Sandia Leadership Team has set three strategic objectives, presented in FY16–FY20 Strategic Plan: (1) amplify our national security impact, (2) strengthen our Laboratories' foundation to maximize mission impact, and (3) advance an exceptional work environment that enables and inspires our people in service to our nation. These objectives define an effort to lead the DOE complex as Federally Funded Research and Development Center. The NTESS strategic plan sets the expectation to model safe, effective, efficient mission performance and robust management assurance while performing with excellence and achieving mission goals.

4.1.1.1 Prepare a Performance Evaluation Measurement Plan

Management annually negotiates a Performance Evaluation Measurement Plan (PEMP) with DOE/NNSA/SFO that defines performance criteria by which DOE/NNSA/SFO will appraise NTESS management and operating performance against contract and programmatic requirements. The PEMP promotes a strategic governance and oversight framework based on prudent management of risk, accountability, transparency, and renewed trust. The PEMP's goal is to reflect a strategic direction and drive stellar performance in work for the national security mission.

The FY17–18 PEMP includes some performance objectives that are the same for every NNSA site and some site-specific objectives. The critical entities and their responsibilities for developing the PEMP include the following:

- The Senior Leadership Team determines progress toward objectives and goals.

- DOE/NNSA/SFO counterparts discuss and negotiate performance objectives before final PEMP approval.
- DOE/NNSA/SFO approves the PEMP. Any changes to the PEMP, after SFO approval, are renegotiated and require formal review and approval by the DOE/NNSA/SFO Change Control Board.
- DOE headquarters provides input to the PEMP objectives and site-specific outcomes, and is also the fee-determining official.
- The Senior Leadership Team accepts and approves all owned PEMP, as well as with the DOE/NNSA/SFO manager, providing final approval.

Performance evaluation involves the following entities:

- The Laboratories Director and the DOE/NNSA/SFO manager engage in partnering meetings.
- Executive Management Review members examine performance quarterly and engage DOE/NNSA/SFO and NTESS management to encourage dialogue at all levels.
- Management review boards at all levels evaluate performance against established measures and targets.

4.1.1.2 Implement an Integrated Safety Management System

The Sandia Leadership Team sets specific safety performance objectives, measures, and commitments for ISMS implementation and performance in consultation with DOE/NNSA/SFO counterparts. These objectives are covered under programs (Performance Objectives 1, 2, and 3—*implementation of policy*) and mission support (Performance Objective 5: *Operations and Infrastructure—mission execution*). Individual entities also establish expectations, such as EMS aspects and impacts (Section 3.2). Expectations with respect to work planning and control are described in MN471022, *ES&H Manual*, "Work Planning and Control" chapter which incorporates MN471021, *Work Planning and Control Criteria for Safe Design and Operations*, as required by ESH001.1, *Integrate ES&H into Work Planning and Execution,* and in organizational work planning and control documentation. Expectations for all Members of the Workforce are established through the performance management policy (HR005, *Manage Employee Performance Policy*).

4.1.2 Prioritize Tasks and Allocate Resources

4.1.2.1 Implement Corporate-Level Institutional Processes

ES&H requirements are integrated into the Laboratory Policy System to ensure that resources are effectively allocated to address environmental, safety, and health considerations whenever activities are planned and performed. This includes meeting ISMS safety objectives and performance commitments as well as maintaining the integrity of ISMS. ES&H roles, responsibilities,

accountabilities, and authorities for all Members of the Workforce are defined in ESH001, *Environment, Safety, and Health Policy*. Managers are responsible for ensuring the following:

- Mission work is planned and budgets requested so that hazards are identified and mitigated appropriately, considering business needs as well as health and safety risks.
- Funding is commensurate with the work to be performed.
- Work is planned and completed within established controls, within ES&H requirements, and according to priorities and customer-sanctioned schedules, budgets, and deliverables.

Financial Management policies are articulated in the Laboratory Policy System and apply to all Sandia organizations, all management elements, all Sandia sites, and all Members of the Workforce. The Financial Management policies regulate the conduct of financial and accounting operations, using sound business principles that comply with contractual requirements. All Members of the Workforce are responsible and accountable for managing and safeguarding customer-entrusted assets and demonstrating competent financial stewardship in all activities. Managers are responsible for ensuring that all costs are permissible and allowable. Accordingly, NTESS maintains an accounting system that is integrated with the DOE books of account and ensures that all work performed is consistent with the DOE Approved Funding Program. Members of the Workforce comply with all appropriate DOE financial requirements, including:

- Maintaining an effective system of internal controls
- Developing and maintaining resource-management systems
- Providing efficient financial services
- Providing accurate, timely, reliable, and useful reporting to customers, senior management, as required

PPM001, *Program and Project Management Policy*, defines a standards-based methodology for supporting consistent, effective project management throughout Sandia. Project managers apply this method with a level of rigor appropriate to the project's deliverables, constraints, scope, complexity, and level of risk. The Project Management Lifecycle aligns with industry and government practices while providing project teams with the flexibility needed to ensure effective and consistent project execution, supporting a graded approach based on the project level of rigor and tailored needs. This application results in predictable and successful delivery in a manner that promotes customer confidence for a wide variety of project types.

4.1.2.2 Obtain Environment, Safety, and Health Program Funding

ES&H funding is obtained through Mission Support as part of the Site Support Indirect Cost Pool. Funding is provided through the Overhead Management Budget Office (OMBO), which allocates indirect funds for standardized services, including ES&H programs and services.

As applicable to the program management center, the OMBO Mission Support Team applies resources to achieve customer and stakeholder results using the following criteria:

- Mission Support Team Prioritized Criteria for Baseline Funding Decisions (in funding priority):

  - Core—required for the corporation to exist
  - Essential—required to manage stewardship and compliance risks
  - Desired—reduces risk or adds value across the Laboratories as a whole
  - Optional—provides for specialized or customized needs
  - Supports lean operations (no more than lean)
  - Supports a uniform or standardized set of services
- Mission Support Team Prioritized Criteria for Non-Baseline/Investment Funding Decisions (in funding priority):
  - Law/compliance—reduces corporate risk and/or is a mandated external requirement
  - Directly supports a strategic objective (Mission support strategy map, Breakthrough strategies, and projects)
  - Advances mission areas
  - Paves the way for the future
  - Mitigates future mortgages

Further detail is provided on the Overhead Management Budget Office website, particularly in the OMBO Budget Procedure. The steps of the process by which ES&H receives OMBO funding are as follows:

- The Mission Support business office issues the annual budget call for the following fiscal year to integrated service managers in the May to June timeframe.
- The integrated service managers submit requests for baseline budgets and non-baseline budgets as appropriate via a web-based application.
- Each functional area leader or delegate works with the integrated service managers in the program to obtain additional information as appropriate to understand the priorities of the requests.
- The Mission Support Team reviews all baseline and non-baseline/investment funding requests for funding consideration and budgets for the following year. The Mission Support Team has final authority for mission support budget decisions. Input from independent reviews and other customer feedback is also considered in budget decisions.
- The Mission Support business office distributes the approved budgets to the integrated service managers.
- Approved budgets, milestones, and metrics are documented in approved Integrated Service Agreements.

4.2 Analyze the Hazards

For the second core ISMS function, Analyze the Hazards, work planning requires Members of the Workforce to identify, and analyze hazards to ensure that work can be performed safely. Hazard management begins before a project starts and continues throughout the project's lifecycle. For

activity-level work, details are found in MN471022, *ES&H Manual*, "Work Planning and Control" chapter which incorporates MN471021, *Work Planning and Control Criteria for Safe Design and Operations*, as required by ESH001.1, *Integrate ES&H into Work Planning and Execution.*

4.2.1 Hazard Classification

Through the PHS process, facilities/operations/activities are classified as business occupancy, standard industrial hazard, low hazard, moderate hazard, accelerator, or nuclear. Nuclear hazards are further categorized as 1, 2, or 3.

The required level of safety basis documentation and readiness review is applied with a graded approach commensurate with the hazards, based on the hazard classification. Safety basis documentation includes the PHS for business occupancy and standard industrial hazard classification; the PHS for low-hazard facilities with a corresponding hazard analysis (HA) and/or a stand-alone hazard analysis; the PHS for moderate or accelerator facilities with a required safety assessment; and the PHS for nuclear facilities with required documented safety analyses and related information. For more information, see MN471022, *ES&H Manual,* "Primary Hazard Screening – Safety Basis," "Safety Basis: Accelerators," "Safety Basis: Moderate Hazards and High Hazards," and "Safety Basis: Nuclear" chapters which incorporate MN471017, *Safety Basis Manual.*

In addition, the hazard classification and requirements logic are built into the PHS Software based on the hazard type (e.g., explosives, chemical, or radiological) and follows the criteria from MN471022, *ES&H Manual* chapters cited above covering DOE directives, and consensus codes and standards. The hazard classification requirements logic is determined by the cognizant safety basis SME and the hazard-specific SME.

4.2.2 Report on Environmental Impact

Environmental impact is documented in Annual Site Environmental Reports for the New Mexico, California, Nevada, and Hawaii sites. Reporting includes information on the EMS, including environmental compliance and monitoring activities, and status on sustainability goals from the annual Site Sustainability Plan as implemented through corporate and division objectives and targets. These objectives and targets are communicated to Members of the Workforce to ensure that planned activities address environmental impacts and identify ways to implement the necessary controls.

An important element of the EMS is compliance with NEPA. Members of the Workforce assist DOE in meeting NEPA responsibilities by doing the following:

- Perform internal reviews of proposed actions for potential environmental impacts and document the reviews. The PHS and NEPA modules of Sandia's ISMS software support the evaluation and documentation.
- Incorporate facility operational descriptions, material and effluent quantities, and hazard descriptions into the NEPA review. This helps to ensure that operations remain within the conditions analyzed and identify when proposed actions may lie outside those conditions.

Through the environmental impact analysis included in Sandia's site-wide environmental impact statement, environmental assessments, and NEPA checklists, DOE establishes limits under which Sandia facilities operate. These limits are established from data provided by facility operators based on existing plans or on best estimates of activities performed at the facility (usually projected for five and ten years). DOE has published these limits in site-wide environmental impact statement documents for the New Mexico, California, and Tonopah Test Range sites.

4.3 Develop and Implement Hazard Controls

The third core ISMS function, Develop and Implement Hazard Controls, requires identifying applicable requirements and implementing controls to prevent or mitigate hazards.

Hazard controls are develop based on the following hierarchy:

- Eliminate or provide substitution for the hazard where feasible and appropriate.
- Engineer controls where feasible and appropriate.
- Implement work practices and administrative controls that limit worker exposure to the hazard.
- Wear personal protective equipment.

TWDs identify and communicate hazards and the associated controls so potential safety and environmental impacts are mitigated or prevented. A TWD identifies the steps necessary to perform the technical aspects of the work. TWDs are required to comply with requirements inESH001.1, *Integrate ES&H into Work Planning and Execution.*

TWDs require management approval, are developed as needed to implement hazard controls, conduct final preparedness verification, and garner management authorization for work to proceed. Details are found in ESH001.1, *Integrate ES&H into Work Planning and Execution* with additional guidance in the *Writer's Guide to Technical Work Documents.*

4.3.1 Establish the Safety Envelope

A safety envelope is the range of conditions covered in appropriate documentation to ensure safe operations. Safety envelopes are applicable to all activities at Sandia sites. MN471022, *ES&H Manual*, "Primary Hazard Screening – Safety Basis," "Safety Basis: Accelerators," "Safety Basis: Moderate Hazards and High Hazards," and "Safety Basis: Nuclear" chapters which incorporate MN471017, *Safety Basis Manual,* as required by ESH001.1, *Integrate ES&H into Work Planning and Execution,* and contains information related to establishing a safety envelope and the process for obtaining NTESS or DOE authorization for activities, operations, and facilities.

4.3.2 Identify Applicable Requirements

The Prime Contract, Clause I-19, DEAR 970.5204-2, *Laws, Regulations, and DOE Directives* requires Members of the Workforce to comply with two categories of requirements:

- All applicable federal, state, and local laws and regulations
- All DOE directives agreed to by the Prime Contract Department and the DOE/NNSA/SFO contracting officer that are identified in the Prime Contract, Section J, Appendix B, "List of Applicable Directives and NNSA Policy Letters." NTESS shall also comply with Operating Requirements identified in Appendix B.

PC001.2, *Modify Baseline Directives*, defines the process for reviewing and implementing draft modifications—including additions, deletions, and cancellations—to the List of Applicable Directives and NNSA Policy Letters, as found in Section J, Appendix B of the Prime Contract. It allows for a unified NTESS response to requests for comments on draft DOE Directives and NNSA Policy Letters.

ES&H requirements for performing work are identified in ESH001, *Environment, Safety, and Health Policy*. Requirements applicable to ES&H program operations are communicated through program description documents and other appropriate mechanisms.

Organizations may customize program-level requirements from the ES&H policy into activity-specific requirements. Tools supporting customization include output from the ISMS software (i.e., a PHS or a hazard analysis), JSAs, and TWDs.

4.3.3 Implement Controls

Work safety controls include hazard elimination, design, engineered controls, and administrative controls (e.g., TWDs, warning signs, or ES&H training). At Sandia, eliminating hazards or implementing controls is accomplished primarily through engineering design and improvements, TWDs, training, high levels of Member of the Workforce involvement, and SME and ES&H coordinator support. See Section 4.3 for the hierarchy of controls.

4.4 Perform Work within Controls

The fourth core ISMS function, Perform Work within Controls, involves performing work safely in accordance with established controls. Controls may include engineered controls, administrative controls, and personal protective equipment (Section 4.3). MN471022, *ES&H Manual*, "Work Planning and Control" chapter incorporates MN471021, *Work Planning and Control Criteria for Safe Design and Operations,* as required by ESH001.1, *Integrate ES&H into Work Planning and Execution,* and presents the steps to complete TWDs, perform a final JSA, confirm team training and qualifications, and conduct a readiness review.

4.4.1 Execute Work

The following activities are completed to ensure readiness to execute work:

- Confirm that the first three core ISMS functions (Define the Scope of Work, Analyze the Hazards, and Develop and Implement Hazard Controls) have been performed.
- Define and implement the safety envelope and its controls and ensure that the envelope and controls remain operational (e.g., no new hazards are encountered, equipment remains functional, Members of the Workforce training remains in compliance, and Members of the Workforce are aware of and follow requirements that are documented in TWDs or other documented policies and procedures).
- Conduct an appropriate readiness review to assure that work can be performed safely.
- Implement conduct of operations appropriate to the work.
- Pause work if the scope of work changes such that new hazards or environmental risks are introduced until revised work planning, hazard, and environmental impacts are analyzed, and any additional controls that are required are documented, approved, implemented, and verified as being effective.

Sandia personnel meet the conditions to execute work by complying with:

- EM001, *Emergency Planning and Response for Members of the Workforce Policy*
- ESH001, *Environment, Safety, and Health Policy*
- ESH001.1, *Integrate ES&H into Work Planning and Execution*, which requires compliance with MN471022, *ES&H Manual*
- GGR001, *Governance and Management System Policy*

4.4.2 Finalize Work

Activities that bring completed work to final closure and acceptance include, for example, post-work operability testing or verification if required, acceptance of completed work by the customer, closing out work packages or work documents in accordance with organizational policies and practices, or developing and disseminating any required reports or papers associated with the work.

4.4.3 Stop Work

All Members of the Workforce have the responsibility and authority to stop or suspend work because of a reasonable belief that the work poses an imminent risk of death, serious physical harm, harm to the environment, or other adverse consequence as described in ESH001, *Environment, Safety, and Health Policy*. It states in part:

> Members of the Workforce must:
>
> - Communicate concerns to the person(s) performing the work.

- If a concern or concerns are not alleviated by explanation or other means provided by the Member(s) of the Workforce performing the work, tell the Member(s) of the Workforce to stop the work activity until that Member of the Workforce's manager or that contractor's SDR directs them to restart their work.
- Whether the work continues or not, inform the following Members of the Workforce so they can take appropriate follow-up action:
  - Appropriate manager and the appropriate ES&H coordinator.
  - SDR (for contracted personnel).
  - Space owner or equipment owner.

In addition, ISCM001.9, *Administer a Subcontract*, states that during required pre-job briefings with onsite subcontractors for contracted activities, the SDR or designee in consultation with SMEs will discuss applicable hazards, mitigations, controls, and site conditions, and their stop work authority. This responsibility and authority is flowed down within contractual documentation for all subcontractors.

4.5 Provide Feedback and Continuous Improvement

The fifth core ISMS function, Provide Feedback and Continuous Improvement, involves gathering feedback information on the adequacy of controls, identifying and implementing opportunities for improving the definition and planning of work, conducting line and independent oversight, and, if necessary, addressing regulatory enforcement. Details are found in MN471022, *ES&H Manual,* as required by ESH001.1, *Integrate ES&H into Work Planning and Execution.*

4.5.1 Provide Feedback on Lessons Learned and Best Practices

Institutionally, CA002, *Performance Monitoring Policy*, describes the requirements for implementing a Lessons Learned, Best Practices Program. The Lessons Learned Program's goal is to prevent adverse operating incidents and facilitate the sharing of good work practices among Members of the Workforce. Successful integration of the Lessons Learned Program enhances mission accomplishment, safety, security, and the probability of quality outcomes.

Monthly Operational Management Reviews are an important element of the feedback and improvement process (Section 4.5.3). This review process incorporates data from multiple data systems and is analyzed and presented at the Operational Management Reviews to evaluate current issues and trends, and to determine whether action needs to be taken.

The ES&H website directs Members of the Workforce in line organizations to ES&H program information. The site provides access to a wide variety of information, including ES&H news and announcements, occurrence information, lessons learned, changes to requirements, and performance measures, as well as the opportunity to report an ES&H issue.

4.5.2 Provide Feedback on the Adequacy of Hazard Controls

Sandia personnel gather different types of information on the adequacy of hazard controls from various sources, including:

- Corporate and division performance measures
- Self-assessments (e.g., line self-assessments, program self-assessments, management surveillances, or internal independent assessments)
- External assessments
- Events (e.g., environmental releases, injuries, or occurrence reports)
- Lessons learned
- Comparison activities (benchmarking)

In addition, Members of the Workforce may provide input on events and facility conditions through a number of methods, including but not limited to:

- ES&H coordinators or SMEs
- Management chain
- Lessons Learned Program
- Service requests to Facilities and Emergency Management Center for facilities-related issues requiring immediate resolution
- Facilities and Emergency Management Center building operations and maintenance contacts
- Union ES&H representative(s) or coordinator(s) for union-represented employees

Data are reported and/or collected through various avenues, including the Assurance Information System (AIS), the Occurrence Reporting and Processing System, the 311 Sandia-Wide Notification Process (triggered by calling 311 for non-emergency E&H concerns), and other databases.

ES&H Performance Assurance Program personnel analyze self-assessment data on a regular basis. Should any potential issues be identified, they are presented to the ES&H leadership team, which determines the appropriate action for the issue. In some cases, the issue is referred to the Senior Leadership Team.

4.5.2.1 Implement Line Self-Assessments

The effectiveness of ISMS implementation is gauged through self-assessments performed by line management, by measures and metric data, and by management reviews or management surveillances. Assessments are conducted in accordance with ESH001.1, *Integrate ES&H into Work Planning and Execution* and CA002.1, *Conduct Internal Assessments*. Self-assessments can vary in scope, frequency, and rigor depending on the programmatic and ES&H hazards and risks associated with organizational activities. ES&H coordinators participate in many of the management surveillances.

4.5.2.2 Implement Environment, Safety, and Health Program Self-Assessments

ES&H programmatic self-assessments are conducted in accordance with CA002.1, *Conduct Internal Assessments*. Self-assessment plans and results are recorded in AIS. The types of assessments performed by ES&H personnel include assessments of ES&H organization performance, policy adequacy, and Sandia-wide policy implementation.

An annual internal assessment of the Environmental Management System determines whether it conforms to the ISO 14001 standard and ensures that it is properly implemented and maintained. ES&H personnel maintain an internal procedure, AOP 09-07, *Environmental Management System Internal Audit*, for conducting these assessments. The scope of these internal assessments includes a review of documentation and a dialogue with line managers, SMEs, and other Sandia personnel who have responsibilities for implementing the Environmental Management System in various functional areas, including:

- Laboratory (research and development, manufacturing, heavy computer, or shop)
- Administrative (office buildings, cafeteria, medical)
- Maintenance (custodial, facilities, construction, decontamination and demolition)
- Logistics (shipping and receiving, fleet services, reapplication)
- Waste management facilities

4.5.2.3 Conduct Internal Independent Assessments

Internal assessments are conducted by the Independent Audit, Ethics and Business Conduct Center, which is organizationally independent and reports directly to senior management and the Board of Managers. Center personnel support the Senior Leadership Team in fulfilling their oversight responsibilities by monitoring the adequacy, effectiveness, and performance of management systems and controls in meeting ES&H, quality, and safeguards and security requirements and expectations as described in IAEB004, *Respond to and Support Audits Policy*. Special internal independent ES&H assessments may also be performed at the request of upper management, a program owner, or an organization manager. An assessment may focus on a specific line organization or on a specific program. Findings and issues from internal independent assessments are entered into AIS in accordance with CA001.2, *Identify and Manage Issues*.

4.5.2.4 Conduct External Assessments

Additional oversight is provided through external assessments performed by groups such as DOE/NNSA: the DOE Office of Enterprise Assessments, including the Office of Enforcement; the DOE Chief of Defense Nuclear Safety; the U.S. Department of Transportation; the DOE Inspector General; the General Accounting Office; ISO 14001 auditors; and, state and local agencies.

4.5.2.5 Manage Corrective Actions

Self-assessment plans and execution and the observations and findings (low, medium, and high risk), external audit findings, and corporate ES&H findings are entered and tracked in AIS. Action owners

are responsible for ensuring that appropriate solutions are implemented and later validated for effectiveness and sustainability.

4.5.3 Manage Issues

CA002.3, *Management Review Process*, describes the requirements for planned management reviews as directed by executive management and defined in ISO 9001:2008, *Quality Management Systems—Requirements*. This process provides for quick communication or rapid escalation of issues.

The monthly Operational Management Review is a venue to address operational issues, risks, accomplishments, and other qualitative and quantitative key performance indicators. The review also provides a format for reviewing performance with the NTESS Board of Managers. This group reviews ES&H-related incidents, assessments, risks, and performance reports to identify issues and trends. Based on these data, direction is provided on how to handle the identified trend or issue. Issues that are within the scope of ES&H are handled by the program owner or the SME. Issues that are outside the scope of ES&H or require corporate attention are elevated or assigned as appropriate.

For ES&H topics, the Safety and Security Regulatory Support Program personnel identify and evaluate issues, assessments, and trends to determine whether there are in compliance with the DOE contractor employee protection program, nuclear, occupational radiation protection, beryllium or worker safety rules (10 CFR 708, 10 CFR 830, 10 CFR 835, 10 CFR 850, 10 CFR 851, respectively), and report to the DOE Non-Compliance Tracking System as necessary. Reporting to the Non-Compliance Tracking System is conducted in accordance with PG470208, *Safety and Security Regulatory Support Program*, and PG470223, *Interaction with the Defense Nuclear Facilities Safety Board.*

The Enforcement Coordinator manages the Safety and Security Regulatory Support Program and the organization responds to information requests, coordinated in conjunction with DOE/NNSA/SFO, from the DOE Office of Enforcement. In addition, this organization represents NTESS during DOE Office of Enforcement site visits and enforcement actions; serves to provide proactive communication between NTESS, the DOE/NNSA/SFO and DOE Office of Enforcement; coordinates a response to reports, enforcement letters, enforcement actions; and, attends DOE complex-wide meetings, workshops, and the Energy Facility Contractors Group (EFCOG) working groups. Finally, the Defense Nuclear Facilities Safety Board Project Lead resides in this organization.

4.5.4 Provide Performance Measurements

4.5.4.1 Manage Safety Performance Objectives, Measures, and Commitments

As required by DEAR 970.5223-1, *Integration of Environment, Safety, and Health into Work Planning and Execution*, Sandia personnel annually review, update, and develop new safety performance objectives, measures, and commitments consistent with and in response to the DOE program and budget execution guidance and direction and in accordance with the Quality Management System. Proposed performance objectives, measures, and commitments are included in Sandia's annual *ISMS Effectiveness Review*, which is submitted to DOE/NNSA/SFO. Sandia's performance is tracked via

corporate assurance tools and correspondence between Sandia SMEs and DOE/NNSA/SFO personnel. In addition, and in response to safety-related issues, Sandia personnel execute corrective action plans to address deficiencies and/or improvement opportunities identified during internal and external assessments. Progress and execution of corrective action plans is managed and tracked using AIS.

Performance measures pertinent to specific individuals or programs are incorporated into general management responsibilities, individual performance management forms, and project plans. High-level corporate ES&H objectives are established by executive management, with input from the ES&H program functional managers, DOE/NNSA/SFO, and Board of Managers, and reported through the corporate performance scorecard on a monthly basis. The Performance Scorecard and the EBI Portal are used to track the following metrics:

- Days Away Rate
- Days Away, Restricted, or Transferred Case Rate
- Total Recordable Case Rate
- Ratio of nonrecordable cases to total recordable cases

4.5.4.2 Monitor Data

Personnel monitor and report performance of ES&H operations. Monitored items include, for example, water discharges, Members of the Workforce exposure to occupational radiation, and Members of the Workforce occupational injuries and illnesses (e.g., Days Away, Restricted, or Transferred Case Rate, Total Recordable Case Rate, and other Occupational, Safety, and Health Administration metrics). The EBI Portal provides the current status of ES&H metrics and current ratings.

DOE/NNSA/SFO conducts an annual review of performance against a Performance Evaluation Plan, which is documented in an annual Performance Evaluation Report.

4.5.5 Identify and Implement Opportunities for Improving Safety Management

Members of the Workforce identify data about events that support opportunities for continuous improvement through reporting as defined in MN471022, *ES&H Manual*, "ES&H Reporting" chapter, as required by ESH001.1, *Integrate ES&H into Work Planning and Execution.*

Primary methods for identifying opportunities for improvement include analysis of ES&H information using various qualitative and quantitative methods and investigation and analysis of events, including occurrences. These investigations are conducted by following CA001.2, *Identify and Manage Issues.*

Implementing mechanisms for improvement opportunities include: completing corrective actions that result from formal and informal investigations and self-assessments, validating effectiveness and sustainability of the actions implemented for formal assessments, implementing executive

management direction based on review of corporate milestones, and reviewing employee performance.

Resources

Related Laboratory Policies and Processes

- CA001, *Enterprise Risks, Opportunities, Issues Management Policy*
- CA001.2, *Identify and Manage Issues*
- CA002, *Performance Monitoring Policy*
- CA002.1, *Conduct Internal Assessments*
- CA002.3, *Management Review Process*
- EM001, *Emergency Planning and Response for Members of the Workforce Policy*
- ESH001, *Environment, Safety and Health Policy*
- ESH001.1, *Integrate ES&H into Work Planning and Execution*
- Financial Management policies and processes
- GGR001, *Governance and Management Structure Policy*
- HR001, *Implement a Strategic Workforce Planning Approach Policy*
- HR002, *Acquire Talent Policy*
- HR003, *Employee Development Policy*
- HR005, *Manage Employee Performance Policy*
- IAEB004, *Respond to and Support Audits Policy*
- ISCM001.5, *Purchase Requisition and Purchase Order*
- ISCM001.9, *Administer a Subcontract*
- PC001.2, *Modify Baseline Directives*
- PPM001, *Program and Project Management Policy*
- PRM001, *Policy and Requirements Management Policy*
- QA001, *Quality Assurance Policy*

References: Internal

- AOP 09-07, *Environmental Management System Internal Audit*
- MN471017, *Safety Basis Manual*
- MN471021, *Work Planning and Control Criteria for Safe Design and Operations*
- MN471022, *ES&H Manual*
- PG470208, Safety and Security Regulatory Support Program
- PG470222, *Environmental Management System Manual*
- PG470223, Interaction with the Defense Nuclear Facilities Safety Board
- PG470246, *10 CFR 851 Worker Safety and Health Program (WSHP)*
- TBP-901, *Integrated Safety Process for Nuclear Weapons Operations and Facilities*

References: External

- 10 CFR 830, *Nuclear Safety Management*
- 10 CFR 835, *Occupational Radiation Protection*
- 10 CFR 851, *Worker Safety and Health Program*
- DEAR 970.5223-1, *Integration of Environment, Safety, and Health into Work Planning and Execution*
- DOE G 450.4-1C, *Integrated Safety Management System Guide*
- DOE O 414.1D Admin Chg 1, *Quality Assurance*
- DOE O 436.1, *Departmental Sustainability*
- DOE P 450.4A Chg 1, *Integrated Safety Management Policy*
- ISO 9001:2008, *Quality Management Systems—Requirements*
- ISO 14001, *Environmental Management*