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**Ames Laboratory
Integrated Safety Management System (ISMS)
Policy and Plan**

The Ames Laboratory Integrated Safety Management System (ISMS) Policy and Plan documents the primary systems, programs, plans, policies, and processes employed to support the principles and functions of the Department of Energy’s Policy 450.4A, *Safety Management System Policy* and Executive Order 13693, *Planning for Federal Sustainability in the Next Decade*. It also encompasses the Ames Laboratory Worker Safety and Health program, and thereby documents the methods for implementing Subpart C of 10 CFR Part 851, *Worker Safety and Health* program.

TABLE OF CONTENTS

Title Page and Table of Contents.....	1
Director’s Statement – ISMS Policy Statement.....	2
1.0 Approval Record.....	3
2.0 Revision/Review Information	3
3.0 Executive Summary.....	3
4.0 Purpose and Objectives	5
5.0 Flow Down of Laboratory Safety Requirements.....	6
6.0 Integration of Laboratory Safety Requirements	7
7.0 Roles, Responsibilities, and Expectations.....	8
8.0 Integrated Safety Management (ISM) System Implementation.....	10
8.1 Background.....	10
8.2 ISM Guiding Principles.....	10
8.3 ISM Core Functions	15
8.4 Annual ISM Maintenance and Continuous Improvement Processes	23
9.0 Worker Safety and Health Program Implementation	24
9.1 Overview, Purpose and Scope.....	24
9.2 Gap Analysis.....	24
9.3 Program Requirements and Implementation	25
9.4 Variances.....	32
10.0 Additional Information.....	32
10.1 References.....	32
10.2 Appendices	32
 Appendix A, Major Program Elements	 A-1
Appendix B, Crosswalk of 10 CFR Part 851 and ISMS System	B-1



Contact Person	Sean Whalen
Document	Plan 10200.016

Revision	14.1
Effective Date	3/15/2016
Review Date	1/1/2017

Ames Laboratory Integrated Safety Management System Policy Statement

Ames Laboratory has a strong commitment to the safety and health of each Laboratory employee. The Laboratory is committed to preventing accidental loss of resources and assets and protecting the general public and the environment through the prevention of pollution, property loss, or damage to the environment. Therefore, it is our goal to eliminate foreseeable hazards and maintain a safe and healthful workplace through continual improvement. In addition, complying with applicable Laboratory Contract requirements, Department of Energy Orders, and regulatory standards is a prerequisite for conducting Laboratory business and the responsibility of each employee.

In order to accomplish these goals, the Laboratory has incorporated the principles of Integrated Safety Management (ISM) and the practices of an Environmental Management System (EMS) into an Integrated Safety Management System (ISMS). Our Integrated Safety Management System provides mechanisms to ensure that we incorporate safety and environmental management into all aspects of our work, from planning to completion.

Each employee must participate through compliance with the Laboratory's environmental, safety and health requirements. Each level of line management has the responsibility to consider the impacts of their activities on the environment and workplace, and to support the performance and continuous improvement of effective safety and environmental practices, such as pollution prevention. This "team" effort is necessary to achieve a safe and productive research laboratory.

Dr. Adam Schwartz, Director
Ames Laboratory

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

1.0 APPROVAL RECORD

- Reviewed by: Document Control Program Assistant (Molly Granseth)
- Approved by: Quality Assurance Manager & ESH&A Manager (Sean Whalen)
- Approved by: Chief Operations Officer (Mark Murphy)
- Approved by: Legal Counsel (Barbara Biederman)
- Approved by: Associate Director for Sponsored Research Administration (Deb Covey)
- Approved by: Assistant Director for Scientific Planning (Cynthia Jenks)
- Approved by: Chief Research Officer (Duane Johnson)
- Approved by: Deputy Director (Tom Lograsso)
- Approved by: Laboratory Director (Adam Schwartz)

The official approval record for this document is maintained in the Training & Documents Office, 105 TASF.

2.0 REVISION/REVIEW INFORMATION

The revision description for this document is available from and maintained by the author.

3.0 EXECUTIVE SUMMARY

Ames Laboratory is a government-owned, contractor-operated (GOCO) national laboratory operated by Iowa State University (ISU), in Ames, Iowa, and is physically integrated into the ISU campus. The Ames Laboratory enjoys international recognition in such fields as condensed-matter physics, analytical chemistry, materials science, solid-state inorganic chemistry, catalytic science, instrument development, and cluster computing.

Ames Laboratory maintains approximately 330,000 gross square feet of government-owned buildings. The Laboratory is situated on land under long-term lease to the Federal Government from ISU and consists of 13 buildings, including four laboratory buildings, one office building, three shop buildings, and five storage buildings.

The unique contractor/national laboratory relationship between ISU and Ames Laboratory generates great efficiencies while simultaneously enhancing quality. Because of its integration with the University, the Ames Laboratory does not have its own roads, library, cafeteria, fire department, police department, sewage system, etc. Also, many of the utility generation and distribution systems are provided and maintained as part of the contractor's campus infrastructure. The Laboratory purchases steam and chilled water from the University; therefore, the Laboratory does not have to maintain large chillers or boiler plants.

The Laboratory also utilizes space in University-owned buildings adjacent to the Laboratory through a space utilization agreement. This is not a lease arrangement, but rather recognition of the collaborative efforts between the Laboratory and the University in individual spaces that allows both parties to leverage their effectiveness, flexibility, and capabilities through sharing resources.

The Ames Laboratory Integrated Safety Management System Policy Statement communicates the goal of conducting all activities in a safe manner with a supporting objective to maintain full compliance with pertinent environment, safety and health (ESH&A) regulations, requirements, and standards, and to continuously improve the effectiveness and efficiency of ESH&A processes. This goal and objective are the foundation of the Ames Laboratory's Integrated Safety Management System (ISMS), as described in Section 4.0. The Laboratory's ISMS also

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

encompasses the Laboratory's Environmental Management System (EMS) and requirements of 10 CFR Part 851, *Worker Safety and Health Program* (the rule). This document provides a roadmap of the Laboratory's safety management program and provides documentation of the *Worker Safety and Health Program*.

The Ames Laboratory's mechanisms for ensuring the appropriate flow down of requirements to contractors and visitors are described in Section 5.0. The Laboratory's safety management approach and its policies, plans, and procedures integrate the requirements for the [Environment, Safety, Health and Assurance \(ESH&A\) Program](#), [Quality Assurance Program](#), and [Contractor Assurance System \(CAS\)](#), as detailed in Section 6.0.

Roles, responsibilities, and expectations have been established to facilitate line management's fulfillment of the principles and functions of Integrated Safety Management (ISM), as presented in Section 7.0. The ISMS also includes ESH&A performance measures for line management and periodic individual employee performance evaluations. Additionally, peer reviews and regular performance audits by the Department of Energy (DOE) Ames Site Office evaluation teams are utilized to identify improvement opportunities. The development of the Laboratory's ISMS mechanisms was undertaken according to the guiding principles of ISM, as described below and in Section 8.0.

The DOE established seven principles to guide implementation of ISMSs, as defined in [DOE P 450.4A Safety Management System Policy](#). Within the ISM hierarchy, these seven principles describe the environment or context for work activities. Ames Laboratory has integrated safety into all levels of management and work practices so that the Laboratory's mission can be accomplished while protecting workers, the public, and the environment. This objective is fulfilled through a system of programs, policies, procedures, and practices based on the following guiding principles of ISM:

- *Line management responsibility for safety*
- *Clear roles and responsibilities*
- *Competence commensurate with responsibilities*
- *Balanced priorities*
- *Identification of safety standards and requirements*
- *Hazard controls tailored to work being performed*
- *Operations authorization*

The Ames Laboratory safety culture is mature and reflects the supplemental safety culture elements described in Section 8.2. The ISMS fully and effectively implements DOE's Integrated Safety Management Policy. Continuous improvement and feedback mechanisms provide assurance that Laboratory safety-related efforts maintain effective and efficient implementation of DOE requirements.

The Ames Laboratory has documented the compliance mechanisms for its Worker Safety and Health program in Section 9 and Appendices A and B.

4.0 PURPOSE AND OBJECTIVES

This document describes Ames Laboratory's efforts to perform work according to a safety management and environmental management system in support of the principles and functions described in DOE's [Safety Management System Policy](#) (450.4A) and Executive Order 13693, [Planning for Federal Sustainability in the Next Decade](#). These systems comprise the Laboratory's Integrated Safety Management System.

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

The Laboratory's ISMS is required by Clause I.126 of Ames Laboratory Contract DE-AC02-07CH11358 (DEAR 970.5223-1 *Integration of Environment, Safety and Health into Work Planning and Execution [DEC 2000]*). The Laboratory's Environmental Management System (EMS) is required by Executive Order 13693, [Planning for Federal Sustainability in the Next Decade](#). In accordance with the [Worker Safety and Health Program](#) (10 CFR Part 851), the documentation requirements for the Ames Laboratory Worker Safety and Health program are addressed by this description. Although the scope of 10 CFR Part 851 does not address radiological and environmental hazards associated with the Laboratory's activities, the Laboratory's ISMS includes environmental and radiological hazards. Requirements from 10 CFR Part 851 are limited to employee protection from workplace safety and health hazards.

This document provides a road map of the Laboratory's policies and practices that establish an environment in which safety activities and functions are an integral part of the Laboratory's mission. This document does not specifically list all of the Laboratory's safety or environmental related requirements, but rather roadmaps the primary mechanisms. Within the context of this ISMS Description the term "safety" is defined to encompass ESH&A, including pollution prevention considerations. Ames Laboratory integrates safety into management and work practices at all levels so that its mission is accomplished while protecting workers, the public, and the environment. This objective is fulfilled through a system of programs, policies, procedures, and practices based on the guiding principles of ISM and the Laboratory's [Quality Assurance program](#). The Ames Laboratory work activities that can potentially affect workers, the public, or the environment are defined, analyzed, developed, performed, and reviewed according to the Laboratory's ESH&A programs and practices.

The Ames Laboratory's programs, policies, procedures, and practices are the mechanisms of the Laboratory's ISMS. The Laboratory has a history of an organized, supportive safety culture built upon sound safety practices and open communication of safety concerns among all levels of line management. This culture and consistent management commitment prove to be a sound foundation for an Integrated Safety Management System.

5.0 FLOW DOWN OF LABORATORY SAFETY REQUIREMENTS

The Worker Safety and Health rule defines a contractor as "any entity, including affiliate entities, such as a parent corporation, under contract with DOE, including a subcontractor at any tier, with responsibility for performing work at a DOE site in furtherance of a DOE mission." The requirements of the rule and flow down of ESH&A requirements have implications for both subcontractor personnel and visitors. Ames Laboratory periodically hosts visitors including official tours, visiting scientists, consultants, university students, vendors, and government officials. The Laboratory's ISMS provides mechanisms by which the Laboratory applies requirements to subcontractors and visitors.

Ames Laboratory does not have on-going subcontractor personnel performing work for standard services, such as custodial services, plant protection forces, or emergency response services. Rather, the Laboratory occasionally utilizes short duration subcontractor services such as instrumentation repair, asbestos removal, and chemical waste disposal. Subcontractor personnel are typically on-site for a few days. The Laboratory's mechanisms for flow down of ESH&A requirements to subcontractors are primarily the [Subcontractor Oversight \(On-Site\) Procedure](#) (Procedure 10200.046) and the terms and conditions in the subcontracts or purchase orders. The subcontractor oversight program is based on the philosophy that all subcontractor personnel are entitled to the same safety rights and have the same responsibilities as Ames

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

Laboratory personnel while on-site. Prior to proceeding with any service or vendor work activity, the Ames Laboratory point-of-contact and subcontractor are responsible for discussing workplace hazards and implementing controls. These safety interactions can consist of a safety briefing, facility walk-through, or on-going surveillance by the point-of-contact or the safety specialists in the ESH&A office. Subcontractors are encouraged to be participants in the safety program by reporting all unsafe work practices or conditions and all work-related injuries and illnesses that occur during on-site work.

The flow down of ESH&A requirements to visitors is described in the [Visitor Guide](#) (Guide 10200.001). With the exception of employees and associates who have received General Employee Training, all persons entering Ames Laboratory are considered visitors. Visitors working within the facility are the responsibility of their host and are to be accompanied at all times until activity/area specific training has been received. Training typically includes a discussion of salient safety and security concerns including use of personal protective equipment, entry into regulated areas, location of safety equipment and emergency notification mechanisms.

6.0 INTEGRATION OF LABORATORY SAFETY REQUIREMENTS

The Ames Laboratory has an organized, supportive safety culture built upon sound safety practices and open communication of safety concerns within line management. This culture is an effective foundation for the Laboratory's ISMS and is supportive of its Worker Safety and Health program. ISMS and the Worker Safety and Health rule require that the Laboratory's safety program describe how requirements are integrated. Ames integrates and implements Worker Safety and Health rule requirements and other program requirements within the broad principles and functions of its ISMS. The primary systems that support the Ames Laboratory ISMS are summarized below.

Environment, Safety, Health and Assurance (ESH&A) Program:

ESH&A processes are documented in the Laboratory's [Environment, Safety, Health and Assurance Program Manual](#) (Manual 10200.002). It incorporates the requirements of standards referenced in the Laboratory's contract clauses and DOE directives with the processes for quality assurance and training. It is also supportive of the Laboratory's safety processes as referenced in the ISMS and Worker Safety and Health program. The *ESH&A Program Manual* also addresses 10 CFR Part 835 *Occupational Radiation Protection Program* requirements. Major topical programs of this manual include: Introduction, Quality Assurance, Training, Industrial Hygiene, Industrial/General Safety, Environmental Protection, Radiological Protection, Fire Protection, Emergency Preparedness and Site Security, and Assessments. Additional manuals, plans, and procedures provide detailed program requirements.

Quality Assurance (QA) Program:

In addition to the Quality Assurance program description provided by the *ESH&A Program Manual* in fulfillment of 10 CFR 830 Subpart A, an Ames Laboratory [Quality Assurance \(QA\) Program Plan](#) (Plan 10200.026) was developed and approved by DOE. The integration of QA into Ames Laboratory's business, safety, security, and assurance processes is based on DOE's quality assurance criteria. QA is implemented in a manner that provides reasonable assurance of adequate protection of workers, the public, and the environment from adverse consequences, taking into account the work to be performed and associated hazards. Ames Laboratory does not apply requirements uniformly across all activities; rather, the Laboratory's QA mechanisms are structured to provide a level of planning, documentation, and work control processes commensurate with the hazard and risk characteristics of the activity, including:

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

safety, safeguards and security, life cycle issues, and programmatic mission. The QA program elements are integrated into the operational aspects of environment, safety, and health; safeguards and security; cyber security; emergency management; and business operations.

Contractor Assurance System (CAS):

The [Ames Laboratory Contractor Assurance System \(CAS\) Description](#) (Plan 40000.006) describes assurance mechanisms with proven track records that support the Laboratory-wide oversight process to ensure compliance with applicable requirements, pursue excellence through continuous improvement, provide for timely identification and correction of deficient conditions, and verify the effectiveness of completed corrective actions.

Safety Coordinator and Representative Program

Employee involvement in the ESH&A program is critical to the goal of providing a safe and healthful workplace. The Laboratory's Safety Coordinator and Representative program is designed to facilitate communication on workplace health, safety and environmental issues between Laboratory personnel and the ESH&A office. Specific responsibilities for successful implementation of this program are included in the [Safety Coordinator & Representative Program Plan](#) (10200.009).

7.0 ROLES, RESPONSIBILITIES, AND EXPECTATIONS

The following roles, responsibilities, and expectations of the Ames Laboratory support the *Ames Laboratory Integrated Safety Management System Policy Statement* (see page 2).

Laboratory Director and Deputy Director

The Laboratory Director is ultimately responsible for assuring that a safe and healthful workplace is provided for employees, protecting the environment and the public, minimizing or eliminating hazards to government property, and complying with applicable ESH&A regulations. The Laboratory Director delegates ESH&A responsibilities to the line organization through division/institute/program directors and department managers (herein referred to as program directors). The Laboratory Director utilizes a periodic Director's message sent via email to all employees to communicate feedback (positive or negative) at the Laboratory. The Laboratory Director also has the authority and responsibility to call mandatory all-hands meetings to provide feedback on events and to communicate actions to be taken for continuous improvement. The Director assigns staff, policy, and advisory functions related to ESH&A to the ESH&A office. The Deputy Director acts on behalf of the Director when the Director is away on travel, or as otherwise delegated.

Program Directors

Program directors have responsibility for assuring the implementation of program/department ESH&A processes under their authority. Program directors shall assure that group leaders implement, maintain, and document the ESH&A program within each group. Program directors are responsible for appointing a safety coordinator. The safety coordinator serves as a liaison between the division, program, or department and ESH&A and also serves as an ESH&A information resource for departmental personnel.

Group Leaders

Group leaders function as first line managers responsible for day-to-day operational oversight of safety in their areas. Group leaders are responsible for implementing the programs described in the *ESH&A Program Manual*. To determine which sections apply to their activities, group leaders will read the applicability statements, understand and implement the program information,

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

complete the appropriate training, and complete the tasks listed on the “performance checklist” Group leaders receive training on their roles and responsibilities via the training courses, *Ames Laboratory Group Leader Training (AL-198)* and *Readiness Review Procedure Training (AL-240)*. Group leaders shall ensure that all employees are properly trained in accordance with the provisions of each subject area and that they have supporting training documentation that is retained for five years after employment. Group leaders may designate a safety representative to assist with ESH&A program implementation.

Safety Coordinators/Safety Representatives

Safety coordinators/representatives shall perform the functions as specified in the [Safety Coordinator & Representative Program Plan](#) (10200.009) as appropriate for the individual division/program or group.

Employees

Employees are responsible for:

- Following established standard operating procedures when performing their work;
- Completing group/activity-specific training with their supervisor or his/her designee prior to conducting any work at the Ames Laboratory;
- Asking questions about standard operating procedures until they are thoroughly understood; and
- Reporting unsafe work conditions to their supervisor or ESH&A, as appropriate.

Information regarding employee responsibilities for specific ESH&A subject areas is detailed in the *ESH&A Program Manual*. Employees are responsible for reading and understanding pertinent sections of the program manual. Employees are also responsible for ensuring the safety of visitors to the Laboratory. Whenever possible, visitors should be excluded from areas of potential hazard. Visitation discussions should be held in offices or conference rooms.

Line Management

Line management is defined as any management level within the Laboratory, including division, program, and institute directors, department managers, group leaders, and supervisors that are responsible and accountable for directing and conducting work. ISM performance expectations for line management are defined as follows:

- 1) Define the Scope of Work
 - Identify new or significantly modified activities during the planning of work associated with the *Unified Field Budget and Work Authorization System (WAS Call)*, [Preliminary Proposal Form](#) (Form 10100.001), and *Service Order Requisitions* (Form 46200.036)
 - Utilize [Position Descriptions](#), [Hazard Inventory](#), [Training Needs Questionnaire](#), or other documentation to define significant safety roles, responsibilities and expectations for new and significantly modified job assignments
- 2) Analyze the Hazards
 - Identify hazards associated with new or significantly modified activities via the [Readiness Review Hazard Identification Checklist](#) (Form 10200.003) and review these hazards with the safety coordinator/representative and ESH&A in accordance with the requirements developed by the Safety Review Committee

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

- Develop and maintain skills necessary to analyze hazards associated with work tasks through participation in related safety training
 - Utilize the [Hazard Inventory](#), [Training Needs Questionnaire](#) or a group template to document the safety hazards related to roles, responsibilities, and expectations for new and significantly modified job assignments
- 3) Develop and Implement Hazard Controls
- Develop and implement hazard controls to assure work is performed safely and consistent with the Ames Laboratory safety policies, procedures, and requirements, including controls required as part of the [Readiness Review Procedure](#) (Procedure 10200.010) or identified deficiencies
 - Assure workers have received appropriate safety and awareness training before performing work
 - Utilize supervisory relationships, such as mentoring, and/or develop job/activity specific requirements to assist employees with control of hazards
- 4) Perform Work within Controls
- Utilize the *Readiness Review* and the *Service Order Requisition* processes to document line management's approval of activities
 - Perform work within the controls developed during activity reviews, written procedures and group/department requirements
 - Utilize Cyber Train, or other implemented training software, to assure appropriate training has been completed for the performance of work within controls
- 5) Provide Feedback and Engage in Continuous Improvement
- Promote worker identification and prompt correction of safety deficiencies
 - Develop, promote, and participate in program/department walk-throughs
 - Promote an open and effective environment for expression and resolution of employee safety concerns
 - Cooperate with independent and external walk-throughs and assessments
 - Review employee safety performance and discuss safety expectations during annual performance reviews
 - Report accident, incidents, and injuries and cooperate with related investigations
 - Promote the distribution of safety-related lessons learned
 - Support the Laboratory's contract performance measures

8.0 INTEGRATED SAFETY MANAGEMENT (ISM) SYSTEM IMPLEMENTATION

8.1 Background

The Laboratory's Integrated Safety Management System is the basic framework of the ESH&A program. Programs, policies, procedures, and practices are the mechanisms through which the Laboratory's ISMS is implemented. These mechanisms ensure that

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

safety is integrated into all aspects of the Laboratory's work, from planning to completion.

In 1997, Ames Laboratory initiated a systematic approach to the development of documented ISMS. The Ames Laboratory ISMS was reviewed through an ISM self-assessment in 1997, an ISM pre-verification assessment in July 1999, and an ISM verification in November 1999. Although all reviews noted areas for improvement, each review cited significant areas of noteworthy practices and a safety culture consistent with the principles and functions of ISM. The Laboratory accepted the results of the ISM-related assessments and proceeded immediately to address the opportunities for improvement and the issues related to identified deficiencies. The Ames Site Office initially granted approval of the Ames Laboratory's ISMS in 2000.

Executive Order 13693 requires federal facilities to have an Environmental Management System (EMS). The EMS is incorporated into the Laboratory's ISMS, and was initially implemented in 2009 with external assessments from the DOE to ensure full compliance in 2012 and 2015.

Through oversight processes pursuant to DEAR 970.5223-1(e) the Ames Site Office ensures that Ames Laboratory's ESH&A performance objectives, performance measures, and commitments are incorporated into an ISMS/EMS and include appropriate environmental elements based on the environmental risks, impact of activities at the site, and established departmental pollution prevention/energy efficiency goals.

8.2 ISM Guiding Principles

The DOE established seven principles to guide implementation of ISMSs, as defined in [DOE P 450.4A Safety Management System Policy](#). Within the ISM hierarchy, these seven principles describe the environment or context for work activities. Ames Laboratory has integrated safety into all levels of management and work practices so that the Laboratory's mission can be accomplished while protecting workers, the public, and the environment. This objective is fulfilled through a system of programs, policies, procedures, and practices based on the following guiding principles of ISM:

- Line management responsibility for safety
- Clear roles and responsibilities
- Competence commensurate with responsibilities
- Balanced priorities
- Identification of safety standards and requirements
- Hazard controls tailored to work being performed
- Operations authorization

The seven ISM guiding principles are discussed below. The first three principles apply to the implementation of all five of the ISM core functions, whereas the remaining four guiding principles primarily apply to specific designated core functions.

8.2.1 Line Management Responsibility for Safety

Line management is directly responsible for the protection of the public, the workers, and the environment.

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

The principle of *line management responsibility for safety* is primarily implemented according to processes and requirements stated in this document and the *ESH&A Program Manual*. This document states the overall framework of the Laboratory's ESH&A programs while the program manual delineates implementation responsibilities for all levels of the organization. Topical areas discussed in the *ESH&A Program Manual* contain implementation responsibilities, whereby supervisory action items are identified. The concept of individual and line management safety responsibility is first introduced through *General Employee Training* for new employees. Line management also learns about their responsibilities through training opportunities such as the *Group Leader Orientation Training*, *Readiness Review Procedure Training* and *ISM Training* as part of *General Employee Training*. The [Readiness Review Procedure](#) (Procedure 10200.010) is another important mechanism for ensuring the documented accountability of all levels of line management from division and program directors and department managers to authorized activity users.

8.2.2 *Clear Roles and Responsibilities*

Clear and unambiguous lines of authority and responsibility for ensuring safety shall be established and maintained at all organizational levels within the Department and its contractors.

The principle of *clear roles and responsibilities* is primarily reflected in the requirements of this document and the *ESH&A Program Manual*. Roles and responsibilities are further defined by position descriptions as part of the hiring process. This principle is also reflected at the division, institute, program, department, and group level, via defined organizational structures and lower level documentation. As stated previously, this document states the overall framework of the Laboratory's ESH&A programs while the program manual delineates implementation responsibilities for all levels of the organization. Employees are educated on the importance of the safety program during *General Employee Training* and are encouraged to be active participants by providing feedback on unsafe work conditions. The Subcontractor Oversight program is an example of how all on-site personnel are educated on the importance of adherence to ESH&A standards. Annual personnel performance reviews are the mechanism by which personnel are apprised of strengths and shortfalls in safety performance.

8.2.3 *Competence Commensurate with Responsibilities*

Personnel shall possess the experience, knowledge, skills, and abilities that are necessary to discharge their responsibilities.

The principle of *competence commensurate with responsibilities* permeates many of the Laboratory's programs and processes. The Laboratory's recruiting and hiring processes are defined in the Human Resources department's policies and procedures. Through the use of documents such as position descriptions, a highly knowledgeable workforce is maintained. The *ESH&A Program Manual* contains information about the Laboratory's Training program. The two-tiered Training program is comprised of both institutional and activity-specific training courses that ensure the knowledge and skills necessary to perform work efficiently and safely are adequately conveyed. Safety and engineering specialists in ESH&A stay current in their disciplines by participating in professional development activities such as attending conferences and other educational opportunities. The Laboratory's integration within the campus of ISU also provides employees with opportunities for continuous learning.

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

8.2.4 *Balanced Priorities*

Resources shall be effectively allocated to address safety, programmatic, and operational considerations. Protecting the public, the workers, and the environment shall be a priority whenever activities are planned and performed.

The principle of *balanced priorities* is communicated through all levels of the organization starting with the Laboratory Director. Periodic Laboratory-wide emails convey the importance of safety as an integral part of a research mission. This theme is also conveyed to all employees during *General Employee Training* and to group leaders during *Group Leader Orientation*. The Readiness Review process and the *ESH&A Program Manual* are primary mechanisms of ensuring regulatory compliance and then clearly communicate the principle that production and safety go hand-in-hand. Human Resources processes ensure the hiring of qualified staff capable of maintaining safe operations. The ESH&A staff reviews funding requests associated with new activities as documented through the [Preliminary Proposal Form](#) (Form 10100.001) and the Work Authorization system, and safety considerations are ensured for new activities. Safety coordinators and representatives are appointed throughout the organization and serve as liaisons between ESH&A and line personnel. The Laboratory's efforts to promote the principle of balanced priorities also support the ISM core function of *define the scope of work*.

8.2.5 *Identification of Safety Standards and Requirements*

Before work is performed, the associated hazards shall be evaluated and an agreed-upon set of safety standards and requirements shall be established which, if properly implemented, will provide adequate assurance that the public, the workers, and the environment are protected from adverse consequences.

The principle of *identification of safety standards and requirements* is embodied in a variety of Laboratory documents and programs. The *ESH&A Program Manual* is the primary roadmap to regulatory compliance and addresses the requirements of applicable standards. Facility modifications are documented by *Service Order Requisitions*; such modifications provide an opportunity to ensure compliance with applicable building codes. The Quality Assurance program states the requirements for adherence to accepted standards in contracts and other agreements. The Readiness Review process is the mechanism by which safety envelopes are established for research and support activities. The Independent and Program/Department Walk-Through programs provide feedback on the status of the safety program and identify opportunities for continuous improvement, the sharing of lessons learned, and best management practices that lead to excellence. The principle of *identification of safety standards and requirements* is most closely aligned with the ISM core functions of *define the scope of work, analyze hazards, and develop and implement hazard controls*.

8.2.6 *Hazard Controls Tailored to Work Being Performed*

Administrative and engineering controls to prevent and mitigate hazards shall be tailored to the work being performed and associated hazards.

The principle of *hazard controls tailored to the work being performed* is supported by several previously discussed processes. The Readiness Review process ensures that all research and operational activities and associated hazards are reviewed by chemical, safety and engineering specialists, or other subject matter experts as needed, and controls are commensurate with risk. The *ESH&A Program Manual* emphasizes the

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

principle of hazard controls with a prioritized hierarchy of elimination/substitution, engineering, administrative, and personal protective equipment controls. *Service Order Requisitions* are reviewed by ESH&A staff and provide an opportunity for interactions on the best type of hazard control for a particular work process. Adequate hazard controls for work performed by contractors are reviewed and ensured through the Subcontractor Oversight program. The Laboratory programs and procedures that support the principle of hazard controls tailored to the work being performed are most closely aligned with the ISM core function of *develop and implement hazard controls*, and *analyze hazards*.

8.2.7 *Operations Authorization*

The conditions and requirements to be satisfied for operations to be initiated and conducted shall be clearly established.

The principle of *operations authorization* is primarily promoted by the Laboratory's *Readiness Review Procedure*. Readiness Review is the mechanism by which all Laboratory research activities are reviewed and approved by the Laboratory's Safety Review Committee. Integral to this approval is verification of activity level readiness including authorization of users via training, a review of group documentation, and a worksite inspection. *Service Order Requisitions* provide an opportunity to review current work activities and associated authorizations. The Subcontractor Oversight program ensures that all work by contractors is discussed and that the work scope and associated hazards are understood. The Quality Assurance program describes mechanisms by which the Laboratory maintains a high level of operational awareness. The Laboratory's efforts to implement the principle of *operations authorizations* are most closely aligned with the ISM core function of *perform work safely*.

8.2.8 *Supplemental Safety Culture Elements (4)*

Within the ISM hierarchy, it is the seven principles that primarily describe the environment or context for work activities, along with the five ISM core functions discussed later in this section, that describe the specific work activities to be accomplished. As a result of a DOE revitalization effort in 2006, four supplemental safety culture elements were established. A brief description of these four supplemental safety culture elements and comments on how Ames Laboratory utilizes ISMS mechanisms to support these elements is presented below.

Individual Attitude and Responsibility for Safety

Every individual 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 employees are mindful of work conditions that may impact safety, and assist each other in preventing unsafe acts or behaviors.

The safety culture element of *individual attitude and responsibility for safety* is first introduced to employees during *General Employee Training*. A message from the Laboratory's Director and a presentation on safety attitudes clearly convey the importance of safety and the necessity of employee participation in the safety program. Periodic messages from the Laboratory Director further communicate the importance of mindfulness and working as a team to achieve the safest work environment possible. The concept of reporting unsafe work conditions is also supported through worker observations, the [Employee Safety & Security Concerns Program](#) (Plan 10200.008), and the [Stop Work Authority Policy](#) (Policy 10200.005). Also, subcontractors that perform

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

work at the Laboratory are given safety briefings and informed of the importance of working safely and reporting unsafe work conditions as a part of the Subcontractor Oversight program.

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, conservative decision-making, open communications, deference to expertise, and systematic approaches to eliminate or mitigate error-likely situations.

The safety culture element of *operational excellence* is primarily stated in the Laboratory's Quality Assurance program. Expectations for conducting business in an effective, safe, and efficient manner are clearly stated and ensure a productive and healthy research organization. Group leaders are informed of their organizational responsibilities via the *Group Leader Orientation* course and subject-specific courses such as *Chemical Hazard Communication*, etc. The Readiness Review process reinforces the concepts of line management responsibility for safety, candid dialogue and debate on safety strategies, and day-to-day oversight. The Laboratory's focus on the research group as a first line organizational structure fosters an environment that promotes regular discussions among group members. These small group interactions also facilitate candid dialogue on operational tasks including the sharing of safety concerns. The Laboratory's Independent Walk-Through program provides a structured mechanism for the safety professional to communicate needed improvements to line managers with the support and participation of upper management.

Oversight for Performance Assurance

Competent, robust, periodic, and independent oversight is an essential source of feedback that verifies expectations are being met and identifies opportunities for improvement. Performance assurance activities verify whether standards and requirements are being met. Performance assurance through conscious, directed, independent reviews at all levels brings fresh insights and observations to be considered for safety and performance improvement.

The principle of *oversight for performance assurance* is manifested through a variety of internal and external oversight and assessment processes at Ames Laboratory. The DOE contract with ISU contains incentivized safety performance measures that are assessed and updated annually. The Laboratory and ISU maintain numerous operational oversight and surveillance activities as part of the *Ames Laboratory Contractor Assurance System (CAS)*. Safety and environmental programs and performance results are regularly assessed by the DOE via the Ames Site Office and include monthly walk-throughs and functional reviews by the DOE Facility Representative. Supervisory personnel interact with employees on a formal basis via annual performance reviews that include safety performance elements. The ESH&A manager participates in upper management meetings and meets with members of ISU's Environmental Health and Safety department. A member of the Executive Council participates with safety and engineering specialists in annual independent walk-throughs of all Laboratory spaces. Also, program directors conduct program/department walk-throughs of their respective spaces.

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

Organizational Learning for Performance Improvement

The organization demonstrates excellence in performance monitoring, problem analysis, solution planning, and solution implementation. The organization encourages openness and trust, and cultivates a continuous learning environment.

The principle of organizational learning for performance improvement is supported by several Laboratory mechanisms, primarily part of the feedback and improvement function. The safety performance measures, incorporated in the Laboratory's contract, are focus points for organizational improvement. The [Event Reporting Program](#) (Plan 10200.002) produces a comprehensive listing of operational events and causal analysis, and is a mechanism by which latent organizational weaknesses are identified. Safety specialists conduct topical appraisals that take a focused look at specific programs and/or their elements, and assess compliance as well as continuous improvement opportunities. Tracking and trending of safety-significant events and the identification of opportunities for improvement in the ESH&A program provide the basis of future improvement initiatives. Individual employees are introduced to the [Employee Safety and Security Concerns Program](#) (Plan 10200.008) during *General Employee Training*. All employees are encouraged to use and participate in this program by identifying, correcting, and reporting deficiencies. The [Readiness Review Procedure](#) (Procedure 10200.010) is the primary means by which all Laboratory organizations are involved in the performance of work from planning to completion. Opportunities for improvement and deficiencies are identified during independent and program/department walk-throughs and tracked to resolution.

8.3 ISM Core Functions

Ames Laboratory work activities that can potentially affect workers, the public, or the environment are defined, analyzed, developed, performed, and reviewed according to the requirements of the Laboratory's ESH&A programs. These work activities are subject to the core functions of ISM with the degree of rigor appropriate to address the type of work activity and hazards involved. The Laboratory's programs, policies, procedures, and practices are the mechanisms by which the ISMS core functions are conducted. These mechanisms ensure compliance with standards described in the Ames Laboratory Contract and define responsibilities and provide implementation guidance according to and sufficient with the hazards associated with the work activity being performed.

The Laboratory's ISMS utilizes a plan-do-check-act approach to integrate safety into planning and performance of work activities. Key safety mechanisms are described in the following sections. Often these mechanisms address several of the principles and functions of ISM and EMS and therefore some repetition exists within the following description.

The Laboratory's ISMS focuses on integration at all levels (Figure 2). At the institutional level, the *Ames Laboratory Contract* and the *Ames Laboratory Lab Plan* define the scope of work; site hazard assessments provide analyses of hazards; the ISMS and *ESH&A Program Manual* establish controls; work is performed in accordance with DOE directives and contract clauses; and feedback is provided via walk-through programs, DOE reviews, and DOE annual assessments.

At the program level, the scope of work is fundamentally defined by the Work Authorization System, *Service Order Requisitions*, and the Preliminary Proposal

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

process. The *Readiness Review* process and National Environmental Policy Act (NEPA) reviews are utilized to analyze the hazards associated with work at the program level. Controls are established in collaboration with the Safety Review Committee, the safety coordinators and representatives, and the ESH&A subject matter experts. Departmental policies and oversight primarily ensures that work is performed within defined controls. Multiple mechanisms, including walk-throughs, performance reviews, and lessons learned provide feedback and improvements at the program level.

At the activity level, mechanisms focus on defined activities and the involved workers. The [Hazard Inventory \(HI\)](#), [Training Needs Questionnaire \(TNQ\)](#), and general activity scoping provide a definition of the work performed. The [Readiness Review Hazard Identification Checklist](#) (Form 10200.003) is used to analyze the hazards associated with activities. Controls are established for activities through hazard mitigations defined through the Readiness Review process. Employee training profiles establish controls for individual workers. Activity-specific standard operating procedures (SOPs) provide assurance that work will be performed within established controls. The primary mechanisms of feedback and improvement at the activity level are worker observations and supervisor oversight.

8.3.1 *Define the Scope of Work*

This core function refers to the actions of translating the work idea into the planned tasks. It includes the definition and prioritization of the tasks and the initial scoping and the allocation of resources with particular emphasis of the principle of balanced priorities. The Laboratory's mechanisms for addressing this core function are performed at various organizational levels. At the institutional level the fundamental mechanism for definition of work at Ames Laboratory is the contract, *Contract No DE-AC02-07CH11358*. The contract provides the general guidance for operation of Ames Laboratory. The *Lab Plan* provides additional information regarding the Laboratory's mission, strategic plan, core businesses, critical success factors, and resource projections. The scope of the Laboratory's overall activities is assessed through the work processes (activities) as reviewed through the Readiness Review process.

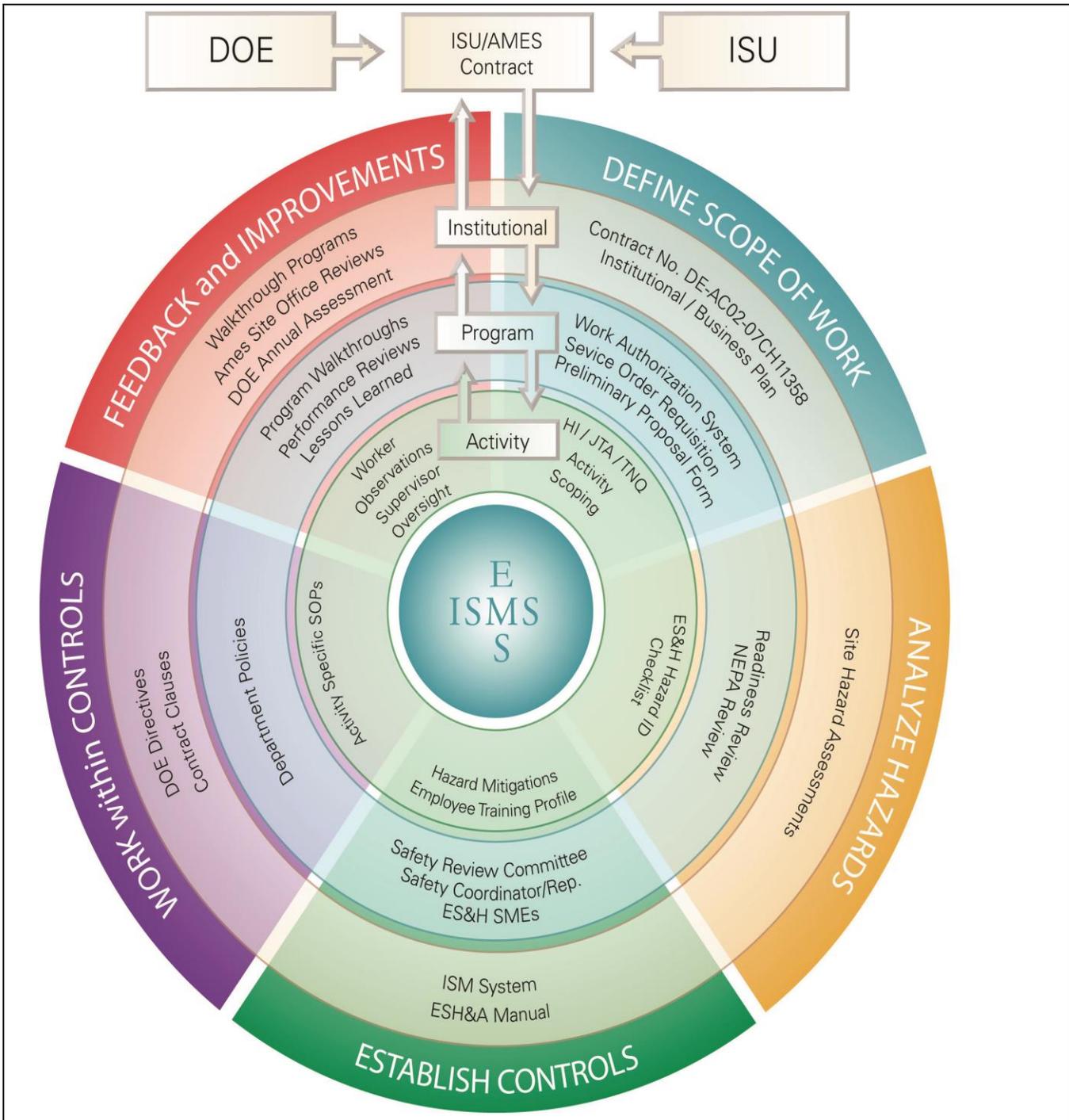


Figure 2. Ames Laboratory Vertical Integration of ISMS Core Functions

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

The [Environmental Aspects Procedure](#) (Procedure 10200.075) is used to list, rank, and prioritize the Laboratory's environmental aspects. The Readiness Review procedure is a mechanism that also identifies environmental aspects.

Definition and prioritization of tasks, the initial scoping, and the allocation of resources for research projects and support functions are achieved according to several mechanisms, including the Field Budget and Work Authorization System (WAS) call, the [Preliminary Proposal Form](#) (Form 10100.001), and the [Incremental Budget Request](#) (Form 58100.002). Activities associated with research and support function projects are reviewed according to the procedure for Readiness Review and the [National Environmental Policy Act \(NEPA\) Procedure](#) (Procedure 10200.025). Specific requests for service work are documented according to the *Service Order Requisition*.

The planning and fulfillment of human resource needs are achieved through the *Position Description* in conjunction with the [Training Needs Assessment Procedure](#) (Procedure 48202.005). A network of safety coordinators and representatives is maintained at Ames Laboratory to facilitate communication on workplace health and safety and environmental protection issues between division and program/department offices and the ESH&A office. The special safety-related roles and responsibilities of these positions are described in the [Safety Coordinator Position Description](#) (Form 10200.090) and the [Safety Representative Position Description](#) (Form 10200.091). The [Training Needs Questionnaire](#) (Form 48202.006) is utilized to document individual training needs for each employee. Subcontract placements and changes are addressed through the Laboratory's [Procurement Operating Practices Manual](#) (Manual 58300.001).

The [Visitor Guide](#) provides guidance on the safety requirements for visitors and vendors. Additional safety policies, programs, and practices and the related responsibilities are described in the *ESH&A Program Manual*.

8.3.2 Analyze the Hazards

This core function refers to the actions of identifying, analyzing, and categorizing the hazards associated with work. It includes the analysis of hazards at the institutional level as well as the analysis of hazards at the activity level.

Detailed hazard assessments conducted by third party organizations in the 1990s and a 1996 review of work activities performed by Ames Laboratory, with participation from DOE Chicago and the Ames Site Office, established the technical basis for hazard types and risk levels associated with the Laboratory's activities. Annual hazard survey updates identify changes in the activities and associated hazards at the Laboratory that would affect safety program needs and emergency preparedness. These assessments and information gathered through Readiness Reviews provide an up-to-date technical basis for emergency planning and safety management activities at the institutional level such as the [Ames Laboratory Emergency Plan](#) (Plan 46300.001) and the [Waste Management Contingency Plan](#) (Plan 10200.017).

The analysis of hazards and environmental impacts associated with specific activities is initially performed by personnel within research groups and departments. The [Hazard Identification Checklist](#) has been developed by the Laboratory's Safety Review Committee to document the identification of environmental impacts and hazards. Group leaders and department managers advise activity supervisors on analysis of environmental impacts and hazards. Activity supervisors are also encouraged to seek

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

assistance from safety coordinators and representatives as described in the [Safety Coordinator & Representative Program](#) (Plan 10200.009). Safety coordinators and representatives are required and group leaders are encouraged to take the *Hazard Identification* training course to supplement their hazard identification skills. Additional assistance is available through engineering and safety specialists within ESH&A and Facilities and Engineering Services. The formal review of activities is conducted according to the procedure for Readiness Review before the initiation of new or significantly modified activities and again prior to the activity's five-year anniversary.

In addition to the hazard reviews associated with activities, hazards associated with specific employee positions are reviewed and documented through the [Hazard Inventory Form](#) (Form 10204.008) as part of the hiring process for new employees. *Service Order Requisition* reviews by ESH&A and service providers are utilized, as necessary, to identify hazards for work conducted and documented as part of the Service Order Requisition process. An ESH&A specialist's attendance at Facilities and Engineering Services planning meetings also facilitates the analysis of work hazards. Specialists conduct additional reviews of procurement events. This information assists in the identification of hazards and potential environmental implications associated with procured items. Additionally, the Facilities and Engineering Services office performs review and inspection activities as described by the *Procurement Quality Procedure* (Procedure 46200.003) to identify and address quality and safety concerns.

8.3.3 *Develop and Implement Hazard Controls*

This core function refers to the process whereby applicable standards and requirements are identified and agreed upon, controls to prevent and mitigate hazards are identified and implemented, and the safety envelope is established. The implementation of hazard controls shall be accomplished based on the hierarchy of 1) hazard elimination; 2) hazard substitution; 3) engineering controls; 4) administrative controls; and 5) personal protective equipment.

The first method of hazard control is the elimination of hazards. Eliminating a hazard is the most desirable method of protection. It involves physically removing a hazard. Examples include a hazard where employees are required to work on equipment at dangerous heights and can be eliminated by moving the equipment to ground level, or if a dangerous process or equipment no longer provides value, simply removing it from the work place.

The second method of hazard control is the substitution of such hazards during the design and planning of the work process with something less hazardous. Examples of substitution include chemical substitution with non-toxic chemicals, the use of non-flammable solvents for cleaning of equipment or metal parts, or the use of chemicals that do not contain chlorofluorocarbons (CFCs).

The third method of hazard control is engineering controls. Many engineering controls are built into equipment from the manufacturer, such as laser and x-ray equipment. The engineering controls must still be tested to ensure they are working adequately. Other examples of engineering controls include fume hoods for handling toxic chemicals, machine guarding, relief valves, spill dikes, and interlocks on equipment.

The fourth method of hazard control is administrative controls. The use of administrative controls to address all hazards should be minimized where the effectiveness and value

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

of engineering controls can be demonstrated. Instead, administrative controls should be used in conjunction with engineering controls to augment hazard control. An example of administrative controls would be training operators of lasers on the limitations of interlocks and that safety devices may need to be bypassed for alignment operations. Other examples of administrative controls include SOPs, access control to non-qualified employees, hazardous material limits (small quantities), limiting exposure time to hazardous materials (exposure to radiological materials), and hazardous environments (noise exposure).

The fifth method of hazard control is the use of personal protective equipment (PPE). PPE should be used when hazard elimination, engineering controls, and administrative controls are not completely adequate or infeasible to control hazards. Frequently, it will be necessary to supplement engineering controls and administrative controls with PPE. An example of PPE supplementing engineering controls would be the handling of toxic and acidic chemicals in a fume hood. The fume hood would control the respiratory hazard and nitrile gloves would control the skin hazard. Other forms of PPE include safety glasses, face shields, hard hats, respiratory protection, steel-toed shoes, and aprons or lab coats.

The Laboratory's contract clauses and DOE directives form the basis for the safety management documents at the Ames Laboratory, such as the: [ESH&A Program Manual](#), [ISU Laboratory Safety Manual](#), [Waste Management Program Manual](#) (Manual 10200.003), and the [Electrical Safety Program Manual](#) (Manual 10200.007). Associated training courses are developed and documented according to the requirements of the procedure for [Institutional Training Course Development](#) (Procedure 48202.003).

Hazard controls for specific activities are initially selected and developed within research groups and departments. Group leaders and department managers provide assistance to activity supervisors as part of the typical mentoring relationship. Also, activity supervisors and group leaders are encouraged to seek assistance from safety coordinators and representatives, as described in the [Safety Coordinator & Representative Program](#) (Plan 10200.009), and from safety specialists in the ESH&A office. Formal reviews of activities are conducted according to the *Readiness Review Procedure* for new or significantly modified activities and at a five-year cycle for on-going activities. Formal activity reviews provide a forum for the activity supervisor, group and department personnel, safety specialists, and engineering professionals to discuss the hazards associated with the activity, review the applicable standards, detail the required control mechanisms, and establish the related safety envelope.

Emergency planning activities at the institutional level are documented in the [Ames Laboratory Emergency Plan](#) (Plan 46300.001). The emergency planning activities are based on information developed through contracted hazard assessments of the Laboratory's activities and facilities. Visitor safety requirements are established according to the hazards encountered while involved with the Laboratory's activities. Guidance for visitors is provided through the [Visitor Guide](#) (Guide 10200.001).

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

8.3.4 *Perform Work within Controls*

The core function listed here relates to confirmation and authorization of readiness to perform activities before work is conducted and to the performance of work according to the agreed upon conditions and requirements.

The primary mechanism for authorization of work at Ames Laboratory by the DOE is the GO/CO contract, Contract No DE-AC02-07CH11358. The primary DOE process for confirmation that work is performed appropriately is the Ames Site Office Surveillance program.

Approval and authorization of specific activities are accomplished through Readiness Review for new or significantly modified activities and for on-going activities on a five year cycle. These procedures require approvals by the group leader, division and program director, department manager, ESH&A lead specialist, and a member of the Safety Review Committee. These approvals are documented on the [Readiness Review Activity Approval Form](#) (Form 10200.004). Approval from the Ames Laboratory Director is required for ESH&A Hazard Level III activities. The formality and rigor of the activity review process and the extent of documentation is dependent upon the hazard and complexity of work related to the activity. A safety analysis document (SAD) is prepared for ESH&A Hazard Level III activities. This document is forwarded to the DOE Ames Site Office manager and the ISU EH&S Director.

Activity reviews allow for developmental approval at which time the specific conditions and requirements, including safety controls and documentation, are delineated. Once the agreed upon conditions and requirements are met the activity review is finalized through operational approval by the Safety Review Committee. The level and rigor of documentation related to activities, such as procedures and training, are determined according to hazard level and complexity of work. Documentation may consist of general instructions for equipment operation, group and department processes, activity or safety documents, or formal procedures.

The *Service Order Requisition* documents the approvals and the safety review related to in-house service work. The group leader or department manager with management responsibility for the task being performed grants visitor and vendor work approvals. Guidance for visitors is provided through the [Visitor Guide](#) (Guide 10200.001).

8.3.5 *Provide Feedback and Continuous Improvement*

The focus of this core function includes gathering information on the adequacy of controls, identification, and implementation of opportunities for improving the definition and planning of work, conducting line and independent oversight, and, if necessary, taking regulatory enforcement actions.

Ames Laboratory utilizes several mechanisms to ensure appropriate feedback and continuous improvement efforts are carried out. The most important and effective process for identification and correction of deficiencies is the observation of individual employees. Employees are charged with the responsibility of continuously assessing their individual performances and their workspaces in order to prevent problems and to identify nonconforming conditions and opportunities for improvement. The [Worker Observation Guide](#) (Guide 10200.003) is available to assist workers in the observation of activities within office, laboratory, and shop spaces. Employees are empowered through

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

the [Ames Laboratory Stop Work Authority](#) (Policy 10200.005) to stop work where there is the apprehension of serious injury, impairment of health or adverse impact to the environment. Resolution of concerns should occur at the level of line management most directly responsible for the activity. If the issue cannot be resolved at this level, the employee is directed to proceed within his/her line management structure or to report the concern to the ESH&A office as part of the [Employee Safety and Security Concerns Program](#) (Plan 10200.008). During *General Employee Training* all employees are apprised of these rights and responsibilities and the right to contact DOE or the Office of Inspector General directly.

Ames Laboratory has developed a network of safety coordinators and representatives to facilitate communication on workplace health, safety, and environmental protection issues between division and program/department offices and the ESH&A office. Responsibilities and requirements are described in the [Safety Coordinator & Representative Program](#) (Plan 10200.009). Safety coordinators and representatives may be involved in group-specific walk-through and surveillance activities. Also, safety coordinators are usually responsible for their program or department walk-throughs. Issues identified through group, division, program, and department feedback efforts are generally resolved within the respective organizational unit. Division and programs and departments identify safety issues and communicate unresolved issues to the ESH&A office for assistance.

Additional safety reviews are conducted by programs administered through the ESH&A office. Independent walk-throughs are conducted for each division, program, and department on an annual basis in accordance with the [Independent Walk-Through Procedure](#) (Procedure 10200.021). The independent walk-through team includes a member of the Executive Council, Ames Site Office and/or other DOE representatives, and a representative from ISU EH&S as contractor oversight. The Ames Laboratory Corrective Action Tracking System (ALCATS) is utilized to track and document close out of concerns. [ESH&A Topical Appraisals](#) (Plan 10200.022), inspections, and surveys of analytical x-ray systems are conducted by ESH&A specialists on a periodic basis.

The ESH&A office provides assistance to division and programs and departments for Subcontractor (On-Site) Oversight program activities. A review of an approved activity's operation is performed after five years according to the requirements of Readiness Review. Safety and engineering specialists perform this review, with approval by the chair of the Safety Review Committee.

Personal ESH&A performance is addressed through supervisor interactions and an annual performance review as part of the Ames Laboratory Performance Review and Planning System. Group leaders, division and program directors, and department managers are responsible for safety related performance measures as communicated through the [ESH&A and EMS Performance Measures Policy](#) (Policy 10200.007). [Guidelines for Discussing ESH&A and EMS during Performance Evaluations](#) (Guide 10200.002) are provided to assist supervisors in reviewing an individual's safety performance during the annual performance review.

Incident information is developed according to the requirements of the procedure [Accidents, Incidents & Employee Safety Concerns: Classification & Investigation](#) (Procedure 10200.038). Occurrence reporting is achieved according to the Event

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

Reporting program. Corrective action plans are developed according to the requirements of [Corrective Action Plan Development](#) (Procedure 10200.039). Lessons learned from internal and external events are distributed according to the [Lessons Learned Program Implementation Plan](#) (Plan 10200.020).

Information from the various feedback mechanisms described above is reviewed according to the procedure for [Trend Analysis of ESH&A Concerns](#) (Procedure 10200.041). This review is included as part of an annual self-assessment process as detailed in *Appendix B, Performance Evaluation Measurement Plan (PEMP)* (Contract No. DE-AC02-07CH11358). Significant institutional issues derived from Type A and B Investigations, DOE program initiatives, and DOE surveillance activities are addressed by corrective action plans and tracked. Management review is conducted annually at a minimum by the Laboratory's executive council which is apprised of the status of the Laboratory's objectives and targets for the Laboratory's significant environmental aspects.

8.4 Annual ISMS Maintenance and Continuous Improvement Processes

The feedback and improvement mechanisms of the Laboratory's ISMS, including the annual self-assessment reporting requirements, the annual *Site Environmental Report*, and the Ames Site Office operational observations, continue to be the basis for ISMS process improvements.

On-going oversight and surveillance activities of ISU, Ames Site Office, DOE, and Ames Laboratory management provide measurement of the effectiveness of the Ames Laboratory ISMS. The Laboratory's [Contractor Assurance System \(CAS\) Description](#) (Plan 40000.006) describes the processes and systems performed by line management, internal oversight functions, and independent oversight organizations that ensure effective and efficient program in support on mission success. Annual mid-year and year-end Ames Laboratory performance reports provide documentation of ISMS and EMS program efforts.

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

9.0 WORKER SAFETY AND HEALTH PROGRAM IMPLEMENTATION

9.1 Overview, Purpose, and Scope

The Department of Energy (DOE) established 10 CFR Part 851, *Worker Safety and Health Program* (the rule) to govern contractor activities at DOE sites in response to the Bob Stump National Defense Authorization Act. The rule was published in the Federal Register, vol.71, No. 27, Thursday, February 9, 2006. Contractors are required to prepare a written worker safety and health program that describes how the requirements of the rule will be integrated with other related site-specific worker protection activities and with their Integrated Safety Management System (ISMS). Ames Laboratory has implemented a comprehensive and effective ISMS, which is also integrated with the requirements of the rule. The Laboratory performed a compliance analysis of the requirements of the rule versus the Laboratory's existing processes. Identified gaps have been addressed and the essential program elements are documented herein.

The Laboratory's Worker Safety and Health program describes the mechanisms utilized to fulfill the requirements of the rule and demonstrates that safety is integrated into work performed at the Ames Laboratory. As required by Section 851.11 (c) (2) of the rule, this plan is updated and submitted to DOE for approval annually as part of the ISMS approval process.

9.2 Gap Analysis

An assessment (Report 10200.002) was conducted in November 2006 to identify gaps in compliance with 10 CFR Part 851, *Worker Safety and Health Program*. The results provided the basis for the preparation of the Laboratory's written Worker Safety and Health program per the requirements of section 851.11 of the rule. A matrix was created to document compliance with specific sections of the rule. Matrix categories were defined as follows:

- **10 CFR 851 Reference:** Verbatim citation from each section of the rule
- **SMEs:** Subject matter expert(s) assigned to address each section of the rule
- **Location of Documentation:** Location of programmatic documentation that addresses each section of the rule
- **Mechanism of Compliance:** Mechanisms by which feedback is received and a determination made on the status of compliance with each section of the rule
- **Noted Gaps:** Identified gaps are noted in each section

In general, the results of this gap analysis show that the Laboratory's current ESH&A program are functioning in compliance with the requirements of *10 CFR Part 851*. The gaps identified were relatively minor in terms of potential health impacts and risk, primarily related to the updating of programmatic documentation.

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

9.3 Program Requirements and Implementation

9.3.1 Management Responsibilities and Worker Rights and Responsibilities (851.20)

(a) Management responsibilities

- 1) Written ESH&A policies, goals, and objectives are primarily embodied in the *ESH&A Program Manual* and the *ISMS Description*. Feedback on the adequacy of programmatic documentation is received via periodic reviews and audits.
- 2) Written procedures ensure qualified staff are hired and properly evaluated. Mechanisms that ensure efficacy include periodic *Position Description* reviews, on-going professional development activities, and annual performance reviews.
- 3) Ames Laboratory has a variety of mechanisms that allow employees to provide feedback on the safety program including a written Employee Safety & Security Concerns program. Safety coordinator, representative, and Safety Review Committee meetings provide information that assures that employee concerns are received. Walk-throughs provide a conduit for employees to share concerns with the ESH&A staff and management. Course evaluations provide valuable information on employee needs and concerns.
- 4) Safety information is provided to employees at all levels of the organization through e-mails, postings, during meetings and personal interactions and the Laboratory's website.
- 5) Employees are educated during *General Employee Training* on the importance of being empowered to participate in the safety program and are strongly encouraged to address and correct any observed unsafe work practices including the exercising of stop work authority. *Readiness Reviews* provide a means by which ESH&A concerns are identified and addressed. Adequate follow up and correction of concerns is ensured via ALCATS. Feedback is given to all levels of the organization via the distribution of lessons learned information.

(b) Workers rights and responsibilities

- 1) The importance of employee participation in the safety program is a concept that is stated in several different Laboratory documents including the director's policy statement in the *ESH&A Program Manual* and the DOE Safety and Health Poster. Safety coordinators and representatives are authorized to spend no less than 5% of their time on safety issues. The *ESH&A Program Manual* formally states that employees are required to participate in the Laboratory's safety program and that participation is allowed on official time.
- 2) Safety information is provided to employees at all levels of the organization through e-mails, postings, and the Laboratory's website. Feedback from employees is received via training courses such as *General Employee Training* and independent and division and program and department walk-throughs. External reviews are an additional mechanism by which feedback is received.
- 3) ESH&A safety specialists conduct monitoring of employees as a part of the industrial hygiene and radiation safety programs. Specialists generate written reports of the results that are given to employees and management. Additional mechanisms by which compliance is assessed are Readiness Review, medical surveillance activities, regular visits to the labs by safety and occupational medicine personnel, and regular review of information in industrial hygiene and medical databases.
- 4) Independent Walk-Throughs are conducted on an annual basis by a multi-disciplinary team including a member of upper management. Employees and line

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

management provide feedback on safety concerns during this process and through their local safety coordinator or representative.

- 5) The Laboratory has a robust incident investigation and categorization process. The incident investigation process provides direct feedback from employees as does the Employee Safety and Security Concerns program.
- 6) The Laboratory has a *Stop Work Authority* policy that is explained to all employees during *General Employee Training*. Readiness Review provides a means for assuring that hazards associated with work are adequately addressed and minimizes the potential for imminently dangerous work activities. The incident investigation process solicits direct feedback from both the employee and supervisor.

9.3.2 Hazard Identification and Assessment (851.21)

(a) Contractors must establish procedures to identify existing and potential workplace hazards and assess the risk of associated workers injury and illness.

- 1) Workplace monitoring activities are documented in the *ESH&A Program Manual* and also in specific procedures such as confined space entry. ESH&A safety specialists conduct monitoring of employees and generate written reports of the results that are given to employees and management. Results of monitoring are maintained in databases. Feedback on the adequacy of this process is gleaned from the Needs Assessment process which solicits employee and supervisory feedback on occupational hazards, essential job functions, and training needs. Walk-throughs and topical appraisals provide information that may lead to workplace monitoring.
- 2) Procedures such as the *Project Completion Inspection & Acceptance* (Procedure 46300.020) and Readiness Review as well as independent walk-throughs ensure proper hazard identification and assessment. The *Hazard Identification Checklist* solicits information from the activity supervisor and management on workplace issues.
- 3) The Laboratory has written procedures that describe how trend analysis is conducted, corrective actions are developed and tracked, and event reporting occurs. Feedback is received via regular reviews of accident and incident information. The results of the trend analysis identify areas of the safety program that need improvement.
- 4) The *Readiness Review* procedure describes a multi-disciplinary approach to addressing workplace hazards including radiological issues. ESH&A surveillance activities, especially oversight of work in radiologically contaminated areas, provide opportunities for interaction between safety specialists and provide a feedback mechanism that ensures appropriate oversight.

9.3.3 Hazard Prevention and Abatement (851.22)

(a) Contractors must establish and implement a hazard prevention and abatement process to ensure that all identified and potential hazards are prevented or abated in a timely manner.

- 1) Hazard identification during the facility design process is documented in the *Readiness Review* and *Program/Department and Independent Walk-Through* procedures. These procedures provide on-going feedback on the adequacy of the process. The *Pre-Proposal Form* allows ESH&A staff a feedback mechanism on new research activities.
- 2) Worker protection from existing hazards is also addressed through the same mechanisms.

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

(b) Contractors must select hazard controls based on the following hierarchy: (1) Elimination or substitution of the hazards where feasible and appropriate; (2) Engineering controls where feasible and appropriate; (3) Work practices and administrative controls that limit worker exposures; and (4) Personal protective equipment.

1) The *ESH&A Program Manual* clearly states the hierarchy of control philosophy; Readiness Review provides a mechanism for addressing and implementing controls. Specific requirements are also in place for assuring that personal protective equipment needs are identified and certified. Periodic topical appraisals assure that programs are working effectively.

(c) Contractors must address hazards when selecting or purchasing equipment, products, and services.

1) The *Procurement Operating Practices Manual* describes mechanisms in place that address any hazards associated with purchased equipment or services. The ESH&A office reviews purchase requisitions on a regular basis.

9.3.4 Safety and Health Standards (851.23)

(a) Contractors must comply with the following safety and health standards that are applicable to the hazards at their covered workplace:

(1) Title 10 Code of Federal Regulation (CFR) 850, “Chronic Beryllium Disease Prevention Program.”

The Laboratory has a written [Chronic Beryllium Disease Prevention Program](#) (Plan 10200.031). The *Occupational Medicine Program* provides medical surveillance on occupational health and safety issues to Laboratory employees. The annual chemical inventory and the *Hazard Inventory* provide specific feedback on work with beryllium. Databases are utilized by occupational medicine and industrial hygiene staff to compile results of surveillance activities.

(2) Title 29 CFR, Parts 1904.4 through 1904.11, 1904.29 through 1904.33; 1904.44, and 1904.46, “Recording and Reporting Occupational Injuries and Illnesses.”

The Laboratory has procedures on how incidents are classified, investigated and reported. Monthly OSHA/CAIRS meetings as well as event reporting meetings are the mechanisms by which information is received and reviewed. The OSHA 300 log and other pertinent ESH&A notifications are publicly posted throughout the facility.

(3) Title 29 CFR, Part 1910, “Occupational Safety and Health Standards,” excluding 29 CFR 1910.1096, “Ionizing Radiation.”

The requirements of the OSHA General Industry Standards are addressed in the *ESH&A Program Manual* and other Laboratory manuals such as the *Electrical Safety Manual*, *ISU Laboratory Safety Manual*, etc. Assurance of compliance is verified through *Topical Appraisals*, walk-throughs, and external DOE reviews.

(4) Title 29 CFR, Part 1915, “Shipyard Employment.”

Ames Laboratory does not have any activities or facilities that are covered by the OSHA standards addressing shipyard employment.

(5) Title 29 CFR, Part 1917, “Marine Terminals.”

Ames Laboratory does not have any activities or facilities that are covered by the OSHA standards addressing marine terminals.

(6) Title 29 CFR, Part 1918, “Safety and Health Regulations for Longshoring.”

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

Ames Laboratory does not have any activities or facilities that are covered by the OSHA standards addressing longshoring.

- (7) **Title 29 CFR, Part 1926, “Safety and Health Regulations for Construction.”**
The requirements of the OSHA Construction Standards are addressed in the *ESH&A Program Manual* and several procedures such as *Subcontractor Oversight Program* and *Readiness Review*. Assurance of compliance is verified through *Topical Appraisals*, walk-throughs, and external DOE reviews.
- (8) **Title 29 CFR, Part 1928, “Occupational Safety and Health Standards for Agriculture.”**
Ames Laboratory does not have any activities or facilities that are covered by the OSHA standards addressing agriculture.
- (9) **American Conference of Governmental Industrial Hygienists (ACGIH), “Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices,” (2005) (incorporated by reference, see – 851.27) when the ACGIH Threshold Limit Values (TLVs) are lower (more protective) than permissible exposure limits in 29 CFR 1910. When the ACGIH TLVs are used as exposure limits, contractors must nonetheless comply with the other provisions of any applicable expanded health standard found in 29 CFR 1910.**
Compliance with exposure limits published by the ACGIH is addressed via the *ESH&A Program Manual*, ISU Laboratory Safety Manual, and the *Occupational Medicine Program*. Assurance of compliance is verified through *Topical Appraisals*, walk-throughs, and external DOE reviews.
- (10) **American National Standards Institute (ANSI) Z88.2, “American National Standard for Respiratory Protection,” (1992) (incorporated by reference, see – 851.27).**
The requirements of ANSI standards on respiratory protection are addressed in the *ESH&A Program Manual*.
- (11) **ANSI 136.1, “Safe Use of Lasers,” (2000) (incorporated by reference, see – 851.27).**
The requirements of ANSI standards on laser safety are addressed in the *ESH&A Program Manual*.
- (12) **ANSI Z49.1, “Safety in Welding, Cutting and Allied Processes,” sections 4.3 and E4.3 (1999) (incorporated by reference, see – 851.27).**
Welding activities are discussed in the *ESH&A Program Manual* and via a written program. The welding safety and hot work training course allows personal interaction between employees and the fire safety specialist.
- (13) **National Fire Protection Association (NFPA) 70, “National Electrical Code,” (2005) (incorporated by reference, see – 851.27).**
NFPA 70 compliance is assured through a variety of documents including the Laboratory’s *Electrical Safety Manual* and the *ESH&A Program Manual* which contains a section on electrical safety. The independent and program walk-throughs are a primary means by which feedback is received and electrical deficiencies identified.
- (14) **NFPA 70E, “Standards for Electrical Safety in the Workplace,” (2004) (incorporated by reference, see – 851.27).**
NFPA 70E compliance is assured through a variety of documents including the Laboratory’s *Electrical Safety Manual* and the *ESH&A Program Manual* which

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

contains a section on electrical safety. The independent and program walk-throughs are a primary means by which feedback is received and electrical deficiencies identified.

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

Hazard awareness and identification is addressed in the *ESH&A Program Manual*. The *Readiness Review* procedure has an authorization process that requires an evaluation of the activities and associated hazards relative to the regulatory drivers applicable to Ames Laboratory.

9.3.5 *Functional Areas (851.24) [This section is cross-referenced with Appendix A.]*

- (a) Contractors must have a structured approach to their worker safety and health program which, at a minimum, include provisions for the applicable functional areas in their worker safety and health program: construction safety; fire protection; firearms safety; explosives safety; pressure safety; electrical safety; industrial hygiene; occupational medicine; biological safety; and motor vehicle safety.**

- (b) In implementing the structured approach required by paragraph (a) of this section, contractors must comply with the applicable standards and provisions in Appendix A of this part (10 CFR 851), entitled “Worker Safety and Health Functional Areas.”**

- 1) Safety during construction activities are addressed in the *ESH&A Program Manual* and *Readiness Review* as well as written procedures on subcontractor oversight and project completion. The *Subcontractor Oversight Checklist* and Training Documentation Form provide feedback on safety issues. The *Hazard Identification Checklist* has an item associated with subcontractor work.
- 2) The Laboratory’s fire protection program is documented in the *ESH&A Program Manual* and is integral to the *Readiness Review* procedure. Feedback on salient fire safety issues is received via the *Hazard Identification Checklist* and considered during regular Fire Safety Committee meetings.
- 3) Firearms and explosives safety issues are not applicable to Ames Laboratory.
- 4) Pressure safety requirements are documented in consensus codes dealing with boiler and pressure vessels and piping. The *Readiness Review* process via the *Hazard Identification Checklist* provides feedback along with walk-throughs. *Service Order Requisitions* are reviewed by ESH&A and provide feedback on facilities activities.
- 5) Electrical safety issues are addressed through a variety of documents including the Laboratory’s *Electrical Safety Manual*; the *ESH&A Program Manual* contains a section on electrical safety; *Independent and Program/Department Walk-Throughs* provide feedback mechanisms by which electrical hazards are addressed and deficiencies corrected.
- 6) The Laboratory’s Industrial Hygiene Program is addressed in the *ESH&A Program Manual* and includes other site-wide documents including the ISU Laboratory Safety Manual and *Occupational Medicine Manual*. Feedback mechanisms include chemical inventories, the *Hazard Inventory*, *Independent and Program/Department Walk-Throughs*, and external DOE reviews.
- 7) The ISU *Occupational Medicine Manual* describes the general aspects of the program and is supported by a policy and procedure manual that details day-to-day

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

activities. Employee feedback is provided by the *Hazard Inventory* and *Job Task Analysis* documents. Recall physicals and monthly site visits allow interactions with employees on issues related to the program.

- 8) The safe use of biohazardous agents is addressed in the *ISU Biosafety Manual* and *Occupational Medicine Program*. The Laboratory has an internal biosafety advisory committee that provides a feedback mechanism. A web-based biohazardous materials awareness course allows employees to interact with biosafety specialists on campus. Information on biosafety is found in the *ESH&A Program Manual*.
- 9) The safe use of motor vehicles is addressed in the *ESH&A Program Manual* and through DOT regulations that govern federal motor carriers. Training courses on elevated work and fork trucks provide opportunity for feedback. DOT training is conducted initially and every 3 years. Information on motor vehicle safety was added to the *ESH&A Program Manual*.

9.3.6 Training and Information (851.25)

- (a) **Contractors must develop and implement a worker safety and health training and information program to ensure that all workers exposed or potentially exposed to hazards are provided with the training and information on that hazard in order to perform their duties in a safe and healthful manner.**
- (b) **The contractor must provide: (1) Training and information for new workers, before or at the time of initial assignment to a job involving exposure to a hazard; (2) Periodic training as often as necessary to ensure that workers are adequately trained and informed; and (3) Additional training when safety and health information or a change in workplace conditions indicates that a new or increased hazard exists.**
- (c) **Contractors must provide training and information to workers who have worker safety and health program responsibilities that is necessary for them to carry out those responsibilities.**

The Laboratory has a comprehensive training program that has systems in place to identify training needs upon employment, notify employees of upcoming training opportunities, and verify the completion of training prior to commencement of work. These systems are described in the [Ames Laboratory Training Program Manual](#) (Manual 48202.001). The majority of supervisors have established a group training template for their employees. Supervisors and employees have the ability to modify the template as necessary for individual needs. If a supervisor has not established a group template, the *Training Needs Questionnaire* is used to identify training. Course announcements and e-mail solicitations ensure that employees are made aware of upcoming training opportunities. Verification of both institutional and group-specific training is conducted via *Readiness Review*. Course evaluations serve as a means of continuous improvement.

9.3.7 Recordkeeping and Reporting (851.26)

- (a) **Recordkeeping**
- (b) **Reporting and Investigation**

Exposure monitoring records and other forms of *Hazard Assessments* are discussed in a number of different Laboratory documents including the *ESH&A Program Manual* and the *Occupational Medicine Manual* and utilize a variety of databases including the industrial hygiene exposure monitoring database. The processes by which events are

Contact Person	Sean Whalen	Revision	14.1
Document	Plan 10200.016	Effective Date	3/15/2016
		Review Date	1/1/2017

investigated and classified are documented in written procedures and employee feedback is integral to both. Corrective actions that result from incidents are tracked in a database, *ALCATS*, which also includes a notification mechanism to ensure completion. Event trending is conducted per a written procedure to focus attention on areas of the ESH&A program that may need strengthening.

9.3.8 Reference Sources (851.27)

(a) Materials incorporated by reference.

(b) List of standards incorporated by reference.

- 1) **American National Standards Institute [ANSI] Z88.2, “American National Standard for Respiratory Protection, “(1992).**
- 2) **ANSI Z136.1, “Safe Use of Lasers,” (2000).** The Ames Laboratory ESH&A requirements for Laser safety are based on this standard.
- 3) **ANSI Z49.1, “Safety in Welding, Cutting and Allied Processes,” sections 4.3 and E4.3, (1999).**
- 4) **National Fire Protection Association (NFPA) 70, “National Electrical Code,” (2005).**
- 5) **NFPA 70E, “Standards for Electrical Safety in the Workplace (2004).**
- 6) **American Society of Mechanical Engineers (ASME) Boilers and Pressure Vessel Code, sections I through XII including applicable Code Cases, (2004).**
- 7) **ASME Boilers and Pressure Vessels.** Facilities and Engineering Services maintains copies of applicable codes. Feedback on adequacy is provided by the *Hazard Identification Checklist*.
- 8) **ASME B31 (ASME Code for Pressure Piping) as follows: B31.1 – 2001 – Power Piping, B31.3 – 2002 – Process Piping, B31.9 – 1996.** Building Services Piping are the only standards that apply to Ames Laboratory. Documentation is found in the applicable standard, in the Ames Laboratory Welding Program, and the *Subcontractor (On-Site) Oversight Program*. Feedback is provided by construction specifications and design documents.
- 9) **DOE Manual 231.1-1A, Environment, Safety and Health Reporting Manual, September 9, 2004.** The Ames Laboratory uses this standard and the requirements of DOE Order 231.1B, “Environment, Safety and Health Reporting,” for its reporting requirements.
- 10) **DOE Manual 440.1-1A, DOE Explosives Safety Manual, Contractor Requirements Document (Attachment 2), January 9, 2006.** DOE Explosives requirements are not applicable to Ames Laboratory.

9.4 Variances

(a) Variances shall be granted by the Under Secretary after considering the recommendation of the Assistant Secretary for Environment, Safety, and Health. The authority to grant a variance cannot be delegated.

The process for obtaining such a variance is described in Subpart D of the rule. DOE-SC’s Ames Site Office will be consulted prior to filing a formal variance request to gain a preliminary opinion of the likelihood the request will be granted and what supporting material would be needed.

10.0 Additional Information

10.1 References

- Ames Laboratory Contract No DE-AC02-07CH11358, Clause I.126, DEAR 970.5223-1 *Integration of Environment, Safety and Health into Work Planning and Execution (DEC 2000)*
- [DOE Policy 450.4A](#) Integrated Safety Management Policy
- [10 CFR Part 851](#) Worker Safety and Health Program
- Additional program information that supports the Ames Laboratory's Integrated Safety Management System is available in the [Environment, Safety, Health & Assurance Program Manual](#) (Manual 10200.002).

10.2 Appendices

- **Appendix A, Major Program Elements**
- **Appendix B, Crosswalk of 10CFR Part 851 and ISMS System**

Appendix A. Major Program Elements

The following summaries of the major program elements of the Ames Laboratory Integrated Safety Management System (ISMS) are designed to provide the reader with a fundamental understanding of applicable safety programs and mechanisms at Ames Laboratory.

Integrated Safety Management System (ISMS) and Environmental Management System:

The [Integrated Safety Management System Description](#) (Plan 10200.016) documents the Laboratory's plan for performance of work according to a Safety Management System and Environmental Management System in support of the principles and functions described in the Department of Energy's *Safety Management System Policy* (Policy 450.4A) and [Planning for Federal Sustainability in the Next Decade](#) (Executive Order 13693). These programs form the Laboratory's Integrated Safety Management System (ISMS), as required by DEAR 970.5223-1 INTEGRATION OF ENVIRONMENT, SAFETY, AND HEALTH INTO WORK PLANNING AND EXECUTION (DEC 2000). The ISMS description provides a road map of the Laboratory's policies and practices that establish an environment where safety activities and functions are an integral part of the Laboratory's mission. It describes the principal safety programs and practices that provide a safe and healthful work environment for the protection of workers, the public and the environment, but does not address all of the Laboratory's safety or environmental related requirements.

ESH&A Program Manual (Quality Assurance, Training, Industrial Hygiene, Industrial/General Safety, Environmental Protection, Radiological Protection, Fire Protection, Emergency Preparedness/Site Security, Assessment):

The primary environment, safety and health, and quality assurance processes are documented in the Laboratory's [Environment, Safety, Health and Assurance Program Manual](#) (Manual 10200.002). It incorporates the requirements of environment, safety, and health standards referenced in the Ames Laboratory contract and DOE directives, with the requirements for quality assurance and training. Major topical programs of this manual include: Quality Assurance, Training, Industrial Hygiene, Industrial/General Safety, Environmental Protection, Radiological Protection, Fire Protection, Emergency Preparedness and Site Security, and Assessments. Additional manuals, plans, and procedures provide additional program definition and implementation requirements.

Quality Assurance Program:

Ames Laboratory's *Quality Assurance (QA) Program* and the integration of QA into its business, safety, security and assurance processes is based on DOE's quality assurance criteria and is implemented through numerous mechanisms, supportive of its overall management approach and reflective of the potential hazards associated with work to be performed. The Laboratory's program is described in the [Quality Assurance Program Plan](#) (Plan 10200.026). Ames does not apply requirements uniformly across all activities; to do so would not necessarily add value or reduce risks and could be an ineffective allocation of resources. Rather, the Laboratory's quality assurance mechanisms provide a level of planning, documentation, and work control processes commensurate with the hazard and risk characteristics of the activity, including: safety, safeguards and security, life cycle issues, and programmatic mission. The current *Quality Assurance Program* efforts cover operational aspects of environment, safety, and health; safeguards and security, cyber security; emergency management; and business operations. Numerous mechanisms, with proven track records, ensure compliance with applicable requirements, pursue excellence through continuous improvement, provide for timely identification and correction of deficient conditions, and verify the effectiveness of completed corrective actions.

* = Referenced by Appendix A to Part 851

Appendix A Major Program Elements

Needs Assessment Program:

The *Needs Assessment* program is a joint effort between Human Resources, Occupational Medicine, and ESH&A and is documented in the *ESH&A Program Manual*. The *Needs Assessment* program provides a mechanism for employees and supervisors to identify hazards and training needs. Each supervisor is given a [Hazard Inventory](#) (Form 46601.021) and a [Training Needs Questionnaire](#) (Form 48202.006) to complete for his/her group. The completed HIs/TNqs will serve as hazard and training needs "templates" for each group and will trigger training requirements automatically in Cyber Train. For employees in groups whose supervisors have chosen not to utilize the template option, the Hazard Inventory/Training Needs Questionnaire is automatically added to new employees' training requirements. Answers to the forms will be used to assign training in Cyber Train. For more information, refer to the [Training Needs Assessment Procedure](#) (Procedure 48202.005).

Training Program:

Ames Laboratory's Training Program provides a cornerstone of its ISMS and is described in the *Training Program Manual*. Hiring and training processes are established to ensure personnel are qualified to carry out their assigned duties and maintain job proficiency. Jobs are described through *Position Descriptions* and an analysis of a hazard inventory and job tasks. Training is assessed using group templates for each supervisor, as well as by the *Hazard Inventory* and *Training Needs Questionnaire*, and employees are provided the training necessary for the safe performance of their responsibilities through a comprehensive training program. *General Employee Training* provides an initial understanding of the Laboratory's organizational structure, policies and procedures, and general safety principles and practices for new employees. Additional institutional training is provided by subject matter experts for employees working with special hazards. The employee's organizational unit provides job (activity) specific training based upon the employee's specific work assignments, typically including policies, procedures, and hands-on training for specialized equipment.

Radiological Protection:

The Laboratory's [Radiological Protection Program](#) (Plan 10202.004) provides requirements for research and support activities. The majority of radiological work at Ames Laboratory includes x-ray devices, remediation of legacy contamination, stewardship of a very limited amount of radioactive materials, and intermittent research involving small amounts of radioactive materials. Appropriate staff are trained in radiation protection for the research applications or as a protection strategy for potential exposure to historical radiological contamination in DOE-owned buildings utilized for uranium and thorium purification and production activities performed in the late 1940's and early 1950's. Radiological activities are subject to the [Readiness Review Procedure](#) (Procedure 10200.010) [*Readiness Review*] process and ALARA committee review as stated in the [ALARA Policy](#) (Policy 10202.001).

Emergency Preparedness:

Ames Laboratory maintains a tested and effective Emergency Preparedness Program, and the [Ames Laboratory Emergency Plan](#) (Plan 46300.001) and the [Emergency Plan Implementation Procedure](#) (Procedure 46300.010) establish and document the Laboratory's emergency preparedness activities and assigned responsibilities. The program has been developed on a thorough understanding of hazards related to the facility, based on hazards and risks associated with Laboratory activities and non-Laboratory activities with potential to impact Laboratory facilities and personnel. Detailed *Hazard Assessments* establish the technical basis for the program, and annual Hazard Survey Updates identify changes in the hazards at the Laboratory that would affect emergency preparedness activities. Emergency preparedness activities are

* = Referenced by Appendix A to Part 851

Appendix A Major Program Elements

conducted according to the criteria of a base program that will not reach an Alert Level operational Emergency as described by DOE Order 151.1C. Due to the low hazard level at Ames and the timely availability of off-site fire, medical, and police services, Ames emergency operations rely heavily on off-site responders for fire, medical, and security response. Also, an in-house Emergency Team, consisting of safety, environmental, and protection specialists, responds to minor emergencies that don't require off-site assistance and assists off-site responders as necessary. An annual assessment of the Emergency Preparedness Program is conducted by the Emergency Coordinator, and includes a review of the *Emergency Plan* and the *Emergency Plan Procedure*.

Readiness Review:

The Laboratory uses an activity-based *Readiness Review* to identify, document, and address potential hazards associated with research and support activities. The process includes participation of line management and safety, engineering, and facility specialists to determine the hazard level of activities, based on specific criteria dealing with the magnitude (seriousness of potential harm) and scope (area of effect) of the hazard, as well as the risk (realistic potential for the hazard to have an impact of a particular scope and magnitude) involved. Typical office activities are classified as Hazard Level I, most experimental research activities and support activities are Hazard Level II, and a few activities are characterized as Hazard Level III. An activity's hazard level is used to determine the degree of formality, rigor, and documentation of the requirements and work controls applied to the activity. The *Readiness Review* process identifies the activity's hazards and the appropriate standards used to develop strategies to control the hazards. Skilled, trained research and support staff implement the appropriate controls and provide oversight through operational observations and walk-throughs. These mechanisms are fully integrated into the Laboratory's planning, budgeting, and management systems and thereby ensure that the Laboratory adequately addresses activities associated with initiatives, programs, and projects of the future. Ames continuously looks for opportunities to improve its *Readiness Review* process. One of the on-going improvements is the application of centralized computer-based documentation and tracking of hazards, mitigations, training, and personal protective equipment (PPE) needs related to each activity approved by the *Readiness Review*.

Contractor Assurance System (CAS):

Ames Laboratory maintains a comprehensive oversight and assurance program, with multiple feedback and improvement mechanisms. The Laboratory's program is described in the [Ames Laboratory Contractor Assurance System \(CAS\) Description](#) (Plan 40000.006). Numerous mechanisms, with proven track records, ensure compliance with applicable requirements, pursue excellence through continuous improvement, provide for timely identification and correction of deficient conditions, and verify the effectiveness of completed corrective actions. Employees are charged with the responsibility of continuously assessing their individual performances and their workspaces in order to prevent problems and to identify nonconforming conditions and opportunities for improvement. Employees are empowered with stop work authority, can utilize the [Employee Safety and Security Concerns Program](#) (Plan 10200.008) and are informed of their rights to contact DOE during *General Employee Training* (AL-001). Also, line management assesses its processes, and identifies and corrects deficiencies that hinder it from achieving established objectives. The ESH&A office administers an *Independent Walk-Through* program, including members of the Executive Council, an Ames Site Office or DOE-CH representative, and several safety, security, electrical, and environmental specialists. A corrective action database is utilized to track and document closeout of identified concerns. [Environment, Safety, Health & Assurance \(ESH&A\) Topical Appraisals](#) (Plan 10200.022) are performed by safety specialists on subjects agreed to by the Ames Site Office and the

* = Referenced by Appendix A to Part 851

Appendix A Major Program Elements

Laboratory. Lessons learned are distributed directly to employees and targeted organizations via mechanisms described in accordance with the [Ames Laboratory Lessons Learned Implementation Plan](#) (Plan 10200.020). Information from the various feedback mechanisms described above is per the requirements stated in the [Trend Analysis of ESH&A Concerns](#) (Procedure 10200.041) procedure. Results are communicated to Laboratory management for review and planning purposes. Also, the Laboratory conducts a broad, comprehensive program of internal auditing in accordance with the estimated level of inherent risks associated with Laboratory activities to examine and evaluate the adequacy and effectiveness of the Laboratory's system of management controls.

Event Reporting Program:

As defined by the [Event Reporting Program](#) (Plan 10200.002), it is the policy of Ames Laboratory to encourage a positive attitude toward reporting issues of concern. The program is designed to ensure that Ames Laboratory and DOE officials are kept fully and currently informed of all events and conditions that could affect the health and safety of the public, seriously impact the intended purpose of Laboratory facilities, have a noticeable adverse effect on the environment, impact safeguards and security, or endanger the health and safety of workers. Potential events are often identified by an individual's direct observation of equipment or process malfunctions, log or record reviews, operator recognition of their own or others' errors, or other means. A team of key Laboratory personnel, the Event Screening Team, is responsible for determining if issues, concerns, findings, and other operational data are potential reportable events. Potentially reportable issues are reviewed, reporting needs are determined, and initial notifications are made. Corrective action plans are developed according to established requirements. Lessons learned are distributed directly to employees and targeted organizations and are discussed during safety meetings, *Readiness Reviews*, and subcontractor oversight meetings. Information from the various feedback mechanisms described above is reviewed according to the Laboratory's procedure for *Trend Analysis*. This review is included as part of an annual self-assessment process. Results of the *Trend Analysis* are also communicated to Laboratory management for review and planning purposes.

Safety Coordinator and Representative Program:

The Laboratory's [Safety Coordinator and Safety Representative Program](#) (Plan 10200.009) describes roles and responsibilities of safety coordinators and representatives who act as liaisons between line personnel and the ESH&A office. Safety coordinators are assigned at the level of the program; safety representatives are assigned at the level of the group. Coordinators and representatives receive specialized training on hazard identification and how to access pertinent safety information that assists them in performing their duties. Safety coordinators and representatives participate in *Readiness Reviews*, receive pertinent safety information from the ESH&A office and help coordinate *Independent and Program/Department Walk-Throughs*.

Subcontractor Oversight Procedure:

Ames Laboratory has a documented [Subcontractor Oversight \(On-Site\) Procedure](#) (Procedure 10200.046) that assures activities conducted on-site by contractors (not vendors) are performed safely and in accordance with Ames Laboratory requirements. The Facilities and Engineering Services and ESH&A offices identify and manage subcontractor activities via weekly planning meetings. ESH&A personnel also monitor purchase requisitions by which subcontractor services are requested. Subcontractor personnel are briefed by a safety specialist on the applicable safety and health requirements related to the work they are performing. Subcontractor personnel are encouraged to report unsafe or off-normal work conditions. Appropriate oversight by line personnel, Facilities and Engineering Services or ESH&A personnel is conducted until work is completed.

* = Referenced by Appendix A to Part 851

Appendix A Major Program Elements

Human Resource Processes:

The Laboratory's Human Resources processes enable the hiring of scientists, professionals and operational staff required to fulfill the mission of the laboratory. Formal *Position Descriptions*, classifications, recruitment, and hiring practices ensure the technical and skill needs of a scientific laboratory are met. Processes include internal reviews and line management approvals. The *Training Needs Assessment* program provides documentation of potential employee workplace hazards. *Annual Performance Reviews*, part of the *Ames Laboratory Performance Review and Planning System*, provide documented evaluations of employee performance, including safety and continuous improvement performance. Human Resource staff also provides Laboratory managers and supervisors with education and coaching for processes designed to address employee performance and labor relations issues, and thereby promote exceptional performance results and effective issue resolution. An effective Employee Assistance Program (EAP) is reviewed and monitored by an ISU Advisory Committee.

Visitor:

Ames Laboratory enjoys an "open-door" policy that is consistent with our close interaction with ISU. In order for this policy to continue, visitors to Ames Laboratory are required to adhere to the Laboratory's safety and security policies. A [Visitor Guide](#) (Guide 10200.001) provides guidance that helps visitors understand and comply with the pertinent policies and procedures. Visitors are informed of their right to know about potential hazards in the areas they will be visiting and the associated controls that will protect them. Visitors are also encouraged to report unsafe work conditions for resolution by Laboratory personnel.

***Construction Safety:**

Construction activities at the Laboratory are primarily managed by Facilities and Engineering Services. The *Readiness Review* process is the mechanism by which all Facilities and Engineering Services activities (including construction) are reviewed and approved by the *Safety Review Committee*. Weekly planning meetings are the forum for discussions about upcoming construction activities and are attended by a safety specialist from ESH&A. Occasionally, construction activities are performed by a subcontractor. The [Subcontractor \(On-Site\) Oversight Program](#) (Procedure 10200.046) is the mechanism that ensures the safety of subcontractor personnel and compliance with applicable Ames Laboratory requirements.

***Fire Protection:**

The Laboratory's Fire Safety Program is based on the principles of prevention, detection, annunciation, and suppression and is described in the *ESH&A Program Manual*. **The Ames Laboratory Director has established the Fire Safety Committee (FSC) as a standing subcommittee of the Safety Review Committee, and empowered the committee to act as the local authority having jurisdiction (AHJ) for the Ames Laboratory routine activities. The Ames Site Office (AMSO) is the AHJ for exemptions, equivalencies, and alternatives.** The committee reviews designs of new and modified fire protection systems, evaluates, interprets and applies the standards for fire safety, applies for exemptions and waivers from standards, and administers the Ames Laboratory Fire Safety Program. An automated detection and notification system is monitored 24 hours a day/7 days a week by the Plant Protection Section. Employees are introduced to the basic concepts of fire safety during *General Employee Training* via discussions about use of fire extinguishers and storage of flammable liquids. The Laboratory's *Emergency Plan* covers employee responsibilities in emergency situations such as fire.

***Explosives Safety:**

Not applicable at Ames Laboratory.

* = Referenced by Appendix A to Part 851

Appendix A Major Program Elements

***Pressure Safety:**

The Laboratory's pressure safety program ensures that pressurized and vacuum systems in use at the Laboratory function properly and are in compliance with applicable codes. The topic of pressure safety is fully integrated into the Laboratory's *Readiness Review* process which is the mechanism by which all laboratory-based activities are reviewed and approved by the *Safety Review Committee*. The Laboratory's pressure safety specialist, in Facilities and Engineering Services, participates in all discussions of potential pressure hazards and associated controls during *Readiness Reviews*.

***Firearms Safety:**

Not applicable at Ames Laboratory.

***Industrial Safety:**

The Industrial Safety Program encompasses traditional safety disciplines such as elevated work platforms, fall prevention, electrical, confined space entry, and accident prevention and investigation. The *ESH&A Program Manual* provides detailed information on the various elements of the program and gives specific implementation responsibilities for employees and supervisory personnel. Mandatory training requirements are clearly stated and are integrated into the *Readiness Review* and *Needs Assessment* processes. The *Independent and Program/Department Walk Through* processes, *Topical Appraisals*, and an annual self-assessment provide feedback on the efficacy of many of the components of the Industrial Safety Program.

Industrial Hygiene and *Biological Safety:

The Laboratory's Industrial Hygiene Program provides a structure by which chemical, physical, biological, and ergonomic hazards are anticipated, recognized, evaluated, and controlled. The *ESH&A Program Manual* describes the elements of the IH program including information on exposure assessments including monitoring, chemical management, hearing conservation, and biohazardous materials. The Industrial Hygiene Program is closely aligned with the Occupational Medicine Program and together they ensure that employees do not experience adverse health effects from exposures at work.

***Occupational Medicine:**

The Occupational Medicine Office provides medical surveillance and assistance to Ames Laboratory and University employees who work with materials and under conditions that have identified and/or regulated risks. Services provided include physicals, phlebotomy and spirometry along with being a source for wellness information. The Occupational Medicine staff and Industrial Hygiene personnel conduct workplace evaluations and provide recommendations on the necessity for employee participation in appropriate medical surveillance programs.

***Motor Vehicle Safety:**

The Laboratory's Motor Vehicle Safety Program ensures the safe operation of motor vehicles owned, leased or rented by Ames Laboratory. The goals of this program are to ensure the safety of the drivers, passengers, and public; to prevent physical damage to vehicles or property; and to eliminate third party claims against the Ames Laboratory. Programmatic documentation delineates safe driving practices, insurance and training requirements along with other procedural information. Laboratory employees utilize ISU's Transportation Services' motor vehicle pool for many work-related motor vehicle needs. Transportation Services policies and procedures also ensure safe operation of vehicles.

* = Referenced by Appendix A to Part 851

Appendix A Major Program Elements

***Electrical Safety:**

The purpose of the Ames Laboratory Electrical Safety Program is to establish minimum safety requirements and safe work practices for the design, construction, installation, inspection, testing, operation and maintenance of all low and high voltage electrical systems and electrical utilization devices/equipment. The Ames Laboratory [Electrical Safety Program Manual](#) (Manual 10200.007) is a resource for employees and provides uniform guidance in reducing and/or eliminating risks associated with electrical related work practices. Electrical safety concerns are fully integrated into the Laboratory's *Readiness Review* process that includes review of all concerns by the Laboratory's electrical safety specialist. Stringent training requirements are enforced for employees who conduct equipment wiring and work with exposed electrical circuits.

***Nanotechnology Safety:**

Ames Laboratory adheres to DOE Policy 456.1, *Secretarial Policy Statement on Nanoscale Safety* and utilizes the DOE Nanoscale Science Research Centers document, *Approach to Nanomaterial ESH&A* as a primary reference document. Ames has developed practices and policies for activities involving Unbound Engineered Nanoparticles in compliance with DOE Order O 456.1 Admin Chg1 (2-14-2013), *The Safe Handling of Unbound Engineered Nanoparticles*.

The Laboratory has some activities involving nanoscale materials. The potential hazards associated with this work are addressed by Plan 10200.035, [Unbound Engineered Nanomaterials Safety Implementation Plan](#). The *Readiness Review* process provides the mechanism for identification of the use of nanomaterials to facilitate the evaluation of potential hazards. In addition, the Readiness Review authorized user data supports the Registry for Nanomaterial Workers, shared with the Occupational Medicine Department. A training course, *AL-206 Nanomaterial Awareness*, provides workers who may be exposed to nanomaterials with an awareness of nanoscale material safety issues. A process for evaluation of the hazards of the nanomaterial use is described in the Plan; ensuring this evaluation has been conducted is a joint responsibility of the researcher and the Industrial Hygiene department. The Laboratory recognizes that nanotechnology is an emerging field and that many ESH&A concerns related to nanomaterials are still being investigated, with new knowledge constantly being developed. Therefore, Ames Laboratory safety professionals monitor professional sources of information to identify and implement new assessment and control strategies associated with nanoscale materials research.

* = Referenced by Appendix A to Part 851

Appendix B Crosswalk of 10 CFR Part 851 and ISMS System

Appendix B. Crosswalk of 10 CFR Part 851 and ISMS System

The following table is a crosswalk between the sections of 10 CFR Part 851 and the Ames Laboratory program elements. The crosswalk is designed to indicate which mechanisms of the ISMS program primarily address the requirements of the rule.

Rule #	Subject	Ames Laboratory Program
(Subpart C)	Specific Requirements	
	Management responsibilities and worker rights and responsibilities.	<ul style="list-style-type: none"> • Manual 10200.002 - ESH&A Program Manual • Course AL-198 Ames Laboratory Group Leader Orientation
(851.20(a))	Management responsibilities	<ul style="list-style-type: none"> • Manual 10200.002 - ESH&A Program Manual • Course AL-198 Ames Laboratory Group Leader Orientation
(851.20(a)(1))	Policy, goals, and objectives.	<ul style="list-style-type: none"> • Manual 10200.002 - ESH&A Program Manual • Plan 10200.016 – Ames Laboratory Integrated Safety Management System Policy Statement • Policy 10200.007 – Safety Performance Measures Policy
(851.20(a)(2))	Qualified staff.	<ul style="list-style-type: none"> • Ames Laboratory Performance Review and Planning System
(851.20(a)(3))	Accountability	<ul style="list-style-type: none"> • Ames Laboratory Performance Review and Planning System • Annual Performance Reviews
(851.20(a)(4))	Employee involvement.	<ul style="list-style-type: none"> • Course AL-001 General Employee Training • Plan 10200.008 – Employee Safety & Security Concerns Program Implementation Plan
(851.20(a)(5))	Access to information	<ul style="list-style-type: none"> • Course AL-001 General Employee Training • Plan 10200.020 – Ames Laboratory Lessons Learned Implementation Plan
(851.20(a)(6))	Report events and hazards.	<ul style="list-style-type: none"> • Plan 10200.008 – Employee Safety & Security Concerns Program Implementation Plan
(851.20(a)(7))	Prompt response to reports.	<ul style="list-style-type: none"> • Procedure 10200.038 – Accidents, Incidents & Employee Safety Concerns: Classification & Investigation • Ames Laboratory Corrective Action Tracking System (ALCATS)
(851.20(a)(8))	Regular communications.	<ul style="list-style-type: none"> • Plan 10200.020 – Ames Laboratory Lessons Learned Implementation Plan • Periodic Directors Messages (email to all employees) • All-Hands Meeting presented by Laboratory Director • Monthly Ames Laboratory Insider publication • Monthly ESH&A newsletter
(851.20(a)(9))	Stop work authority.	<ul style="list-style-type: none"> • Policy 10200.005 – Ames Laboratory Stop Work Authority
(851.20(a)(10))	Inform workers of rights.	<ul style="list-style-type: none"> • Course AL-001 General Employee Training • DOE Policy Poster
	Budget	<ul style="list-style-type: none"> • Unified Field Budget and Work Authorization System (WAS) • Form 10100.001 - Preliminary Proposal Form
	Additional resources.	<ul style="list-style-type: none"> • Form 58100.002 – Incremental Budget Request
(851.20(b))	Worker rights and responsibilities.	<ul style="list-style-type: none"> • Course AL-001 General Employee Training • DOE Policy Poster • Manual 10200.002 – ESH&A Program Manual
(851.20(b)(1))	Participate on official time.	<ul style="list-style-type: none"> • Manual 10200.002 – ESH&A Program Manual • Human Resources Policies & Procedures

Appendix B Crosswalk of 10 CFR Part 851 and ISMS System

Rule #	Subject	Ames Laboratory Program
(851.20(b)(2))	Access to information.	• Manual 10200.002 – ESH&A Program Manual
(851.20(b)(3))	Notification of monitoring results.	• Manual 10200.002 – ESH&A Program Manual, Chapters 4 (Industrial Hygiene), 5 (Industrial Safety), 7 (Radiological Protection)
(851.20(b)(4))	Observe monitoring.	• Manual 10200.002 – ESH&A Program Manual, Chapters 4 (Industrial Hygiene), 5 (Industrial Safety), 7 (Radiological Protection)
(851.20(b)(5))	Accompany inspections.	• Procedure 10200.021 – Independent Walk-Through Procedure • Procedure 10200.014 – Program/Department Walk-Through
(851.20(b)(6))	Results of inspections and investigations.	• Procedure 10200.021 – Independent Walk-Through Procedure • Procedure 10200.014 – Program/Department Walk-Through
(851.20(b)(7))	Express concerns.	• Plan 10200.008 – Employee Safety & Security Concerns Program Implementation Plan • Course AL-001 General Employee Training
(851.20(b)(8))	Decline to perform in imminent risk.	• Manual 10200.002 – ESH&A Program Manual
(851.20(b)(9))	Stop work.	• Policy 10200.005 – Stop Work Authority
	Informing workers through training	• Manual 10200.002 – ESH&A Program Manual
	Employee concerns	• Plan 10200.008 – Employee Safety & Security Concerns Program Implementation Plan
	Additional resources	
	Hazard identification and assessment.	• Procedure 10200.010 – Readiness Review Procedure • Form 10100.001 - Preliminary Proposal Form
(851.21(a))	Identify and assess risks.	• Procedure 10200.010 – Readiness Review Procedure • Form 10100.001 - Preliminary Proposal Form
(851.21(a)(1))	Assess workers exposures.	• Manual 10200.002 – ESH&A Program Manual, Chapters 4 (Industrial Hygiene), 5 (Industrial Safety), 7 (Radiological Protection)
(851.21(a)(2))	Document hazard assessment	• Manual 10200.002 – ESH&A Program Manual, Chapters 4 (Industrial Hygiene), 5 (Industrial Safety), 7 (Radiological Protection)
(851.21(a)(3))	Record results.	• Manual 10200.002 – ESH&A Program Manual, Chapters 4 (Industrial Hygiene), 5 (Industrial Safety), 7 (Radiological Protection)
(851.21(a)(4))	Analyze designs for potential hazards.	• Procedure 10200.010 – Readiness Review Procedure
(851.21(a)(5))	Evaluate operations, procedures, and facilities.	• Procedure 10200.010 – Readiness Review Procedure
(851.21(a)(6))	Job activity-level hazard analysis.	• Procedure 10200.010 – Readiness Review Procedure
(851.21(a)(7))	Review safety and health experience.	• Plan 10200.002 - Event Reporting Program
(851.21(a)(8))	Consider other hazards	• Procedure 10200.010 – Readiness Review Procedure
	Closure facilities hazard identification	• Procedure 10200.010 – Readiness Review Procedure
	Hazard identification schedule	• Procedure 10200.010 – Readiness Review Procedure
(851.22)	Hazard prevention and abatement	• Procedure 10200.010 – Readiness Review Procedure
(851.22(a))	Hazard prevention and abatement process.	• Procedure 10200.010 – Readiness Review Procedure

Appendix B Crosswalk of 10 CFR Part 851 and ISMS System

Rule #	Subject	Ames Laboratory Program
(851.22(a)(1))	During design or procedure development.	• Procedure 10200.010 – Readiness Review Procedure
(851.22(a)(2))	Existing hazards.	• Procedure 10200.010 – Readiness Review Procedure
(851.22(b))	Hierarchy of controls.	• Procedure 10200.010 – Readiness Review Procedure • Manual 10200.002 – ESH&A Program Manual
(851.22(b)(1))	Substitution.	• Procedure 10200.010 – Readiness Review Procedure
(851.22(b)(2))	Engineering.	• Procedure 10200.010 – Readiness Review Procedure
(851.22(b)(3))	Work practices and administrative.	• Procedure 10200.010 – Readiness Review Procedure
(851.22(b)(4))	Personal protective equipment.	• Procedure 10200.010 – Readiness Review Procedure • Course AL-133 – Personal Protective Equipment (PPE)
(851.22(c))	Purchasing equipment, products, and services.	• Manual 58300.001 - Procurement Operating Practices Manual
	Additional resources	
(851.23)	Safety and health standards	• Contract Clauses and Directives
(851.24)	Functional areas.	• See Appendix A
(851.25)	Training and information.	• Manual 48202.001 – Training Program Manual • Procedure 10200.029 – Training Needs Assessment Procedure
	Providing Training	• Manual 48202.001 – Training Program Manual
	Additional resources:	
(851.26)	Recordkeeping and reporting	• Manual 10200.002 – ESH&A Program Manual, Chapter 2 (Quality Assurance Program) • Occupational Medicine Manual
	Hazard Abatement Tracking	• Ames Laboratory Corrective Action Tracking System
(851.27)	Reference sources	
Appendix A		
1.	Construction Safety	• Manual 10200.002 – ESH&A Program Manual
2.	Fire Protection	• Manual 10200.002 – ESH&A Program Manual, Chapter 8 (Fire Protection Program)
3.	Explosives Safety	• Not Applicable
4.	Pressure Safety	• Procedure 10200.010 – Readiness Review Procedure
5.	Firearms Safety	• Not Applicable.
6.	Industrial Hygiene	• Manual 10200.002 – ESH&A Program Manual, Chapter 4 (Industrial Hygiene Program)
7.	Biological Safety	• Manual 10200.002 – ESH&A Program Manual
8.	Occupational Medicine	• ISU Occupational Medicine Manual
9.	Motor Vehicle Safety	• Manual 10200.002 – ESH&A Program Manual, Chapter 5 (Industrial Safety)
10.	Electrical Safety	• Manual 46200.001 - Electrical Safety Program Manual
11.	Nanotechnology Safety	• Plan 10200.035 – Nanomaterials Safety Implementation Plan
12.	Workplace Violence Prevention - Reserved	• Reserved