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**DOE G 440.1-1A
Approved: 6-4-07**

**WORKER PROTECTION PROGRAM
FOR DOE (INCLUDING THE NATIONAL
NUCLEAR SECURITY ADMINISTRATION)
FEDERAL EMPLOYEES GUIDE
for Use with DOE O 440.1B**

[This Guide describes suggested nonmandatory approaches for meeting requirements. Guides are not requirements documents and are not to be construed as requirements in any audit or appraisal for compliance with the parent Policy, Order, Notice, or Manual.]



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AVAILABLE ONLINE AT:
www.directives.doe.gov

INITIATED BY:
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FOREWORD

1. This Department of Energy Guide is for use by all DOE components.
2. Beneficial comments (recommendations, additions, and deletions) and any pertinent data that may improve this document should be sent to the Director, Office of Worker Safety and Health Policy, U.S. Department of Energy, Washington, D.C. 20585 by letter or by sending the self-addressed Standardization Document Improvement Proposal (DOE F 1300.3).
3. This Guide is intended to identify acceptable methods for implementing the provisions of DOE O 440.1B.

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WORKER PROTECTION PROGRAM FOR DOE (INCLUDING THE NATIONAL NUCLEAR SECURITY ADMINISTRATION) FEDERAL EMPLOYEES

1. INTRODUCTION

DOE Order 440.1B (DOE O 440.1B), *Worker Protection Program for DOE (including the National Nuclear Security Administration) Federal Employees*, establishes the framework for an effective worker protection program that will reduce or prevent accidental losses, injuries, and illnesses by providing DOE Federal workers with a safe and healthful workplace. The worker protection program integrates occupational safety, industrial hygiene, occupational medical, construction safety, fire protection, firearms safety, explosives safety, motor vehicle safety, pressure vessel safety, and other functions addressed in Standards required by the Order. The purpose of DOE O 440.1B is to establish a comprehensive worker protection program that reasonably ensures that DOE employees are afforded a level of safety and health on the job that is at least equal to that provided to its contractor employees and to private-sector employees under the Occupational Safety and Health Act of 1970. The Order establishes a baseline program that can be used as the foundation for the type of proactive worker protection program that the best employers in private industry have established for their workplaces.

2. APPLICATION

DOE O 440.1B applies to all activities (which may include design, construction, operation, maintenance, decontamination and decommissioning, research and development, and environmental restoration activities) performed by DOE employees. The Order (including the functional area requirements in Attachment 1 to the Order) is applicable to all DOE elements except the Naval Nuclear Propulsion Program; activities conducted under the Nuclear Explosives and Weapons Safety Program relating to the prevention of accidental or unauthorized nuclear detonations to the extent a requirement under this part cannot be implemented for a particular facility in a manner that does not compromise the effectiveness of such activities; and activities conducted by Bonneville Power Administration as authorized by Delegation Order No. 00-033.00A. This Implementation Guide provides general information and methodologies that DOE finds acceptable in meeting the Department's requirements defined in DOE O 440.1B. Other worker protection-related Implementation Guides with useful information for DOE 440.1B activities are:

- DOE G 440.1-2, *Construction Safety Management Guide For Use With DOE Order 440.1*
- DOE G 440.1-3, *Occupational Exposure Assessment*
- DOE G 440.1-5, *Fire Safety Program for use with DOE O 420.1 and DOE O 440.1*

The Federal Employee Occupational Safety and Health (FEOSH) Program is established in 29 CFR 1960, *Basic Program Elements for Federal Employee Occupational Safety*

and Health Programs and Related Matters. Requirements for FEOSH flow down into DOE O 440.1B and are reflected in this Implementation Guide and in the *DOE Federal Employee Occupational Safety and Health Handbook*. In addition, other DOE Rules, directives, and implementation guides will have an impact on the overall worker protection program. Those documents contain requirements that must be met for a worker protection program to be complete and effective. Those Orders and Rules include:

- DOE O 225.1A, *Accident Investigations*, dated 11-26-97.
- DOE O 231.1A, *Environment, Safety, and Health Reporting*, dated 6-3-04.
- DOE O 360.1B, *Federal Employee Training*, dated 10-11-01.
- DOE O 442.1A, *Department of Energy Employee Concerns Program*, dated 6-6-01.
- 10 CFR 835, *Occupational Radiation Protection*, dated 11-26-97.

In addition to these Orders and Rules, requirements are also contained in the mandatory Manual, DOE M 440.1-1A, *DOE Explosives Safety Manual*.

Additional non-mandatory Technical Standards and handbooks are available to assist DOE elements in developing successful worker protection programs. These include:

- DOE-STD-1091-96, *Firearms Safety*
- DOE-STD-1090-04, *Hoisting And Rigging Standard*
- DOE-HDBK-1092-2004, *Electrical Safety*

Additional, non-mandatory guidance for the implementation of 10 CFR 835, *Occupational Radiation Protection*, a key component of the Department's overall worker protection program, is contained in DOE G 441.1-1B, *Radiation Protection Programs Guide for Use with Title 10, Code of Federal Regulations, Part 835, Occupational Radiation Protection*.

This Implementation Guide and associated Technical Standards describe acceptable means of satisfying the requirements established in DOE O 440.1B. DOE elements are free to use the guidance provided in these non-mandatory documents or to develop their own unique methods, provided that these alternate methods afford workers a level of protection equal to or greater than that afforded by DOE O 440.1B and the non-mandatory Guides and Standards. DOE Rules, Orders, Guides, and Standards change over time, so DOE elements should keep up to date with these changes. This Guide presents suggestions and alternative approaches that DOE elements may wish to consider in implementing their worker protection programs.

3. GENERAL INFORMATION

It is DOE policy to provide a safe and healthful workplace for all Federal personnel. These conditions will be ensured by implementing the worker protection program established in DOE O 440.1B. Fundamental elements of the worker protection program include:

- establishing a written program with policy, goals, objectives, and performance measures;
- using qualified staff;
- assigning responsibility and holding personnel accountable;
- encouraging involvement of workers;
- ensuring workers' rights and informing workers of their rights and responsibilities;
- identifying workplace hazards and evaluating risk of injury and illness;
- preventing or abating workplace hazards;
- providing worker protection training; and
- complying with DOE-prescribed worker protection standards.

The requirements in DOE O 440.1B are organized in this Implementation Guide to reflect what the Department considers to be the essential elements of a successful worker protection program:

- management commitment;
- employee involvement;
- hazard identification and evaluation;
- hazard prevention and control; and
- worker protection training.

The Department recognizes that DOE O 440.1B provides the basic foundation for a worker protection program and that some DOE elements may need or decide to go beyond the Order's minimum requirements in establishing programs to protect workers from hazards associated with their activities. Decisions concerning implementation of worker protection measures should be based on the use of a graded approach to ensure that available resources are used most efficiently.

4. GUIDELINES

4.1. Management Commitment

4.1.1. Establishing and Implementing a Written Worker Protection Program

DOE O 440.1B requires:

- DOE elements to implement a written worker protection program that provides a place of employment free from recognized hazards that are causing or likely to cause death or serious physical harm to their employees [paragraph 4a(1)];
- DOE elements to implement a written worker protection program that integrates all requirements contained in paragraphs 4a through 4o, program requirements contained in Title 29, Code of Federal Regulations (CFR) Part 1960, *Basic Program Elements for Federal Employee Occupational Safety and Health Programs and Related Matters*, applicable functional area requirements contained in Attachment 1 of the Order, and other related site-specific worker protection activities.

The written program should describe an integrated management organization and support systems that fully satisfy DOE worker protection requirements of all technical disciplines. It should clearly convey the framework for the program and describe how the program works. All elements of the safety and health program, including management leadership, employee involvement, worksite analysis, hazard prevention and control, and worker protection training, are part of the written program. At a minimum, the written program should:

- Identify the roles, responsibilities, and authorities for implementing the program.
- Identify the taxonomy of other documentation for the organization's worker protection program [including policy, objectives, operating procedures, interfaces with other functions (e.g., finance, maintenance, security), and other safety and health related plans mandated by specific requirements (e.g., Health and Safety Plans in accordance with 29 CFR 1910.120)].
- Include a system for ensuring that employees comply with safe and healthful work practices, which includes provisions for recognition of employees for following safe and healthful work practices, training and retraining programs, disciplinary actions, or other appropriate means to ensure employee compliance with safe and healthful work practices.
- Identify the mechanisms for involving workers in the worker protection program.
- Include a system for communicating with employees about matters relating to worker protection, including provisions designed to encourage employees to inform the employer of hazards at the worksite without reprisal.

- Include procedures for workers and supervisors to identify and evaluate workplace hazards and for qualified worker protection professionals to conduct periodic inspections to identify unsafe conditions and work practices.
- Include a procedure to investigate and report occupational injuries and illnesses.
- Include methods and/or procedures for correcting unsafe or unhealthful conditions, work practices, and work procedures in a timely manner based on the risk associated with the hazard.
- Provide for adequate initial and recurring training.

Listed below are examples of specific technical disciplines that the written program should address and integrate as applicable:

- occupational safety
- motor vehicle safety
- industrial hygiene
- occupational medicine
- radiological protection
- explosives safety
- firearms safety
- emergency preparedness
- pressure vessel safety
- fire protection
- construction safety
- biological safety
- electrical safety

Separate Implementation Guides to accompany DOE O 440.1B have been developed for several of these disciplines. Coordination must be established, maintained, and documented among these technical disciplines and other organizations at a site to ensure successful implementation of the worker protection program.

When multiple contractors, subcontractors, and Federal organizations are working on the same DOE site, resolving safety and health issues between the organizations can be confusing. For this reason, clear statements of roles and responsibilities with respect to compliance with worker protection program requirements, and mechanisms for resolution of these issues need to be clearly defined. Good lines of communication between the affected parties are essential and should be included in agreements between the parties. The nature and extent of the organizational relationships vary from situation to situation. The need for a firmly established agreement between affected parties regarding worker protection program requirements is essential. As described in paragraph 5b(5) of DOE O 440.1B, one of the responsibilities of the Heads of Departmental Elements and Heads of Field Elements is to evaluate the need for and where necessary, direct the development of formal written agreements between organizations on their sites. Such agreements are

to outline the respective roles, responsibilities, and authorities of each organization as they relate to compliance with DOE worker protection requirements and the resolution of cross-cutting worker protection related issues.

Some common written instruments used at DOE facilities to document and communicate agreements between multiple organizations are the Contract, the Memorandum of Understanding (MOU), the Memorandum of Agreement (MOA), and the Intraservice Support Agreement (ISA). These and other documents are usually prepared to identify roles and responsibilities of respective parties in these shared situations. The roles, responsibilities, and procedures contained in these agreements should be clearly addressed in the written worker protection program to ensure that they are adequately communicated throughout the site.

4.1.2. Managing the Worker Protection Program

DOE O 440.1B requires DOE elements to establish written policy, goals, and objectives for the worker protection program [paragraph 4b].

4.1.2.1. Policy, Goals, and Objectives

A facility's worker protection policy is the guiding principle or philosophy that provides overall direction for the organization in regard to worker protection. The written policy statement conveys senior management's commitment and expectations for overall performance. The organization states its commitment to worker protection through a written, clearly communicated policy, which is ultimately its "mission" statement relative to worker protection. The policy places appropriate emphasis on worker protection and is signed by the highest ranking company official on the site. A concise and clear worker protection policy:

- creates consistency and continuity in safety and health activities;
- provides a point of reference when worker protection conflicts with other company goals; and
- supports supervisors in their enforcement of worker protection rules and safe and healthful work practices.

An example of a worker protection policy might be as follows:

This organization is committed to providing a safe and healthful workplace for employees. These conditions shall be ensured through an aggressive and comprehensive worker protection program. This organization regards employee protection as a priority and is committed to developing, implementing, and improving safety and health practices that will afford optimal protection to employees and enable continuous improvement for the quality of its worker protection performance.

The safety and health of employees shall take precedence whenever conflicts with production or other objectives arise.

An organization's worker protection policy should flow down into specific goals and objectives, which in turn are reflected in the written program. The goals and objectives should be measurable for use as indicators of performance.

4.1.2.2. Budget

To meet the challenge of managing an adequate worker protection program with sometimes constrained resources, it is imperative that DOE elements and contractors request the necessary funding for operation of the facility and properly plan for effective use of the personnel, material, and resources to support the worker protection program. Planning and budgeting exercises serve to set priorities for operations to include worker protection and become the foundation for structuring an operational plan that provides for adequate worker protection. Funding requirements are determined based on projected costs and are submitted in the annual operating budget plan.

Operational planning typically spans periods of 1 to 5 years and focuses on specific functions such as marketing, research and development, production, finances, worker protection, etc. These are the things necessary to ensure that the day-to-day operation has adequate materials and supplies to carry out its work. Likewise, the facility requirements—including the people, equipment, supplies, and resources necessary for worker protection—should be addressed in this planning.

4.1.2.3. Qualified Staff

DOE O 440.1B requires DOE elements to use qualified worker protection staff to direct and manage the worker protection program [paragraph 4c].

Project organizations should seek to hire and retain the most qualified worker protection professionals needed for the hazards at the site. Examples of these positions are Occupational Safety and Health Managers, Safety Engineers, Construction Managers, Industrial Hygienists, Health Physicists, etc. The U.S. Office of Personnel Management (OPM) has published position classification standards for safety and occupational health managers (018), industrial hygienists (690), safety engineers (803), health physicists (1306), and fire protection engineers (804). The OPM standard should be followed for DOE Federal worker protection. These individuals may be employed directly, by contract, or as consultants, but they should possess qualifications relative to the particular hazards at the facility. The hiring of certified professionals (e.g., Certified Safety Professionals, Certified Industrial Hygienists, and Certified Health Physicists) may be appropriate and help to ensure that competent staff is in place. Guidance on specific qualifications for these professionals is available in DOE's *Functional Area Qualification Standards* available at <http://www.eh.doe.gov/techstds/standard/standard.html>. Using a

browser's text searching feature to search for "Qualification Standard" will highlight the available functional area qualification standards.

4.1.2.4. Accountability

DOE O 440.1B requires DOE elements to assign worker protection responsibilities, evaluate personnel performance, and hold personnel accountable for worker protection performance [paragraph 4d]. Managers of facilities must clearly communicate roles, responsibilities, and authorities and insist on accountability of workers at all levels. Managers and supervisors must carry out their own responsibilities and expect employees to follow safe and healthful work practices. Managers and supervisors held accountable for their worker protection responsibilities are more likely to press for solutions to safety and health problems. Managers are typically accountable for the overall worker protection program, including planning and allocating resources for the facility. Supervisors are accountable for ensuring that the worker protection plans, programs, and procedures, including hazard identification and abatement activities, are implemented on a day-to-day basis on the front line. Employee accountability involves following procedures, using safe work practices, reporting hazards, etc.

Holding managers, supervisors, and employees accountable relative to the expectations of their respective positions greatly increases the probability of maintaining safe working conditions. The results of holding people accountable should be frequently communicated and thoroughly documented. The best way is to include roles, responsibilities, and authorities for worker protection in managers', supervisors', and employees' performance objectives. This can be done by establishing performance goals and objectives for personnel and evaluating the person against those elements periodically. The organization should have a process for measuring each individual's performance, including worker protection performance. These evaluations should be considered in the individual's ratings, promotions, bonuses, evaluations, etc.

Top management sets the tone for the work done on site. They must make it known to all employees that worker protection is of vital importance. Moreover, top management commitment to worker protection should be evident in every aspect of site operations. Management can demonstrate their commitment by taking an active role and setting a positive example. They should establish the written worker protection program, ensure that it integrates all elements and functional areas covered by DOE Orders, and fully support the program. They can also demonstrate commitment through such activities as:

- walking their spaces with workers, supervisors, and worker protection professionals;
- becoming actively involved in worker protection committees; and
- expressing a commitment to ensure that all employees understand that the organization regards worker protection as a primary objective is fundamental.

Management commitment to worker protection should be evident to the employee and reinforced by genuine efforts to maintain excellence in worker protection.

4.1.3. Applicable Standards and Guidance Documents

- Occupational Safety and Health Administration, *Safety and Health Program Management Guidelines*. (FR 54:3904-3916; 1/26/1989, http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=FEDERAL_REGISTER&p_id=12909)
- 29 CFR 1960, Basic Program Elements for Federal Employee Occupational Safety and Health Programs and Related Matters
- National Safety Council Data Sheet 585, Rev. 94, *Management Safety Policies and Procedures*.

4.2. Employee Involvement

Employees play a vital role in implementing an aggressive and effective worker protection program. Employees are involved in all site operations, have intimate knowledge of potential worker protection hazards, and can contribute as valuable problem solvers. Active and meaningful employee involvement in the worker protection program means the workforce is trained to recognize hazards and is involved in correcting them. An indicator of effective employee involvement is enthusiastic employees who understand their role in the program and who are interested in its success. DOE elements should assign and communicate worker protection responsibilities to workers, provide adequate authority and resources to permit them to meet these responsibilities, and hold them accountable for proper performance. Line management should also develop and implement programs to encourage and promote employee involvement and commitment to the worker protection program. DOE elements should also establish forums for employees to gain an appreciation for the worker protection program and to foster communication between management and affected workers.

4.2.1. Involving Workers

DOE O 440.1B requires DOE elements to encourage employee involvement in developing program goals, objectives, and performance measures and in the identifying and controlling of hazards in the workplace [paragraph 4e].

Avenues for employee involvement include, but are not limited to, the following:

- participation on committees and work teams;
- participation in worksite inspections, hazard analysis [especially job safety analyses (JSAs)], and design control;
- development and review of workplace operating procedures;

- providing assistance in training;
- conduct worker protection meetings; and
- participation in accident investigations.

4.2.1.1. Committees

Each worker protection committee should consist of employees and management representatives, with the majority being non-managerial. Note that the organization of any such committee should be consistent with acceptable practices for labor/management relations. The responsibilities of each worker protection committee should be clearly stated in a written charter, and each committee should have clear and specific performance-based goals. These goals should be responsive to the atmosphere and operations in the worksite and should be revised as necessary to accommodate changes in operations, technology, and materials and to reflect tasks completed by the committee.

Worker protection committees should have access to necessary records (subject to provisions of the Privacy Act), work areas, and personnel to fully investigate any worker protection concern. Committees should also have access to the training, resources, and technical expertise that will allow them to function effectively.

4.2.1.2. Participation in Worksite Inspections, Hazard Analyses, and Design Control

Employees should be encouraged to perform informal worksite inspections as part of their daily work activities. This includes daily, weekly, or monthly worksite walk-throughs by workers and their supervisors with the frequency determined by the types of hazards typically encountered in the facility.

For worksite inspections to be effective, employees should:

- be trained in hazard recognition;
- have reasonable access to worker protection professionals;
- have access to reference sources (e.g., all DOE worker protection requirements documents, Guides, and Technical Standards);
- be able to suggest abatement methods; and
- be able to track corrective actions.

4.2.1.3. Other Avenues for Employee Involvement

Employee participation activities should ensure employee involvement in the development, review, and revision of worker protection related documents and activities, including:

- performance measures for the worker protection program;
- annual goals and objectives;
- job safety analyses;
- operating procedures;
- site inspections and exposure assessments;
- analyses of facilities, processes, materials, and equipment;
- variance requests and hazard abatement plans, along with the development of equivalent, interim, or protective measures for variance requests or abatement plans; and
- participation in the development of worker protection requirements, Guides, and Standards (consistent with any acceptable practices for labor/management relations).

Qualified employees make excellent instructors for new employees. Having employees as instructors also enhances worker protection awareness because instructors should keep up with requirements to be effective. Employee presentations at meetings are an excellent way for employees to share their experiences and lessons learned. Including employees in accident/incident investigations is a worthwhile investment for employers. Worksite employees often can provide valuable insight on actual workplace procedures that could have contributed to an accident and on the effectiveness and practicality of proposed corrective actions. In addition, involvement in accident investigations can increase an employee's awareness of how workplace hazards can lead to accidents and incidents and thus, how employees can better protect themselves. One way to involve employees in accident investigations is to establish special-function committees with a specific scope of responsibility and to periodically rotate employee membership on the committee. Selected employees should be trained in accident/incident investigations, be used in the investigations, and be recognized for their contributions.

4.2.2. Workers' Rights

DOE O 440.1B [paragraph 4f] requires that DOE elements provide workers the right, without reprisal, to:

- accompany DOE worker protection personnel during workplace inspections;
- participate in activities provided for in the Order on official time;
- express concerns related to worker protection;

- decline to perform an assigned task because of a reasonable belief that, under the circumstances, the task poses an imminent risk of death or serious bodily harm to that individual, coupled with a reasonable belief that there is insufficient time to seek effective redress through the normal hazard reporting and abatement procedures established in accordance with the Order;
- have access to DOE worker protection publications, DOE-prescribed Standards, and the organization's own worker protection standards or procedures applicable to the workplace;
- observe monitoring or measuring of hazardous agents and have access to the results of exposure monitoring;
- be notified when monitoring results indicate they were overexposed to hazardous materials; and
- receive results of inspections and accident investigations upon request.

One or more employee representatives should be provided the opportunity to participate in briefings and in the walk-around phase of DOE-conducted oversight inspections. Employee participation may be waived by DOE in the event of labor disputes or other special circumstances. Note that employee participation should be consistent with acceptable practices for labor/management relations (e.g., union official or bargaining unit representative participation in compliance inspections). Workers have the right to report hazards without fear of reprisal and to refuse to work when faced with an imminent danger of death or serious injury. If workers are punished for reporting such hazards or for refusing to work when faced with an imminent danger condition, they may file a discrimination complaint. Workers also have other rights with regard to worker protection. They can:

- request information about safety and health hazards in the workplace, precautions that may be taken, and procedures to be followed if the worker is involved in an accident or is exposed to toxic substances;
- have access to their own exposure and medical records; and
- review (or have an authorized representative review) the summary information about occupational injuries.

4.2.3. Stop Work Authority

DOE O 440.1B requires that DOE elements implement procedures to allow workers, to stop work when they discover employee exposures to imminent danger conditions or other serious hazards [paragraph 4g].

The procedure should ensure that any stop work authority is exercised in a justifiable and responsible manner. All workers, supervisors, managers, and OSH professionals are

responsible for being cognizant of the conditions in their workplaces and for being prepared to stop work when these conditions pose a serious threat to health or safety. When a “reasonable person” views the circumstances as having the potential to cause injury, serious impairment, or harmful health effects, a stop work order should be issued.

Whenever workers see a need for a stop work order, they are expected to request one from their supervisors. Before a stop work order is issued, the person issuing it should ensure that the work stoppage itself will not negatively impact the health and safety of workers. DOE elements should have procedures in place that address stop work authority, and workers should be trained in those procedures.

4.2.4. Informing Workers

DOE O 440.1B requires DOE elements to inform workers of their rights and responsibilities by appropriate means, including posting the Occupational Safety and Health Protection for DOE Employees poster in the workplace where it is accessible to all workers [paragraph 4h].

DOE elements are expected to post the DOE Worker Protection Poster (FEOSH version) in a significant number of places to permit workers the opportunity to observe the information en route to or from their work place. This expectation applies to all DOE-owned or leased facilities where federal employees work. In addition to the poster, DOE elements are expected to take other actions to provide relevant information to workers. In areas where noncompliance with a DOE-prescribed worker protection Standard is identified during an oversight inspection, information about the noncompliance should be conveyed to worksite employees. This can be achieved by posting noncompliance information in such areas for 5 working days or until the noncompliance is corrected, whichever is longer.

Other worker protection posting requirements may be applicable to special situations in specific workplaces. For example, OSHA’s confined space standard requires employers to post danger signs or use other equally effective means to inform exposed employees of the existence and location of, and the danger posed by, the confined space. DOE elements should consult the appropriate OSHA regulations for specific posting requirements. Along with their rights, workers also have several responsibilities. First, they should comply with all worker protection Standards and all related Rules, Regulations, and Orders. In addition, they should:

- read the worker protection poster;
- wear or use prescribed protective clothing and equipment while working;
- report hazardous conditions to the supervisor;
- report any job-related injury or illness to the employer, and seek treatment promptly;

- cooperate with worker protection professionals conducting inspections; and
- exercise their rights in a responsible manner.

Additional details about requirements for informing workers through training are contained in DOE O 360.1B, which addresses training for Federal employees.

4.2.5. Applicable Standards and Guidance Documents

- OSHA standards that address informing workers of hazards include, among others:
- Hazard Communication (29 CFR 1910.1200),
- Hazardous Waste Operations and Emergency Response (29 CFR 1910.120),
- Confined Space (29 CFR 1910.146),
- Blood-borne Pathogens (29 CFR 1910.1030), and
- Specific chemical substance regulations in 29 CFR 1910, Subpart Z.

For additional guidance on employee rights and responsibilities, see—

- U.S. Department of Labor Fact Sheet No. OSHA 95-35, *OSHA: Employee Workplace Rights and Responsibilities*, dated 01-01-95; and
- 10 CFR Part 708, which describes how contractor employee representatives are protected from acts of discharge, discipline, or other acts of discrimination that result from participation in compliance inspections.

Other applicable standards and guidance documents include:

- 29 CFR 1960;
- DOE O 442.1A, Department of Energy Employee Concerns Program; and
- OSHA's Safety and Health Program Management Guidelines.

4.3. Hazard Identification and Evaluation

DOE O 440.1B requires DOE elements to identify existing and potential workplace hazards and evaluate the risk of associated worker injury or illness [paragraph 4i]. The seven components of this requirement are detailed in sections 4i(1) through (7).

4.3.1. Analysis and Review

DOE O 440.1B [paragraph 4i] requires the analysis or review of:

- designs for new facilities and for modifications to existing facilities and equipment;
- operations and procedures; and
- equipment, product, and service needs.

Incorporating worker protection features and requirements in the design and construction of facilities and equipment is the most cost-effective way to control hazards. Design reviews should be conducted by a team of engineers, operations managers and employees, and appropriate worker protection professionals. This should be initiated at the earliest design phase and continue throughout the design process to ensure that potential hazards are identified, evaluated, and to the extent feasible, eliminated or controlled through design changes. Where hazards cannot be controlled through design changes, procedural or administrative controls or the use of personal protective equipment should be considered.

Worker protection professionals should be assigned review and approval authority in all four phases of project design: conceptual design, preliminary design, final design, and inspection. Review during the conceptual design phase, the earliest phase of the project, is critical. Hazard analysis methodologies can be applied to facilities, processes, equipment, and operations (including D&D) throughout their life cycle. Methodologies include:

- preliminary hazard analysis;
- health hazard analyses;
- facility hazard analysis;
- process hazard analysis; and
- safety review.

Preliminary hazard analyses (PHA) provide a broad hazard screening tool that includes a review of the types of operations that will be performed in the proposed facility and identifies the hazards associated with these types of operations and facilities. The results of the PHA are used to determine the need for additional, more detailed analysis, serve as a precursor where further analysis is deemed necessary, and serve as a baseline hazard analysis where further analysis is not indicated. The PHA is most applicable in the conceptual design stage, but it is also useful for existing facilities and equipment that have not had an adequate baseline hazard analysis. A facility hazard analysis is a detailed study to identify and analyze potential hazards associated with each aspect of the facility and related equipment and operations. The analysis should include a systematic review of each facility component and task and should consider:

- facility design characteristics such as electrical installations, platform heights, egress concerns, etc.;
- proposed equipment including types of equipment, location of equipment relative to the other operations and workers, required equipment interfaces, etc.;
- proposed operations including related hazardous substances and potential exposures, potential energy sources, locations of operations and required interfaces, resulting material and personnel traffic patterns, etc.; and
- facility and equipment maintenance requirements including confined space concerns, electrical hazards, inadvertent equipment startup or operation hazards, etc.

The facility hazard analysis may identify the need for other more specialized hazard analyses by functional experts such as health hazard analyses (see DOE G 440.1-3, *Occupational Exposure Assessment*) and process hazard analyses (see 29 CFR 1910.119). The following techniques are available to assist in the performance of hazard analyses.

Safety Review. A Safety Review is a technique to provide a detailed evaluation of facility operations or processes. It is used to identify hazards associated with conditions, practices, maintenance, and other pertinent aspects of the facility or process.

Change Analysis. A change analysis is performed to ensure that design or proposed operational changes do not adversely affect the safety of the facility. The analysis identifies differences between the existing and the proposed design or operational change, identifies how the change will affect related features, and evaluates the effects of the differences and relationships on the overall safety of the facility. The change analysis is used during the design and construction phase of the facility to address proposed changes.

Energy Trace and Barrier Analysis (ETBA). The ETBA identifies potential energy sources, traces those sources to a potential hazard, and determines if the proper barriers to the hazard (i.e., controls) are in place. The ETBA provides an effective tool to identify potential hazards for the PHA.

Failure Modes and Effects Analysis (FMEA). The FMEA is a critical review of the system (facility and operations), coupled with a systematic examination of all conceivable failures and an evaluation of the effects of these failures on the mission capability of the system. The FMEA can help avoid costly facility modifications and should be initiated early in the design phase. Once performed, the FMEA provides valuable information if updated throughout the design process.

Fault Tree Analysis (FTA). The FTA is a logic tree used to evaluate a specific undesired event. The FTA is developed through deductive logic from an undesired event to all sub-events that should occur to cause the undesired event. The FTA can be applied at any point in the life of a facility. The FTA can be used to support the PHA during facility design.

Detailed information on the selection and use of various hazard analysis methodologies and techniques is available in the American Institute of Chemical Engineers' *Guidelines for Hazard Evaluation Procedures*, Second Edition, 1992. Operations and procedures should also be analyzed and reviewed to identify potential worker protection hazards and deficiencies. A Job Safety Analysis (JSA), or a job hazard analysis (JHA), is the most basic and widely used tool to identify hazards associated with work operations and procedures. JSAs and JHAs can satisfy a large portion of the worker protection hazard identification requirements at most workplaces. A JSA is useful for dynamic work activities like construction as well as relatively static activities involved in continuous operations. JSAs should be conducted:

- during the planning stage for new operations and procedures;
- prior to implementation of changes to existing operations and procedures;
- for existing operations and procedures that have resulted in injuries, illnesses, or near misses; and
- for existing operations and procedures that have not been adequately evaluated in the past or when there is no recent hazard analysis.

JSAs should be updated periodically to ensure that new hazards have not been introduced since the last evaluation of the activity and that procedures are still applicable to the operations.

The principle elements of a job safety analysis are:

- selection of operations and procedures to be analyzed;
- breakdown of operations and procedures to their component tasks;
- identification of hazards associated with each task and the controls necessary to protect workers against those hazards; and
- development of operations procedures incorporating identified controls.

Participation by affected employees and supervisors in the JSA process is essential. Their knowledge of the tasks and familiarity with the procedures actually used in performing the work, along with the associated hazards, will provide more complete information during the JSA. In addition, these front-line personnel can assist in determining the feasibility and effectiveness of proposed control measures. Detailed information on the conduct of JSAs is presented in U.S. Department of Labor, Occupational Safety and Health Administration, OSHA Publication 3071, *Job Hazard Analysis* and the DOE NNSA document *Activity Level Work Planning and Control Processes—Attributes, Best Practices, and Guidance for Effective Incorporation of Integrated Safety Management and Quality Assurance* (link on web site <http://www.doeism.org/>).

4.3.2. Exposure Assessment

DOE O 440.1B requires assessment of worker exposure to chemical, physical, biological, and ergonomic hazards. This assessment should entail appropriate:

- workplace monitoring (including personal, area, wipe, and bulk sampling);
- biological monitoring; and
- observation [paragraph 4i(3)].

Monitoring results should be recorded with documentation that—

- describes the tasks and locations where monitoring occurred and
- identifies:
 - workers monitored or represented by the monitoring,
 - sampling methods and durations,
 - control measures in place during monitoring (including use of personal protective equipment), and
 - any other factors that may have affected sampling results.

Samples should be analyzed by a laboratory that is accredited by the American Industrial Hygiene Association. Other detailed guidance on the implementation of this requirement is provided in DOE G 440.1-3, *Occupational Exposure Assessment*.

4.3.3. Workplaces and Activities

DOE O 440.1B requires routine evaluation of workplaces and activities by workers, supervisors, and managers and periodic evaluation by qualified worker protection professionals [paragraph 4i(4)]. Hazard identification is accomplished most effectively by workers and their supervisors during the course of daily activities, with technical assistance from worker protection professionals and functional area technical experts, as necessary.

Daily workplace evaluations by workers and supervisors include such things as inspections of tools and equipment, ranging from inspection of manual tools and power tools, forklifts, cranes, slings, and warning systems to inspection of respiratory protective equipment and other personal protective equipment prior to and during use.

In addition, workplace conditions, housekeeping, utilization of assigned personal protective equipment, and conformance with procedures, work permits, health and safety plans, and other established criteria should be evaluated. Workers and supervisors should consult with worker protection professionals as necessary to address questions regarding

regulatory requirements and compliance or where specific technical expertise is needed. In addition, daily worker and supervisor evaluations should be supplemented by worker protection professional evaluations of the workplace. These routine evaluations should include both informal unscheduled walk-through evaluations conducted during worksite visits and formal, scheduled periodic (annual) workplace evaluations.

Annual evaluations are recommended at all workplaces. It should be noted that 29 CFR 1960.25(c) requires annual workplace inspections of Federal operations. The first annual evaluation should be a comprehensive “wall-to-wall” evaluation which serves as a baseline for future evaluations. Annual evaluations are conducted to identify and document existing and potentially hazardous work conditions and practices that do not comply with worker protection standards or may otherwise pose hazards to the safety or health of workers. These evaluations should be performed by worker protection professionals with the participation of affected employees and supervisors.

An effective approach to accomplishing such an evaluation is to use a team comprised of affected employees and supervisors, as well as the worker protection professionals necessary to evaluate specific workplace hazards. Worker protection professionals required on the team may include:

- safety professionals;
- industrial hygienists;
- health physicists;
- occupational medical professionals; and
- other worker protection professionals, as appropriate for the nature of the workplace and the hazards associated with the activities.

Alternatively, the team could include safety and health professionals cross-trained in the disciplines applicable to the workplace being evaluated. These cross-trained professionals would consult with functional area experts as needed. The evaluation team should use the worker protection hazard abatement information, information from the employee concerns program, results of baseline and previous inspections, and injury and illness data, among others, as tools for determining their strategy for such evaluations.

4.3.4. Accident, Injury, and Illness Reporting and Data Analysis

DOE 440.1B requires the reporting and investigation of accidents, injuries, and illnesses and analysis of related data for trends and lessons learned [paragraph 4i(5) and Attachment 1]. The collection of detailed, accurate data and information regarding workplace accidents, injuries, and illnesses and the subsequent analysis of the data and information are useful in identifying worker protection problem areas. This type of analysis or trending is used to identify the prevalent types of accidents, injuries, and illnesses and their sources and causes. Information derived from trend analysis can be

used to focus worker protection efforts on the actual sources of injuries and illnesses and to help prioritize hazard abatement activities. Necessary components of accident, injury, and illness data collection and analysis include:

- systems and methods to collect, record, compile, and manage accident, injury, and illness data and information, including but not limited to the OSHA Form 300, *Log of Occupational Injuries and Illnesses*, workers compensation data, accident reports, incident reports, industrial hygiene and health physics exposure monitoring results, and inspection reports and corrective action tracking entries;
- methodologies to analyze data and information to identify and trend accidents, injuries, and illnesses by type and source; and
- a formalized approach to analyze identified trends, to determine root causes, and to develop appropriate control measures.

Requirements for accident, injury, and illness reporting and investigation and trending and lessons-learned are contained in DOE O 231.1A, Chg 1, and DOE O 225.1A.

4.4. Hazard Prevention and Control

DOE O 440.1B requires DOE elements to implement a hazard prevention/abatement process to ensure that all identified hazards are managed through final abatement or control [paragraph 4j].

4.4.1. Design and Development Phase

For hazards identified either in the facility design or during the development of procedures, controls are incorporated in the appropriate facility design or procedure [paragraph 4j(1)].

Hazards that are identified in the design phase of new facilities and facility modifications or during the development or modification of procedures should be eliminated or controlled through design or procedure changes. The controls implemented should be commensurate with the risk level identified in the risk assessment process. For example, hazards that pose a serious threat to employee health and safety should be either completely eliminated or be effectively controlled.

Proposed design or procedure modifications intended to eliminate or control hazards should be reviewed by worker protection professionals to ensure that the change adequately addresses the hazard and does not introduce new workplace hazards. Alternative control measures should be evaluated to determine the reduction of risk provided by each measure and identify the most effective practical control for the hazard.

When engineering controls do not reduce the associated risk to acceptable levels, they may be supplemented with work practices and administrative controls. Where necessary,

these controls may be further supplemented with the use appropriate personal protective equipment.

4.4.2. Existing Hazards

For hazards identified in the workplace, abatement actions, which are prioritized according to risk to the worker, should be promptly implemented and interim protective measures should be implemented pending final abatement. Workers should be protected immediately from imminent danger conditions [paragraph 4j(2)]. Hazards should be systematically managed and documented through final abatement or control.

4.4.2.1. Imminent Danger

In accordance with DOE O 440.1B, in the event an imminent danger situation is discovered, immediate action must be taken either to correct the imminent danger condition or practice or to remove all employees from exposure to the imminent danger until the condition or practice has been abated. An effective hazard abatement program is essential to ensure that workers are protected from exposure to current and future workplace hazards. The focus of this program must be the immediate control of identified workplace hazards. Where this is not possible, the program must ensure the protection of workers while awaiting final abatement action and it must provide an efficient mechanism to ensure that all identified hazards are abated as quickly as possible.

4.4.2.2. Hazard Abatement Prioritization

The relative level of risk should be assessed for each identified hazard to ensure that hazard abatement efforts and resources are focused first on addressing the most serious workplace hazards. Risk assessment is an essential element of effective risk management. The assignment of risk levels provides a relatively simple and consistent method of expressing the risk associated with worker exposures to identified hazards. Although important in prioritization and abatement planning, assigning a risk assessment code or level to a hazard should not be an impediment to quick abatement. If a hazard can be fixed immediately, assigning a risk category is not necessary, although organizations may prefer to assign one for trending purposes. The determination of the priority assigned to the abatement of a specific hazard should first be based on the risk of injury or illness the hazard presents to the worker; however, other factors may be considered, including:

- regulatory compliance;
- resources (budget and personnel);
- complexity of abatement; and
- organizational mission.

In some cases, it may be appropriate to address lower-level hazards before higher-level hazards if quick abatement is possible.

Additional resources:

- MIL-STD-882D, System Safety Program Requirements, Appendix A (www.safetycenter.navy.mil/instructions/osh/milstd882d.pdf)
- Department of Defense Instruction No. 6055.1, Department of Defense
- Occupational Safety and Health Program, E7. Enclosure 7, www.dtic.mil/whs/directives/corres/pdf/i60551_081998/i60551p.pdf, and
- Mulhausen, JR and Damiano, J, A Strategy for Assessing and Managing Occupational Exposures, Second Edition, AIHA Press, Fairfax, VA, 1998 (available at <http://www.aiha.org/webapps/commerce/product.aspx?id=AEAK06-327&cat=Books&subcat=>).

4.4.2.3. Interim Protection

In accordance with DOE O 440.1B, in the interval during which an abatement action is being carried out, DOE elements must protect their employees from the identified hazards. A short-term strategy must be established that provides interim protection to employees. Methods such as administrative controls, work practice modifications, or personal protective equipment may be used to provide this interim protection. These measures must provide employees with protection that is equivalent to the permanent protection that will be provided by compliance with the relevant DOE-prescribed worker protection Standard. The level of risk associated with interim protective measures can be assessed to verify that equivalent protective measures are provided. The assessment of risk associated with interim protection, however, cannot be used to lower the priority of final abatement actions. The hazard should be tracked and abated based on the initial risk assessment.

4.4.2.4. Hazard Abatement Tracking

Hazard abatement management requires a mechanism to track all planned abatement activities through to completion. Therefore, all hazards identified during worker protection evaluations should be recorded regardless of whether the evaluation was conducted by DOE, contractors, or external agencies such as OSHA. In addition, hazards identified by employees or line management should be recorded if they are not immediately abated. Hazard abatement information may be in any format (electronic or paper file), as long as it:

- meets its purpose of documenting identified hazards and associated corrective actions through final abatement;
- allows for appropriate planning and budgeting decisions; and

- is retrievable.

Hazard Abatement Information

The following elements should be included in the documentation for each hazard:

- location;
- date found;
- description of hazard;
- referenced DOE-prescribed worker protection Standard;
- planned corrective action;
- estimated cost of abatement;
- interim protective measures;
- abatement period (number of calendar days);
- scheduled abatement date;
- actual abatement date;
- risk level; and
- record identification number (unique identifying number).

In addition, the information should also indicate if actual corrective action differs from planned corrective action.

Coordination

To ensure that the responsible Operations Office is kept informed of the status of abatement activities, any DOE office under the purview of an Operations Office should advise that Operations Office quarterly on the status of hazard abatement activities requiring 30 or more days to complete. In addition, the Operations Office can request copies of the hazard abatement activity documentation at any time.

4.4.3. Equipment, Products, and Services

Hazards should also be addressed when selecting or purchasing equipment, products, and services [paragraph 4j(3)]. Provisions should be made for worker protection professional and employee evaluation of pre-engineered or “off-the-shelf” equipment prior to selection and purchase. This evaluation should focus on whether the equipment or

procured material (e.g., parts, chemicals, or fasteners) can perform its required task without endangering the health and safety of workers (e.g., suspect or counterfeit parts) given existing facility and operational constraints. Evaluation methods can include:

- review of equipment or material specifications;
- observations of equipment or material demonstrations;
- change analyses;
- operational hazard analyses;
- ergonomic/human factor analyses; and
- checks for suspect or counterfeit parts.

Worker Protection considerations to be taken into account when reviewing equipment specifications include:

- health hazards;
- operating noise;
- temperature levels;
- point-of-operation guards;
- lockout provisions;
- presence of hazardous material;
- training requirements for safe operation;
- ergonomic design, worker/machine interface;
- maintenance requirements;
- availability and practicality of “add-on” (post-purchase) worker protection equipment; and
- existing facility and operational constraints (e.g., floor loading, hazards from adjacent operations, congested workplaces, etc.).

After installation of complex or potentially hazardous equipment, a pre-startup evaluation with affected workers, supervisors, and worker protection professionals should be conducted to verify safe conditions and identify any previously unforeseen hazards.

4.4.4. Control Hierarchy

DOE O 440.1B requires that hazard control methods be selected based on the following hierarchy:

- substitution and/or elimination;
- engineering controls;
- work practices and administrative controls that limit worker exposures; and
- personal protective equipment

4.4.4.1. Engineering Controls

Where substitution for a less hazardous operation or material is not an option and controls are necessary to reduce worker risk from exposure to workplace hazards, engineering controls should be implemented to the extent feasible. Principal engineering controls include:

- enclosing the hazard;
- locating hazardous operations or equipment in remote and/or unoccupied areas;
- establishing physical barriers and guards; and
- using local and general exhaust ventilation.

4.4.4.2. Work Practice and Administrative Controls

The effectiveness of work practice and administrative controls depends on the ability of line management to make employees aware of established work practices and procedures, to reinforce them, and to provide consistent and reasonable enforcement. Administrative controls include:

- written operating procedures, safe work practices, and work permits;
- exposure time limitations;
- limits on the use of hazardous materials and monitoring of such operations;
- health and safety plans;
- altered work schedules, such as working in the early morning or evening to reduce the potential for heat stress; and
- training employees in methods of reducing exposure.

4.4.4.3. Personal Protective Equipment

When engineering and/or administrative controls have been considered and implemented and are not sufficient to fully protect the worker from a recognized hazard, personal protective equipment (PPE) can be used to supplement these other controls as appropriate. PPE is acceptable as a control method:

- to supplement engineering, work practice, and administrative controls when such controls are not feasible or do not adequately reduce the hazard;
- as an interim measure while engineering controls are being developed and implemented;
- during emergencies when engineering controls may not be feasible; and
- during maintenance and other non-routine activities where other controls are not feasible.

The use of PPE can itself create significant worker hazards, such as heat stress, physical and psychological stress, and impaired vision, mobility, and communication. An example would be a worker wearing several layers of clothing (for warmth and contamination control), a respirator, gloves, and a helmet while welding or cutting. This arrangement of PPE could prevent the worker from being aware of the environment in the event of a fire (for example, because of the lower heat transfer rate) or other emergency. In these situations, engineering and/or administrative controls (e.g., a fire watch to ensure the safety of the worker as well as the property) should be implemented to supplement PPE. Equipment and clothing should be selected that provide an adequate level of protection. The selection process should involve representatives of the affected safety disciplines (e.g. health physicist, industrial hygienist, fire protection staff, etc.) working in concert. Two basic objectives of any PPE practice should be to protect the wearer from safety and health hazards, and to prevent injury to the wearer from incorrect use and/or malfunction of the PPE. To accomplish these objectives, a comprehensive PPE practice should include hazard identification (hazards that PPE will protect against and hazards caused by the use of PPE), medical monitoring, environmental surveillance, selection, use, maintenance, and decontamination of PPE and its associated training.

4.5. Worker Protection Training

4.5.1. Providing Training

DOE O 440.1B requires DOE elements to provide workers, supervisors, managers, visitors, and worker protection professionals with worker protection training [paragraph 4k and Attachment 1, paragraph 10]. DOE O 360.1B and 29 CFR 1960, Subpart H, contains training requirements for Federal employees. Training is required for the following personnel:

- top management officials;

- supervisors;
- safety and health specialists and inspectors;
- collateral duty safety and health personnel and committee members; and
- employees and employee representatives.

4.5.2. Emergency Contingencies

DOE elements are required to develop and implement occupant emergency plans and procedures, conduct training, and emergency drills according to directives and guidance issued by: DOE O 151.1C and associated guides; the General Services Administration; and the Office of Personnel Management.

4.5.3. Applicable Training Standards and Guidance Documents

- 29 CFR 1960, Subpart H, Training
- DOE O 360.1B, Federal Employee Training
- Department of Energy, *Occupational Safety and Health Training Program Management Guide* (Draft), November 1992, prepared by Pacific Northwest Laboratory .
- OSHA Publication 2254, *Training Requirements in OSHA Standards and Training Guidelines*, 1998 (Revised).

4.6. Standards

When the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV[®]s) are used as exposure limits, DOE elements must nonetheless comply with the other provisions of any applicable OSHA expanded health standard. DOE recognizes that OSHA health standards and ACGIH TLV[®]s often are not expressed in directly comparable formats. DOE elements should use their qualified worker safety and health staff (see 4.1.2.3 Qualified Staff in this Guide) to determine the appropriate exposure limits and applicable provisions and may request clarification from DOE's Office of Health, Safety and Security (HSS). Users of ACGIH TLV[®]s should consult *Documentation of the Threshold Limit Values and Biological Exposure Indices*, 7th Ed., American Conference of Governmental Industrial Hygienists, <http://www.acgih.org/store/>, to assure that they understand how to properly apply the TLV[®]s.

The listed OSHA regulations are not dated but the consensus standards are. The current version of OSHA regulations are incorporated into the Order by reference because they are promulgated pursuant to public rulemaking. Only the versions of consensus standards specifically cited are required by the Order. DOE Elements may include

successor versions of the consensus standards that provide equal or greater worker protection if included in their approved worker safety and health program. Users of successor ACGIH TLV[®]s should consult the corresponding *Documentation of the Threshold Limit Values and Biological Exposure Indices* to assure that they understand the how to properly apply those specific TLV[®]s.

DOE elements can assume that HSS will concur with utilizing existing and future OSHA standards interpretations listed on the OSHA website <http://www.osha.gov> to evaluate compliance with the requirements of the OSHA regulations listed in section 4.m. DOE elements also may request validation by HSS that an OSHA standards interpretation applies to a particular situation or request additional technical interpretations of OSHA regulations by submitting questions to the DOE Standards Response Line at <http://www.eh.doe.gov/il/question/new.cfm>.

DOE elements are not required to comply with 29 CFR 1926.53 *Ionizing Radiation*. DOE elements should determine whether additional standards are needed for their workplaces and activities to control recognized hazards. If needed, DOE elements should include such additional standards in their written worker safety and health program.

Nothing in this document is to be construed as relieving a federal facility from complying with any additional specific safety and health requirement that it determines to be necessary to protect the safety and health of workers.

4.7. Other Provisions of DOE O 440.1B

4.7.1. Functional Programs

DOE O 440.1B establishes requirements for the overall management system that supports the functional areas of worker protection (e.g., industrial hygiene). Certain functional areas have additional requirements [Attachment 1, paragraphs 1 through 9] specific to potential hazards in those areas.

5. ADDITIONAL INFORMATION

For policy-related questions pertaining to the DOE Worker Protection Program for DOE and NNSA Federal Employees Program, contact the Office of Worker Safety and Health Policy (HS-11) at (301) 903-6061. For site-specific questions concerning the implementation of DOE O 440.1B, contact your respective DOE Operations Office or alternatively contact the Office of Corporate Safety Programs at (301) 903-9840.