The Secretary of Energy
Washington, DC 20585

October 31, 2000

The Honorable John T. Conway
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW, Suite 700
Washington, D.C. 20004

Dear Mr. Chairman:

We are pleased to forward the Department's initial Implementation Plan (Plan) for Defense Nuclear Facilities Safety Board (Board) Recommendation 2000-2, *Configuration Management, Vital Safety Systems.*

The Plan outlines the activities we will take to baseline the operational readiness of safety systems, strengthen safety system expertise, and enhance our capability to routinely assess the condition of safety systems.

I have assigned Mr. Steven Cary as my Responsible Manager for executing this Plan. Mr. Cary can be reached at (202) 586-6151. We appreciate the advice and support provided by the Board and its staff during the development of this Plan.

Yours sincerely,

Bill Richardson

Bill Richardson

Enclosure

Recommendation 2000-2

Configuration Management
Vital Safety Systems

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Executive Summary

On March 8, 2000, the Defense Nuclear Facilities Safety Board (Board) issued Recommendation 2000-2, concerning the degrading conditions of vital safety systems and the capability to apply engineering expertise to maintain the configuration of these systems. Specifically, the Recommendation identified possible degradation in confinement ventilation systems and noted that the Department of Energy (DOE or Department) has not adopted the nuclear business' long-standing practice of designating system engineers for systems and processes that are vital to safety. The Board recommended that the Department take action to assess the condition of its confinement ventilation systems, develop programs for contractor and federal technical personnel that strengthen safety system expertise, and improve the self-assessment processes that evaluate the condition of vital safety systems. On April 28, 2000, the Department accepted the Board's Recommendation. In a September 8, 2000 letter the Board amplified the intent of Recommendation 2000-2. *The term vital safety system, as used within this implementation plan, is understood to mean safety-class systems, safety-significant systems, and other systems that perform an important defense in depth safety function.* This definition is consistent with the Board's terminology and defined within Appendix C of this implementation plan.

The resolution approach described within this implementation plan defines additional practices that enhance the Department's ability to apply engineering expertise to maintain and operate vital safety systems that protect the public, worker and the environment. The purpose of the implementation plan is to address a near-term objective of completing a baseline assessment of the operational readiness of vital safety systems. Actions to correct and/or compensate for degradation will be identified and prioritized to ensure that these systems remain in, or are restored to, their operational readiness condition. As a long-term objective, the Department will institutionalize a process to ensure continued operational readiness of vital safety systems and support the Department's continuing effort to establish Integrated Safety Management (ISM) as the central, enduring framework for safely accomplishing the Department's mission and work. Specifically, the actions described in this implementation plan:

- Implement a phased approach to assess the current operational readiness of vital safety systems and assess key facilities and/or systems where operability may have degraded. Corrective actions and compensatory actions will be tracked and managed locally to ensure that the operational readiness of these systems is maintained.
- Establish a practice of qualifying contractor technical personnel with system expertise and designating them as system engineers for systems and processes that are important to safety. This practice is expected to enhance the Department's ability to apply engineering expertise in all five functions of ISM.
- Define Federal workforce expertise necessary to support oversight of the contractor's system engineer program. Once defined, the Department will establish qualification requirements for federal personnel relied upon for system expertise. This practice is

also expected to enhance the Department's ability to apply engineering expertise in all five functions of ISM.

- Establish a practice that strengthens line management's review of feedback mechanisms by periodically reviewing the scope and results of ES&H self-assessments and summarizing the results for the Secretary. This practice is expected to provide senior leadership with an executive summary of the results obtained from mechanisms that make up the feedback and improvement function of ISM.

The resolution approach also describes actions to establish an expert team that will develop and test a process for assessing the condition of confinement ventilation systems. Once tested, field element managers will apply the process in facilities at their sites.

The Responsible manager for overall execution of this implementation plan is the Office of Environment, Safety and Health. In this capacity, the Responsible manager ensures individuals responsible for deliverables and commitments identified within this implementation plan complete their actions. However, overall responsibility for operational readiness of vital safety systems rests with the line management and they are responsible for many of the deliverables associated with commitments made within this implementation plan. The various lead responsible organizations identified within the implementation plan are accountable to the Responsible manager with regard to the completion of deliverables.

Table 2 provides a summary of commitments made in this implementation plan, which are described further in Section 4.

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1.0 BACKGROUND

The Defense Nuclear Facilities Safety Board (Board) issued Recommendation 2000-2 on March 8, 2000. The Department of Energy (DOE or Department) accepted the Board's Recommendation on April 28th, 2000. The Board noted, in Recommendation 2000-2, that it was concerned with the fact that many of the Department's nuclear facilities were constructed years ago and are approaching end-of-life. The Board expressed concern that some degradation of reliability and operability of systems designed to ensure safety can reasonably be expected and recommended specific actions to assess system condition and apply system expertise in managing the configuration of vital safety systems.

In Recommendation 2000-2, the Board identified recommendations to improve the configuration management of vital safety systems, and defined vital safety systems as safety-class, safety-significant, and defense-in-depth. The Department's Directives system defines safety-significant as those structures, systems, and components not designated as safety-class structures, systems and components (SSCs) but whose preventive or mitigative function is a major contributor to defense-in-depth (i.e., prevention of uncontrolled material releases) and/or worker safety as determined from hazard analysis. *The term vital safety system, as used within this implementation plan, is understood to mean safety-class systems, safety-significant systems, and systems that perform an important defense in depth safety function.* This definition is consistent with the Board's terminology and defined within Appendix C of this implementation plan.

The Department completed its own analysis of the Board's Recommendation and evaluated the impact of safety program weakness upon ventilation and confinement systems that perform safety functions. The conclusions drawn from the evaluation validate the safety issues and recommendations described in Board Recommendation 2000-2. The Department's analysis of the Board's Recommendation led to a commitment to develop an implementation plan as described in the Secretary's acceptance letter of April 28, 2000, to accomplish the following:

- Development of expert-based guidelines for surveying and assessing confinement ventilation systems and implementation of a plan to identify and correct root cause of deficiencies.
- Incorporation of open commitments remaining in the action plan addressing safety issues related to High Efficiency Particulate Air (HEPA) filters.
- Evaluation of existing practices and industry models for use in establishing a cognizant system engineer concept to strengthen the engineering resources available for facility configuration management.
- Assessment of the availability and sufficiency of DOE expertise, identification of actions necessary to ensure expertise can be brought to bear in the life-cycle management of vital safety systems and to assess whether federal technical expertise on safety systems is available to support operating contractors when significant system problems arise.

- Review of line oversight of contractor programs to determine whether safety systems, as well as programs essential to system operability, are being included in those programs. As necessary, identify corrective actions to improve implementation of line oversight programs.

2.0 UNDERLYING CAUSES

In accepting the Board's Recommendation, the Department performed an evaluation of oversight findings and data reported in the Occurrence Reporting and Processing System (ORPS). The evaluation reached many of the same conclusions identified by the Board, including the need to assess confinement ventilation systems, and provided a framework for defining the safety issues addressed in this implementation plan.

The Department's evaluation concluded that, despite their importance to safety, confinement ventilation systems are often not maintained or upgraded in a timely manner. The ORPS data indicated that the two dominant root causes for occurrences were related to equipment/material deficiencies and management problems (e.g., authorization basis problems, configuration management, and operator qualifications). The evaluation concluded that problems with resource availability, and their prioritization, often led to "work-around" measures to achieve a marginally operable safety condition in lieu of system upgrades and maintenance.

3.0 BASELINE ASSUMPTIONS

The Department made the following baseline assumptions during the development of the 2000-2 Implementation Plan:

- If properly implemented, additional resources are not required to phase in a system engineer concept.
- Actions described within this implementation plan are applicable to defense nuclear facilities.

4.0 SAFETY ISSUE RESOLUTION

The Department's Integrated Safety Management (ISM) System makes environment, safety and health (ES&H) practices an integral part of the process of planning and performing work safely. A continuous effort is needed to establish ISM as the central, enduring framework for safely protecting the public, worker, and the environment while accomplishing the Department's mission and work.

Full implementation of ISM cannot be considered accomplished until vital safety systems are identified, responsibility for their operational readiness is clearly established, an

understanding of their readiness is developed, and functional maintenance and configuration management systems are in place to ensure continuing readiness.

The resolution approach described within this implementation plan defines actions to initially assess the operability of the Department's vital safety systems and enhances the Department's ability to apply engineering expertise to safely maintain and operate those systems. The following sections describe actions to:

- Implement a phased approach to assess the current operational readiness of vital safety systems and assess key facilities and/or systems where operability may have degraded. Corrective actions and compensatory actions will be tracked and managed to ensure that the operational readiness of these systems is maintained.
- Establish a practice of qualifying technical personnel with system expertise and designating them as system engineers for systems and processes that are important to safety. This practice is expected to enhance the Department's ability to apply engineering expertise in all five functions of ISM.
- Define Federal workforce expertise necessary to support oversight of the contractor's system engineer program. Once defined, the Department will establish qualification requirements for federal personnel relied upon for system expertise. This practice is also expected to enhance the Department's ability to apply engineering expertise in all five functions of ISM.
- Establish a practice that strengthens line management's review of feedback mechanisms by periodically reviewing the scope and results of ES&H self-assessments and summarizing the results for the Secretary. This practice is expected to provide senior leadership with an executive summary of the results obtained from mechanisms that make up the feedback and improvement function of ISM.

4.1 Safety System Operability

In Recommendation 2000-2, the Board describes several technical reports that identify concerns related the ability of ventilation systems to reliably perform their intended safety functions. In that Recommendation, the Board specifically urged the Department to establish a team of experts to survey the operational condition of ventilation systems and observed that other vital safety systems could benefit from similar attention.

In a September 8, 2000 letter to the Secretary of Energy, the Board amplified the intent of Recommendation 2000-2 and defined the basic thrust of the Board's Recommendation to be the assessment of the operational readiness of vital safety systems and noting that the operational readiness of vital safety systems is at the core of ISM. As facilities age, a combination of age-related degradation and less than effective implementation of preservation programs (e.g., change control, upgrades, and maintenance) may affect system reliability and ability to perform design safety functions. In its September 8, 2000 letter, the Board concluded that the Department's operating contractors have not always

given equipment designed to serve vital protective functions the attention those safety functions deserve, and urged the Department to ensure the operational readiness of these systems.

Actions to assess ventilation and fire protection systems are described in Section 4.1.2 and 4.1.3. The following Section describes actions to baseline the operability of the defense nuclear facility vital safety systems and the process to manage the actions necessary to improve and maintain their operability.

4.1.1 Operability Assessments

Resolution Approach

The Department will employ a two-phased approach to verify the operational readiness of vital safety systems. The following paragraphs provide an overview of the Department's approach.

During the first phase, operating contractors, overseen by Federal field office personnel, will perform an initial assessment of vital safety system operational readiness. This will be accomplished by identifying the vital safety systems within defense nuclear facilities of interest listed in Appendix E; reviewing existing operational and maintenance records; and qualitatively determining a readiness state for each vital safety system within these facilities. To assure consistency, a basic set of criteria will be developed to guide the performance of the initial Phase I assessments.

Once Phase I assessments are complete, the Department will evaluate the results and identify key facilities and/or systems where issues or concerns are identified regarding the operational readiness of vital safety systems. These key facilities and/or systems will be further assessed in Phase II, while existing self-assessment processes will continue to be relied upon to maintain the condition of the remaining facilities. In Phase II assessments, a vertical slice will be performed upon these key facilities and systems by assembling review teams to tailor assessment criteria and perform a detailed assessment of the operational readiness of systems. In a manner similar to the approach used by the Department in verifying the implementation of ISM, team leaders will be selected who will, in turn, assemble and train a team to conduct the Phase II assessment. Team personnel would be recruited locally and, where possible, from other field and program offices. For the ISM-like assessments, the ventilation system assessment guidance and criteria (discussed in Section 4.1.2) will be tailored for use in specific facilities.

Deficiencies and associated corrective actions/compensatory actions that arise from Phase I and Phase II assessments will be tracked and managed in local corrective action management systems. Where systemic issues or degradation requiring significant capital upgrades (i.e., upgrades requiring a Congressional budget line item or a major system acquisition) are identified, corrective actions will be documented and managed in the Department's Corrective Action Tracking System. Budget requirements for corrective

actions resulting from these assessments will be identified on an annual basis and submitted into the budget process.

Commitments

Note: The Department intends to meet the schedule established by commitments 5, 6, and 7. However, the time needed to complete commitments 3 and 4 will be evaluated to assess the validity of that schedule. If necessary, completion of commitment 5 will be delayed up to two months, which would in turn delay completion of commitments 6 and 7.

Commitment 1
Commitment Statement: The Secretary will initiate Phase I assessments and issue guidance/criteria to ensure consistent results.
Deliverable: Assessment criteria/guidance
Responsible Manager: Assistant Secretary for Environment, Safety and Health
Due Date: November 2000

Commitment 2
Commitment Statement: Cognizant Secretarial Officers (CSOs) will identify and list safety-class systems, safety-significant systems, and other systems that perform important defense in depth functions in defense nuclear facilities at each of their facilities. These lists will be used for other actions described within this implementation plan and forwarded to the FTCP for use in determining the system expertise needed at the Federal level.
Deliverable: CSO memos forwarding the system lists to the Chair of the FTCP.
Responsible Manager: Assistant Secretary for Environmental Management
Deputy Administrator for Defense Programs
Due Date: November 2000

Commitment 3
Commitment Statement: At the priority facilities listed in Appendix E, the Department will complete initial Phase I assessments of safety class, confinement ventilation, and fire protection systems.
Deliverable: Response to Phase I assessment guidance/criteria
Responsible Manager: Assistant Secretary for Environmental Management
Deputy Administrator for Defense Programs
Due Date: February 2001

Commitment 4
Commitment Statement: At the follow-on facilities listed in Appendix E, the Department will complete Phase I assessments of safety class, confinement ventilation, and fire protection systems.
Deliverable: Response to Phase I assessment guidance/criteria
Responsible Manager: Assistant Secretary for Environmental Management
Deputy Administrator for Defense Programs
Due Date: May 2001

Commitment 5
Commitment Statement: At all facilities listed in Appendix E, the Department will complete Phase I assessments of remaining vital safety systems.
Deliverable: Response to Phase I assessment guidance/criteria
Responsible Manager: Assistant Secretary for Environmental Management
Deputy Administrator for Defense Programs
Due Date: June 2001

Commitment 6
Commitment Statement: The Department will evaluate the results obtained from Phase I assessments conducted at Facilities of Interest and identify key facilities and/or systems that will receive Phase II assessments.
Deliverable: Briefing to the Board on the list of key facilities and systems that will receive a Phase II assessment and a schedule for their completion
Responsible Manager: Assistant Secretary for Environmental Management
Deputy Administrator for Defense Programs
Assistant Secretary for Environment, Safety and Health
Due Date: July 2001

Commitment 7
Commitment Statement: The Department will assemble teams and begin Phase II assessments.
Deliverable: Letter announcing commencement of the first Phase II assessment
Responsible Manager: Field Office Manager
Due Date: September 2001

Commitment 8
Commitment Statement: Deficiencies observed during Phase I and Phase II assessments will be tracked and managed in local corrective action management systems. Resources allocated to address finding resulting from confinement ventilation system and other assessments within this Implementation Plan will be identified on an annual basis
Deliverable: Summary of resources allocated within the FY 2003 budget request from congress
Responsible Manager: Assistant Secretary for Environment, Safety and Health
Assistant Secretary for Environmental Management
Deputy Administrator for Defense Programs
Due Date: February 2002

4.1.2 Ventilation System Operability

Resolution Approach

In Recommendation 2000-2, the Board concluded that degradation of confinement ventilation system reliability and operability might be approaching unacceptable levels. Their conclusion was based upon a review and analysis of DOE occurrence reports. The frequency and variety of off-normal occurrences led the Board to recommend the establishment of a team to survey operational records and assess the current condition of confinement ventilation systems important to safety in defense nuclear facilities.

In accepting the Board's Recommendation, the Department performed an analysis of oversight findings and data reported in ORPS. The analysis reached many of the same conclusions identified by the Board, including the need to assess confinement ventilation systems.

The first step in addressing this safety issue is to develop a set of assessment criteria and guidance to be used to ascertain the current condition of confinement ventilation systems vital to safety within defense nuclear facilities. A team of experts, with expertise in areas such as system design, reliability/safety analysis, equipment operation and performance, maintenance and operations, health physics, fire safety, industrial hygiene, and assessor/inspector practices will develop the assessment criteria/guidance and test their effectiveness at a limited number of facilities. The expert team will consist of representatives from the Department, its M&O contractors, and industry organizations with experience with confinement ventilation systems.

The assessment criteria developed for confinement ventilation systems will also begin to address other systems (e.g., electrical power; instrumentation and control systems) whose operation are essential to support this vital safety system. The assessment will review the general condition of the supporting systems and determine whether their design and classification appropriately support operation of the confinement ventilation system. This review of supporting systems will provide some indication as to whether the

condition of these systems has degraded to the point where they are not capable of supporting the operation of the confinement ventilation system.

Conceptually, the assessment guidelines developed by these experts will have an assessment team begin with a review of technical authorization basis documents to identify critical system functions. The team will then review system drawings and walk down the system to determine overall material condition and physical layout. Once the assessment team has developed an understanding of the facility-specific conditions and layout, the team will review facility records (e.g., equipment operating logs) and perform additional walk downs to evaluate programs that ensure reliable system performance (e.g., maintenance and operator training) and identify operational trends.

Where negative trends or problem areas are identified, the assessment team will identify and document causes and recommend actions to address them (e.g., system upgrades, maintenance program adjustments, or training). Finally, based upon the assessment results and engineering judgement, the assessment team will estimate the ability of the confinement system to reliably perform its safety function(s) over the remaining system lifetime. As conceived, the assessment results will be documented in a summary report and issued to the field element manager. Lessons learned during the performance of these assessments will be provided to field element managers for use in future ES&H assessments.

Once assessment criteria and guidance are developed, the expert team will test the criteria's effectiveness at pilot facilities. Five facility attributes were identified for consideration in selecting facilities to assess as pilots. The attributes were defined in a manner to maximize the ability to test criteria effectiveness on facilities with a diverse range of missions and complexity.

1. Facility Age. Moderate to old facilities were considered more desirable as candidates. Conditions at older facilities were considered to provide the best challenge to assessment criteria.
2. Remaining Mission Life. The assessment criteria should be tested at a facility with significant missions remaining and one nearing deactivation.
3. Authorization Basis Status. Pilot tests should be conducted at facilities with recently updated Authorization Basis and well documented system classification (safety-class/safety-significant)
4. System Complexity. Criteria effectiveness should be initially tested on relatively complex confinement ventilation systems.
5. Program Owner. Although a number of program offices oversee facilities with confinement ventilation systems, facilities operated by Environmental Management (EM) and Defense Programs (DP) were considered to be representative of the Department.

Several facilities were identified as possible pilot facilities during development of this implementation plan. All candidate facilities were considered to have a complex ventilation system:

- Rocky Flats Building 371: Building 371 is an EM facility with a current Authorization Basis. The facility is approximately 20 years old and will be deactivated in the near future. The confinement ventilation system is safety-class.
- Savannah River H-Canyon: The canyon is also an EM facility with a good Authorization Basis. The facility is approximately 45 years old and is expected to remain operational in excess of 10 years. The confinement ventilation system is safety-class.
- Los Alamos National Laboratory's TA-3 Chemistry and Metallurgical Research Laboratory (CMR): CMR is a DP facility with a current Basis for Interim Operations. The facility is approximately 50 years old and is expected to remain operational for another 10 years. The confinement ventilation system is classified as safety-significant.
- Los Alamos National Laboratory's TA-55 Building 4: TA-55 is a DP facility with a good Authorization Basis. The facility is approximately 20 years old and is expected to remain operational in excess of 10 years. The confinement ventilation system is classified as safety-significant.
- Lawrence Livermore National Laboratory's Building 332: Building 332 is also DP facility with a current Authorization Basis. The facility is approximately 40 years old and is expected to remain operational in excess of 10 years. The confinement ventilation system is safety-class.

Once developed and tested by the "expert team," the assessment criteria/guidance will be issued to the CSOs for use at their facilities. Line management in the field will assemble a team, using local expertise (supplemented as needed by expertise available elsewhere in the complex), to assess confinement ventilation systems that are important to safety. Members of the "expert team" involved in the development and testing of the assessment guidelines will be available to consult with field personnel to ensure consistency in guideline application and assist in evaluating findings relative to criteria in the assessment plan.

Recommended actions to address issues or concerns identified by assessment teams (e.g., improved maintenance, compensatory measures, or training) will be documented in the reports issued to the field element managers and managed in local corrective action management systems. The qualitative system reliability evaluation made by an assessment team will be considered when recommending compensatory measures. Where systemic issues or degradation requiring significant capital upgrades (i.e., upgrades requiring a Congressional budget line item or a major system acquisition) are identified, corrective actions will be documented and managed in the Department's Corrective Action Tracking System.

In a June 8, 1999, letter to the Secretary of Energy, the Board released Technical Repor t23 , *HEPA Filters Used in the Department of Energy's Hazardous Facilitie* , and *s* requested a plan outlining the steps required to restore the infrastructure that supports the HEPA filter program. HEPA filters are used extensively at the Department's sites to remove small hazardous and radioactive particles from air flowing from a facility's interior to the outdoors. The filters are the accepted method to keep airborne particulate emissions within safety standards in order to protect the public, workers, and the environment.

In a response dated December 6, 1999, the Department issued an action plan that addressed four general issue : assessments, technical issues, management issues, and information exchange. In the action plan, the Department identified six actions to be taken and committed to providing thirteen deliverables. In response to Board Recommendation 2000-2, the Department agreed to incorporate into this implementation plan the open commitments from the Secretary's HEPA filter action plan.

A copy of the Secretary's HEPA filter action plan is provided in Appendix A. A summary of commitments made in the Secretary's HEPA filter action plan and their status are provided in Table 1. The open commitments from that action plan are incorporated by reference into this implementation plan and listed in Table 2.

Commitments

Commitment 9
Commitment Statement: The Department will develop assessment criteria and guidelines to ascertain the current condition of confinement ventilation systems within defense nuclear facilities.
Deliverable: Assessment criteria and guidelines for Department defense nuclear facilities.
Responsible Manager: Assistant Secretary for Environment, Safety and Health
Assistant Secretary for Environmental Management
Deputy Administrator for Defense Programs
Due Date: March 2001

Commitment 10
Commitment Statement: The expert team will test the effectiveness of confinement ventilation system assessment criteria and guidelines at two pilot facilities.
Deliverable: Briefing to the Board
Responsible Manager: Assistant Secretary for Environment, Safety and Health
Assistant Secretary for Environmental Management
Deputy Administrator for Defense Programs
Due Date: June 2001

Commitment 11
Commitment Statement: Field element managers will assemble teams to assess the condition of confinement ventilation systems that are important to safety. Corrective actions will be entered into local corrective action management systems, and as necessary, the Department's Corrective Action Tracking System.
Deliverable: CSO letters reporting completion with an enclosed sample assessment report from a facility at each site.
Responsible Manager: Assistant Secretary for Environmental Management
Deputy Administrator for Defense Programs
Due Date: September 2001

Secretarial HEPA filter report commitments incorporated by reference include:

- Action 2.0, Deliverable 2.1; Responsible Manager: Deputy Administrator for DP
- Action 2.0, Deliverable 2.2; Responsible Manager: Deputy Administrator for DP
- Action 2.0, Deliverable 2.3; Responsible Manager: Lead Program Secretarial Officers (LPSOs)
- Action 3.0, Deliverable 3.3; Responsible Manager: LPSOs
- Action 4.0, Deliverable 4.1; Responsible Manager: Assistant Secretary for EM
- Action 4.0, Deliverable 4.2; Responsible Manager: Assistant Secretary for EM
- Action 5.0, Deliverable 5.1; Responsible Manager: Assistant Secretary for EM

4.1.3 Fire Protection System Operability

Resolution Approach

In a memorandum dated October 2, 2000 (Appendix F), the Secretary of Energy initiated action to assess the abilities of DOE sites to effectively prevent fires and respond effectively in the event a fire occurs. The Secretary's initiative begins with an initial review of the Department's current capabilities related to wildfire safety, including those aspects of emergency management that deal with the ability to respond to a wildfire. A copy of that review, including its site-specific and DOE-wide recommendations for improvement, will be provided to the Board as a deliverable under this implementation plan.

Using data obtained from the initial review, the Assistant Secretary for Environment, Safety and Health will develop a plan and take the lead in conducting a comprehensive study that provides for an in-depth evaluation of the capability to respond to wildfires and emphasizes facility fire safety, including fire detection and suppression systems and facility-specific programs that support those systems.

Information obtained as a result of reviewing fire protection systems during the initial Phase I assessments will be factored into the development of the comprehensive study

developed by the Office of Environment, Safety and Health. Conceptually, the facility assessments described in the comprehensive study will be comparable in nature to the Phase II assessments conducted on other vital safety systems under this implementation plan. Additionally, the technical concepts and principles provided by the Board in its Technical Report 27, *Fire Protection at Defense Nuclear Facilities*, will be incorporated during development of the comprehensive study. The Office of Environment, Safety and Health will coordinate 2000-2 Phase 2 activities with the comprehensive study developed for the Secretary's fire safety initiative to avoid duplication of efforts. The comprehensive study is scheduled to commence early in calendar year 2001. A copy of the plan for the comprehensive facility fire safety study will be provided to the Board as a deliverable under this implementation plan.

Commitments

Commitment 12
Commitment Statement: The Department will complete an initial review of the ability of DOE sites to effectively prevent fires and respond effectively in the event that a fire occurs. This review, in addition to the Phase I assessments, will provide the information to plan the comprehensive study described in Commitment 13.
Deliverable: Initial review report
Responsible Manager: Assistant Secretary for Environment, Safety and Health
Due Date: December 2000

Commitment 13
Commitment Statement: The Department will develop a plan for conducting a comprehensive study that provides for an in-depth evaluation of the capability to respond to wildfires and emphasizes facility fire safety, including fire detection and suppression systems and facility-specific programs that support those systems.
Deliverable: Comprehensive study plan
Responsible Manager: Assistant Secretary for Environment, Safety and Health
Due Date: April 2001

4.2 Safety System Expertise

Safety Issue: Integrated Safety Management (ISM) System processes help to ensure systems are able to perform their design safety functions. Effective implementation of ISM relies upon the ability to apply engineering expertise to maintain safety system configuration and assess system condition.

4.2.1 System Expertise: Contractor Personnel

Resolution Approach

In Recommendation 2000-2, the Board observed that the Department has not adopted the nuclear business' long-standing practice of designating system engineers for systems and processes that are vital to safety. The Board stated a belief that by identifying personnel outside the operational forum, designating them as system engineers, and assigning them responsibility for configuration management, the Department could establish a mechanism that would go a long way toward ensuring reliable safety system performance.

In developing this implementation plan, the Department performed a review of system engineer guidance and system engineer configuration management practices in place at a number of DOE facilities. The results of that review are discussed in the following paragraphs.

Although contractors have put into place programs to maintain configuration control of safety systems, the Department has not established a consistent set of requirements related to the application of a system engineer concept to maintain configuration control of safety systems. DOE STD 1073-93, *Guide for Operational Configuration Management Program*, which provides guidance related to the elements of a contractor configuration management program, includes a brief, general discussion of the system engineer concept. Appendix B of Part I of the standard describes the potential value added by the system engineers in managing change control at DOE facilities and outlines the key attributes of a system engineer program.

The Department reviewed configuration management practices at a number of sites. Although configuration management programs were observed, many contractors had not adopted a formal system engineer function. Where analogous programs exist, rigor and formality varied significantly. In general, the National Laboratories are organized on a project basis and primarily rely on the facility manager or individual scientist/experimenter to concern themselves with their safety systems and control system configuration. Of the facilities reviewed, the system engineer programs in place at the Paducah and Portsmouth gaseous diffusion plants represented the most mature programs.

The Nuclear Regulatory Commission (NRC) regulates the United States Enrichment Corporation (USEC), which operates the Paducah/Portsmouth gaseous diffusion plants. The diffusion plants' system engineer programs were developed from a review of successful programs in place at a number of commercial nuclear power plants. At their plants, USEC has implemented a mature system engineer function that meets NRC expectations regarding the use of system engineers and performs the functions described by the Board.

The Institute of Nuclear Power Operations (INPO) developed Good Practice TS-413, *Use of System Engineers*, as a guide to assist the commercial nuclear industry develop its own

system engineer program. TS-413 defines the features of an effective system engineer program, lessons learned from the adoption of these programs, and provides an example program as a model for commercial use.

The Department agrees that, if implemented correctly, the system engineer concept could represent a mechanism for applying technical expertise to maintain the design basis, control configuration, and trend performance. The results obtained from the document and program reviews described in the preceding paragraphs were used to develop a conceptual system engineer model for use at the Department's facilities. Where safety systems are required to protect the public and workers, the system engineer concept is applicable throughout a facility's life cycle (i.e., new facilities, existing facilities, and facilities undergoing decontamination and decommissioning). DOE O 430.1A, *Life Cycle Asset Management*, will be revised to include requirements for a contractor system engineer program. However, as this implementation plan is being developed, a proposal to cancel DOE O 430.1A and incorporate applicable requirements into other orders is being evaluated by the Department. If DOE O 430.1A is cancelled, system engineer requirements will be incorporated into another applicable order, such as DOE O 420.1, *Facility Safety*.

An Order revision will be drafted to establish requirements to address the following program elements:

- Identify systems whose safety significance warrants the use of a system engineer.
- Establish a program to implement key system engineer functions. Conceptually, a contractor's system engineer program would perform three key functions: configuration management activities, evaluation of system status and performance, and technical support for operations and maintenance activity and evaluation of potential inoperability when a safety function appears compromised. The system engineer function should be established outside the operational forum, but within line management, to provide a perspective that is insulated from operational pressures and production requirements.
- Establish a need for contractors to define minimum qualification/requalification requirements and establish a process for identifying successor system engineers. The qualification/requalification requirements defined for system engineers should be consistent with those defined for senior engineering positions described in DOE O 5480.20A, *Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities*. The qualification/requalification requirements established for the system engineers will be incorporated into the contractor training programs required by DOE O 5480.20A.
- Safety system assessments: System engineers must be actively involved in periodic facility condition inspections to assess the condition of their assigned system. Actions and requirements to address system assessment are contained in DOE O 4330.4B, *Maintenance Management Program.*

Implementation of these system engineer requirements should be tailored to facility hazards and the systems relied upon to prevent or mitigate those hazards. A graded approach will be used to implement system engineer Order requirements.[1]

Development and coordination of new requirements to be included in an Order is expected to take a significant amount of time. While awaiting formal requirements to be established, the Secretary will provide interim direction that will have contractors define vital safety systems warranting the use of a system engineer and initiate action to develop and implement the type of system engineer program defined within this implementation plan. This interim direction will describe the elements of a system engineer program to be institutionalized within the Directives system and establish dates for interim implementation while awaiting processing through the Directives system. The Office of Environment, Safety and Health will monitor the field's response to the Secretary's interim guidance and evaluate implementation progress after one year.

Although line management is responsible for facility safety, the system engineer is responsible for ensuring the assigned safety system(s) remains operable and receives the care and maintenance necessary to support the facility mission. DOE STD 1073-93 provides guidance regarding the system engineer concept, and the following discussion supplements and reinforces the guidance contained within the document.

Configuration Management: Conceptually, this program function is associated with maintaining consistency among the system's design basis and requirements, system documentation, and physical configuration. The system engineer would be responsible for identifying documents (e.g., drawings, calculations, applicable portions of documented hazard and accident analyses, and vendor manuals) that define the design basis for a system important to facility safety, identifying additional documents needed, and ensuring system documentation is kept up to date using a formal work control/change control process. Where a facility's design basis has not been clearly defined, the system engineer would be responsible for identifying system requirements, performance criteria,

[1] A graded approach is defined within DOE Rules and orders, and would consider factors such as:

- *Remaining facility lifetime and the safety significance of remaining operations*. For example, it might not be practicable to designate a system engineer for a facility scheduled to be decommissioned or demolished in a couple of years. On the other hand, hazards posed by planned operations and decommissioning activities should be reviewed to determine whether a specific safety system would continue to be relied upon following facility decommissioning. A system engineer should be assigned to safety system(s) where operability is required following facility decommissioning.
- *Systems that are important to safety in non-nuclear facilities*. For example, it would be prudent to designate a system engineer for a confinement ventilation system in a facility with significant non-nuclear hazards (e.g., chemical or industrial hazards).
- *Multiple systems and facilities*. A system engineer can be assigned responsibility for multiple systems and/or facilities, depending upon the scope of system support needed and the individual engineer's experience and expertise.
- *Multiple Systems*. Where several systems important to safety are connected to form a chemical or mechanical process, one system engineer could be designated for the entire process rather than designating a number of system engineers to cover each sub-system.

and documents considered to be essential to system operation. DOE STD 3024-98, *Content of System Design Descriptions*, provides guidance regarding the identification and consolidation of key design documents. The system engineer will also be responsible for ensuring work control and change control processes are followed and for regular assessments of the system to ensure continued operational readiness as detailed in the following paragraph.

Assessment of System Status and Performance: Conceptually, this program function is associated with being cognizant of ongoing maintenance and operations activities, evaluating system performance, and involvement in the identification and correction of equipment deficiencies. To be effective, the system engineer must remain apprised of the system's operational status and ongoing modification activities. The system engineer would also assist operations to review key system parameters, evaluate system performance, and initiate actions to correct problems. System material condition should also be periodically reviewed by the system engineer during implementation of facility condition inspections required by the Maintenance Order. These periodic reviews should include a review of component classification and an assessment of the system's ability to perform design and safety basis functions.

Technical Support for Operations and Maintenance Activity: Conceptually, this program function is associated with providing technical assistance in support of maintenance and operations activities. Once established, a system engineer would function as the individual cognizant of the system-specific maintenance/operations history as well as industry operating experience. The system engineer would be actively involved in day-to-day activities to identify emerging trends and would provide technical assistance, as necessary, in determining operability or correcting out-of-specification conditions or evaluating questionable data. When a safety system is suspected to be inoperable or degraded, the system engineer provides an analysis or supports an analysis, which determines operability. The system engineer will also be responsible for reviewing and concurring with design changes and providing input to the development of special operating/test procedures.

Commitments

Commitment 14
Commitment Statement: While awaiting formal requirements to be established, the Secretary will provide interim direction that will have contractors initiate actions to designate system engineers for vital safety systems.
Deliverable: Secretarial letter
Responsible Manager: Assistant Secretary for Environment, Safety and Health
Due Date: November 2000

Commitment 15
Commitment Statement: The Department will establish requirements for a system engineer concept to manage the configuration of systems designated as important to safety.
Deliverable: Draft DOE Order revision submitted into the Directives review process.
Responsible Manager: Assistant Secretary for Environment, Safety and Health
Due Date: March 2001

Commitment 16
Commitment Statement: The Office of Environment, Safety and Health will monitor the field's response to the Secretary's interim guidance and evaluate implementation progress after one year.
Deliverable: Briefing to the Board
Responsible Manager: Assistant Secretary for Environment, Safety and Health
Due Date: November 2001

4.2.2 System Expertise: Federal Personnel

The oversight role of the DOE Federal workforce requires familiarity with vital safety systems and the contractor's application of the system engineer concept. Once contractors implement a system engineer program, the Department needs to ensure that Federal technical personnel knowledgeable of those safety systems are available to support the contractor's life-cycle management of vital safety systems, particularly when significant system problems arise.

Determination of system expertise needed at the Federal level begins with the identification of safety-class and safety-significant systems at each site. The types and number of these safety systems at each site will determine the need for Federal personnel with expertise in a particular safety system. As described in Commitment 2, CSOs will work with field element managers to identify these systems and forward a list of systems from each site to the Federal Technical Capability Panel (FTCP).

As a supplement to the Department's annual workforce needs assessment, the FTCP will assess the availability of DOE Federal expertise and recommend actions necessary to ensure that such expertise can be brought to bear in the life-cycle management of vital systems. Where a field element manager determines it is not practicable to maintain Federal expertise in a particular system, expertise must be available from elsewhere within the complex. Based on the FTCP's assessment, a report will be generated that describes current organizational methods and processes that align Federal technical expertise with system engineer needs. Based on recommendations of that report, changes or additions will be made to the Technical Qualifications Program (TQP) standards and processes. Such changes may include required demonstration of expertise in vital safety systems or involve definition of a qualification standard(s).

Commitments

Commitment 17
Commitment Statement: As a supplement to the annual workforce analysis, the FTCP will identify system expertise needed at the Federal level and survey the availability and sufficiency of personnel required to ensure effective oversight of contractor safety systems.
Deliverable: Letter to the Board forwarding analyses provided to the Chair of the FTCP.
Responsible Manager: Chair, FTCP
Due Date: March 2001

Commitment 18
Commitment Statement: A report will be compiled identifying the Department's needs for Federal technical personnel capable of reviewing safety systems and programs essential to systems operability and the means of addressing critical technical skills gaps.
Deliverable: Recommendations provided to the Deputy Secretary
Responsible Manager: Chair, FTCP
Due Date: April 2001

Commitment 19
Commitment Statement: Based on conclusions and recommendations made in Commitment 18, changes or additions will be made to the Technical Qualifications Program (TQP) standards and processes.
Deliverable: Revised Technical Qualifications Program standard or process for safety system expertise.
Responsible Manager: Chair, FTCP
Due Date: June 2001

4.3 Safety System ES&H Assessments

In Recommendation 2000-2, the Board recommended that the Department ensure safety system status, as well as supporting programs, are scrutinized as a regularized part of assessments performed by the line management. In accepting the Board's Recommendation, the Department committed to a review of line oversight of contractor programs to determine whether safety systems, as well as programs essential to system operability, are being included in those programs.
DOE P 450.5, *Line Environment, Safety and Health Oversight*, sets forth the expectations for ES&H oversight and the use of contractor self-assessment programs as the cornerstone of this oversight. The Policy defines the key elements of a line ES&H program for both the contractor and DOE line organizations.

The Department and its contractors have an abundance of oversight and feedback mechanisms that satisfy the requirements of DOE P 450.5 and are used to improve operations throughout the DOE complex. In developing the ISM System, the Department established a guiding principle that line management is responsible for safety, and line

managers have a responsibility to get personally involved in reviewing and making use of performance feedback information to drive continuous improvement.

In order to provide senior leadership with information obtained from these oversight and feedback processes, the Department will begin a regular practice of periodically reviewing ES&H assessments performed by DOE and the maintenance and operation (M&O) contractor at each site, and summarizing the results for the Secretary. Annually, LPSOs will review the results of ES&H assessments performed during the previous year and provide the Secretary with a summary report for each of their sites. The report for each site will:

- Summarize the scope and schedule for ES&H assessments performed over the previous 12 months by the M&O contractor, DOE line management, and the Office of Independent Oversight.
- Summarize the results obtained from these assessments, both by program and vital safety systems. Using a site-specific list of vital safety systems (Commitment 3), the summary report will provide a crosswalk of how ES&H assessment programs at each site review the condition of their vital safety systems.
- Note actions taken to address significant issues.
- Identify issues where the field element manager has asked for assistance.

This annual review of ES&H assessments will be institutionalized as a requirement in the Directives system (e.g., a revision of DOE O 231, *Environment, Safety and Health Reporting*).

Commitments

Commitment 20
Commitment Statement: Annually, LPSOs will review the results of ES&H assessments performed during the previous year and provide the Secretary with a summary report for each of their sites.
Deliverable: Summary reports from each LPSO reporting the results of assessments at each of their sites.
Responsible Manager: Assistant Secretary for Environmental Management
Deputy Administrator for Defense Programs
Director of the Office of Science
Due Date: February 2001
February 2002

Commitment 21
Commitment Statement: Annual LPSO reviews of ES&H assessments, described in Commitment 20, will be institutionalized within the Directives system.
Deliverable: Draft DOE Order and/or Policy revisions submitted into the Directives review process.
Responsible Manager: Assistant Secretary for Environment, Safety and Health
Due Date: July 2001

5.0 Organization and Management

The Responsible manager for overall execution of this implementation plan is the Office of Environment, Safety and Health. In this capacity, the Responsible manager ensures individuals responsible for deliverables and commitments identified within this implementation plan complete their actions. To coordinate completion of these commitments, the Responsible manager will establish and chair a team comprised of senior representatives from the field and from the Headquarters program offices of Science, Defense Programs, and Environmental Management. The various lead responsible organizations identified within the implementation plan are accountable to the Responsible manager with regard to the completion of deliverables.

5.1 Change Control

Complex, long-range plans require sufficient flexibility to accommodate changes in commitments, actions, or completion dates that may be necessary due to additional information, improvements, or changes in baseline assumptions. The Department's policy is to (1) provide prior, written notification to the Board on the status of any implementation plan commitment that will not be completed by the planned milestone date, (2) have the Secretary approve all revisions to the scope and schedule of plan commitments, and (3) clearly identify and describe the revisions and bases for the revisions. Fundamental changes to the plan's strategy, scope, or schedule will be provided to the Board through formal revision and reissuance of the implementation plan. Other changes to the scope or schedule of planned commitments will be formally submitted in appropriate correspondence approved by the Secretary, along with the basis for the changes and appropriate corrective actions.

5.2 Reporting

To ensure the various Department implementing elements and the Board remain informed of the status of plan implementation, the Department's policy is to provide progress reports until implementation plan commitments are completed. The Department will provide briefings to the Board approximately every 4 months.

Commitment 22
Commitment Statement: The Department will provide briefings to the Board approximately every four months.
Deliverable: Briefings
Responsible Manager: Assistant Secretary for Environment, Safety and Health
Due Date: January 2001, and approximately every four months thereafter

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Table 1: Summary Status of Secretarial HEPA Filter Report Commitments

Action Plan Commitment Summary	Commitment Status
Action 1, Deliverable 1.1	The Department has completed this commitment. On March 1, 2000, the Deputy Secretary issued a memorandum initiating action to assess nuclear facilities. A copy of the memorandum was provided to the Board on April 19, 2000.
Action 1, Deliverable 1.2	All vulnerability assessments were completed by August 2000. The Assistant Secretary for Environment, Safety and Health is developing a letter that formally notifies the Board that the Department has completed this action and that the Department intends to reevaluate the condition of HEPA filters during the performance of confinement ventilation system assessments.
Action 1, Deliverable 1.3	The Department's commitment to enter corrective actions into CATS was completed by September 2000. The Assistant Secretary for Environment, Safety and Health is developing a letter that formally notifies the Board that the Department has completed this action and that the Department intends to reevaluate the condition of HEPA filters and identify corrective actions under this implementation plan activity to assess confinement ventilation systems.
Action 2, Deliverable 2.1	The Secretary's HEPA filter report committed to a completion date of 12/01/00
Action 2, Deliverable 2.2	The Secretary's HEPA filter report committed to a completion date of 11/30/01
Action 2, Deliverable 2.3	The Secretary's HEPA filter report committed to a completion date of 11/30/01
Action 3, Deliverable 3.1	The Department has completed this commitment. A page change was developed to DOE HDBK 3010-94 and issued on March 1, 2000. This completed Action 3, Deliverables 3.1 and 3.1. The Deputy Administrator for Defense Programs provided formal notification to the Board on September 1, 2000.
Action 3, Deliverable 3.2	The Department has completed this commitment. A page change was developed to DOE HDBK 3010-94 and issued on March 1, 2000. This completed Action 3, Deliverables 3.1 and 3.1. The Deputy Administrator for Defense Programs provided formal notification to the Board on September 1, 2000.
Action 3, Deliverable 3.3	The LPSO's have not yet issued letter to field describing the change and identifying the need to screen Authorization Basis documents for unreviewed safety questions.

Action Plan Commitment Summary	Commitment Status
Action 4, Deliverable 4.1	The Department has completed an evaluation of the management issues related to QPL Laboratory and Filter Test Facility operations. A working group evaluation, which addressed consolidation of filter test facilities at one site, is referred to the DOE Chief Operating Officers (COO's) for final resolution of recommendations. The COO's will decide on the final content of recommendations in December, 2000 and the results will be forwarded to the Board.
Action 4, Deliverable 4.2	While Action 4.1 and 5.1 are being worked, Headquarters continues to provide funding to support operation of the Filter Test Facility at Oak Ridge.
Action 5, Deliverable 5.1	The Department has completed an evaluation of the management issues related to the testing of HEPA filters. The recommendations developed through the evaluation did not receive the concurrence of all the Programs. The recommendations are referred to the Chief Operating Officers (COO's) for a decision on final content, December, 2000 and the results will be forwarded to the Board.
Action 6, Deliverable 6.1	The Department has completed this commitment. In December 1999, the Assistant Secretary for Environment, Safety and Health convened a working group to identify options. On January 12th, the Department issued a letter to the Board describing actions to support the 26th Nuclear Air Cleaning conference that is scheduled for September 2000. The letter also described actions to develop an Internet web site for sharing of information and lessons learned within the air filter and ventilation technology community and coordinate future air cleaning conferences with existing conferences, such as the Department's Waste Management Conference.

Table 2: Summary of Implementation Plan Commitments and Deliverables/Milestones

Number	Commitment	Deliverable	Due Date	Responsibility
1	The Secretary will initiate Phase I assessments and issue guidance/criteria to ensure consistent results.	Assessment criteria/guidance	November 2000	Assistant Secretary for Environment, Safety and Health
2	Cognizant Secretarial Officers (CSOs) will identify and list safety-class systems, safety-significant systems, and other systems that perform important defense in depth functions in defense nuclear facilities at each of their facilities. These lists will be used for other actions described within this implementation plan and forwarded to the FTCP for use in determining the system expertise needed at the Federal level.	CSO memos forwarding system lists to the Chair of the FTCP.	November 2000	Assistant Secretary, EM Deputy Administrator, DP
3	At the priority facilities listed in Appendix E, the Department will complete Phase I assessments of safety class, confinement ventilation, and fire protection systems.	Response to Phase I assessment guidance/criteria	February, 2001	Assistant Secretary, EM Deputy Administrator, DP
4	At the follow-on facilities listed in Appendix E, the Department will complete Phase I assessments of safety class, confinement ventilation, and fire protection systems.	Response to Phase I assessment guidance/criteria	May 2001	Assistant Secretary, EM Deputy Administrator, DP

Number	Commitment	Deliverable	Due Date	Responsibility
5	At all facilities listed in Appendix E, the Department will complete Phase I assessments of the remaining vital safety systems.	Response to Phase I assessment guidance/criteria	June 2001	Assistant Secretary, EM Deputy Administrator, DP
6	The Department will evaluate the results obtained from Phase I assessments conducted at Facilities of Interest and identify key facilities and/or systems that will receive Phase II assessments.	List of key facilities and systems that will receive a Phase II assessment and a schedule for their completion	July 2001	Assistant Secretary, EM Deputy Administrator, DP Assistant Secretary, Environment, Safety and Health
7	The Department will assemble teams and begin Phase II assessments.	Letter announcing commencement of the first Phase II assessment	September 2001	Field Office Manager
8	Deficiencies observed during Phase I and Phase II assessments will be tracked and managed in local corrective action management systems. Resources allocated to address findings resulting from confinement ventilation system and other assessments within this Implementation Plan will be identified on an annual basis	Summary of resources allocated within the FY 2003 budget request from congress	February 2002	Assistant Secretary, EH Assistant Secretary, EM Deputy Administrator, DP
9	The Department will develop assessment criteria and guidelines to ascertain the current condition of confinement ventilation systems within defense nuclear facilities.	Assessment criteria and guidelines.	March 2001	Assistant Secretary for Environment, Safety and Health

Number	Commitment	Deliverable	Due Date	Responsibility
10	The expert team will test the effectiveness of confinement ventilation system assessment criteria and guidelines at two pilot facilities.	Briefing to the Board.	June 2001	Assistant Secretary for Environment, Safety and Health
11	Field element managers will assemble teams to assess the condition of confinement ventilation systems that are important to safety. Corrective actions will be entered into local corrective action management systems, and as necessary, the Department's Corrective Action Tracking System.	LPSO letters reporting completion with an enclosed sample assessment report from a facility at each site.	September 2001	Assistant Secretary, EM Deputy Administrator, DP
12	The Department will complete an initial review of the ability of DOE sites to effectively prevent fires and respond effectively in the event that a fire occurs. This review, in addition to the Phase I assessments, will provide the information to plan the comprehensive study described in Commitment 13.	Initial Review report	December 2000	Assistant Secretary for Environment, Safety and Health
13	The Department will develop a plan for conducting a comprehensive study that provides for an in-depth evaluation of the capability to respond to wildfires and emphasizes facility fire safety, including fire detection and suppression systems and facility-specific programs that support those systems.	Comprehensive study plan	April 2001	Assistant Secretary for Environment, Safety and Health

Number	Commitment	Deliverable	Due Date	Responsibility
14	While awaiting formal requirements to be established, the Secretary will provide interim direction that will have contractors initiate actions to designate system engineers for vital safety systems.	Secretarial Letter	November 2000	Assistant Secretary for Environment, Safety and Health
15	The Department will establish requirements for a system engineer concept to manage the configuration of systems designated as important to safety.	Draft DOE Order revision submitted into the Directives review process	March 2001	Assistant Secretary for Environment, Safety and Health
16	The Office of Environment, Safety and Health will monitor the field's response to the Secretary's interim guidance and evaluate implementation progress after one year.	Briefing to the Board	November 2001	Assistant Secretary for Environment, Safety and Health
17	As a supplement to the annual workforce analysis, the FTCP will identify system expertise needed at the Federal level and survey the availability and sufficiency of personnel required to ensure effective oversight of contractor safety systems	Letter to the Board forwarding analyses provided to the Chair of the Federal Technical Capability Panel.	March 2001	Chair, Federal Technical Capability Panel
18	A report will be compiled identifying the Department's needs for Federal technical personnel capable of reviewing safety systems and programs essential to systems operability and the means of addressing critical technical skills gap	Recommendations provided to the Deputy Secretary	April 2001	Chair, Federal Technical Capability Panel

Number	Commitment	Deliverable	Due Date	Responsibility
19	Based on conclusions and recommendations made in Commitment 18, changes or additions will be made to the Technical Qualifications Program (TQP) standards and processes.	Revised Technical Qualifications Program standard or process for safety system expertise	June 2001	Chair, Federal Technical Capability Panel
20	Annually, LPSOs will review the results of ES&H assessments performed during the previous year and provide the Secretary with a summary report for each of their sites.	Summary reports from each LPSO reporting the results of assessments at each of their sites.	February 2001 February 2002	Assistant Secretary, EM Deputy Administrator, DP Office of Science
21	Annual LPSO reviews of ES&H assessments described in commitment 20 will be institutionalized within the Directives system.	Draft DOE Order or Policy revision submitted into the Directives review process.	July 2001	Assistant Secretary for Environment, Safety and Health
22	The Department will provide briefings to the Board approximately every four months.	Briefings	January 2001, approximately every four months thereafter	Assistant Secretary for Environment, Safety and Health
	HEPA filter report commitments Incorporated in Section 4.2.1:			
23	DOE will develop a revision to the *Nuclear Air Cleaning Handbook.*	Letter to the Board announcing placement of the draft handbook into the Directives system for DOE-wide review.	December 2001	Deputy Administrator, DP
24	DOE will develop a revision to the *Nuclear Air Cleaning Handbook.*	Issuance of a revision of the *Nuclear Air Cleaning Handbook*	November 2002	Deputy Administrator, DP

Number	Commitment	Deliverable	Due Date	Responsibility
25	DOE will develop a revision to the *Nuclear Air Cleaning Handbook.*	Issuance of a letter to field office managers describing the handbook changes and the need to screen authorization basis documents for possible unreviewed safety questions, including filter service life. Corrective actions to be entered into CATS.	November 2002	Assistant Secretary, EM Deputy Administrator, DP
26	DOE-HDBK-3010-94 *Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities* will be revised to eliminate problematic guidance regarding HEPA filter performance.	Issuance of a letter to field office managers describing the handbook changes and the need to screen authorization basis documents for possible unreviewed safety questions, including filter service life. Corrective actions to be entered into CATS.	November 2000	Assistant Secretary, EM Deputy Administrator, DP
27	Field Management Council review of consolidation of the QPL laboratory and FTF operation.	Letter to the Board describing decision and path forward for the QPL laboratory and FTF operation.	January 2001	Assistant Secretary, EM

Number	Commitment	Deliverable	Due Date	Responsibility
28	Field Management Council review of consolidation of the QPL laboratory and FTF operation	Maintain operation and funding of the FTF at Oak Ridge, and maintain contact with the Army's Edgewood facility to remain appraised of plans for its continued operation until a revised strategy is established and implemented	January 2001	Assistant Secretary, EM
29	Field Management Council review of the benefit of testing 100% of HEPA filters, including options other than 100% testing.	Letter to the Board describing decision and path forward for testing of HEPA filters.	January 2001	Assistant Secretary, EM

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APPENDIX A

SECRETARIAL
HEPA FILTER
REPORT

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The Secretary of Energy
Washington, DC 20585

December 6, 1999

The Honorable John T. Conway
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW, Suite 700
Washington, DC 20004

Dear Mr. Chairman:

Enclosed is the Department of Energy's report and action plan addressing issues raised in the May 1999 Technical Report 23 – *HEPA Filters Used in the Department of Energy's Hazardous Facilities.*

The Department acknowledges the concerns raised by the Board. This action plan fulfills our commitment to you to develop a plan that will ultimately ensure that adequate infrastructure is in place so that High-Efficiency Particulate Air (HEPA) filters are maintained and their performance assured. The Department believes that the action plan addresses the issues raised in Technical Report 23.

The Lead Program Secretarial Officers will proceed with an initiative, using the principles of Integrated Safety Management, to assess the potential safety vulnerability to workers, the public, and the environment due to degraded filters that are relied on to mitigate accidents. Corrective actions will be tracked and managed through the Department's corrective action tracking system. This initiative will be completed by May 31, 2000. Also by May 31, 2000, the Department will resolve issues concerning maintenance of the HEPA filter infrastructure, including filter test facility consolidation, interim operation of the Oak Ridge test facility, and the benefits of testing 100 percent of the filters prior to installation.

The Department will update technical guidance used by the field to safely operate the filters – the *Airborne Release Fractions/Rates Handbook* and the *Nuclear Air Cleaning Handbook* – by December 1, 2000, and November 30, 2001, respectively. By January 15, 2000, the Department will review options for

adequate information exchange and dialogue on ventilation filtration technology. The Department will document completion of these initiatives in a letter to the Board.

We appreciate the Board's advice and support in this important matter. If you have any questions, please contact me.

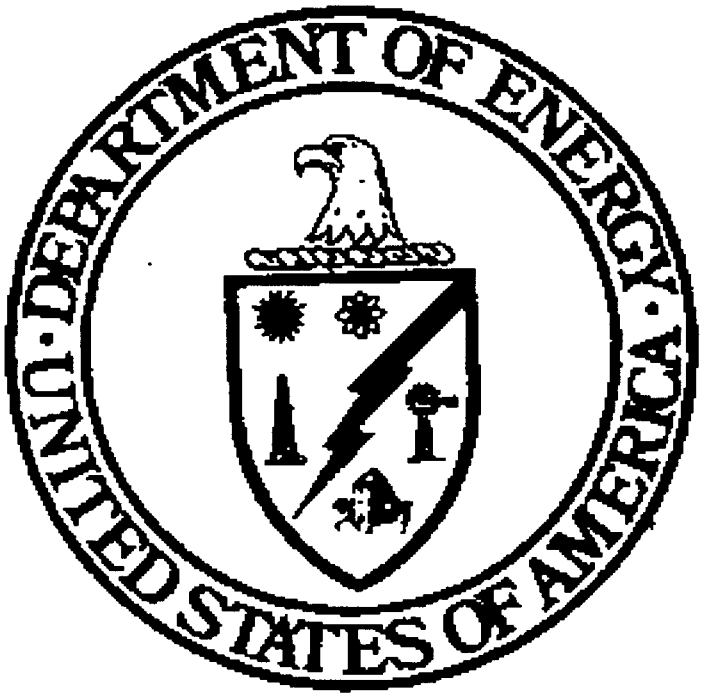
Yours sincerely,

Bill Richardson

Bill Richardson

Department of Energy
HEPA Filter Program Infrastructure

A Report and Action Plan In Response to
Defense Nuclear Facilities Safety Board
Technical Report 23



December 1999

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Executive Summary

High-Efficiency Particulate Air (HEPA) filters are used extensively at Department of Energy (DOE) sites to remove small hazardous and radioactive particles from air flowing from a facility's interior to the outdoors and from being re-circulated within a facility. The filters are the accepted method to keep airborne emissions within safety standards in order to protect the public, workers, and the environment. In May 1999, the Defense Nuclear Facilities Safety Board (Board) released Technical Report 23 – *HEPA Filters Used in the Department of Energy's Hazardous Facilities* – that detailed shortcomings in programs to maintain the filters due to aging and degraded infrastructure and budget cuts. Identified problems include increased likelihood of filters failing which would allow dangerous emissions to escape, outdated written technical guidance, and maintaining the capability to test filters prior to installation in contaminated systems. Oak Ridge Operations Office estimates that the cost to test every filter prior to installation into nuclear containment ventilation systems across the DOE complex (2,500 - 4,000 filters per year) is $300,000 per year.

In a June 8, 1999 letter to the Secretary of Energy, the Board requested a plan outlining the steps required to restore the infrastructure that supports the HEPA filter program. In response, the Department has developed a plan with six actions that address four issues:

- **Assessments.** The Board assigned the highest priority to assessing the potential vulnerability due to degraded filters that are relied upon to mitigate accidents in DOE facilities. The plan tasks the field offices under the cognizance of the Lead Program Secretarial Officers to conduct assessments of potential vulnerability, using the principles of Integrated Safety Management, of Category 1, 2, and 3 nuclear facilities that rely on HEPA filters for accident mitigation. Action 1 of the plan commits DOE to complete the assessments by April 28, 2000 and enter identified corrective actions into DOE's corrective action tracking system by May 31, 2000.

- **Technical Issues.** The technical issues relate to updating two handbooks that govern the use and testing of HEPA filters – the *Nuclear Air Cleaning Handbook* and the *Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities Handbook.* Actions 2 and 3 of the plan commit DOE to revise and issue these handbooks through the Directives system by November 30, 2001 and December 1, 2000, respectively.

- **Management Issues.** The management issues concern maintaining the infrastructure of HEPA filter testing that provides proof of design and assure quality of filters that may be relied upon to provide a safety function. Management issues also concern consolidation of filter testing facilities, operation of the Oak Ridge testing facility until consolidation issues are resolved, and the benefit of testing 100% of filters prior to installation. Actions 4 and 5 of the plan commit DOE to resolve, by May 31, 2000 issues related to consolidated HEPA testing facilities, and the benefit of testing 100% of HEPA filters.

- **Information Exchange.** The Nuclear Air Cleaning Conference has historically provided a feedback forum for information exchange and peer review. Action 6 of this plan commits DOE, by December 30, 1999, to review and recommend options – via the Secretarial Safety Council – to assure adequate ventilation filtration information exchange (e.g., the Internet, or maintaining support for the *Nuclear Air Cleaning Conference).*

1.0 Introduction

High-Efficiency Particulate Air (HEPA) filters are used extensively at DOE sites to remove small hazardous and radioactive particles from air flowing from a facility's interior to the outdoors and from being re-circulated within a facility. The filters are the accepted method to keep airborne emissions within safety standards in order to protect the public, workers, and the environment.

In May 1999, the Defense Nuclear Facilities Safety Board (Board) released Technical Report 23 – *HEPA Filters Used in the Department of Energy's Hazardous Facilities* – that detailed shortcomings in programs to maintain the filters due to aging and degraded infrastructure and budget cuts. Identified problems include increased likelihood of filters failing which would allow dangerous emissions to escape, outdated written technical guidance, and maintaining the capability to test filters prior to installation in contaminated systems. Oak Ridge Operations Office estimates that the cost to test every filter prior to installation in nuclear containment ventilation systems across the DOE complex (2,500 - 4,000 filters per year) is $300,000 per year.

In a June 8, 1999 letter to the Secretary of Energy, the Board requested a plan outlining the steps required to restore the infrastructure that supports the HEPA filter program. Specifically, four general issues need to be resolved:

- **Assessments.** The Board assigned the highest priority to assessing the potential vulnerability due to degraded filters that are relied upon to mitigate accidents in DOE facilities.

- **Technical Issues.** The technical issues relate to updating guidance governing the use and testing of HEPA filters in DOE facilities.

- **Management Issues.** The management issues concern maintaining the infrastructure of HEPA filter testing that provides proof of design and assure quality of filters that may be relied upon to provide a safety function. Management issues also concern consolidation of filter testing facilities, operation of the Oak Ridge testing facility until consolidation issues are resolved, and the benefit of testing 100% of filters.

- **Information Exchange.** The information exchange issue concerns maintaining support for the Nuclear Air Cleaning Conference as a forum for peer review and exchange of ideas, or other means (e.g., the Internet) to better assure adequate information exchange on ventilation filtration.

Sections 2.0, 3.0, 4.0, and 5.0 of this report describe the actions to be taken by the Department to resolve these issues in response to the Board's concerns.

1.1 Background

The Board first identified concerns about maintenance of ventilation systems including filters at plutonium processing facilities in a report (DNFSB/TECH-3) issued in 1995. In February 1996, the Department submitted a plan to the Board that identified 36 corrective actions. Approximately one-quarter of these actions presently remain open.

In April 1998, a report on vulnerabilities from ventilation filter degradation was submitted to the Board. In October 1998, a DOE report of problems associated with filter wetting and subsequent degradation was completed. In addition, there was a study of the effects of service applications on HEPA filter performance, including results of destructive and nondestructive filter testing at Rocky Flats in 1997, and a paper given at the 24th Nuclear Air Cleaning Conference in 1996 on lessons learned from three serious fires in plutonium facilities at Rocky Flats over three decades.

In 1996, the Office of Environmental Management (EM) completed a report that evaluated technical and programmatic issues related to HEPA filter quality (E. Brolin et al., 1996). The report had several conclusions and recommendations, two of which are pertinent to the commitments made in Section 4.0 of this report:

- The present DOE practice of 100% receipt inspection and efficiency and pressure drop testing of HEPA filters for nuclear applications should be continued and made mandatory in a DOE directive to be developed by the Office of Defense Programs (DP).

- Testing facilities should be consolidated at one location. The report recommended closure of the Oak Ridge (OR) Filter Test Facility (FTF) and consolidating it to either the Army's laboratory in Edgewood, MD or to a private-sector facility selected by competitive bidding.

The Brolin report was approved by EM with concurrences by DP, the Office of Environment, Safety and Health, and the Office of Field Management.

2.0 Assessments

The Board assigned the highest priority to assessing the potential vulnerability due to degraded filters. DOE field offices will conduct assessments of each nuclear facility that relies on HEPA filters for accident mitigation. The assessments will be limited to Category 1, 2, and 3 nuclear facilities, that may, because of special circumstances (e.g., material form and hazard type, or proximity to site boundary) depend on HEPA filters for protection of persons outside the facility. The status of identified corrective actions will be tracked in DOE's corrective action tracking system (CATS).

The assessments will focus on HEPA filters that perform a safety function in accident situations (including standby and bypass filter banks). Note that the assessments will not be limited only to those "credited" in a safety analysis report (SAR), but should include all that may perform an accident mitigation function. The assessments should be based on existing documentation (no new studies will be requested).

Assessments will be of the ability of potentially degraded HEPA filters (e.g., high radiation exposure, wetting, high temperature) to perform their safety function under accident conditions (e.g, fires, explosions) that stress the filters. The assessments will include information on how long the installed filters have been in service and any existing policies relating to change-out.

Action 1.0: DOE field offices to conduct assessments of vulnerability of each nuclear facility relying on HEPA filters for accident mitigation.

Responsible Managers: Lead Program Secretarial Officers (LPSOs)

Deliverables:

1.1 – Memorandum from the Deputy Secretary, coordinated by the Assistant Secretary for Environment, Safety and Health with LPSO concurrence, and reviewed by the Secretarial Safety Council (SSC), tasking field offices to conduct assessments of each facility under their cognizance that rely on HEPA filters for accident mitigation. The memo will include guidance on filter applications/conditions that may represent a vulnerability and suggestions regarding performance assessment. **Due date:** February 1, 2000.

1.2 – Results of the assessments to be forwarded to the Deputy Secretary and the SSC through the Office of Environment, Safety and Health. **Due date:** April 28, 2000.

1.3 – Identified corrective actions resulting from the assessments entered in DOE's corrective action tracking system (CATS). **Due date:** May 31, 2000.

3.0 Technical Issues

Technical issues relate to updating guidance governing use and testing of HEPA filters in DOE facilities, principally the *Nuclear Air Cleaning Handbook* and *Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities Handbook* (DOE-HDBK-3010-94). Commitments discussed in the following sections will be supported by a technical basis.

3.1 Nuclear Air Cleaning Handbook

The Nuclear Air Cleaning Handbook was issued by the Energy Research and Development Administration (ERDA) in 1976. It is more than 20 years old and in need of an update to address current technology. Material that needs updating includes:

- technological developments in equipment (e.g., manifold systems, bag-in-bag-out filter housings, and fluid seal filters),
- technological developments in testing methods (e.g., laser efficiency and in-place leak testing),
- construction, and
- codes and standards that have been revised or developed since the 1976 ERDA handbook was released.

The Department has not been successful in issuing a draft revision to the handbook. In developing this plan, three options for revising the handbook were considered:

- Resolve comments and issue the existing draft revision of the handbook. The existing draft revision reformats the handbook into more of a "textbook" style that may not be suitable for easy use as a nuclear air cleaning and HEPA filter reference.
- Update and issue the handbook as a series of monographs that address air cleaning topics.
- Update the handbook using the same format.

An informal HEPA filter topical committee was convened in July 1999 to evaluate the three options. The committee concluded that the format of the existing Nuclear Air Cleaning Handbook (Option 3) would be the most effective format to be used in the field as a reference manual. The Department will develop a new revision to the Nuclear Air Cleaning Handbook. The revision will update topical information in the published handbook and address significant new issues that were not addressed in the original document. The revision will provide guidance to be used on a site-by-site basis for maximum HEPA filter service life based on hazard and operational factors. Once complete, the draft will be reviewed by the Field Management Council prior to placing it into the Directives system for use as a DOE standard.

Action 2.0: DOE will revise the *Nuclear Air Cleaning Handbook.*

Responsible Manager: Assistant Secretary for Defense Programs

Deliverables:

2.1 – Letter to the Board announcing placement of the draft handbook into the Directives system for DOE-wide review. **Due date:** December 1, 2000.

2.2 – Issuance of revision of the *Nuclear Air Cleaning Handbook.* **Due date:** November 30, 2001.

Responsible Managers: Lead Program Secretarial Officers

Deliverables:

2.3 – Issuance of a letter to field managers describing handbook changes and the need to screen authorization basis documents for possible unreviewed safety questions (USQs), including filter service life. Corrective actions to be entered into CATS. **Due date:** November 30, 2001.

3.2 DOE-HDBK-3010-94

In its technical report, the Board noted that DOE-HDBK-3010-94 provides confusing guidance regarding HEPA filter performance. Specifically, Section 5.4 of DOE-HDBK-3010-94 provides confusing information regarding the response of a HEPA filter under thermal stress. This section will be revised to eliminate inconsistent guidance. The revision will be reviewed by the Field Management Council prior to issuance through the Directives system.

Action 3.0: DOE-HDBK-3010-94 *Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities* revised to eliminate inconsistent HEPA filter performance guidance.

Responsible Manager: Assistant Secretary for Defense Programs

Deliverables:

3.1 – Letter to the Board announcing placement of the revised sections of DOE-HDBK-3010-94 into the Directives system for DOE-wide review. **Due date:** April 14, 2000.

3.2 – Issuance of the revised sections of DOE-HDBK-3010-94. **Due date:** September 1, 2000.

Responsible Managers: Lead Program Secretarial Officers

Deliverables:

3.3 – Issuance of a letter to field managers describing handbook changes and the need to screen authorization basis documents for possible unreviewed safety questions (USQs). Corrective actions to be entered into CATS. **Due date:** November 30, 2001.

4.0 Management Issues

Management issues concern the HEPA filter quality assurance infrastructure, including filter test facility consolidation, continued operation of the Oak Ridge test facility until a revised testing strategy is in place, and the benefit of testing 100% of filters prior to installation.

In a memorandum dated April 21, 1999, the Secretary established the Field Management Council (FMC) charged with integration of corporate programs and support activities with line programs. The FMC reviews policy and guidance which have a significant impact upon the field, and makes recommendations to the Deputy Secretary, who chairs the FMC.

A DOE working group consisting of representatives from the Lead Program Secretarial Offices and the Office of Environment, Safety and Health (EH), and chaired by the Office of Environmental Management (EM), will perform the necessary analysis of the HEPA filter program infrastructure and make three recommendations to the FMC concerning: (1) filter test facility consolidation; (2) continued operation of the Oak Ridge test facility; and (3) the benefit of testing 100% of filters prior to installation.

4.1 Consolidation of the Filter Test Facility and Qualified Products List Laboratory

HEPA filters used in the Department's hazardous facilities are produced with a high degree of quality and uniformity through the application of stringent specifications. The *Nuclear Air Cleaning Handbook* and DOE-STD-3020 provide design, performance, and testing specifications for HEPA filters. These specifications are used for filter applications in both commercial and DOE nuclear facilities. The initial design performance is proven through destructive testing at a qualified products list (QPL) laboratory. Once filter design has been proven at a QPL laboratory, continued assurance of filter production is provided by nondestructive testing of each filter's ability to meet specified particle removal efficiencies, pressure drop, and conformance to design specifications. The testing is performed at an independent filter test facility (FTF).

Filter manufacturers pay the cost of "proof of design" destructive filter testing at a QPL laboratory. The Army's Edgewood facility currently performs this testing. Currently, DOE operates only one FTF, located at Oak Ridge. Observed filter failure rate is approximately five percent.

In 1996, Environmental Management completed a report which evaluated technical and programmatic issues related to HEPA filter quality (E. Brolin et al., 1996). With respect to maintaining test facilities capable of assuring filter quality, the report concluded that the QPL laboratory and FTF should be consolidated at one location. The report recommended closure of the Oak Ridge test facility and consolidating it to either the Army's laboratory in Edgewood, MD, another DOE facility, or to a private-sector facility selected by competitive bidding.

Continued quality assurance testing is an essential component of the infrastructure supporting DOE's HEPA filter program. Using current information, previous HEPA filter studies will be re-evaluated to recommend a course of action that either consolidates these facilities in one location,

or puts in place measures that ensure both facilities remain operable to support DOE's needs.

These recommendations will be considered by the Field Management Council as part of the process of resolving issues concerning consolidation of filter testing facilities that best suits the Department's future needs. Operation of the FTF at Oak Ridge will be maintained until a consolidated facility is established.

Action 4.0: Field Management Council review of consolidation of the QPL laboratory and FTF operation, and continued operation of the Oak Ridge test facility until a revised filter testing strategy is in place.

Responsible Manager: Assistant Secretary for Environmental Management

Deliverables:

4.1 – Letter to the Board describing the decision and the path forward for the QPL laboratory and FTF operation. **Due date:** May 31, 2000.

4.2 – Maintain operation and funding of the FTF at Oak Ridge, and maintain contact with the Army's Edgewood QPL facility to remain appraised of plans for its continued operation until a revised strategy is established and implemented.

4.2 Benefit of Testing 100% of DOE's HEPA Filters

The benefit associated with testing 100% of the filters prior to installation on a complex-wide basis must be determined.

Action 5.0: Field Management Council review of the benefit of 100% testing of HEPA filters, including options other than 100% testing.

Responsible Manager: Assistant Secretary for Environmental Management

Deliverable: **5.1** – Letter to the Board describing decision and path forward for testing of HEPA filters. **Due date:** May 31, 2000.

5.0 Information Exchange

The information exchange issue concerns assuring adequate dialogue on ventilation filtration technology. The *Nuclear Air Cleaning Conference* has historically provided a forum for feedback from peer review and free exchange of ideas. EH will lead a review and recommend options - via the Secretarial Safety Council (SSC) - to assure adequate information exchange on the subject of ventilation filtration. The SSC, a subcommittee of the FMC, reviews policy and guidance that have a significant impact upon the field, and makes recommendations to the Deputy Secretary, who chairs the SSC. For information exchange, the options include maintaining support for the conference, or other appropriate means (such as the Internet).

Action 6.0: Review and recommend options – via the Secretarial Safety Council – to assure adequate ventilation filtration information exchange (e.g., the Internet, or maintaining support for the *Nuclear Air Cleaning Conference).*

Responsible Manager: Assistant Secretary for Environment, Safety and Health

Deliverable: Letter to the Board describing decision and path forward of means to better assure adequate information exchange on the subject of ventilation filtration. **Due date:** 1/15/00.

Table 1 – Summary of Actions and Deliverables			
Action	**Responsible Manager**	**Deliverables**	**Due Date**
1.0 –DOE field offices to conduct assessments of the vulnerability of each nuclear facility relying on HEPA filters for accident mitigation.	Lead Program Secretarial Officers (LPSOs)	**1.1** – Memorandum from the Deputy Secretary, coordinated by the Assistant Secretary for Environment, Safety and Health with LPSO concurrence, and reviewed by the SSC, tasking field offices to conduct assessments of each facility under their cognizance that rely on HEPA filters for accident mitigation. Memo will include guidance on filter applications/conditions that may represent a vulnerability and suggestions regarding performance assessment.	2/01/00
		1.2 – Results of the assessments forwarded to the Deputy Secretary and the SSC through the Office of Environment, Safety and Health.	4/28/00
		1.3 – Identified corrective actions resulting from the assessments entered into the DOE corrective action tracking system (CATS).	5/31/00
2.0 – DOE will revise the *Nuclear Air Cleaning Handbook.*	Assistant Secretary for Defense Programs	**2.1** – Letter to the Board announcing placement of the draft handbook into the Directives system for DOE-wide review.	12/01/00
		2.2 – Issuance of revision to the *Nuclear Air Cleaning Handbook.*	11/30/01
	LPSOs	**2.3** – Issuance of a letter to field managers describing handbook changes and the need to screen authorization basis documnets for possible unreviewed safety questions (USQs), including filter service life. Corrective actions to be entered into CATS.	11/30/01
3.0 – DOE-HDBK-3010-94 *Airborne Release Fractions/Rates & Respirable Fractions for Nonreactor Nuclear Facilities* revised to eliminate inconsistent HEPA filter performance guidance.	Assistant Secretary for Defense Programs	**3.1** – Letter to the Board announcing placement of the revised sections of DOE-HDBK-3010-94 into the Directives system for DOE-wide review.	4/28/00
		3.2 – Issuance of the revised sections of DOE-HDBK-3010-94.	12/1/00
	LPSOs	**3.3** – Issuance of a letter to field managers describing handbook changes and the need to screen authorization basis documnets for possible unreviewed safety questions (USQs). Corrective actions to be entered into CATS.	12/1/00

Table 1 – Summary of Actions and Deliverables			
Action	**Responsible Manager**	**Deliverables**	**Due Date**
4.0 – Field Management Council review of consolidation of the QPL laboratory and FTF operation, and continued operation of the Oak Ridge test facility until a revised filter testing strategy is in place.	Assistant Secretary for Environmental Management	**4.1 –** Letter to the Board describing decision and path forward for QPL laboratory and FTF operation.	5/31/00
		4.2 – Maintain operation and funding of the FTF at Oak Ridge, and maintain contact with the Army's Edgewood QPL facility to remain appraised of plans for its continued operation until a revised strategy is established and implemented.	N/A
5.0 – Field Management Council review of the benefits of 100% testing of HEPA filters prior to installation, including options other than 100% testing.	Assistant Secretary for Environmental Management	**5.1 –** Letter to the Board describing the decision and path forward for testing of HEPA filters.	5/31/00
6.0 – Review and recommend options – via the Secretarial Safety Council – to assure adequate ventilation filtration information exchange (e.g., the Internet, or maintaining support for the *Nuclear Air Cleaning Conference).*	Assistant Secretary for Environment, Safety & Health	**6.1 –** Letter to the Board describing decision and path forward of means to better assure adequate information exchange on the subject of of ventilation filtration.	1/15/00

Table 2 – Cross Walk Between Issues Identified in DNFSB Tech 23 and DOE's Response in the HEPA Filter Program Infrastructure Report and Action Plan

DNFSB Tech 23			DOE Response	
Issue	**Page**	**Description of Issue**	**Page**	**Description of Response**
1	3-1	After nearly 50 years of continuing support for the Nuclear Air Cleaning Conferences, DOE has decided to withdraw support for future conferences, seriously compromising opportunities for feedback from peer review and a free exchange of ideas. Reconsideration of this decision is warranted in order to restore vigor to this important safety-related research area and to provide better assurance of adequate information exchange on the subject of ventilation filtration.	10, 11	Action 6.0 commits the Assistant Secretary for Environment, Safety and Health, by 1/15/00, to review and recommend options – via the Secretarial Safety Council – to assure adequate ventilation filtration information exchange (e.g., the Internet, or maintaining support for the *Nuclear Air Cleaning Conference).*
2	3-1	The Qualified Products List (QPL) laboratory committed to by senior DOE management is not in place.	8, 9, 10	Action 4.0 commits a working group under the direction of the Assistant Secretary for Environmental Management to perform the necessary analysis and make recommendations to the Field Management Council concerning consolidation of the QPL laboratory and the FTF. Action 4.1 commits DOE, by 5/31/00, to provide a letter to the Board describing the decision and path forward for the QPL laboratory and FTF operation.
3	3-1	The existence of the last remaining Filter Test Facility (FTF) is tenuous.	9	Action 4.2 commits DOE to maintain operation and funding of the FTF at Oak Ridge, and maintain contact with the Army's Edgewood QPL facility until a revised strategy is established and implemented.
4	3-1	An updated *Nuclear Air Cleaning Handbook*, a draft revision of which was originally committed to by December 1996, is not yet available.	6, 7, 10	Action 2.0 commits DOE, by 12/01/00, to place the draft handbook into the Directives system for DOE-wide review, and issue the final *Nuclear Air Cleaning Handbook* by 11/30/01.
5	3-1	There is a serious need to update DOE-HDBK-3010-94 to correct errors that could lead to non-conservative analysis.	7, 10	Action 3.0 commits the Assistant Secretary for Defense Programs to revise DOE-HDBK-3010-94 to eliminate inconsistent guidance regarding HEPA filter performance. By 4/28/00, the revised sections will be placed into the Directives system for DOE-wide review. By 12/1/00, the revised sections will be issued.

Table 2 – Cross Walk Between Issues Identified in DNFSB Tech 23 and DOE's Response in the HEPA Filter Program Infrastructure Report and Action Plan				
DNFSB Tech 23			**DOE Response**	
Issue	**Page**	**Description of Issue**	**Page**	**Description of Response**
6	3-1	Designate a location and firmly commit to provide funding, personnel, and physical resources, and continued programmatic support for a replacement for the QPL laboratory, on an expedited schedule.	See above.	Refer to DOE response under Issue 2 above.
7	3-1	Ensure continued operation of the Oak Ridge FTF.	See above.	Refer to DOE response under Issues 2 and 3 above.
8	3-2	Identify needed resources and assign responsibility for early publication of a revised *Nuclear Air Cleaning Handbook*, in order to make accurate, up-to-date guidance available.	See above.	Refer to DOE response under Issue 4 above.
9	3-2	Revise, update, and implement DOE-HDBK-3010-94 to eliminate confusing guidance regarding the performance characteristics of installed HEPA filters, and to improve the quality and reliability of assumptions supporting safety analyses involving these critical components of confinement systems protecting workers, the public, and the environment.	See above.	Refer to DOE response under Issue 5 above.
10	3-2	Establish a conservative maximum age limit for HEPA filters involved in safety-related service. Such a limit should be established, simply because the filters degrade with time, and only 1–15 years of meaningful data is available to justify extended service life. Any age limit established should be supported by a systematic evaluation of how the strength of HEPA filters varies over time, for both installed filters and those in storage.	6	The revision of the Nuclear Air Cleaning Handbook under Action 2.0 will provide guidance to be used on a site-by-site basis for maximum HEPA filter service life based on hazard and operational factors.

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Appendix B: List of Acronyms

CSO - Cognizant Secretarial Officer

DOE - Department of Energy

DP - Defense Programs

EIS - Environmental Impact Statement

EM - Environmental Management

ES&H - Environment, Safety and Health

FTCP - Federal Technical Capability Panel

HEPA - High Efficiency Particulate Air

INPO - Institute of Nuclear Power Operations

ISM - Integrated Safety Management

LANL - Los Alamos National Laboratory

LPSO - Lead Program Secretarial Officer

M&O - Management and Operating

NRC - Nuclear Regulatory Commission

ORPS - Operational Reporting and Processing System

QPL - Qualified Parts List

SAR - Safety Analysis Report

TQP - Technical Qualification Program

TSR - Technical Specification Requirement

USEC - United States Enrichment Corporation

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Appendix C: Glossary of Terms

Authorization Basis. DOE STD 3024-98 defines authorization Basis as those aspects of the facility design basis and operational requirements relied upon by DOE to authorize operation. These aspects are considered to be important to the safety of the facility operations. The authorization basis includes the safety basis for the facility, which focuses on the protection of personnel, both offsite and onsite. The terms authorization basis and safety basis are sometimes used interchangeably.

Authorization Basis Documents. DOE STD 3024-98 defines authorization basis documents as those providing authorization basis information. These typically include, but are not necessarily limited to, the SAR, TSRs, EISs, DOE-issued Safety Evaluation Reports, and documents containing facility-specific commitments to comply with DOE Orders or policies.

Safety Basis. DOE-STD-3009-94 defines safety basis as information relating to the control of hazards at a facility (including design, engineering analyses, and administrative controls) upon which DOE depends for its conclusion that activities at the facility can be conducted safely. The terms "authorization basis" and "safety basis" are sometimes used interchangeably. The authorization basis may also include information related to environmental protection.

Safety-class structures, systems, and components (safety-class SSCs). The interim final rule for 10 CFR 830 (effective December 11, 2000) defines safety-class SSCs ,including portions of process systems, as those as identified by safety analyses whose failure could adversely affect the safety and health of the public.

Safety-significant structures, systems, and components (safety-significant SSCs). The interim final rule for 10 CFR 830 (effective December 11, 2000) define safety-significant SSCs as those structures, systems, and components not designated as safety-class SSCs but whose preventive or mitigative function is a major contributor to defense in depth (i.e., prevention of uncontrolled material releases) and/or worker safety as determined from hazard analysis.

As a general rule of thumb, DOE STD 3009-94 and DOE G 420.1-2 note that safety-significant SSC designations based on worker safety are limited to those systems, structures, or components whose failure is estimated to result in an acute worker fatality or serious injuries to workers. Serious injuries, as used in this definition, refers to medical treatment for immediately life-threatening or permanently disabling injuries (e.g., loss of eye, loss of limb) from other than standard industrial hazards. It specifically excludes potential latent effects (e.g., potential carcinogenic effects of radiological exposure or uptake).

Vital Safety Systems. As used within this implementation plan, vital safety systems is understood to mean safety-class systems, safety-significant systems, and systems that perform an important defense in depth safety function

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APPENDIX D

Defense Nuclear Facilities Safety Board Recommendation 2000-2

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DEFENSE NUCLEAR FACILITIES SAFETY BOARD

625 Indiana Avenue, NW, Suite 700, Washington, D.C. 20004-2901
(202) 694-7000

March 8, 2000

The Honorable Bill Richardson
Secretary of Energy
1000 Independence Avenue, SW
Washington, DC 20585-1000

Dear Secretary Richardson:

Designs of the Department of Energy's (DOE's) high hazard defense nuclear facilities typically include systems whose reliable operation is vital to the protection of the public, workers and the environment. Operations are constrained by technical safety requirements and operational limits established by analyzing the hazards of the operations and the capability of design features to prevent or mitigate consequences of potential mishaps or operational disruptions caused by either man or natural phenomena. The availability and operability of such systems and the conditions specifying operational limits are included in the written agreements established by DOE with its contractors as conditions for authorizing performance of work.

Ventilation systems installed in many defense nuclear facilities are among those that provide vital safety functions. Such systems contribute much to the safe environment for workers and serve a vital confinement function should work process upsets and mishaps result in airborne releases of hazardous materials.

The Defense Nuclear Facilities Safety Board (Board) has advised DOE in various ways during the past several years of the need to increase attention to ventilation systems and of the steps we believe would lead to more certain performance of their important safety functions. Although DOE has responded to some extent, the upgrade efforts to date have been less comprehensive and effective than the matter merits.

The Board further believes that DOE's upgrades of ventilation systems could well serve as a model for implementing similar programs for other vital safety systems that may be needed in defense nuclear facilities.

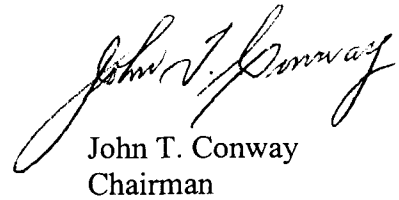
The Board believes this matter requires additional DOE attention. More explicitly, the Board recommends for your consideration an action plan structured to address the elements set forth in the enclosed Recommendation 2000-2, *Configuration Management, Vital Safety Systems.*

The Board's recommendation is directed explicitly at systems for ensuring nuclear safety. This is in keeping with the Board's enabling legislation. However, the concepts advocated could be applied to good advantage to systems designed for safety management of hazardous material and processes of non-nuclear nature as well. In the spirit of Integrated Safety Management (ISM) to which DOE is committed, DOE is encouraged to do so.

Recommendation 2000-2, *Configuration Management, Vital Safety Systems*, was unanimously approved by the Board, and is submitted to you pursuant to 42 U.S.C. § 2286a(a)(5), which requires the Board, after receipt by you, to promptly make this recommendation available to the public. The Board believes the recommendation contains no information which is classified or otherwise restricted. To the extent this recommendation does not include information restricted by the Department of Energy under the Atomic Energy Act of 1954, 42 U.S.C. §§ 2161-68, as amended, please arrange to have this recommendation promptly placed on file in your regional public reading rooms.

The Board will publish this recommendation in the Federal Register.

Sincerely,



John T. Conway
Chairman

c: Mr. Mark B. Whitaker Jr.

Enclosures: DNFSB/TECH-26
Recommendation 2000-2

DEFENSE NUCLEAR FACILITIES SAFETY BOARD
RECOMMENDATION 2000-2 TO THE SECRETARY OF ENERGY
pursuant to 42 U.S.C. § 2286a(a)(5)
Atomic Energy Act of 1954, as amended

Dated: March 8, 2000

Background

The Defense Nuclear Facilities Safety Board (Board) continues a strong interest in safety systems and their effectiveness at defense nuclear facilities. These systems are at the heart of safety at the facilities. Department of Energy (DOE) Standards 3009 and 3016 provide guidance for the identification of safety systems and associated Technical Specifications as important elements of maintaining safety of facilities and operations. In addition, the implementation guide to DOE Order 420.1, *Facility Safety*, provides guidance on design and procurement of safety systems to attain and sustain reliability in performance.

Most of the facilities of interest to the Board were constructed many years ago, and are undergoing the deterioration attached to aging. It is important that their protective features be maintained serviceable and effective. In the following, the Board recommends measures necessary to ensure reliable performance of the safety systems of both the older facilities and the ones that are relatively new, and in particular stresses the actions required to ensure viability of confinement ventilation systems. Confinement ventilation systems are relied on almost everywhere by DOE as the principal system to protect the public and collocated workers at its more hazardous facilities.

Previous Issuances by the Board on Safety Systems

In May 1995, the Board issued DNFSB/TECH-5, *Fundamentals for Understanding Standards-Based Safety Management of Department of Energy Defense Nuclear Facilities,* which stressed the importance, among other things, of functions that preserve those structures, systems, and components that are relied upon to protect the public, workers, and the environment (e.g., configuration management, training, and maintenance). In October 1995, the Board issued DNFSB/TECH-6, *Safety Management and Conduct of Operations at the Department of Energy's Defense Nuclear Facilities.* The report underscored the importance of conduct of operations as the body of practice, or operational formality, that implements the Safety Management System for a defense nuclear facility. Operational formality includes "Supervision by highly competent personnel who are knowledgeable as to the results of the safety analysis and operating limits for the facility or activity." Key aspects of facility Safety Management Systems discussed in these two reports are central to the issues addressed herein.

In 1996, in response to Recommendation 95-2, *Safety Management*, DOE provided the Board a plan for upgrading safety management of its defense nuclear facilities. DOE Orders 5480.22, *Technical Safety Requirements*, and 5480.23, *Nuclear Safety Analysis Reports*,

established requirements for identifying design features important to safety and the conditions/controls to ensure safe operation. DOE authorized its contractors to grade facilities by hazard category and to tailor the comprehensive safety assessments according to hazard potential and operational future. This upgrade effort has reaffirmed the important safety role played by confinement ventilation systems. (See enclosed Appendix B of DNFSB/TECH-26). In general, these systems have been designated as important to safety, making them subject to more stringent quality assurance, maintenance, surveillance, and configuration management programs in recognition of their safety functions. Commitments to such programs are typically made in the Authorization Agreements that capture the contractor-DOE agreed upon conditions for performing the work.

Issuances Concerning Confinement Ventilation Systems

Some of the Board's analyses concerning safety systems focused on confinement ventilation systems in particular. In March 1995, the Board issued DNFSB/TECH-3, *Overview of Ventilation Systems at Selected DOE Plutonium Processing and Handling Facilities*, which addressed the design of confinement ventilation systems. In its June 15, 1995, letter forwarding that report, and in subsequent correspondence in July 1995, the Board requested that DOE evaluate the design, construction, operation, and maintenance of ventilation safety systems in terms of applicable DOE and industry standards.

In a letter dated October 30, 1997, the Board pointed out the problem of wetting high efficiency particulate air (HEPA) filters during tests of fire sprinkler systems, and the need for complex-wide guidance from DOE concerning the relationship between maintaining filter integrity and fire fighting strategies. HEPA filters are key components of confinement ventilation systems. In its June 8, 1999, letter concerning HEPA filters installed in confinement ventilation systems, the Board requested a report outlining the steps DOE plans to take to resolve those issues. In recent weeks, individual Board members and the Board's staff have met informally with DOE representatives to resolve differences concerning DOE's proposed response to the Board's request.

Current Status of Ventilation Systems

As a part of its continuing oversight of these vital safety systems, the Board's staff has recently completed a review of the operational data on confinement ventilation systems as reported in DOE's Operational Reporting and Processing System (ORPS). The data reviewed covered the period July 1998 to December 1999. An analysis of these data is documented in report DNFSB/TECH-26. This review indicates that the reliability of these systems, for reasons not readily evident, may not be adequate, given the vital safety function they serve.

The operational data reveal deficiencies in areas of test and surveillance, quality assurance (replacement components), maintenance, configuration management, training and qualification, and conduct of operations. One can reasonably deduce from such observations that there exists no single entity assigned responsibility for the configuration and operational state of these systems as a whole.

The Board recognizes that many confinement ventilation systems now require less air flow and permit more particulate loading than in original designs. This allows for more extended useful life than might otherwise be tolerable, particularly with adequate preventive care. However, the operational data suggest that less than optimum care is being given to these systems, considering their age.

Status of Safety Systems in General

Many of DOE's nuclear facilities were constructed years ago and are approaching end-of-life status. Under these circumstances, some degradation of reliability and operability of systems designed to ensure safety can reasonably be expected. To some extent, the effects of aging can be offset by increased surveillance and maintenance. A point occurs, however, where costs for upkeep justify major upgrades or replacement, particularly where mission needs are projected well into the future. While a considerable number of high-hazard defense nuclear facilities have such long-term missions (greater than 10 years, for example), others undergoing phase-outs and decommissioning do not. Some facilities must continue to rely on operational safety systems, such as ventilation systems, to serve a safety function even after their operational mission has ended and well into the decommissioning process. Long-term or short-term, however, the performance required for safety must be ensured.

It has been a long-standing practice in the nuclear business to designate a "system engineer" for each major system vital to successful operation of hazardous processes. Some DOE contractors have done so on occasions (e.g., the Defense Waste Processing Facility at the Savannah River Site), but this practice is not as prevalent as it should be. The Board believes that having specific individuals outside the operational forum, tasked with the configuration management (design and operational constraints) of systems designated as important to safety, would go a long way to ensuring the dependable service such systems must provide.

Recommendation

Considerable upgrading of programs for ensuring reliable and effective performance of confinement ventilation systems has occurred during the years 1995-1999. However, the frequency and variety of off-normal occurrences that continue to be reported clearly indicate that more attention to these vital systems is needed. Likewise, other systems serving equally vital safety functions might well benefit from similar attention. Towards such an end, the Board recommends that the Department of Energy:

1. Establish a team, expert in confinement ventilation systems, to survey the operational records during the past 3 years and the current operational condition of all confinement ventilation systems now designated or that should be designated as important to safety in defense nuclear facilities (i.e., safety class, safety significant, defense-in-depth). In so doing:

a. Assess the root cause or causes for less than satisfactory operational history of these systems and recommend an action plan to address the causes. In so doing evaluate such programs as may exist to ensure reliable system performance. These should include surveillance, maintenance (including quality assured inventory of replacement parts), configuration management (system descriptions, drawings and specifications), and requisite training and qualification of operators.

b. Estimate the remaining system lifetime with and without refurbishing as a function of reliability; (e.g., 1 year - 95%, 10 years - 50%) and recommend such upgrades or compensating measures as may be appropriate to ensure reliability, current or future, commensurate with the safety functions being served.

2. Include key elements of the plan for addressing the HEPA filters issues identified in the Board's June 8, 1999, letter in any plan developed in response to this recommendation.

3. Amend appropriate directives and associated contract requirements documents (e.g., DOE Order 430.1A, *Life Cycle Asset Management*, DOE Order 420.1, *Facility Safety*), to require for the confinement ventilation system and every other major system designated as important to safety:

a. The development and maintenance of documentation that captures key design features, specifications, and operational constraints to facilitate configuration management throughout the life cycle.

b. The designation of a "system engineer" during each facility life cycle—design, construction, operation and decommissioning with:

(1) The requisite knowledge of the system safety design basis and operating limits from the safety analysis; and

(2) The lead responsibility for the configuration management of the design.

c. The education and training of successor "system engineers" as may be required because of contractor organizational changes, facility life cycle change, or other causes for reassignments.

4. Task the Federal Technical Capability Panel established in response to Board Recommendation 93-3 to:

a. Survey the availability and sufficiency of personnel in DOE with expertise in these vital safety systems.

b. Recommend to DOE senior management such actions as may be appropriate to augment, redeploy or otherwise bring such expertise more effectively to bear in the life-cycle-management of vital safety systems.

c. Add to DOE's technical staff qualification program the requisites for qualifying as subject matter experts for these vital systems.

d. Develop descriptions of functions and responsibilities for inclusion in the Function and Responsibilities Authorities Manual for individuals serving as subject matter experts on vital safety systems.

5. Make the scrutiny of the status of all systems serving to protect the public, workers and the environment a regularized part of the assessments performed as required by DOE P 450.5, *Line Environment, Safety and Health Oversight*. Include in such review the programs, such as quality assurance, maintenance, configuration management and conduct of operations, that contribute much to ensuring these systems will operate as intended.

John T. Conway, Chairman

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APPENDIX E

Recommendation 2000-2
Defense Nuclear Facilities of Interest

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DEFENSE PROGRAMS
PRIORITY AND FOLLOW-ON FACILITIES

DP PRIORITY FACILITIES

Lawrence Livermore

Superblock:
Building 332, Plutonium Facility

Los Alamos

TA-55, Bldg.4, Plutonium Facility
TA-3, Bldg. 29, Chemical Metallurgical Research (CMR) Facility

Oak Ridge

Y-12:
Bldg. 9212, Wet Chemistry, Casting, Storage
Bldg. 9204-2E, Disassembly Operations
Bldg. 9215, SNM Processing &Fabrication

Pantex

Buildings 12-84 and 12-104 (all Nuclear Explosive Bays), 12-85 and 12-98 (all Nuclear Explosive Cells)

DP FOLLOW-ON FACILITIES

Lawrence Livermore

Building 231 Complex (Vaults)
Building 334, Hardened Engineering Testing Facility
Building 331 Tritium Facility

Los Alamos

TA-18, Los Alamos Critical Experiments Facility
TA-16, Weapons Engineering Tritium Facility
TA-50, Radioactive Materials Research, Operations and Demonstration Facility (RAMROD)
TA-54-G Solid Waste Disposal Site
TA-54-TWISP Transuranic Waste Inspectible Storage Facility

DP FOLLOW-ON FACILITIES- continued

Nevada Test Site

Device Assembly Facility

Oak Ridge

ORNL:
Building 3019, Material Storage

Y-12:
Bldg. 9201-5, Depleted Uranium Machining, Arc Melt, Casting
Bldg. 9720-12, Warehouse Recoverable Salvage
Bldg. 9720-18, Depleted Uranium Warehouse
Bldg. 9206, Enriched Uranium Chemical Processing
Bldg. 9720-5, Warehouse Operations
Bldg. 9204-4, Quality Evaluation

Pantex

Building 12-116, SNM Staging Facility
Buildings 12-64 and 12-99 (all Nuclear Explosive Bays), 12-44 (including 44-8) and 12-96 (all Nuclear Explosive Cells)
Bldg 12-50 Separation Testing
Bldg. 12-60 Dynamic Balancer
Zone 4 Pit and Nuclear Weapons Storage

Sandia National Laboratory

Sandia Pulse Reactor Facility

Savannah River

Tritium Facilities

ENVIRONMENTAL MANAGEMENT
PRIORITY AND FOLLOW-ON FACILITIES

EM PRIORITY FACILITIES

Hanford

Tank Farms
Plutonium Finishing Plant

Rocky Flats

Building 371, Plutonium Chemical Processing Facility

Savannah River

Canyons
- F Canyon
- FB Line
- H Canyon
- HB Line

Liquid Radioactive Waste Handling Facilities

Idaho

CPP-666 Underwater Fuel Storage

EM FOLLOW-ON FACILITIES

Hanford

Waste Encapsulation and Storage Facility (WESF)
Spent Nuclear Fuel Processing Facility[1, 2]
- K Basins (East and West)
- Cold Vacuum Drying Facility
- Canister Storage building

1 Phase 1 assessment completion may be delayed until the latest Phase 1 Commitment due date
2 Phase 1 assessments may take credit for recent Readiness Assessment and Operational Readiness Reviews where appropriate

EM FOLLOW-ON FACILITIES- continued

Idaho

CPP-603-B Irradiated Fuel Storage Facility (Dry SNM Storage)
CPP-659 New Waste Calcining Facility
CPP-651 Unirradiated fuel Storage Facility
Radioactive Waste Management Complex (RWMC)

Lawrence Livermore National Laboratory

233 Canister Storage Facility

Nevada Test Site

Radioactive Waste Management Sites in Area 5, Area 3, and the TRU Pad
Waste Evaluation Facility

Rocky Flats

Building 559, Analysis Laboratory

Savannah River

235-F
Defense Waste Processing Facility
Waste Pretreatment Facilities
Receiving Basin for Offsite Fuel (RUBOF)
Savannah River Technology Center
K-Reactor
L-Reactor
Central Laboratory Facility

Waste Isolation Pilot Plant (WIPP)

Entire Facility

APPENDIX F

Secretary of Energy Memorandum:

Fire Safety Initiative

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The Secretary of Energy
Washington, DC 20585

October 2, 2000

MEMORANDUM FOR DAVID M. MICHAELS, ASSISTANT SECRETARY FOR ENVIRONMENT, SAFETY, AND HEALTH

GENERAL EUGENE E. HABIGER, DIRECTOR
OFFICE OF SECURITY AND EMERGENCY OPERATIONS

GLENN S. PODONSKY, DIRECTOR,
OFFICE OF INDEPENDENT OVERSIGHT AND PERFORMANCE ASSURANCE

FROM: BILL RICHARDSON BR

CC: T. J. GLAUTHIER
ERNIE MONIZ
GENERAL JOHN GORDON
CAROLYN HUNTOON
MILLIE DRESSELHAUS

SUBJECT: DOE FACILITY FIRE SAFETY INITIATIVE

Our experiences with serious wildfires at several of our sites this year have revealed that the Department's management systems for dealing with such events are in need of reexamination and improvement. We have identified inadequacies in several specific areas, including equipment, manpower, training, facilities, procedures, and coordination and communication with the wildland firefighting community.

In order to better prepare the Department to prevent and respond to wildfires in the future, I am taking or directing several actions. I will execute a Memorandum of Understanding (MOU) with the Departments of Agriculture and Interior to initiate and formalize cooperative efforts in the areas of planning, preparation, prevention, and fire response. I will convene a panel of nationally recognized fire, safety, and emergency management experts to provide their perspectives on the adequacy of our fire safety programs and our preparedness and ability to deal with a fire-induced emergency. Finally, I am directing an immediate complex-wide initial joint review of fire safety and related emergency management capabilities, to be followed by a more comprehensive study of facility fire safety, as detailed below.

The purpose of this memorandum is to direct the Office of Emergency Operations (SO-40), the Office of Independent Oversight and Performance Assurance (OA), and the Assistant Secretary for Environment, Safety and Health (EH), through the EH Office of Oversight (EH-2) to plan, conduct, and report the results of an initial joint review, and to direct EH to begin initial planning for a comprehensive follow-on study. Both efforts are outlined below:

INITIAL JOINT REVIEW

Purpose

The review will assess the abilities of DOE sites to effectively prevent fires and to respond effectively in the event that a fire occurs, including a fire in the local area that threatens DOE facilities or property. This review will also develop the information needed to plan the comprehensive follow-on study.

Scope

The review will examine the Department's current capabilities related to wildfire safety, including those aspects of emergency management that deal with the ability to respond to a wildfire.

The review will include on-site visits to selected DOE facilities, with emphasis on facilities containing or located adjacent to areas subject to wildfires.

Responsibilities

The review will be co-led by SO-40, EH and OA, who will ensure that the efforts of all three organizations are integrated and coordinated. SO-40 and OA will have primary responsibility for evaluating emergency management aspects, including planning and emergency response functions. EH-2 will have primary responsibility for identifying and ensuring the collection of data necessary to scope and plan a comprehensive follow-on study that will include an in-depth evaluation of facility fire safety.

Period of Performance

Planning for this effort should begin immediately. Planning should be completed and data collection should begin by October 15, 2000. Data collection, analysis, and report writing should be completed and a report submitted by December 15, 2000.

Report

The results of this initial review will be reported to me and to the Chairman of the advisory committee, mentioned above.

In addition to assessing current capabilities and levels of preparation, the report should include recommendations for both site-specific and DOE-wide improvements, as well as recommendations regarding the scope and conduct of the comprehensive follow-on study.

COMPREHENSIVE STUDY

Based on information collected during the initial review, the Assistant Secretary for Environment, Safety and Health will take the lead in planning a more comprehensive study of facility fire safety across the Department of Energy complex. The following preliminary planning guidance is provided:

- EH will take the lead in the comprehensive study, which will include the involvement, as necessary and appropriate, of Headquarters organizations and DOE and contractor line management. EH is encouraged to retain outside assistance as necessary, such as experienced fire protection engineering and fire department operations professionals.

- The scope of the study, while including a more in-depth study of the Department's capabilities to respond to wildfires, will also place a significant emphasis on evaluating facility fire safety, including fire detection and suppression systems and any facility-specific programs that may be implemented.

- The study will be included in activities to be conducted under the Implementation Plan in response to Defense Nuclear Facilities Safety Board Recommendation 2000-2 (Configuration Management, Vital Safety Systems), and will commence early in CY2001.

cc:
J. McBroom, SO-40
C. Lewis, OA-30
D. Stadler, EH-2

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APPENDIX G

Defense Nuclear Facilities Safety Board
Letter of September 8, 2000

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DEFENSE NUCLEAR FACILITIES SAFETY BOARD

625 Indiana Avenue, NW, Suite 700, Washington, D.C. 20004-2901
(202) 694-7000

September 8, 2000

The Honorable Bill Richardson
Secretary of Energy
1000 Independence Avenue, SW
Washington, DC 20585-1000

Dear Secretary Richardson:

The Defense Nuclear Facilities Safety Board (Board) acknowledges your August 21, 2000 letter of notification that the Department of Energy (DOE) requires an additional 45 days to transmit the implementation plan for our Recommendation 2000-2, *Configuration Management, Vital Safety Systems*. The Board agrees that the draft plan developed to date can benefit from additional planning.

Section 315(e) of the Atomic Energy Act of 1954, as amended, provides that the Secretary "may implement any such recommendation (or part of any such recommendation) before, on, or after the date on which the Secretary transmits the implementation plan to the Board under this subsection." In this regard, the Board notes that some limited, preliminary actions have been taken by DOE to define pre-requisites for tasks still in planning stages, e.g., identification of industry practices/standards relative to development of a contractor system engineer program. The Board suggests that DOE move more aggressively forward with similar initiatives such as the selection of the team for the Ventilation Systems Assessment, the initiation of the development of generic Criteria Review and Approach Documents (CRADs) for vital safety systems, and a review by Field Managers of current Functions and Responsibility assignments of both the Federal and Contractor personnel relative to vital safety systems. The Board urges DOE to take advantage of the authority granted under Section 315(e) to get more such preliminary actions underway.

Notwithstanding substantial Board staff discussions with DOE personnel responsible for drafting the plan, progress to date has been unduly slow. These discussions indicate that the leadership of the plan's development does not clearly understand the basic thrust of the Recommendation. The Board offers further amplification in the enclosed material. Since your acceptance letter of April 28, 2000, did not reject any part of Recommendation 2000-2, the Board has assumed that the safety issue—Configuration Management of Vital Safety Systems—is to be fully assessed.

The basic thrust of the Board's Recommendation—assessment of the operational readiness of vital safety systems—is direct and simple. The operational readiness of vital safety

systems, their continued surveillance, maintenance and configuration management are at the core of Integrated Safety Management (ISM). Both the contractor and the Federal workforces must recognize the pivotal role that these systems play in ensuring safety. The assessments to be done in response to Recommendation 2000-2 represent an important part of DOE's continued implementation of ISM throughout the complex. Full implementation of ISM cannot be considered accomplished until such vital safety systems are identified, responsibility is clearly established for their operational readiness, a satisfactory state of operational readiness is established, and a functional maintenance and configuration management system is put in place to ensure future readiness. Further elaboration of this core concept is described in the amplifying material enclosed. Ideas are also presented therein for closely coupling this 2000-2 effort with the ISM verification efforts that have been underway for the past several years. The Board sees no reason why the majority of the assessment effort required cannot be performed by resources, both contractor and Federal, that are already committed to ensuring safety. The potential for finding that upgrades of infrastructure may be required should not be cause for delaying assessments, nor should the accomplishment of verification goals set for September 2000 be cause for relaxation of continuing upgrade efforts.

It is the Board's view that developing a completely acceptable plan in the additional forty five days is not likely unless a change in momentum takes place. The Board has instructed its staff to continue its clarifying exchanges with the designated leadership of the implementation planning effort. DOE is urged to move expeditiously to complete the planning effort and to begin full implementation as soon as possible.

Sincerely,

John T. Conway
Chairman

Enclosure

c: Mark B. Whitaker Jr.

Recommendation 2000-2 Amplification

In performing its diverse missions, the Department of Energy (DOE) and its contractors use hazardous materials and processes. In doing so, DOE is required to protect the public, the workers, and the environment. DOE is fulfilling its environmental, safety and health responsibilities through its program of Integrated Safety Management (ISM) as defined by DOE Policy 450.4, *Safety Management*. A core function of ISM, "Develop and Implement Hazard Controls," results in the establishment of a set of safety controls. Frequently these controls are in the form of systems and equipment designed and operated to protect the public, the worker, and the environment. Periodic surveillance, maintenance, and configuration management of these systems and equipment are required to ensure their dependability and reliability, to determine whether deterioration is taking place, and to identify technical obsolescence that threatens performance, safety, or facility operation. Full implementation of ISM cannot be considered accomplished until all such vital safety systems are identified, responsibility is clearly established for their operational readiness, a satisfactory state of operational readiness is established, and a functional maintenance and configuration management program is in place to ensure continued readiness.

DOE has developed the necessary standards and requirements to identify and implement both engineering and administrative controls to prevent accidental releases of hazardous materials or mitigate the consequences of such releases, should they occur. For accidental events that potentially could cause harm offsite or cause worker deaths or serious injury, such controls and the hazardous processes with which they are associated are described in Safety Analysis Reports (SARs) or equivalent documents. Limits on hazardous processes and the requisite availability of preventive and mitigative equipment are established as Technical Safety Requirements (TSRs). Such TSRs are made conditions for conducting the hazardous operations. These are included in "Authorization Agreements," a set of safety measures mutually agreed upon by DOE and the contractor for operating high hazard facilities.

In addition, other controls to provide workplace safety and protection of the environment are defined through various process hazard analyses, job hazards analyses, environmental impact assessments and environmental permitting processes. These controls also become conditions for performing the hazardous tasks. Figure 1 illustrates basic elements of an "Integrated Safety Control Set" and the basic documents in which they are commonly described.

Figure 1

Authorization Protocols

	INTEGRATED SAFETY CONTROL SET*			
	Safety Sector	**Hazards Assessment**	**Hazards Controls**	**Authorization Protocol**
Macro Level	Public	SAR and Graded Equivalents DOE Orders 5480.23	Technical Safety Requirements: • Design (Engineered Controls)	• Authorization Agreement - High/Moderate Hazards Facilities Category 1 and 2
	Worker Sector A	Process Hazards Analysis: 29 CFR 1910.119. Risk Management Program: 40 CFR 68	• Work practices and administrative procedures	• Authorizing Correspondence Moderate/Low Hazards Facilities Category 3 and 4
Micro Level	Worker Sector B	Job Hazards Analysis and Equivalents DOE Order 440.1 IG 440.1-1	Work Control Conditions: • Engineered Controls • Work practice and administrative procedures • Personnel Protective Equipment	• Rad Work Permits • Work Control Permits • Operation Procedure
	Environment	NEPA Documentation Permit Support Documents	Discharge Control: • Engineered features • Limits on discharges	Discharge Permits • air • water • solid wastes

This figure is taken from Board Report DNFSB/TECH-16

* Safeguards and Security not included

The Defense Nuclear Facilities Safety Board has emphasized that safety systems relied upon to protect the public, the workers, and the environment deserve special focus. Their design, procurement, fabrication, installation, operation, maintenance, and configuration management are at the core of ISM. Both contractors and the Federal workforce must recognize the pivotal role these systems play in ensuring safety and deploy their resources accordingly.

Much of the DOE nuclear complex was built years ago. Both the Federal workforce and the contractors employed by the government for maintenance and operation have turned over many times during the operational life of the facilities. Both process knowledge of many hazardous operations and the design basis of protective equipment and associated systems are often not current. While substantial updating of authorization basis documents is being accomplished under pressures of the ISM program, assessments by both DOE's internal safety management organizations and the Board's external safety oversight staff show that DOE's operating contractors are not always giving equipment designed to serve vital protective functions the attention their safety functions deserve. Confinement ventilation systems and fire protection systems are good examples. Recommendation 2000-2 seeks to have DOE systematically assess the readiness state of its vital safety systems and the effectiveness of their configuration management.

The acceptability of any plan offered by DOE in response to Recommendation 2000-2 will be based upon our evaluation of how well the objectives described above are likely to be satisfied. A set of tasks such as the following are visualized:

Task 1. The identification of high hazard processes performed in all defense nuclear facilities, the vital safety systems/equipment providing protective functions, and the programs that support and preserve these systems (e.g., maintenance).

Task 2. The targeting of Confinement Ventilation Systems in defense nuclear facilities for priority attention, using a special task force of subject matter experts to: (a) develop evaluation guidelines to be used in evaluating them, and (b) assess the operational ability to meet design requirements of a selected number of them, including the assessment of programs needed to preserve the system such as surveillance, maintenance, and configuration management programs.

Task 3. The systematic assessment of the state of all systems/equipment upon which the safety of the site and its hazardous facilities depend (public, worker, and environment) and the adequacy of the resources applied to do surveillance, maintenance, and configuration management. Evaluation guidelines used in the Confinement Ventilation Systems evaluation will be used or adapted as appropriate. The assessments performed as required by DOE Policy 450.5, *Line Environment Safety and Health Oversight* will be reviewed to ensure that the assessments provide adequate assurance that the systems maintain their ability to protect the public, the workers, and the environment.

Task 4. The assessment of functions, responsibilities, and authorities relative to the caretaking of vital safety systems and the adequacy of the resources (number and expertise) dedicated to ensuring their state of readiness.

Establish contractor qualification requirements, and qualify system engineers, for hazardous processes and associated vital safety systems identified under Task 1. This will enhance the DOE's ability to ensure that engineering expertise is applied in all five functions of ISM.

Define Federal workforce expertise necessary to support, review, and oversee the contractor's system engineer program. Establish qualification requirements for, and qualify federal personnel, who will be relied upon for system expertise. This will enhance the DOE's ability to apply engineering expertise in all five functions of ISM.

Task 5. The development of an upgrade program, prioritized to ensure reliable operation of systems that prevent or mitigate higher risk.

Task 6. The resolution of the key HEPA filter issues identified in the Board's June 8, 1999 letter.

The Board remains open of course to any other alternative that would satisfy the objectives of the recommendation. The plan needs to not only define the work to be done but also the responsibility for doing it. The Board recognizes that the assignment of resources is the prerogative of DOE. However, the Board offers the following observations for DOE consideration. In keeping with one of the fundamental principles of Integrated Safety Management, the primary responsibility for maintaining vital safety systems in a reliable state of readiness rests with line management—more explicitly, those responsible for developing, reviewing, approving, and maintaining safety bases documentation, the safety controls and the related support programs. These responsibilities now lie principally with the DOE Operations Offices and their contractors. Hence, DOE Operations Office Managers and their contractors logically should be tasked to lead and perform the majority of the actions defined in the above tasks. In the interests of maintaining continuity and consistency with the Phase II verification effort, it would be highly desirable for the Field Managers to use the same individuals that led the Phase II verification assessments for them. Team membership, however, will require the selection of those expert in the vital safety systems being assessed.

While this recommendation is viewed as largely a field oriented effort, a continuing DOE-Headquarters line oversight of the effort is important to ensure appropriate consistency, accountability, and priority are maintained as these activities are conducted across programs and sites. Further, there may well be subject matter experts in DOE-Headquarters that could well be brought to bear, for example, in the developing of uniform evaluation guidelines as was done for the *ISM Verification Team Leaders Handbook.* The use of an assessment approach similar to that put in place for the Phase II ISM verification will make it clear that 2000-2 tasks are in reality an extension of the ISM verification efforts.

DOE has been seeking to embed Integrated Safety Management as a fundamental responsibility of those in the line responsible for performing hazardous work. The Safety Management Integration Team (SMIT) was established as an ad-hoc group in response to Board Recommendation 95-2. Recommendation 2000-2 offers DOE a vehicle for facilitating the transition of the post-September 2000 ISM leadership efforts back to the Lead Program Secretarial Offices (LPSOs) and the Administrator of the National Nuclear Security Agency (NNSA). This could be accomplished by establishing for 2000-2 a steering group at headquarters, consisting of the Chief Operating Officers (COOs) of the Administrator of NNSA and the LPSOs, and the Principal Assistant Secretary for Environmental, Safety and Health (ES&H). The headquarters steering group could, for example, be made responsible for selecting expert team leadership and for creating assessment team guidance and generic Criteria Review and Approach Documents (CRADs) for vital safety systems. Such a steering group could monitor implementation plan progress, brief senior DOE management, and initiate course corrections as appropriate.