Department of Energy
Washington, DC 20585

February 3, 2011

The Honorable Peter S. Winokur
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue NW, Suite 700
Washington, DC 20004-2901

Dear Mr. Chairman:

This letter is to inform you of the completion of Commitment 20, *Implementation Plan for Defense Nuclear Facilities Safety Board Recommendation 2004-01,* dated May 21, 2004, by the Department of Energy.

Commitment 20 requires the Office of Health, Safety and Security's Office of Environment, Safety and Health Evaluations to perform an effectiveness assessment to determine that the actions described in Section 5.2 of the Implementation Plan have been adequately implemented and that the identified safety issues have been resolved. A summary report documenting the effectiveness review is enclosed.

If you have any questions or need further information, please contact me at (202) 287-6071, or you may contact Thomas Staker, Director, Office of Environment, Safety and Health Evaluations, at (301) 903-5392.

Sincerely,

Glenn S. Podonsky
Chief Health, Safety and Security Officer
Office of Health, Safety and Security

Enclosure

Department of Energy

Washington, DC 20585

EXEC-2011-001001

February 3, 2011

MEMORANDUM FOR THE SECRETARY OF ENERGY

THROUGH: DANIEL B. PONEMAN
DEPUTY SECRETARY

FROM: GLENN S. PODONSKY
CHIEF HEALTH, SAFETY AND SECURITY OFFICER
OFFICE OF HEALTH, SAFETY AND SECURITY

SUBJECT: Office of Health, Safety and Security's Closure of Deliverable Relevant to the Defense Nuclear Facility Safety Board Recommendation 2004-1 Commitment 20

ISSUE: Transmittal of the Office of Health, Safety and Security's (HSS) effectiveness review (report) of the Department of Energy (DOE) Action Plan for the Columbia space shuttle accident and Davis-Besse event and the comprehensive operating experience program. This review was performed to fulfill Commitment #20 of the DOE *Implementation Plan to Improve Oversight of Nuclear Operations*, which DOE developed in response to Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2004-1, *Oversight of Complex, High-Hazard Nuclear Operations.*

BACKGROUND: This memorandum provides you with the final deliverable relevant to Commitment 20 in the DOE Implementation Plan for Defense Nuclear Facilities Safety Board Recommendation 2004-01, dated May 21, 2004.

In May 2004, the DNFSB issued DNSFB Recommendation 2004-1, *Oversight of Complex, High-Hazard Nuclear Operations*, which recommended that DOE – including the National Nuclear Security Administration – take several actions to provide increased assurance of safety at defense nuclear facilities. In response to this recommendation, DOE issued an Implementation Plan to Improve Oversight of Nuclear Operations in December 2004. The DOE Implementation Plan established numerous commitments to 1) Strengthen Federal safety assurance, 2) Learn from internal and external operating experience, and 3) Revitalize integrated safety management implementation. DOE subsequently updated and reissued its Implementation Plan in October 2006 to reflect various changes in scope, approach, schedules, and responsibilities. Several commitments from the Department's 2004-1 Implementation Plan remain open.

Commitment 20 requires the Office of Environment, Safety and Health Evaluations (within HSS) to perform an effectiveness review to determine whether the actions described in Implementation Plan section 5.2 have been adequately implemented and that the identified safety issues have been resolved. A summary report documenting the effectiveness review is attached and has been forwarded to the DNFSB under separate correspondence.

Office of Health, Safety and Security Report to the Secretary on the

Status and Effectiveness of DOE Efforts to Learn from Internal and External Operating Experience in Accordance with Commitment #20 of the DOE Implementation Plan for Defense Nuclear Facilities Safety Board Recommendation 2004-1

February 2011

Office of Health, Safety and Security
U.S. Department of Energy

HSS
Office of Health, Safety and Security

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1.0 Introduction

Purpose. The Department of Energy (DOE) Office of Health, Safety and Security (HSS) performed an effectiveness review of the DOE Action Plan for the Columbia space shuttle accident and Davis-Besse event and the comprehensive operating experience program. The review was performed to fulfill Commitment #20 of the DOE *Implementation Plan to Improve Oversight of Nuclear Operations*, which DOE developed in response to Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2004-1, *Oversight of Complex, High-Hazard Nuclear Operations.* This report to the Secretary of Energy documents the results of the effectiveness review and fulfills DOE Commitment #20.

Background. In May 2004, the DNFSB issued DNFSB Recommendation 2004-1, *Oversight of Complex, High-Hazard Nuclear* Operations, which recommended that DOE – including the National Nuclear Security Administration (NNSA) – take several actions to provide increased assurance of safety at defense nuclear facilities. In response to this recommendation, DOE issued an *Implementation Plan to Improve Oversight of Nuclear Operations* in December 2004. DOE subsequently updated and reissued its Implementation Plan in October 2006 to reflect various changes in scope, approach, schedules, and responsibilities.

The DOE Implementation Plan addresses three main areas for improvement:

- Strengthening Federal safety assurance
- Learning from internal and external operating experience
- Revitalizing integrated safety management (ISM) implementation.

Commitment #20 of the Implementation Plan relates only to the second of the above areas (i.e., learning from internal and external operating experience). The Operating Experience section of the DOE Implementation Plan identifies three improvement initiatives and four specific commitments, which are shown in Table 1. For each commitment, the Implementation Plan identifies deliverables, milestones for completion, and the DOE organization with lead responsibility for completion. Commitments #17, #18, and #19 are reported as complete.

Table 1. Initiatives and Commitments Related to Learning from Operating Experience

INITIATIVE	COMMITMENTS[1]
Department-wide Action Plan for the Columbia Accident and Davis-Besse Event	▪ Commitment #17: Complete Department-wide formal review of the Columbia accident and Davis-Besse event, and develop consolidated Department-wide Action Plan.
Comprehensive Operating Experience Program	▪ Commitment #18: Develop comprehensive DOE Operating Experience Program. ▪ Commitment 19: Demonstrate performance of DOE Operating Experience Program.
Verification of Implementation of Operating Experience	▪ Commitment #20: Verify effectiveness of implementation of implementation plan sections.

[1] Because the original Implementation Plan was revised, some commitment numbers are no longer in use. The original numbering of commitments was retained to maintain continuity with previous revisions.

Commitment #20 assigns the DOE Chief Health, Safety and Security Officer (HS-1) the responsibility for verifying the effectiveness of implementation of DOE actions related to the initiatives in the Implementation Plan that address internal and external operating experience. HS-1 assigned subject matter experts from the HSS Office of Environment, Safety and Health Evaluations (HS-64), which is the HSS organization with responsibility for independent oversight of nuclear safety, to lead the effectiveness review.

Scope and Review Methodology. HSS developed a review plan, including a Criteria, Review, and Approach Document (CRAD) that addressed the two improvement initiatives. In accordance with the CRAD, HSS reviewed the specific commitments identified in the Implementation Plan to verify that commitments were complete and to assess the effectiveness of the actions in addressing the issues.

To this end, HSS reviewed various documents and interviewed personnel from organizations with responsibilities for completing the specified actions. These personnel included various managers within NNSA, the Office of Environmental Management (EM), and the HSS Office of Health and Safety. HSS's assessment of the completion and effectiveness of the commitments also considered the results of environment, safety, and health (ES&H) and nuclear safety inspections performed by HS-64 from fiscal year (FY) 2007 through FY 2009. Most HSS inspections include an evaluation of DOE site office and contractor performance in using lessons learned to improve safety and implementing an operating experience program; therefore, the inspection results provided good perspectives on the effectiveness of implementation of the initiatives. Further, the inspections performed in the 2007-2009 timeframe encompass the program offices of most interest to the DNFSB (i.e., NNSA and EM) and provide a good cross section of DOE site offices and site contractors; the inspections included EM operations offices and contractors at Oak Ridge and Savannah River, and NNSA site offices and site contractors at Pantex, Y-12 Plant, Savannah River, Nevada National Security Site, and Lawrence Livermore National Laboratory. HSS also considered information gathered during various oversight reviews, follow-up interviews, and other oversight activities during calendar year 2010. Specific deficiencies identified during inspections and other reviews were communicated to the applicable organizations through the inspection reports.

Sections 2 and 3 of this report discuss the status of completion and assessment of the effectiveness of each initiative. Section 4 presents HSS's conclusions.

2.0 Department-wide Action Plan for the Columbia Accident and Davis-Besse Event

DNFSB Recommendation 2004-1 includes a recommendation that DOE issue corrective action plans consistent with recommendations resulting from internal DOE reviews of the Columbia accident and the Davis-Besse incident. DOE's Implementation Plan identified a need to identify and fully implement applicable lessons from these events. To address the recommendation, the Implementation Plan identifies one commitment (Commitment #17) that involves completing a Department-wide formal review of the Columbia accident and Davis-Besse events and developing a consolidated Department-wide action plan. This commitment is reported as complete.

Verification of Completion. HSS's independent review verified that DOE submitted a lessons-learned report and action plan in July 2005. The submission was consistent with the DOE Implementation Plan and responsive to DNFSB Recommendation 2004-1.

Effectiveness of Actions and Implementation. In addition to establishing a DOE-wide operating experience program (see Section 3), various other actions resulted from the evaluation of lessons learned from the Columbia accident and Davis-Besse event and the associated DOE Action Plan. Some of the key actions were:

- DOE established a differing professional opinion (DPO) program that provides an avenue for individuals to present alternative perspectives for management consideration. The Department issued DOE Policy 442.1, *Differing Professional Opinions on Technical Issues Related to ES&H*, and DOE Manual 442.1-1, *DPO Manual for Technical Issues Involving ES&H*, on November 16, 2006.

- As discussed further in Section 3, the HSS Office of Corporate Safety Analysis developed and disseminated analytical tools (such as operating experience metrics and CRADs) to support the DOE operating experience and lessons-learned program.

- Training on ISM and contractual performance objectives is incorporated into the Nuclear Executive Leadership Training.

- The DOE ISM Champions Council has focused attention on sharing lessons learned and best practices.

With a few exceptions, the HSS review indicates that most aspects of the actions were effectively implemented and have contributed to improvements in DOE safety management of higher-hazard activities. For example, the DPO program establishes an important option for individuals to raise safety concerns without fear of reprisal and has been used on occasion to address nuclear safety issues within NNSA and EM. Also, the NNSA Chief, Defense Nuclear Safety (CDNS) and Chief, Nuclear Safety (CNS) have participated in DPO actions as required, and their involvement has ensured that nuclear safety issues are elevated to Headquarters management for consideration.

The DPO process has been used effectively on a number of occasions to identify and resolve technical issues. For example, after receiving a DPO from an engineer at the Waste Treatment Plant at the Hanford Site, the CNS convened a panel of technical experts to review the issues, and the CNS rendered a final decision based on input from the panel to accept the identified issues and take corrective actions. In another case, a subject matter expert raised a DPO related to a fire protection issue at a glovebox at Los Alamos National Laboratory's Waste Characterization, Reduction and Repackaging Facility. After an

initial decision by a panel commissioned by the Los Alamos Site Office, the subject matter expert appealed the initial decision to Headquarters. Under the CDNS, Headquarters initiated a panel consisting of three DOE/NNSA fire protection engineers and a panel manager, which also evaluated the information and determined that the proposed activities did not present an unreasonable risk to the public. Although the subject matter expert's DPO was ultimately not endorsed in this case, the process ensured that the issue received management attention and was thoroughly reviewed by two panels of experts, and that senior management (i.e., the NNSA Central Technical Authority) had sufficient information to make a risk-informed decision. In both cases, the individuals who raised the issues were formally advised of the final disposition of the issues.

One of the lessons learned from the evaluation of the Davis-Besse event and the National Aeronautics and Space Administration Columbia accident was the importance of human factors and management support for safety-related questions. To enhance these aspects of safety management, DOE has promoted and facilitated advancement of the non-mandatory human performance improvement and high reliability organization programs in cooperation with the Energy Facility Contractors Group. For example, fundamental and advanced human performance initiative handbooks have been developed and courses have been conducted at numerous locations around the DOE complex. In addition, the benefits of high reliability organization principles in addressing lessons learned from the Columbia accident and the Davis Besse incident were highlighted to the DOE community through various forums, such as ISM workshops and training sessions. Some sites have made significant progress in implementing human performance initiative and high reliability organization programs. For example, the Pantex Site Office and site contractor developed processes to apply high reliability organization principles, in combination with enhanced causal factor analyses, to improve the effectiveness of corrective actions and reduce recurring deficiencies, and many Pantex personnel have completed high reliability organization training.

3.0 Comprehensive Operating Experience Program

DNFSB Recommendation 2004-1 includes a recommendation that DOE establish a comprehensive operating experience program. DOE's Implementation Plan identified a need to upgrade its operating experience program to ensure systematic, timely attention to identify, evaluate, and implement applicable lessons from both internal and external events. To address the issue, the Implementation Plan identifies two commitments, which involve developing a comprehensive operating experience program (Commitment #18) and demonstrating its performance (Commitment #19). Both commitments are reported as complete.

Verification of Completion. HSS's independent review verifies that DOE issued a DOE directive on operating experience in accordance with Commitment #18. Specifically, DOE Order 210.2, *DOE Corporate Operating Experience Program*, was issued in June 2006. DOE line organizations have submitted reports on the implementation of the operating experience program at their sites, as specified in the DOE Implementation Plan for Commitment #19. The reports are responsive to the provisions of the DOE Implementation Plan for establishing and implementing the operating experience requirements at DOE sites.

Effectiveness of Actions and Implementation. DOE has established and implemented an effective set of requirements that govern the operating experience program, which includes processes for disseminating and incorporating lessons learned. DOE operating experience programs and processes are developed and implemented in accordance with the key elements outlined in DOE Order 210.2, *DOE Corporate Operating Experience Program*, which establishes appropriate requirements for collecting information from various internal and external sources, identifying trends, disseminating information through a central clearinghouse (i.e., a lessons-learned web page), and regularly screening information on operating events. The order also appropriately establishes responsibilities and working groups.

Within DOE Headquarters, the HSS Office of Corporate Safety Analysis has made significant progress in implementing an effective operating experience program. It maintains a web site that provides an effective means of storing and disseminating information. The website, updated on a regular basis, provides appropriate implementing guidance and best practices, as well as analytical tools (e.g., operating experience metrics and CRADs). The DOE Operating Experience Committee was chartered and a Task Team was formed to address operating experience program metrics/effectiveness. The Task Team coordinated benchmarking efforts to identify the traits of "effective" operating experience programs and produced a report that provides substantial guidance on establishing effective performance measures. In addition, the Operating Experience Committee meets in conjunction with the ISM Champions meeting each year. Safety trends, issues, lessons learned, and good work practices are routinely discussed.

A review of NNSA and EM submittals and HS-64 inspection results indicated that DOE organizations have made progress in implementing effective operating experience and lessons-learned programs. The operating experience programs are continuing to improve and mature and, for the most part, are achieving their intended benefits; there have been significant increases in the dissemination of event information and lessons learned and more focus on evaluating events and lessons learned to identify and apply preventive and corrective actions by at DOE sites. However, the programs across DOE and contractor organizations are at various levels of maturity, and some implementation weaknesses are evident.

Site contractors that have been reviewed by HSS have established operating experience programs that meet the intent of the DOE order requirements and are improving as experience is gained. Most sites have extensive processes for disseminating lessons learned, and some sites have effective processes for ensuring that recipients of lessons learned screen and evaluate the information for applicability.

Although operating experience and lessons-learned programs are established and functioning at the DOE sites reviewed by HS-64 during inspections, weaknesses that impeded implementation of a fully effective program were evident during HS-64 inspections at some sites. These included:

- Some lessons-learned procedures and requirements were insufficiently defined and documented (e.g., applicability reviews for externally generated DOE lessons learned).

- Some lessons learned from external sources (e.g., other site or agencies) were not adequately screened for applicability or evaluated for needed actions, and significant actions were not tracked to completion. At some other sites, lessons learned are extensively disseminated but there are few instances where the lessons learned result in process changes or other actions to enhance safety.

- Relevant operating experience publications have not always been distributed for technical evaluation or entered into lessons-learned databases.

- Some site-specific internal lessons learned have not been generated and disseminated to other sites.

DOE site offices typically use the contractors' operating experience and also have established processes to accomplish Federal responsibilities for evaluating and disseminating lessons learned. For example, the Pantex Site Office Lessons Learned Coordinator receives and screens lessons learned from the contractor's operating experience/lessons-learned program and from the Headquarters list server; distributes those lessons to appropriate site office personnel; and distributes safety operations reports, safety alerts, safety bulletins, ES&H advisories, and operating experience summaries as appropriate. Site offices' processes, however, are at various levels of maturation. In some cases, site office procedures have gaps or deficiencies (e.g., responsibilities for program implementation not well defined, and information about points of contact is out of date). Also, although site offices focus on the effectiveness of contractor processes for disseminating lessons learned, they have not always used their oversight activities to evaluate the effectiveness of site operating experience processes. For example, few site offices selectively sample some events or lessons learned to determine whether the contactor took action at the site to evaluate applicability and prevent similar events. As a result, site offices are not optimally effective in promoting and ensuring the effectiveness of site contractor operating experience programs.

At the program office level, EM has an adequate operating experience program and has ensured that the programs of its field elements and contractors have been reviewed. NNSA Headquarters has recently published an operating experience program as required by the DOE order; implementation is planned for the coming year. Although not institutionalized, NNSA has been performing many of the elements of an operating experience program through its regular operational awareness activities.

4.0 Conclusions

DOE and contractor management of nuclear safety has improved because of the actions taken in response to DNFSB Recommendation 2004-1 in the areas of operating experience and lessons learned. DOE has met the commitments and performed the actions specified in its Implementation Plan for Recommendation 2004-1 in the areas of operating experience and lessons learned. This independent HSS review verified that the required actions were completed and were consistent with the provisions of the Implementation Plan.

While some implementation weaknesses are evident and continued improvement is warranted, overall DOE has adequately implemented operating experience programs and is devoting significant effort to evaluating and disseminating lessons learned. In response to lessons learned from external accidents and events, DOE has also implemented an effective DPO program and continues to promote and facilitate human performance improvement and high reliability organization initiatives. Collectively, these efforts have contributed to improvements in nuclear safety and have provided timely feedback to site personnel about best practices and lessons learned that could be evaluated and applied to prevent accidents or undesired events.