
U. S. Department of Energy

Implementation Plan to Improve Oversight of Nuclear Operations

*(in response to Defense Nuclear Facilities
Safety Board Recommendation 2004-1)*



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Executive Summary

The Defense Nuclear Facilities Safety Board (Board) issued its Recommendation 2004-1, *Oversight of Complex, High-Hazard Nuclear Operations*, on May 21, 2004. In its recommendation, the Board noted concerns regarding a number of safety issues, including delegations of responsibility, technical capability, central technical authority, nuclear safety research, lessons learned from significant external events, and integrated safety management.

The Department of Energy (DOE or Department) accepted the Board's recommendation on July 21, 2004. This implementation plan defines the actions that the Department will take in response to this recommendation. These actions fit into three broad areas:

- Strengthening Federal Safety Assurance
- Learning from Internal and External Operating Experience
- Revitalizing Integrated Safety Management (ISM) Implementation

To resolve the identified issues within these areas, the Department has established a number of end-state commitments, described in this plan, including the following:

- Establish two Central Technical Authorities (CTAs) with adequate technical support.
- Implement and strengthen the DOE Oversight Model.
- Establish and implement a nuclear safety research function.
- Complete technical staffing and qualification of federal safety assurance personnel.
- Establish and verify implementation of the new processes and criteria for safety delegations.
- Establish and implement DOE Operating Experience Program, an element of the ISM “feedback and improvement” function.
- Complete field element action plans to improve work planning and work control.
- Complete DOE actions to improve implementation of the ISM “feedback and improvement” function.

For each commitment, the Department has identified the set of intermediate milestones necessary to achieve the end-state commitments, as well as the verification activities to ensure that actions taken are effective to resolve the original issues. Overall execution of this Implementation Plan is the responsibility of the 2004-1 responsible managers.

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1.0 INTRODUCTION

The purpose of this plan is to define the Department's path forward in three areas critical for the continuance of the Department's strong record in protecting the health and safety of the public and the Department's workers. The three focus areas or themes of this plan are as follows:

- **Strengthening Federal Safety Assurance** – the structure, practices, and methods by which Department's federal technical personnel ensure safety by defining clear safety expectations, monitoring performance, and obtaining effective implementation and continuous improvement.
- **Learning from Internal and External Operating Experience** – the practices by which the Department and its contractors learn from their own operating experience as well as that from others, particularly from the recent NASA Columbia accident and from the Davis-Besse nuclear plant vessel head corrosion incident.
- **Revitalizing Integrated Safety Management Implementation** – a set of actions the Department will pursue to re-confirm that ISM will be the foundation of the Department's safety management approach and to address identified weaknesses in implementation.

2.0 BACKGROUND

The Board issued its Recommendation 2004-1 on May 21, 2004 (Appendix D). The Department of Energy (DOE or Department) accepted the Board's recommendation on July 21, 2004 (Appendix E).

In its Recommendation 2004-1, the Board identified several specific concerns related to changes or proposed changes being made by the Department. Contemplated or proposed modifications to DOE's, including the National Nuclear Security Administration's (NNSA's), organizational structure, staffing, contract management, oversight policies and practices, and safety directives were cited as potential sources of unintended safety consequences.

3.0 UNDERLYING CAUSES

The Department has fully evaluated the Board recommendation and assessed the underlying causes that led to these concerns. The Department's evaluation activities included the following:

- Reviewing recent changes in the Department as well as related historical lessons
- Studying NNSA's Columbia Accident Investigation Board (CAIB) Lessons Learned Team report for applicability across the Department

- Evaluating trends from occurrences, events, and internal and external reviews related to safety management
- Researching High Reliability Organization (HRO) literature with emphasis on attributes deemed essential to preventing organizational accidents
- Benchmarking other industries (e.g., Aviation, Commercial Nuclear Power, and Naval Reactors)

From this effort, the Department has identified the following underlying causes and mapped them to three main areas addressed in this plan: federal safety assurance, learning from operating experience, and ISM.

Federal Safety Assurance

- Lack of centralized technical expertise and operational awareness concerning implementation of nuclear safety policy and requirements
- Overall decline in strength of Headquarters line oversight
- Lack of a strong central focus on nuclear safety research and development.
- Delegations of authority not consistently made with clear expectations
- Decline in the Department's technical capability and capacity

Learning from Operating Experience

- Inconsistent use of operating experience (both internal and external such as Columbia Accident and the Davis-Besse events)
- Lack of quality improvement programs to identify and take preventive or corrective actions.

Integrated Safety Management

- Continued inconsistencies in ISM implementation. Lack of rigor in work planning and control, and repeat failures and issues (indicating problems with feedback and improvement) are common causes identified from events and internal and external reviews. The Department needs to improve implementation in these areas.
- Lack of attention and commitment to developing the attributes recognized in HROs. Specifically, emphasis is required to promote technical excellence, encourage a questioning attitude, avoid normalization of deviations, and ensure that organizational learning is a key value.

4.0 BASELINE ASSUMPTIONS

The Department makes the following baseline assumptions regarding successful fulfillment of the 2004-1 Implementation Plan, as developed:

- This plan assumes a continuity of supportive leadership commitment and active engagement of the Department’s senior leaders, even in the midst of sometimes frequent changes to the politically appointed leaders of the Department.
- This plan is based on continued Department commitment to, and support of, the Department’s ISM and QA Programs. Integrated quality and safety management systems are considered to be a solid foundation upon which to build further improvements to the Department’s safety management behaviors, performance, and culture. Building from this strong existing base is expected to make the actions under this plan more achievable and more acceptable throughout the Department.
- Implementation plan execution is based on target-level funding approved by Congress in an atmosphere of stable mission requirements. Initial funding can be accommodated from existing budgets. The Department will vigorously pursue necessary funding for steady-state activities.
- Actions identified in this plan are intended to address concerns identified in Board Recommendation 2004-1. The Department may take additional actions outside of this plan to address other issues.
- This plan does not contemplate changes to DEAR clauses or directives, except to the extent specifically described in the plan.
- This plan describes Department actions for nuclear facilities. For the purposes of interacting with the Board on this implementation plan, however, the deliverables are limited to those facilities within the Board’s scope (i.e., defense nuclear facilities). The Department will consider the level of hazard involved in tailoring implementation, and focus the most attention on preventing potential accidents related to high hazard, nuclear operations.
- Line management has primary responsibility for safety and the implementation of safety policy and requirements. CTAs ensure the availability of technical expertise and operational awareness necessary for adequate and proper implementation of the Department’s safety programs by line management. OA remains responsible for performing independent oversight. EH-1 is the corporate officer responsible for making Environment, Safety and Health policy and providing technical interpretation of it.

5.0 SAFETY ISSUE RESOLUTION

This section is organized around the following three main areas:

- Strengthening Federal Safety Assurance
- Learning from Internal and External Operating Experience
- Revitalizing ISM Implementation

Within each of the above main areas, supporting discussion addresses specific issues, bases for the issues, resolution approaches, and commitments/deliverables/milestones to resolve the issues.

5.1 Strengthening Federal Safety Assurance

Central to the needed improvement in federal safety assurance are:

- Instituting Central Technical Authorities;
- Providing Effective Federal Oversight;
- Instituting a Nuclear Safety Research Program;
- Establishing Clear Roles, Responsibilities, and Authorities;
- Ensuring Technical Capability and Capacity to Fulfill Safety Responsibilities.

5.1.1 *Instituting Central Technical Authorities*

Issue

The Department needs centralized technical expertise and operational awareness to assure adequate and proper implementation of Departmental nuclear safety policy and requirements.

Basis

The Department needs to improve the availability of technical expertise and operational awareness concerning implementation of its set of nuclear safety policies, requirements and standards. Currently the lack of qualified personnel and the lack of consistent adherence to existing practices for exemptions and waivers to nuclear safety requirements have led to variability in implementation. Additionally, line oversight of implementation is not consistently performed across the DOE Complex. Finally, the Department's line organizations have not systematically and consistently evaluated their nuclear safety performance to determine whether approved sets of requirements and standards are properly understood, applied and implemented.

Resolution

DOE needs to ensure that core nuclear safety expectations are fulfilled. More consistent evaluations of the flow-down of key nuclear safety requirements to contractors are needed to ensure that these requirements are adhered to and implemented adequately and properly, and that nuclear safety performance meets or exceeds safety expectations. To promote achievement of these objectives, the

Department established two Central Technical Authorities (CTAs), one in the NNSA and one in ESE. The CTA for NNSA will be the Principal Deputy Administrator (or other line official designated by the Administrator), and the CTA for ESE will be the Under Secretary.

The CTAs are line management executives who will be responsible for core nuclear safety functions, including:

- (1) ensuring strong technical expertise is available to ensure that operational and nuclear safety goals, expectations, requirements, and standards are properly implemented throughout headquarters and the field,
- (2) maintaining operational awareness of the implementation of nuclear safety requirements and standards to ensure consistent and appropriate application of the requirements as necessary to provide adequate assurance of nuclear safety,
- (3) improving the process for approving deviations and waivers of operational and nuclear safety requirements, and assuring that the process is followed, and
- (4) providing input on nuclear safety policy, working with EH-1 in performing its role as corporate officer responsible for making Department-wide nuclear safety policy.

The CTAs will be supported by a core of identifiable technical experts in key nuclear safety fields. The CTA for NNSA will be supported by the NNSA Chief of Defense Nuclear Safety (CDNS) and the CDNS staff. The CTA for ESE will be supported by EH-1 and EH technical experts. EH-1 will seek input from the CTA for ESE to determine how best to provide this support and to ensure that adequate personnel and funding are available. Preliminary estimates for the number of technical experts supporting the CTAs are in the range of 15-20 for the Department as a whole; the required support staffing level will be evaluated and set based on a detailed staffing analysis. The Department's objective is for the supporting technical experts to maintain exceptional technical capability with institutional constancy, and, therefore, their advice, counsel, and guidance would be readily sought from both headquarters and field offices on nuclear safety matters. Over time, the technical expertise of the supporting personnel would be easily recognizable and well-appreciated in both headquarters and the field. The CTAs and supporting technical experts will work closely with federal line managers and, as necessary, coach and mentor on techniques, tools, and skills to improve and upgrade the quality of the Department's technical safety management capability. The CTAs and supporting technical experts will also maintain an operational awareness of field activities, to include safety basis implementation, nuclear start-ups and restarts, personnel training and qualifications, maintenance, criticality safety, conduct of operations, and radiation protection. The CTAs and supporting technical experts will maintain awareness of production decisions and assure that the desire to meet programmatic commitments is properly balanced with safety. The operational awareness role of the CTAs is not intended to duplicate the independent oversight function.

Specific authorities associated with the CTA positions will be clearly delineated as described below. To fully implement the CTA role, the Department will need to:

- Define the detailed functions, responsibilities and authorities for the CTAs
- Update the Department Functions, Responsibilities, and Authorities Manual (FRAM) and Program office Functions, Responsibilities, and Authorities (FRA) documents to reflect the CTAs' functions, responsibilities, and authorities
- Complete a staffing analysis for technical experts necessary to support CTAs
- Fill the positions for supporting technical experts
- Define the processes and protocols for fulfilling the CTA roles and responsibilities. For example, the specifics on how and when the CTAs must be involved in the approval of deviations and waivers to nuclear safety rules and orders needs to be finalized, considering existing processes that require approval of the program line managers and the Office of Primary Interest (OPI).
- Describe how the CTAs will interface with other organizations (for example, Office of Enforcement, field elements, and program offices). For example, the 2 CTAs and EH-1 will need to meet periodically to coordinate activities.
- Establish an operating budget for fulfilling CTA duties.

In establishing and bringing the CTAs to a full implementation status, the Department has identified the following three key milestones:

1. The CTAs are formally established – the CTAs are formally designated, and the CTA roles and responsibilities have been defined.
2. The CTAs have adequate technical support – key critical staff positions that support the CTAs have been defined and are filled on a permanent or temporary basis.
3. The CTA function is fully implemented – CTAs are supported by sufficient resources (personnel, funding, etc.), have a demonstrated record of performance, and feedback is available on the impact of the CTA function.

Deliverables/Milestones

Commitment 1: Formally establish the CTAs (as described above).

Lead Responsibility: Secretary of Energy

Deliverable: Secretarial delegation Order identifying the CTAs and their roles and responsibilities.

Date: March 2005

Commitment 2: Provide Adequate Technical Support for the CTAs (as described above).

Lead Responsibility: Central Technical Authorities

Deliverable: Letter report from the CTAs to the Secretary declaring the CTAs have adequate technical support and providing the basis for this declaration.

Date: [December 2005] Nine months after formally establishing the CTAs (per Commitment 1).

Commitment 3: Fully Implement the CTA function (as described above).

Lead Responsibility: Central Technical Authorities

Deliverable: Letter report from the CTAs to the Secretary declaring the CTA function fully implemented and providing the basis for this declaration (NNSA report requires NNSA Administrator's concurrence).

Date: [December 2006] Twelve months after providing adequate technical support to the CTAs (per Commitment 2).

5.1.2 Providing Effective Federal Oversight

Issue

The Department must provide effective federal safety oversight to ensure it fulfills safety responsibilities at all levels of the Department.

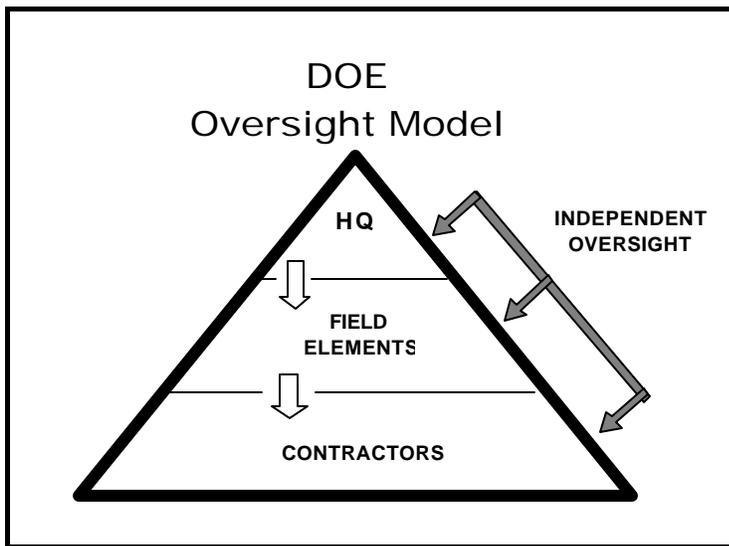
Basis

DOE officials may delegate safety authorities. These delegations do not relieve the delegating officials of their responsibilities for safety. Fulfilling the original safety responsibilities demands that delegations of authority and delegated work must be reviewed to ensure that it is being done consistent with expectations. In recent years, the consistency and rigor of the Department's line management oversight processes have declined. The Department's Oversight Policy, P 450.5, has not been fully implemented throughout the DOE organization. In particular, line oversight by DOE program offices at headquarters has not been well defined and implemented to ensure that field office safety functions are being effectively performed. As a general principle, oversight provides a degree of redundancy that is necessary for safety in highly complex, high-hazard operations.

Resolution

The Department's oversight model is based on four tiers:

- Contractors
- DOE field elements
- DOE Headquarters line management organizations
- Independent Oversight



Headquarters line management oversight is focused on the DOE field elements and also looks at contractor activities to evaluate the implementation of HQ expectations and the effectiveness of field element line management oversight. Field element oversight is focused on Contractors. Independent oversight looks at all levels. Self-assessments are done at each level. The CTAs and supporting technical experts will maintain awareness of operational activities and conditions that affect nuclear safety and, as

executives within the line management chain, will work to continually strengthen and improve the line management's safety oversight capability and performance. This awareness will be maintained through such activities as monitoring applicable reports and performance metrics, reviewing various site-specific and complex-wide documents, technical discussions, and occasional site visits.

Key principles for effective oversight include:

- Oversight programs include operational awareness by the facility representatives and safety system oversight personnel, periodic oversight assessments, for-cause reviews, self-assessments, and monitoring and evaluation of operational occurrences, performance measures, and other operational data and information.
- Oversight programs should clearly define areas for periodic oversight assessments.
- Oversight assessments should be performed to clearly established requirements or Criteria and Review Approach Documents (CRADs), derived from DOE directives, standards, and expectations.
- Oversight should be performed by reviewers who have demonstrated technical capability in both technical areas and oversight methods.
- A base level of oversight and minimum periodicity should be defined for each oversight area; oversight can increase with poor performance, but cannot reduce below the base level and minimum periodicity.

- Oversight programs should consider the level of hazard involved, and provide increased focus and attention on high-hazard, nuclear operations.
- Redundancy in oversight is necessary and appropriate for high-risk operations.
- Oversight findings should be reviewed for accuracy, addressed by corrective action plans, tracked to resolution, and verified to be effectively resolved by completed actions.

Independent Oversight reviews are conducted by OA under the direct authority of the Office of the Secretary of Energy with results provided to DOE line management and other interested parties. Independent oversight performance evaluations provide an independent perspective on the effectiveness of DOE line management and contractors in ensuring that HQ and site operations are performed safely, securely, and in compliance with applicable requirements. OA has developed extensive expertise in performing oversight, and serves as the Department's OPI on oversight policy.

A draft DOE Policy and Order 226.1, "DOE Oversight," are both under development with the objective of providing the overall framework for all DOE oversight activities. The Department will revise and finalize these draft directives to ensure consistency between them and this plan. These directives will also provide the foundation for oversight of a broad range of activities including environment, safety, and health; safeguards and security; cyber security; emergency management; and other disciplines. They will be reviewed and approved in accordance with the Department's directive process, which allows all programs to provide review and concurrence.

Additional requirements for safety oversight are being developed as part of the 2004-1 implementation plan. The Department will develop a new DOE Safety Oversight Manual to fully address oversight requirements for nuclear operations. Subsequent to publishing the DOE policy and order on oversight, the Department will begin development of this manual by identifying and promulgating the core set of review areas for which periodic oversight review is needed to assure nuclear safety. This set will include, but is not limited to, the following review areas:

- Integrated Safety Management, including annual ISM system review and ISM description update
- Functions, Responsibilities and Authorities
- Technical Qualifications/Certifications
- Quality Assurance activities
- Design and construction of nuclear facilities, and Critical project decisions
- Identification and Flow-down of requirements
- Safety basis documentation development, review, approval, and implementation
- Work planning and control
- Conduct of maintenance, operations, and testing
- Start-up and restart readiness reviews
- Emergency management
- Feedback and improvement mechanisms, including ORPS, issues management, corrective action program, and the Operating Experience Program
- Oversight activities including self-assessments

The Department will develop CRADs to support oversight review activities. These will ultimately be rolled into the DOE Safety Oversight Manual, which will contain specific requirements for the conduct of safety oversight. The Manual will then serve to establish the minimum acceptable assessment program. The Manual will formalize oversight expectations and will include the following:

- Establish minimum review periodicity with an absolute floor, but with an allowance/factor for safety performance;
- Establish functional area CRADs;
- Establish HQ review/interface process;
- Establish performance metrics for measuring conduct of oversight, and resolution of oversight findings.

With publication of the new DOE Safety Oversight Manual, the previous DOE Oversight Policy 450.5 will be cancelled.

Deliverables/Milestones

Commitment 4: Issue DOE Order on Oversight.

Lead Responsibility: OA-1

Deliverable: DOE Order 226.1 on Oversight, approved and issued by the Deputy Secretary

Due Date: April 2005

Commitment 5: Develop and issue initial CRADs for use in performing safety oversight for a core set of technical areas.

Lead Responsibility: NA-1 and US-ESE

Deliverable: Memo issuing CRADs for oversight of nuclear facilities and providing direction for their use, approved and issued by the Deputy Secretary

Due Date: June 2005

Commitment 6: Issue DOE M 226.1, Safety Oversight Manual.

Lead Responsibility: NA-1 and US-ESE

Deliverable: DOE Safety Oversight Manual 226.1

Due Date: June 2006

Commitment 7: Verify implementation of safety elements of the DOE directives on oversight

Lead Responsibility: OA-1

Deliverable: OA special study of implementation of federal line safety oversight

Due Date: [November 2007] Seventeen months after issuance of the DOE Safety Oversight Manual 226.1 (per Commitment 6).

5.1.3 Instituting a Nuclear Safety Research Function

Issue

DOE should establish an integrated corporate program for assessing, prioritizing, integrating and managing applicable nuclear safety research.

Basis

To improve Federal safety assurance, a strong nuclear safety research program is necessary. Currently, nuclear safety research decisions are made either by program offices based on perceived need, or by established groups that are also authorized to make decisions. While program office decisions of need may be coordinated with other offices, particularly if additional funding is needed, there is no requirement to seek collaboration or participation. The current nuclear safety research program is fragmented and not consistently prioritized relative to the need.

Resolution

DOE nuclear operations demand a high level of safety and attention to detail, particularly for operations involving high consequence, low probability accidents. These operations also demand rigorous research and development. An integrated nuclear safety research program will preserve key needs, better integrate research development, and provide critical information to enhance decision-making. This effort also needs to ensure when nuclear safety issues arise, that proper prioritization is given at a high enough level of authority to address the issue. The nuclear safety research program is designed to not duplicate normal programmatic research that enhances efficiency or effectiveness of processes and technologies.

EH will have the primary responsibility for this function which will focus on safety research in areas that need further attention such as risk management, nuclear criticality safety, and fire safety. This does not preclude other organizations, such as EM and NNSA, from conducting research, as required, to meet their unique needs. EH will maintain cognizance of these activities. Key features of the implementation strategy for the establishment of the nuclear safety research function are the following:

- Define the nuclear safety research roles and responsibilities
- Update the FRAM to reflect the nuclear safety research functions, responsibilities and authorities
- Describe the interfaces between the nuclear safety research program and other organizations (e.g., Program Secretarial Offices, sites, CTA(s))
- Define the funding mechanism for the nuclear safety research program
- Perform staffing analysis for the nuclear safety research function
- Hire staff as necessary
- Establish the safety research assessment and prioritization criteria and guidance
- Initiate the process of identifying, prioritizing, and executing safety-related research and development
- Identify nuclear safety research needs
- Review and evaluate operating experiences and line oversight findings as potential sources of nuclear safety research needs
- Fund specific nuclear safety research projects/efforts

To fully implement the nuclear safety research function, the Department has identified the following three key milestones:

1. The nuclear safety research function is formally established – the organizational placement of the function within EH is determined, the responsible leader (acting or permanent) has been named, and the roles and responsibilities have been broadly defined.
2. The nuclear safety research function has adequate technical support – the key critical staff position(s) that support the function have been established.
3. The nuclear safety research function is fully implemented – the nuclear safety research function has sufficient support resources (personnel, funding, etc.), has a demonstrated record of performance, and feedback is available on its impact.

Deliverables/Milestones

Commitment 8: Formally establish the nuclear safety research function (as described above).

Lead Responsibility: Secretary of Energy

Deliverable: Secretarial delegation Order identifying the roles and responsibilities of the nuclear safety research function.

Date: March 2005

Commitment 9: Provide adequate technical support for the nuclear safety research function (as described above).

Lead Responsibility: EH-1

Deliverable: Letter report to the Secretary declaring that adequate technical support is available and providing the basis for this declaration.

Date: [December 2005] Nine months after formally establishing the nuclear safety research function (per Commitment 8).

Commitment 10: Fully implement the nuclear safety research function (as described above).

Lead Responsibility: EH-1

Deliverable: Letter report to the Secretary declaring the nuclear safety research function fully implemented and providing the basis for this declaration.

Date: [December 2006] Twelve months after providing adequate technical support for the nuclear safety research function (per Commitment 9).

5.1.4 Establishing Clear Roles, Responsibilities, and Authorities

Issue

The Department's process for delegating authority from Headquarters to the DOE Field Offices for safety responsibilities must be more clearly defined.

Basis

Departmental assignments of safety responsibilities are captured in the Department's FRAM, for which EH is the OPI. Assigned headquarters officials may delegate authority to field personnel to implement these assignments, but may not delegate their responsibilities for ensuring safety. Recent Department decisions have decentralized many responsibilities from Headquarters to field offices. While decentralization is useful in improving productivity and moving decision-making closer to the work, sometimes delegations of authority have been made using inconsistent standards and without verifying individual and organizational capabilities to carry out the responsibilities. To have confidence that safety responsibilities are properly performed, the Department must more clearly establish processes and criteria for delegations of authority. After delegations of authority are made, the delegations must be periodically reviewed to ensure that the individuals and organizations maintain the necessary capability and capacity on which the delegation was made.

Resolution

For each identified safety responsibility, the Department will determine whether authority to fulfill these responsibilities can be delegated from Headquarters to the DOE Field Offices. The Department's FRAM captures those instances where delegations of authority are not allowed. For each safety responsibility for which authorities can be delegated to the field offices, the following criteria need to be evaluated and deemed acceptable:

- Qualifications, experience, and expertise expected in the position receiving the delegation.
- Qualifications, experience, and expertise of the organization receiving the delegation.
- Proper framework of processes and procedures to implement the delegated authorities.
- Sufficient resources.
- Periodic re-verification of capability and capacity and demonstrated performance.
- Compensatory measures implemented, if needed.

The Department will clearly define the process and criteria for making these delegations of authority. This will include review and verification of qualifications, experience, and expertise; resources, both technically qualified staff and sufficient funding; proper framework (or plan to develop) of processes and procedures to implement the authorities delegated; and compensatory measures if needed. The rigor and formality of the delegation of authority process may vary based on the risk associated with the assigned responsibilities. Nuclear safety responsibilities, such as safety basis processes and start-up approvals, would require the highest standard of assurance. The Department will define and list the core nuclear safety delegations that may require additional rigor in delegation, and clearly define additional process steps or criteria.

Completion of these resolution actions will permit lifting of existing Department restrictions on new safety delegations, established by the Secretary on July 21, 2004.

Pursuant to DOE Order 414.1B, headquarters organizations will establish Quality Assurance Plans (QAPs), which will describe quality assurance roles and responsibilities, how these organizations

ensure the quality of the delegation of authority process and criteria, and how the quality assurance criteria are met.

The Department's Functions, Responsibilities and Authorities Manual (FRAM), maintained by EH, is supposed to be revised on an annual basis. So too are the DOE headquarters program office and field element Functions, Responsibilities and Authorities (FRA) documents, revised annually in a trickle-down sequence. As various responsibilities described in this plan are implemented, the Department plans to make appropriate changes in the DOE FRAM, the headquarters program office FRAs (such as the NNSA FRA) and the field element FRAs, in accordance with the normal schedules for updates. Oversight of all assigned safety responsibilities, regardless of delegations, will be conducted in accordance with the process described in Section 5.1.2.

Deliverables/Milestones

Commitment 11: Define the process and criteria for delegating authorities to field personnel for fulfilling assigned safety responsibilities.

Lead Responsibility: CTAs

Deliverable: Process definition and criteria, approved by the Deputy Secretary

Due Date: July 2005

Commitment 12: Develop and implement QAPs as required by DOE O 414.1B, "Quality Assurance."

Lead Responsibility: NA-1 and US-ESE

Deliverable A: Approved HQ QAPs, with approved paths forward and schedules for achieving full implementation, including revision and implementation of field element QAPs.

Due Date A: November 2005

Deliverable B: Approved Field Element QAPs.

Due Date B: Completion in accordance with schedules provided in Part A above

Commitment 13: Verify implementation of the processes and criteria for delegating authorities to field personnel for fulfilling safety responsibilities, and evaluate whether all existing delegations of authority to the DOE Field Offices have been and are being made using these new processes and criteria.

Lead Responsibility: CTAs

Deliverable: Report to the Secretary

Due Date: [February 2006] Seven months after issuance of delegation process and criteria description (per Commitment 11)

5.1.5 Ensuring Technical Capability and Capacity to Fulfill Safety Responsibilities

Issue

DOE must establish and maintain the technical capability and capacity to fulfill its safety responsibilities at all levels of the Department.

Basis

Highly qualified people are essential for safety. Recruiting, training, and retaining the right people are central priorities for federal safety assurance. One of the ISM principles is technical capability consistent with responsibilities. In other words, DOE needs the right people with the right experience, qualification and training in the right roles. Decision-makers must have the qualifications and training necessary to fulfill their safety responsibilities. High Reliability Organizations consistently demonstrate the attribute of valuing technical excellence and expertise.

An NNSA team reviewed the Columbia accident report for applicable lessons. The team concluded that erosion of technical capability is a concern within NNSA. The team pointed to major reductions in nuclear safety expertise within NNSA during the recent organization changes. Following organizational changes, EM is re-evaluating its technical expertise to fulfill its safety responsibilities, including its oversight responsibilities. In addition to these issues, DOE is facing a long-term challenge in maintaining a technically capable workforce. Over the next five years approximately one half of the DOE workforce will become eligible to retire. The Department has the opportunity to attract highly-qualified personnel to replenish its technical staff from the loss of an expected large number of technical employees retiring from the Department.

Resolution

To address the identified need to provide supplemental training to DOE senior personnel, including new DOE decision-makers, the Department will develop and implement a structured training program tailored to these senior personnel. The Under Secretaries for NNSA and ESE will identify those individuals who need to participate in this training program. This program will tailor training

based on the experience and expertise of identified senior personnel. The Department will evolve this training into an institutionalized leadership and development program.

The Department's vision is for its technical personnel to be recognized among all federal technical agencies for the excellence of its federal staff. Further, the Department wants to have sufficient capacity of technically excellent personnel such that continuous learning and continuous training is a valued norm. The Department needs competent technical personnel with equal or superior knowledge and capability compared to the Department's contractors. The Department intends to implement new, innovative, and practical ways to achieve its vision of a technically excellent staff

To begin progress in the direction of this vision, the Department's Federal Technical Capability Panel (FTCP) will review past data and assessments of the Department's performance in recruiting, developing, training, qualifying, maintaining proficiency, and retaining technically excellent personnel who are fulfilling safety responsibilities, and identify areas where improvement is needed. Previous assessments have already identified many of the relevant issues. These assessments include: workforce staffing analyses; Facility Representative quarterly reports; FTCP quarterly reports; internal reviews such as annual ISM reviews and OA independent assessments; internal evaluations, such as the NASA Columbia investigation report,; and external reports and correspondence, such as those from the Board and the March 1999 Report of the "Chiles Commission" on Maintaining Nuclear Weapons Expertise. The FTCP will also evaluate its effectiveness at overseeing these activities. The FTCP will identify concrete corrective actions to improve recruiting, developing, training, qualifying, maintaining proficiency, and retaining technical personnel, as well as enhancing FTCP effectiveness. The FTCP will take the Department lead in managing implementation of the corrective actions.

To review the Department's path forward toward achieving the vision of technical excellence, the Department, consistent with the provisions of the Federal Advising Committee Act, will enlist the help of an emeritus-level panel with experience and expertise in Federal and large commercial technical organizations, particularly High Reliability Organizations. This panel will review Department performance in this area and make recommendations to the Secretary for improvements.

The Department will provide the panel with a summary of previous reviews and findings in the DOE technical capabilities area. This panel will take a fresh look at the status of the Department's efforts to upgrade technical capability. The main emphasis for this panel will be on high-impact, practical recommendations to achieve change. The panel will be charged to provide specific attention on the following topic areas:

- The overall Department goal, strategy, priority, and processes related to recruiting, developing, and retaining excellent technical personnel
- The use of incentives and rewards for attracting and retaining excellent technical personnel
- The relationship between position descriptions, technical capability expectations, and performance evaluations
- The ability of DOE to move federal technical staff between site locations as needed

- The ability of DOE to make changes in federal technical assignments based on personnel performance
- The use and effectiveness of the Technical Qualification Program
- The effectiveness of ongoing technical training and development
- The effectiveness of the Federal Technical Capability Panel
- The top Federal staffing needs to enhance nuclear safety

To address the staffing and technical qualification for the federal safety assurance roles described in this implementation plan, and to address inconsistencies in current staffing and technical qualification for federal safety roles, the Department will take the following steps:

- Complete a comprehensive federal staffing analysis at headquarters and the field offices with federal safety assurance responsibilities.
- Identify gaps based on the staffing analysis, and hire or re-assign personnel with the proper education and experience to fill gaps.
- Provide the new and reassigned personnel the training and mentoring necessary to fulfill their safety responsibilities.
- Assign appropriate technical qualification standards to the identified federal safety assurance personnel and individual objectives for completing qualifications.
- Identified individuals will complete technical qualifications to identified standards.

To improve the quality and rigor of technical qualifications across the Department, the Department will identify personnel who are the most experienced and technically capable in select functional areas and charge these individuals with a central role in the qualification of others. Once identified, these persons will assist the Department in improving overall technical capability. Potential activities would include serving as members of technical examining boards in the qualification of others in a particular functional area, reviewing technical qualification standards, evaluating ongoing proficiency standards, and conducting ongoing training. These personnel could also provide training to others in particular functional areas. This will use the high-quality technical talent that exists within certain areas of the Department to raise the overall standard of technical qualifications across the Department.

Deliverables/Milestones

Commitment 14: The FTCP will develop corrective actions to improve recruiting, developing, training, qualifying, maintaining proficiency, and retaining technical personnel, as well as FTCP effectiveness. The corrective action plan will include a prioritized list of key positions that should be filled to enhance safety.

Lead Responsibility: Chairman, FTCP

Deliverable: Corrective Action Plan, approved and issued by the Deputy Secretary

Due Date: May 2005

Commitment 15: DOE will identify highly qualified and experienced personnel who will assist the Department in improving overall technical capability.

Lead Responsibility: Chairman, FTCP (as an agent for the Deputy Secretary)

Deliverable: A report identifying high-qualified and experienced personnel in select functional areas and describing their roles in improving overall technical capability, as well as a plan for implementing this concept and a mechanism for maintaining the list.

Due Date: July 2005

Commitment 16: DOE will provide structured training, as necessary, for safety professionals, senior managers and decision-makers responsible for nuclear safety, including those responsible for nuclear safety oversight.

Lead Responsibility: NA-1 and US-ESE

Deliverable: A report describing the training and professional development program, including the training materials, the status of personnel identified for training, the date when all identified personnel will complete training, and an assessment of the training's effectiveness.

Due Date: August 2005

Commitment 17: DOE will commission an emeritus -level panel to review the Department's efforts for recruiting, developing, and retaining technically excellent personnel to fulfill safety responsibilities, evaluate the FTCP's effectiveness, evaluate associated organizational systems and impediments, and make recommendations to the Secretary for improving the Department's effectiveness in the areas reviewed.

Lead Responsibility: Deputy Secretary

Deliverable: Report to the Secretary

Due Date: June 2006

Commitment 18: DOE will complete technical staffing of the personnel placed in identified positions needed to perform the federal safety assurance function for nuclear facilities.

Lead Responsibility: Deputy Secretary

Deliverable: A report on completed DOE staffing actions, with status of technical qualifications.

Due Date: December 2006

5.1.6 Verification of Federal Assurance Capability

After at least one full year of implementation experience after the CTA offices are fully implemented (after completion of CTA milestone 3), the Deputy Secretary will direct an effectiveness review to be performed of all areas related to establishing a robust Federal Assurance Capability. The scope of this review will include all areas covered in this section of the Implementation Plan. A review plan with CRADs will be developed to guide the review. Follow-on verification activities to determine when objectives have been successfully institutionalized and whether additional improvement opportunities exist are included in the Project Management Plan.

5.2 Learning from Internal and External Operating Experience

5.2.1 Department-wide Action Plan for Columbia and Davis-Besse Events

Issue

The Department has not completed identification and full implementation of applicable lessons from the Columbia accident and the Davis-Besse incident.

Basis

Two significant external events occurred in the last 2 years – the Columbia accident and the Davis-Besse incident – which are profound enough for the Department to pro-actively perform thorough evaluations for applicable lessons learned, to identify actions to take to implement these lessons, and to ensure these actions are effectively implemented. The Department has started on this effort through various evaluations of these events. While NNSA conducted a comprehensive evaluation of the Columbia event, further work is planned to capture the lessons learned from the Davis-Besse incident and to define Department-wide actions to capitalize on the lessons learned from the experience of others.

Resolution

To resolve this issue, the Department will complete its evaluation of the Columbia and Davis-Besse events and implement applicable lessons. To complete the Department-wide review and action plan, the Department will pursue the following approach:

- ESE will form a team, review completed analysis to date, and define recommended actions for ESE.
- NNSA will identify unique insights or additions from the Davis-Besse incident that are not already covered by the NNSA CAIB review, and develop additional recommendations for actions to implement lessons learned, and NNSA will develop potential actions, with an eye toward elevating those with Department-wide applicability.
- The Department will form a cross-functional team, headed by EH-3, to review the ESE and NNSA lessons learned and recommended actions to identify those actions that are applicable to the Department as a whole, and will benefit from a consistent, Department-wide approach. This team will also review the insights of these events on corporate processes and systems, such as the directives system, the personnel system, and the technical qualification system, which are outside of the scope of the other reviews. The Department will then develop a Department-wide action plan to implement applicable lessons. The Department will consider the use of the Differing Professional Opinions process where appropriate.
- The NNSA and ESE action plans will be finalized after the Department-wide plan is finalized. These plans will not be expected to double-track Department-wide actions. To ensure management attention on completing these actions, the actions from the consolidated plan will be entered into the Corrective Action Tracking System (CATS) for resolution and closure.

Deliverables/Milestones

Commitment 19: Complete Department-wide formal review of Columbia and Davis-Besse events, and develop the Department-wide action plan.

Lead Responsibility: Deputy Assistant Secretary for Corporate Performance Assessment (EH-3)

Deliverable: Consolidated Department-wide Action Plan, approved and issued by the Deputy Secretary, and describing who will determine that corrective actions have been effective

Due Date: May 2005

5.2.2 Comprehensive Operating Experience Program

Issue

The Department's comprehensive operating experience program needs to be upgraded to ensure systematic, timely attention to identify, evaluate, and implement applicable lessons from both internal and external events.

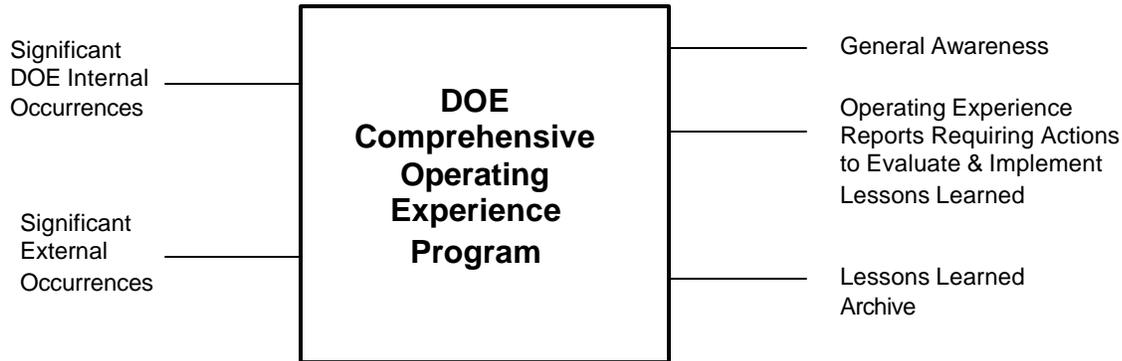
Basis

The need for an effective comprehensive operating experience program is one of the key lessons from both the Columbia and the Davis-Besse events. The Board's Recommendation 2004-1 and other feedback from several sources within the Department have led to the conclusion that the Department needs to make substantial improvement in this area. Effective safety cultures learn from experience, regardless of whether the experience is their own or that of others. A strong questioning attitude and the ability to learn from experience are attributes consistently evident in HROs. These organizations are learning organizations, which have implemented systems and processes to facilitate continuous learning and continuous improvement.

Resolution

To resolve this issue, the Department will enhance its comprehensive operating experience program to include key elements used in the commercial nuclear industry's operating experience program, established and run by the Institute of Nuclear Power Operations (INPO). The Department's existing program is defined by DOE-STD-7501-99, *The DOE Corporate Lessons Learned Programs*. This program will be significantly upgraded and necessary requirements will be added to the directives system. This program is one of many elements supporting the "feedback and improvement" function of the Department's ISM system.

The INPO operating experience program is a cornerstone of the commercial nuclear industry's approach for learning from experience. INPO sends out noteworthy operating experience, sorted into two levels of importance. The more important items require responses describing review and actions taken. The less important items still require review and action, but do not require submittal. Regardless of importance level, when no action is taken, organizations are required to describe and document why no actions are applicable or necessary. Implementation of the operating experience is reviewed annually to ensure that sites are performing adequate reviews and taking appropriate corrective actions as warranted. EH will analyze and identify those operating experiences and safety issues that need attention, and identify the level of importance/action, with the concurrence of line management representatives from ESE and NNSA. Program offices and field elements will be responsible for verifying implementation through line management oversight. EH will provide feedback to NNSA and the ESE program officers on program level implementation using appropriate protocols established in the Operating Experience program directives. EH will perform annual self-assessment reviews on the effectiveness of their program to guide ongoing program improvement.



The addition of the INPO-like elements to the Department's existing lessons learned/operating experience program will enhance the Department's operating experience program. Once fully established, the Department's comprehensive operating experience program will accomplish the following functions:

- Increased integration and collective analysis of the results of various feedback systems to identify adverse trends or areas where increased attention is needed
- Identify and review internal occurrences, accidents, and other events of interest
- Identify and review external events of interest
- Determine the level of Department response appropriate for each occurrence
- Promote general awareness of operating experiences through various regular communications vehicles
- Require action on the part of line management in response to certain occurrences; action may include review, analysis, identification and implementation of corrective actions. Depending on the severity of the operating experience, actions will be taken at the local level, and subject to later reporting, verification and oversight.
- Provide briefings and training sessions to promote general awareness and valuing of operating experience, and to promote understanding and actions on specific high-profile operating events
- Maintain a searchable lessons learned database
- Perform annual self-assessments of the effectiveness of the operating experience program, including benchmarking of other programs, and solicitation of feedback from users, to continue to improve the program effectiveness

The Department's Comprehensive Operating Experience Program will include all of these attributes and issue appropriate Department requirements and guidance. The Department will also initiate annual site training sessions on operating experience. Implementation will be verified periodically as part of ongoing line oversight reviews, as described in Section 5.1.2. The Department will develop specific CRADs for oversight of field element Operating Experience Programs to review analysis of applicability of operating experience information, identification of response actions, and follow-on completion and effectiveness reviews of these actions.

Deliverables/Milestones

Commitment 20: Develop Comprehensive DOE Operating Experience Program.

Lead Responsibility: EH-1

Deliverable: DOE Directive on Operating Experience, approved and issued by the Deputy Secretary, along with implementation direction and a schedule to complete implementation.

Due Date: July 2005

Commitment 21: Demonstrate Performance of DOE Operating Experience Program.

Lead Responsibility: Applicable Program Secretarial Officers and Field Element Managers

Deliverable: Line oversight review reports on the implementation of the operating experience program at the line program's sites.

Due Date: [December 2006] Eighteen months after issuance of the DOE directive on Operating Experience (per Commitment 20).

5.2.3 Verification of Implementation of Operating Experience

Following the conclusion of all planned action in this section (5.2) and the associated line verification activities, the Office of Independent Oversight and Performance Assurance (O A) will perform an independent effectiveness assessment to determine whether the actions described in Section 5.2 have been adequately implemented and have resolved the identified safety issues.

5.3 Revitalizing Integrated Safety Management Implementation

The Department remains committed to ISM as the foundation of its safety management system and process. The Department recognizes that ISM is not being consistently implemented throughout the DOE complex. In particular, some DOE organizations are not consistently embracing and implementing ISM. Increased clarity of expectations and requirements for DOE organizations is expected to enhance the active engagement of DOE organizations.

The ISM areas of work planning and control and feedback and improvement were selected due to their importance, potential to leverage improvements in other areas, and evidence showing opportunities for continued improvement in these areas.

5.3.1 Enhancing ISM Implementation at DOE Headquarters and Field Offices

Issue

The Department's implementation of Integrated Safety Management within its Federal organizations can be improved through clear definition of federal expectations and federal ISM system descriptions.

Basis

The Department and its contractors remain firmly committed to ISM as first defined in 1996. Despite this, the Federal organizations have not consistently and completely implemented ISM. This is due to ambiguity in ISM expectations at the Federal level, inconsistent follow-up and oversight, and incomplete implementation guidance. The nature of Federal roles places strong emphasis on the ISM guiding principles. Over the past decade, HRO attributes have been developed from low-probability high-consequence work experience and research findings. The Department's ISM principles and related guidance do not fully reflect the lessons learned about effective HROs.

Resolution

The Department will clarify its expectations for DOE programs and field elements. For example, clear requirements and a set of CRADs need to be established for ISM system descriptions and for annual reviews and annual declarations. Results of annual reviews need to be effectively used to improve ISM. In parallel with this effort, the Department will also clarify existing ISM expectations for contractors regarding annual reviews and annual declarations, and clarify expectations regarding full ISM verifications. DOE programs and sites will develop and implement ISM system descriptions, if they have not already. In some cases, ISM system description requirements can be addressed in QAPs; in other cases, program FRA documents may be revised to address ISM system description requirements. The actual vehicle for addressing ISM system description requirements is not as important as the fact that the requirements have been consciously addressed and are being implemented. Verification of implementation will take place as part of normally scheduled line oversight and independent oversight reviews.

To enhance the understanding of ISM Policy and expectations, the Department will articulate the HRO attributes and delineate how these attributes relate to the existing set of guiding principles and functions. This articulation would also reflect the lessons from Columbia and Davis-Besse, and the draft INPO Nuclear Safety Culture Principles Document. Examples of primary attributes of HROs are:

- Systematic Approach to Safety
- Clear Roles and Responsibilities
- Technical Excellence
- Balanced Priorities
- Safety Standards and Requirements
- Operational Reliability

- Questioning Attitude
- Multiple Levels of Oversight
- Learning Organization

The Department will define clearly its expectations concerning implementation of ISM by DOE personnel and DOE contractors. As part of this process, the Deputy Secretary will decide whether a DOE Order or Manual to institutionalize these expectations should be developed.

The main thrust of the action in this section is focused on the DOE federal ISM system descriptions. While Department personnel have a different role to play in the Department-wide ISM system, this role is important, and needs to be clearly articulated. Federal personnel need to take a strong role in assuring both ISM Guiding Principles and ISM Core Functions. The Department expects that contractor system descriptions will continue to be updated annually and reviewed by the local site offices as part of their oversight programs.

Deliverables/Milestones

Commitment 22: Link HRO attributes with existing ISM principles and functions, and describe how these attributes will be incorporated in the Department's guidance directives.

Lead Responsibility: 2004-1 Implementation Team

Deliverable: DOE reaffirmation of ISM and statement on HRO attributes, approved by the Secretary of Energy

Due Date: April 2005

Commitment 23: Issue expectations for DOE organizations regarding ISM implementation.

Deliverable A: A set of expectations for DOE ISM system descriptions for DOE headquarters and field organizations

Lead Responsibility A: NA-1 and US-ESE

Due Date A: May 2005

Deliverable B: Decision on whether ISM Order or Manual is needed to institutionalize the expectations.

Lead Responsibility A: Deputy Secretary

Due Date B: June 2005

Commitment 24: Implement requirements for DOE organizations regarding ISM implementation.

Lead Responsibility: NA-1 and US-ESE

Deliverable A: Schedule for completing approved DOE ISM system descriptions (which may be addressed in revisions to QAPs or FRA documents) for DOE headquarters and field organizations

Due Date A: September 2005

Deliverable B: Approved DOE ISM system descriptions (which may be addressed in revisions to QAPs or FRA documents) for DOE headquarters and field organizations

Due Date B: Completion in accordance with schedules provided in Part A above (with target of June 2006)

5.3.2 Work Planning and Work Control Processes at the Activity Level

Issue

The Department needs additional improvement in consistency and reliability of work planning and work control performance at the activity level.

Basis

The need for additional improvement in work planning and work execution at the activity level has been identified by internal self-assessments, line and independent oversight, and Board oversight. Effective work planning and work control processes ensure that other activity level functions, such as hazards identification and controls are adequate to ensure safety and reliability. The current ISM system contains minimal expectations, and no explicit requirements, at any level to routinely assess the implementation of work planning and work control processes at the activity level.

Resolution

The resolution approach is designed to promote local ownership of the problems and solutions. Specifically:

- Contractors and DOE field elements will perform initial assessments to evaluate the effectiveness of work planning and work control processes at the activity level. DOE's role to provide oversight and assistance in achieving the desired behaviors and processes will be considered in the assessments.
- Based on these assessments, contractors and DOE field elements will identify specific areas where improvement is needed, and may identify recommended solutions.

- Contractors and DOE field elements will share their findings with each other at a DOE workshop, and participate in workshop sessions to develop approaches for effectively addressing concerns and measuring improvement.
- Following the workshop, contractors and DOE field elements will identify specific actions that they will pursue to correct identified weaknesses and deficiencies, specific schedules for completing these actions, and specific actions to continue to monitor performance in these areas.

NNSA has already initiated this action and held an initial work planning workshop. The lessons from the NNSA activities will be shared with the rest of the Department. NNSA has found multiple examples of problems cited with (1) job-hazard analysis at the task level, and (2) feedback and improvement specific to work planning, work control, and work performance. NNSA has also found multiple examples where line management has not taken sufficient steps to ensure that work is conducted strictly in accordance with established ISM system processes and procedures. Further, in some cases, there has been an over-reliance on automated job hazard analysis tools. NNSA's path forward includes development and promulgation of additional guidance and good practices, and follow-up workshops. NNSA also plans to revise and re-issue its draft CRADs to capture expectations in this area.

Site action plans will be developed to drive further improvements in work planning and control. Site action plans may contain a variety of actions depending on the site-specific situation and root cause of deficiencies, including:

- Revised processes, based on good practices and operational experience from others
- A good practices handbook, if useful
- Additional training and supervision
- Additional oversight and monitoring
- Additional coaching
- Additional and more effective self-assessments
- More effective learning from self-assessments to realize improvements
- Recommended changes to Department directives and guidance, if needed

Like other technical areas, the Department will develop oversight CRADs to capture core expectations for work planning and control, as described in Section 5.1.2. Field and headquarters organizations will perform periodic oversight in accordance with the CRADs developed in accordance with Section 5.1.2.

Deliverables/Milestones

Commitment 25: Complete site office action plans to improve work planning and work control.

Lead Responsibility: NA-1 and US-ESE

Deliverable: Action plans, approved by field elements and HQ program office.

Due Date: August 2005

Commitment 26: Perform HQ line oversight on work planning and work control.

Lead Responsibility: NA-1 and US-ESE

Deliverable: Headquarters oversight reports, in accordance with approved CRADs.

Due Date: [February 2007] Eighteen months following approval of site office action plans (per Commitment 25).

5.3.3 Integration and Use of Feedback Mechanisms to Produce Improvement

Issue

The Department needs improvement in consistency and use of the core ISM function of “feedback and improvement,” with emphasis on the “improvement” side.

Basis

The ISM core function, “feedback and improvement,” is not yet performing as intended, according to a variety of sources. For example, the recent (July 2004) DOE Office of Independent Oversight Lessons Learned Report identified the “feedback and improvement” function as having important weaknesses and is not well established or implemented. DOE and its contractors have a variety of feedback mechanisms, including occurrence reports, self-assessments, oversight assessments, non-conformance reports, and others. In general, the Department is good at collecting “feedback,” and not as good at making meaningful and lasting “improvement.” For the Department’s feedback mechanisms to be of benefit, deviations need to be reported and analyzed, and feedback mechanisms need to be integrated to identify problems and make improvements. Improved DOE attention to integration and use of “feedback and improvement” is expected to generate improved attention and use by contractors as well. Effective reporting and improvement systems are essential elements of an effective safety culture, demonstrating core values of “questioning attitude” and “learning organization.”

Resolution

To guide resolution of this issue, the Department will develop a clear set of core expectations (criteria) based on ISM and related HRO attributes that address:

- Increased leadership emphasis on reporting, issue evaluation, corrective actions, and follow-up to ensure corrective actions are effective.
- Training on use of various reporting mechanisms, including Employee Concerns processes, Differing Professional Opinion processes, Non-Conforming Items processes, issues management processes, and other feedback mechanisms.
- Increased use of positive feedback, recognition, and rewards for individuals who report errors and concerns, regardless of who caused the error.
- Increased integration and collective analysis of the results of various feedback systems to identify adverse trends or areas where increased attention is needed.
- Increased effectiveness of Corrective Action processes for analyzing identified issues, determining corrective actions, and closing items only after corrective actions are independently evaluated to be effective.
- Increased use of performance measures in understanding effectiveness of issues management and corrective actions management systems. Specifically, increased use of metrics related to “repeat findings” is needed.
- More effective self-assessments and line oversight of the “feedback and improvement” core function is needed to make these efforts more effective.
- Effective roll-up of year-end contractor and site office feedback results in the annual ISM reviews to identify specific areas for increased attention in the following year, including inputs to the annual planning and budgeting cycle.
- Effective roll-up of year-end program office feedback results, based on input from the site annual ISM reviews, to identify new goals and direction for improvement in the following year, including inputs to the annual planning and budgeting cycle, and goal setting as in the DOE Management Challenges.

The reference set of expectations for reporting, integration and use of the feedback findings and improvement actions will address implementation differences between HQ program offices, field elements, and contractors. DOE organizations will use the “feedback and improvement” expectations in development/revision and implementation of DOE ISM system descriptions. Sites will develop and implement plans of action to improve their “feedback and improvement” processes to meet the expectations defined in the CRADs. After at least one year of experience is gained in implementing newly issued DOE ISM system descriptions, the line managers will review implementation of the “feedback and improvement” element and make mid-course changes as needed. Line managers will review the responses to the ISM expectations as part of the line oversight program and make adjustments to expectations and oversight, as appropriate.

Deliverables/Milestones

Commitment 27: Develop a reference set of expectations and CRADs for “feedback and improvement” core element.

Lead: NA-1 and US-ESE

Deliverable: Feedback and improvement CRADs, approved and issued by the Deputy Secretary

Due Date: May 2005

Commitment 28: Review the implementation of “feedback and improvement” core element through disciplined line management oversight program, and provide both a summary status report to the Secretary and mid-course direction to direct reports on improving the institutionalization of ISM into the annual Departmental planning.

Lead: NA-1 and US-ESE

Deliverable: Report to the Secretary and direction to direct reports

Due Date: [February 2007] One year and nine months after issuance of CRADs (per Commitment 27).

5.3.4 ISM Verification

When ISM was originally implemented, the Department completed a series of thorough verifications of the effectiveness of the ISM systems as implemented. The ISM Guide currently describes that such thorough ISM system effectiveness verifications are needed when major changes are made. Implementation of ISM verifications has been very inconsistent; some sites established sound basic systems, some sites had flaws and others never deployed systems. The Department now believes that full ISM verifications need to be conducted at each site periodically, on a staggered schedule throughout the complex, to determine whether program implementation of requirements is consistent with the Department’s vision.

These periodic full verifications are intended to have a slightly different focus from the current ISM reviews. The performance of ISM to expectations should be captured adequately in the annual verifications. The periodic full verifications are intended to provide a more complete assurance to management on two fronts: 1) has the ISM been effective at all levels, including federal levels, and 2) are there enhancements in ISM that should be incorporated at the corporate level. Full ISM verifications are envisioned to occur at least every 5 years. More frequent full verifications may be appropriate where significant system or performance weaknesses are identified.

Some sites and field offices have decided to conduct full verifications every year. For these sites, the periodic full verifications will not differ significantly from the annual reviews. In general, full verifications differ from annual reviews as follows:

- Full verifications are led by a team leader who is not from the organization being reviewed.
- Full verifications have several team members who are not from the organization being reviewed.
- Teams for full verifications are typically at least 6-8 members, whereas annual reviews can be done with smaller teams.
- Full verifications are more intense, covering more CRADs in more depth over a shorter period of time than annual reviews.

Combined teams of NNSA and ESE personnel will perform the two initial ISM verifications to foster shared learning.

Deliverables/Milestones

Commitment 29: Complete comprehensive (HQ program offices, sites, contractors) ISM reviews at two major sites with defense nuclear facilities, one from NNSA and one from ESE, and schedule remaining reviews to be performed at all levels.

Lead Responsibility: NA-1 and US-ESE

Deliverable: Reports from ISM verifications and Schedule for remaining reviews

Due Date: [July 2006] 13 months after the issuance of ISM expectations (per Commitment 23A).

6.0 ORGANIZATION AND MANAGEMENT

This is a major implementation plan and a high priority for the Department. NA-2 and EH-1 will serve as the DOE responsible managers for this plan. They will establish a 2004-1 Implementation Team to coordinate overall execution of this plan. The team will include members from NNSA, EM, and EH, and other affected programs, and up to 5 additional members bringing field experience, technical experience, and continuity from the 2004-1 plan development effort. The team will also establish points of contact at each affected program office and site office. The 2004-1 responsible managers will establish the team structure necessary to accomplish plan implementation.

Roles and Responsibilities

The 2004-1 team will have the following responsibilities:

- Coordinate overall implementation of the Department's 2004-1 implementation plan.

- Complete assigned commitments, working with affected organizations and obtaining necessary concurrences from affected program offices.
- Monitor plan commitments and provide assistance and feedback to keep plan commitments on schedule and consistent with the planned objectives.
- Review all 2004-1 implementation plan deliverables for completeness and consistency, and provide input and recommendations to the responsible commitment managers.
- Communicate regularly with affected headquarters and site offices regarding the status of plan activities and expectations for near-term activities in support of plan implementation.
- Identify and resolve cross-cutting issues affecting plan implementation.
- Keep the executive leaders informed of overall plan performance and any issues that need senior management attention and direction.

Communications Strategy

To support management of this plan, the 2004-1 implementation team will develop a communications strategy. A central element of this strategy will be “road show” meetings for all DOE sites and headquarters locations. Participation in these “road shows” and support by top DOE officials, including the Secretary, will be important to the success of this plan. A Secretarial videotape will be provided to field locations. Personal visits from senior DOE officials to field locations will also be part of successful “road shows” to demonstrate DOE management commitment.

Commitment 30: The Department will provide kick-off meetings for affected DOE site and headquarters locations to cover: (1) 2004-1 planned actions, (2) Columbia/Davis-Besse lessons learned, and (3) lessons-learned from recent Type A accidents.

Lead Responsibility: 2004-1 Implementation Team Leader

Deliverable: Kick-off meetings

Due Date: April 2005

6.1 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 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 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.

6.2 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 to the Board and/or Board staff. The Department will provide briefings to the Board and/or Board staff approximately every 4 months.

Commitment 31: The Department will provide periodic status briefings to the Board. These briefings will include updates on the status of completing actions identified in the various reviews and assessments indicated in this plan.

Lead Responsibility: 2004-1 Implementation Team Leader

Deliverable: Briefings

Due Date: April 2005, and approximately every four months thereafter

Table 1: Summary of Implementation Plan Commitments and Deliverables/Milestones

Number	Commitment	Deliverable	Due Date	Responsibility
1	Formally establish the CTAs.	Secretarial delegation Order identifying the CTAs and their roles and responsibilities.	March 2005	Secretary of Energy
2	Provide adequate technical support for the CTAs.	Letter report from the CTAs to the Secretary declaring the CTAs have adequate technical support and providing the basis for this declaration.	[December 2005] Nine months after formally establishing the CTAs (per Commitment 1)	Central Technical Authorities
3	Fully implement the CTA function.	Letter report from the CTAs to the Secretary declaring the CTA function fully implemented and providing the basis for this declaration (NNSA report requires NNSA Administrator’s concurrence).	[December 2006] Twelve months after providing adequate technical support to the CTAs (per Commitment 2).	Central Technical Authorities
4	Issue DOE Order on Oversight.	Order 226.1 on Oversight, approved and issued by the Deputy Secretary	April 2005	OA-1
5	Develop and issue initial CRADs for use in performing safety oversight for a core set of technical areas.	Memo issuing CRADs for oversight of nuclear facilities and providing direction for their use, approved and issued by the Deputy Secretary	June 2005	NA-1 and US-ESE

Number	Commitment	Deliverable	Due Date	Responsibility
6	Issue DOE M 226.1, Safety Oversight Manual.	DOE Safety Oversight Manual 226.1	June 2006	NA-1 and US-ESE
7	Verify implementation of safety elements of the DOE directives on oversight	OA special study of implementation of federal line safety oversight.	[November 2007] Seventeen months after issuance of the DOE Safety Oversight Manual 226.1 (per Commitment 6).	OA-1
8	Formally establish the nuclear safety research function.	Secretarial delegation Order identifying the roles and responsibilities of the nuclear safety research function.	March 2005	Secretary of Energy
9	Provide adequate technical support for the nuclear safety research function.	Letter report to the Secretary declaring that adequate technical support is available and providing the basis for this declaration.	[December 2005] Nine months after formally establishing the nuclear safety research function (per Commitment 8)	EH-1

Number	Commitment	Deliverable	Due Date	Responsibility
10	Fully implement the nuclear safety research function.	Letter report to the Secretary declaring the nuclear safety research function fully implemented and providing the basis for this declaration.	[December 2006] Twelve months after providing adequate technical support for the nuclear safety research function (per Commitment 9)	EH-1
11	Define the process and criteria for delegating authorities to field personnel for fulfilling assigned safety responsibilities.	Process definition and criteria, approved by the Deputy Secretary	July 2005	CTAs
12	Develop and implement QAPs as required by DOE O 414.1B, “Quality Assurance.”	A. Approved HQ QAPs, with approved paths forward and schedules for achieving full implementation, including revision and implementation of field element QAPs. B. Approved Field Element QAPs.	A. November 2005 B. Completion in accordance with schedules provided in Part A above	NA-1 and US-ESE

Number	Commitment	Deliverable	Due Date	Responsibility
13	Verify implementation of the processes and criteria for delegating authorities to field personnel for fulfilling safety responsibilities, and evaluate whether all existing delegations of authority to the DOE Field Offices have been and are being made using these new processes and criteria.	Report to the Secretary	[February 2006] Seven months after issuance of delegation process and criteria description (per Commitment 11).	CTAs
14	The FTCP will develop corrective actions to improve recruiting, developing, training, qualifying, maintaining proficiency, and retaining technical personnel, as well as FTCP effectiveness. The corrective action plan will include a prioritized list of key positions that should be filled to enhance safety.	Corrective Action Plan, approved and issued by the Deputy Secretary	May 2005	Chairman, FTCP
15	DOE will identify highly qualified and experienced personnel who will assist the Department in improving overall technical capability.	A report identifying high-qualified and experienced personnel in select functional areas and describing their roles in improving overall technical capability, as well as a plan for implementing this concept and a mechanism for maintaining the list.	July 2005	Chairman, FTCP

Number	Commitment	Deliverable	Due Date	Responsibility
16	DOE will provide structured training, as necessary, for safety professionals, senior managers and decision-makers responsible for nuclear safety, including those responsible for nuclear safety oversight.	A report describing the training and professional development program, including the training materials, the status of personnel identified for training, the date when all identified personnel will complete training, and an assessment of the training's effectiveness.	August 2005	NA-1 and US-ESE
17	DOE will commission an emeritus-level panel to review the Department's efforts for recruiting, developing, retaining, and rewarding technically excellent personnel to fulfill safety responsibilities, evaluate associated organizational systems and impediments, evaluate the FTCP's effectiveness, and make recommendations to the Secretary for improving the Department's effectiveness in the areas reviewed.	Report to the Secretary	June 2006	Deputy Secretary of Energy

Number	Commitment	Deliverable	Due Date	Responsibility
18	DOE will complete technical staffing of the personnel placed in identified positions needed to perform the federal safety assurance function for nuclear facilities.	A report on completed DOE staffing actions, with status of technical qualifications.	December 2006	Deputy Secretary of Energy
19	Complete Department-wide formal review of Columbia and Davis-Besse events, and develop the Department-wide action plan.	Consolidated Department-wide Action Plan, approved and issued by the Deputy Secretary, and describing who will determine that corrective actions have been effective.	May 2005	Deputy Assistant Secretary for Corporate Performance Assessment (EH-3)
20	Develop Comprehensive DOE Operating Experience Program.	DOE Directive on Operating Experience, approved and issued by the Deputy Secretary, along with implementation direction and a schedule to complete implementation.	July 2005	EH-1

Number	Commitment	Deliverable	Due Date	Responsibility
21	Demonstrate Performance of DOE Operating Experience Program.	Line oversight review reports on the implementation of the operating experience program at the line program’s sites.	[December 2006] Eighteen months after issuance of the DOE directive on Operating Experience (per Commitment 20).	Applicable Program Secretarial Officers and Field Element Managers
22	Link HRO attributes with existing ISM principles and functions, and describe how these attributes will be incorporated in the Department’s guidance directives.	DOE reaffirmation of ISM and statement on HRO attributes, approved by the Secretary of Energy	April 2005	2004-1 Implementation Team
23	Issue expectations for DOE organizations regarding ISM implementation.	<p>A. A set of expectations for DOE ISM system descriptions for DOE headquarters and field organizations</p> <p>B. Decision on whether ISM Order or Manual is needed to institutionalize the expectations.</p>	<p>A. May 2005</p> <p>B. June 2005</p>	<p>A. NA-1 and US-ESE</p> <p>B. Deputy Secretary</p>

Number	Commitment	Deliverable	Due Date	Responsibility
24	Implement requirements for DOE organizations regarding ISM implementation.	<p>A. Schedule for completing approved DOE ISM system descriptions (which may be addressed in revisions to QAPs or FRA documents) for DOE headquarters and field organizations.</p> <p>B. Approved DOE ISM system descriptions (which may be addressed in revisions to QAPs or FRA documents) for DOE headquarters and field organizations.</p>	<p>A. September 2005</p> <p>B. Completion in accordance with schedules provided in Part A above (with target of June 2006).</p>	NA-1 and US-ESE
25	Complete site office action plans to improve work planning and work control.	Action plans, approved by field elements and HQ program office.	August 2005	NA-1 and US-ESE
26	Perform HQ line oversight on work planning and work control.	Headquarters oversight reports, in accordance with approved CRADs.	[February 2007] Eighteen months following approval of site office action plans (per Commitment 25).	NA-1 and US-ESE

Number	Commitment	Deliverable	Due Date	Responsibility
27	Develop a reference set of expectations and CRADs for “feedback and improvement” core element.	Feedback and improvement CRADs, approved and issued by the Deputy Secretary	May 2005	NA-1 and US-ESE
28	Review the implementation of “feedback and improvement” core element, and provide both a summary status report to the Secretary and mid-course direction to direct reports on improving the institutionalization of ISM into the annual Departmental planning.	Report to the Secretary and direction to direct reports	[February 2007] One year and nine months after issuance of CRADs (per Commitment 27).	NA-1 and US-ESE
29	Complete comprehensive (HQ program offices, sites, contractors) ISM reviews at two major sites with defense nuclear facilities, one from NNSA and one from ESE, and schedule remaining reviews to be performed at all levels.	Reports from ISM verifications and Schedule for remaining reviews	[July 2006] 13 months after the issuance of ISM expectations (per Commitment 23A).	NA-1 and US-ESE

Number	Commitment	Deliverable	Due Date	Responsibility
30	The Department will provide kick-off meetings for affected DOE site and headquarters locations to cover: (1) 2004-1 planned actions, (2) Columbia/Davis-Besse lessons learned, and (3) lessons-learned from recent Type A accidents.	Kick-off meetings	April 2005	2004-1 Implementation Team Leader
31	The Department will provide periodic status briefings to the Board. These briefings will include updates on the status of completing actions identified in the various reviews and assessments indicated in this plan.	Briefings	April 2005, and approximately every four months thereafter	2004-1 Implementation Team Leader

Appendix A: List of Acronyms

CAIB – NASA Columbia Accident Investigation Board

CAP – Corrective Action Plan

CDNS - Chief of Defense Nuclear Safety

CRAD – Criteria and Review Approach Document

CTA – Central Technical Authority

CSO – Cognizant Secretarial Officer

DOE – Department of Energy

DS – Deputy Secretary

EM – Environmental Management

EH – Environment, Safety and Health

ESE – Energy, Science and Environment

FRA – Functions, Responsibilities and Authorities

FRAM – Functions, Responsibilities and Authorities Manual

FTCP – Federal Technical Capability Panel

HRO – High Reliability Organization

INPO – Institute of Nuclear Power Operations

ISM – Integrated Safety Management

M – Manual

NASA (or NA) – National Aeronautics and Space Administration

NE – Nuclear Energy

NNSA (or NA) – National Nuclear Security Administration

NRC – Nuclear Regulatory Commission

O – Order

OA – Office of Independent Oversight and Performance Assurance

OPI – Office of Primary Interest

P – Policy

PMP – Project Management Plan

PSO – Program Secretarial Officer

QA – Quality Assurance

QAP – Quality Assurance Plan

SC – Office of Science

US – Under Secretary

Appendix B: Glossary of Terms

High Reliability Organizations - Organizations that consistently operate under trying and hazardous conditions, and manage to have relatively few accidents. These organizations operate in settings where the potential for error and disaster is very high. They have no choice but to function reliably because failure results in severe consequences. HRO theory holds that significant accidents can be prevented through proper management of prevention and mitigation activities. Examples of high-reliability organizations: nuclear aircraft carriers, nuclear power generating plants, power grid dispatching centers, air traffic control systems, aircraft operations, hospital emergency departments, hostage negotiating teams, firefighting crews, continuous processing firms.

Integrated Safety Management System - To prevent organizational accidents, the Department of Energy has developed a comprehensive safety management system – the Integrated Safety Management system – based on a set of safety requirements and standards, detailed safety analyses to identify hazards and controls, robust design and administrative controls for identified hazards, a technical qualification program, detailed work planning, operational readiness certifications, a strong occurrence reporting system, extensive performance monitoring and reviews, and independent oversight. Sustained vigilance is required for an effective ISM system.

Organizational Accidents - Organizational accidents often involve a complex combination of individual errors, human-machine interface difficulties, latent weaknesses in designed hardware or administrative controls, and programmatic weaknesses that allowed these latent defense weaknesses to be created and sustained without detection. Complex technologies vulnerable to organizational accidents include nuclear power plants, commercial aviation, petrochemical industry, chemical process plants, marine and rail transport, banks and stadiums. Most accidents originate from or are propagated by latent failures – loopholes in the system’s defenses, barriers, and safeguards whose potential existed unobserved for some time prior to the onset of the accident sequence. These loopholes consist of imperfections in features such as leadership/supervision, training and qualification, report of defects, engineered safety features, safety procedures, and hazard identification and evaluation. Some illustrative examples of organizational accidents are listed below:

- USS Thresher Nuclear Submarine (1963)
- NASA Apollo 1 Fire (1967)
- Flixborough, UK Petrochemical Explosion (1974)
- Three Mile Island Nuclear Station (1979)
- Bhopal, India (1984)
- NASA Challenger Space Shuttle (1986)
- Chernobyl Nuclear Power Plant, Ukraine (1986)
- Explosion on the Piper Alpha Oil Platform (1988)
- Exxon Valdez runs aground (1989)

- Davis-Besse Reactor Vessel Head Incident (2002)
- NASA Columbia Space Shuttle (2003)

Differences between individual and organizational accidents are summarized below:

Individual Accidents	Organizational Accidents
A specific individual or group is the agent of the accident.	Have Multiple Causes, involving many operating at different levels of the respective organizations
The agent of the accident is usually also the main victim of the accident. Consequences may be great to those involved, but they are limited.	Consequences can be catastrophic. Organizational accidents can have devastating effects on uninvolved populations, assets, and the environment.
The frequency is moderate. Within the DOE complex, serious individual accidents typically occur each year.	The frequency of organizational accidents is rare or extremely rare. Some possible organizational accidents are considered unacceptable – to be avoided at all costs.
Nature of individual accidents has remained relatively unchanged over recent years.	Organizational accidents – a product of technological innovations – have become more prevalent in recent years as technologies have gotten more complex.

Normalization of Error (also Normalization of Deviation) - The tendency to redefine and accept previously-unexpected anomalies over time as expected events and ultimately as acceptable risks. Diane Vaughan developed this term based on her study of the O-ring failures in the Challenger accident. In this accident, “the range of expected error enlarged from the judgment that it was normal to have heat on the primary O-ring, to normal to have erosion on the primary O-ring, to normal to have gas blowby, to normal to have blowby reaching the secondary O-ring, and finally to the judgment that it was normal to have erosion on the secondary O-ring.”

Nuclear Facility – A reactor or a nonreactor nuclear facility where an activity is conducted for or on behalf of DOE and includes any related area, structure, facility, or activity to the extent necessary to ensure proper implementation of the requirements established by 10 CFR 830. [10 CFR 830]

Safety Culture - The safety culture of an organization is the product of individual and group values, attitudes, competencies, and patterns of behavior that determine the commitment to, and the style and proficiency of, an organization’s health and safety programs. Organizations with a positive safety culture are characterized by communications founded on mutual trust, by shared perceptions of the importance of safety, and by confidence in the efficacy of preventive measures. The term safety culture entered public awareness through the vocabulary of nuclear safety after the Chernobyl nuclear power plant explosion.

Appendix C: Cross-Walk to Recommendation

TOPIC AREA	Board Recommendation 2004-1 (May 21, 2004)	Secretary's Response Letter (July 21, 2004)	Department's 2004-1 Implementation Plan
Delegations of Authority	<i>"The Board recommends: 1. That delegation of authority for nuclear safety matters to field offices and contractors be contingent upon the development and application of criteria and implementing mechanisms to ensure that:"</i>	<i>The Department will: "1. Clarify and/or establish formal requirements regarding delegation of authority on safety matters to ensure that delegations are made with clear criteria. ..."</i>	Section 5.1.4 , Strengthening Federal Safety Assurance - Establishing Clear Roles, Responsibilities, and Authorities
Oversight	<i>"(a) oversight responsibility includes the capability for examining, assessing, and auditing by all levels of the DOE organization,"</i>	<i>The Department will: "1. ... Ensure that adequate oversight [is] in place to fulfill these safety responsibilities at all levels of the Department."</i>	Section 5.1.2 , Strengthening Federal Safety Assurance - Providing Effective Federal Oversight
Technical Capability	<i>"(b) the technical capability and appropriate experience for effective safety oversight is in place, and"</i>	<i>The Department will: "1. ... Ensure that technical capability [is] in place to fulfill these safety responsibilities at all levels of the Department."</i>	Section 5.1.5 , Strengthening Federal Safety Assurance - Ensuring Technical Capability and Capacity to Fulfill Safety Responsibilities
Operating Experience Program	<i>"(c) corrective action plans consistent with recommendations resulting from internal DOE and NNSA reviews of the Columbia accident and the Davis-Besse incident are issued."</i>	<i>The Department will: "2. Identify applicable lessons from the Columbia accident and Davis-Besse incident and implement corrective actions to improve safety throughout the organization."</i>	Section 5.2 , Learning from Operating Experience
Central Technical Authority	<i>"2. That to ensure that any features of the proposed changes will not increase the likelihood of a low-probability, high-consequence nuclear accident, DOE and NNSA take steps to: (a) empower a central and technically competent authority responsible for operational and nuclear safety goals, expectations, requirements, standards, directives, and waivers;</i>	<i>The Department will: "3. Establish a technically-competent, central authority or authorities with core safety responsibilities."</i>	Section 5.1.1 , Strengthening Federal Safety Assurance - Instituting a Central Technical Authority (CTA)
Nuclear Safety	<i>"(b) ensure the continued integration and support of</i>	<i>The Department will: "4. Identify safety research,</i>	Section 5.1.3 , Strengthening Federal Safety Assurance -

Research Program	<i>research, analysis, and testing in nuclear safety technologies;”</i>	<i>analysis, and testing needs and institute a program to ensure effective management, integration, and execution of efforts to address these needs.”</i>	Instituting a Nuclear Safety Research Program
Integrated Safety Management	<i>“(c) require that the principles of Integrated Safety Management serve as the foundation of the implementing mechanisms at the sites.”</i>	<i>Second Paragraph: “The Department remains firmly committed to its Integrated Safety Management (ISM) program as the foundation for performing work safely throughout the Department. The Department’s response will include actions to enhance the effectiveness of our ISM program.”</i>	Section 5.3 , Revitalizing Integrated Safety Management Implementation
FRAs and QAPs	<i>“3. That direct and unbroken line of roles and responsibilities for the safety of nuclear operations—from the Secretary of Energy and the NNSA Administrator to field offices and sites—be insured according to appropriate Functions, Responsibilities, and Authorities documents and Quality Assurance Implementation Plans.”</i>	<i>The Department will: “5. Revise and implement the Functions, Responsibilities and Authorities documents and Quality Assurance Plans, as needed, to achieve the actions described above and to ensure direct and unbroken lines of roles and responsibilities for the safety of nuclear operations.”</i>	Section 5.1.4 , Strengthening Federal Safety Assurance - Establishing Clear Roles, Responsibilities, and Authorities [with additional actions throughout the plan]
Verification	<i>“4. That prior to final delegation of authority and responsibility for defense nuclear safety matters to the field offices and contractors, DOE and NNSA Program Secretarial Officers provide a report to the Secretary of Energy describing the results of actions taken in conformance with the above recommendations.”</i>	<i>The Department will: “6. Validate that safety responsibilities, capabilities, and authorities are implemented and consistent with requirements.”</i>	Section 5.3.4 , Revitalizing Integrated Safety Management Implementation – Verification [with additional actions throughout the plan]

Appendix D: Board Recommendation 2004-1

[DNFSB LETTERHEAD]

May 21, 2004

The Honorable Spencer Abraham
Secretary of Energy
1000 Independence Avenue, SW
Washington, DC 20585-1000

Dear Secretary Abraham:

On May 21, 2004, the Defense Nuclear Facilities Safety Board (Board), in accordance with 42 U.S.C. § 2286d(a), unanimously approved Recommendation 2004-1, which is enclosed for your consideration. Recommendation 2004-1 deals with Oversight of Complex, High-Hazard Nuclear Operations.

After your receipt of this recommendation and as required by 42 U.S.C. § 2286d(a), the Board will promptly make it available to the public. The Board believes that the recommendation contains no information that is classified or otherwise restricted. To the extent this recommendation does not include information restricted by DOE under the Atomic Energy Act of 1954, 42 U.S.C. §§ 2161-68, as amended, please see that it is promptly placed on file in your regional public reading rooms. The Board will also publish this recommendation in the *Federal Register*.

Sincerely,

John T. Conway
Chairman

Enclosure

c: Mr. Mark B. Whitaker, Jr.

**DEFENSE NUCLEAR FACILITIES SAFETY BOARD
RECOMMENDATION 2004-1 TO THE SECRETARY OF ENERGY
Pursuant to 42 U.S.C. § 228a(a)(5)
Atomic Energy Act of 1954, As amended.**

Dated: May 21, 2004

In furtherance of its statutory duty to oversee the Department of Energy's (DOE) protection of workers and the public from hazards at defense nuclear facilities operated for DOE and the National Nuclear Security Administration (NNSA), the Defense Nuclear Facilities Safety Board (Board) conducted eight public hearings to examine DOE's current and proposed methods of ensuring safety at its defense nuclear facilities.

In these hearings, the Board also sought to benefit from the lessons learned as a result of investigations conducted following the Columbia Space Shuttle disaster and the discovery of the deep corrosion in the reactor vessel head at the Davis-Besse Nuclear Power Plant. The Board received testimony from representatives of the Nuclear Regulatory Commission; the Naval Reactors Program; the Columbia Accident Investigation Board; the Deputy Secretary of Energy; the Administrator of NNSA; DOE's Under Secretary of Energy, Science and Environment; DOE's Assistant Secretary for Environment, Safety, and Health; and selected site managers of DOE's facilities, senior contractor managers, and members of the public.

The overall objective of the hearings was to gather information that could be helpful in assessing DOE's proposals for changing the methods it uses for contract management and nuclear safety oversight, as they have been controlled through the DOE Directives System. NNSA has proposed shifting responsibility for safety oversight from DOE Headquarters to the DOE field offices and site contractors. The key question the Board sought to address was: Will modifications proposed by DOE/NNSA to organizational structure and practices, as well as increased emphasis on productivity, improve or reduce safety, and increase or decrease the possibility of a high-consequence, low-probability nuclear accident?

DOE's programs for national security and environmental protection are complex, with potentially high consequences if not safely performed. Mishandling of nuclear materials and radioactive wastes could result in unintended nuclear criticality, dispersal of radioactive materials, and even nuclear detonation. DOE has a long and successful history of nuclear operations, during which it has established a structure of requirements directed to achieving nuclear safety. That structure is based on such methods as defense in depth, redundancy of protective measures, robust technical competence in operations and oversight, extensive research and testing, a Directives System embodying nuclear safety requirements, Integrated Safety Management, and processes to ensure safe performance.

The United States owns the defense nuclear facilities at which its programs are carried out by a government agency—DOE. Each such facility is operated by a contractor that was selected by DOE on the basis of being best suited to conduct the work for DOE at that site.

Under the original Atomic Energy Act of 1946 and continuing to date in the Atomic Energy Act of 1954, as amended, the government officials in charge (i.e., the Secretary of Energy and other line officers) have a statutory responsibility to protect health and minimize danger to life or property. In any delegation of responsibility or authority to lower echelons of DOE or to contractors, the highest levels of DOE continue to retain safety responsibility. While this responsibility can be delegated, it is never ceded by the person or organization making the delegation. Contractors are responsible to DOE for safety of their operations, while DOE is itself responsible to the President, Congress, and the public.

This reality was highlighted during the course of the Board's hearings. Many important lessons were cited in the testimony provided. These included the importance of a centralized and technically competent oversight authority, central control of technical safety requirements and waivers for departure from those requirements, an ability to operate in a decentralized mode when appropriate, a willingness to accept criticisms, the need for retention of technical expertise and capabilities at high levels of any organization in which technical failure could have high consequences, and an awareness that complacency can arise from a history of successes. DOE representatives testified that DOE's attention to safety has continued to improve with better on-site oversight and self-assessment programs, use of Integrated Safety Management, careful attention to safety statistics, and stabilization and disposal of high risk nuclear materials. However, cause for concern with regard to the potential increase in the possibility of nuclear accidents was also evident in: (1) the increased emphasis on productivity at the possible expense of safety, (2) the loss of technical competency and understanding at high levels of DOE's and NNSA's organizational structure, (3) the apparent absence of a strong safety research focus, and (4) the reduced central oversight of safety.

Clearly, safety performance can benefit from attention to detail and lessons learned from small incidents and minor accidents. However, failures leading to high-consequence, low-probability accidents would likely have their roots in interactions between engineering failures and improper human actions. Because the consequences of large nuclear accidents would be unacceptable, the nuclear weapons complex cannot permit them to occur. While the potential for such accidents cannot be completely eliminated, their likelihood can be held to an insignificant level by rigorous attention to Integrated Safety Management with technical and operational excellence based on nuclear safety standards subject to rigorous oversight. In addition, nuclear safety must be founded on solid research, analysis, and testing to ensure an adequate understanding of energetic initiating mechanisms under off-normal conditions.

DOE has taken some preliminary steps toward its proposed changes in safety practices. These actions may have contributed to some unfortunate consequences, such as the following:

- A glovebox fire occurred at the Rocky Flats closure site, where, in the interest of efficiency, a generic procedure was used instead of one designed to identify and control specific hazards. Apparently, success of the cleanup project resulted in management complacency. DOE site management had given the impression that safety was less

important than progress, and contract management had not emphasized oversight of work control processes.

- Downsizing of safety expertise has begun in NNSA's NA-53 organization, while field organizations such as the Albuquerque Service Center have not developed an equivalent technical capability in a timely manner. As a result, NNSA field offices are left without an adequate depth of understanding of such important matters as seismic analysis and design, training of nuclear workers, and protection against unintended criticality.
- DOE's Office of Environmental Safety and Health, with assistance from some sites and contractors, has reviewed DOE Directives to simplify safety requirements, with the objective of supporting accelerated operations that are also more efficient. This shift has led to proposals for downgrading some worker safety Directives to the level of guidance and modifying some radiation protection requirements. It has also led to a proposed modification of the Order on Worker Safety and Health to reduce requirements for protecting workers from the consequences of fires, explosions, and discharges from high-pressure systems.

Proposed modifications to DOE and NNSA's organizational structure, manpower, contract management, oversight policies and practices, and safety directives could have unintended consequences. These include reduction of defense in depth, potentially inconsistent safety-related decisions caused by decentralization of safety authority, emphasis on performance as opposed to safety, and reduction of technical capability at key points in the organizational structure. DOE and NNSA line managers could be left with inadequate awareness of safety issues.

As a result of testimony it has received, the Board is not convinced of the benefit of the changes to DOE's and NNSA's organizational structure and practices as they have been described. The Board cautions that if any such changes are made, they must be done formally and deliberatively, with due attention given to unintended safety consequences that could reduce the present high level of nuclear safety. DOE should take full advantage of lessons learned from safety problems discovered by National Aeronautic Space Administration and Nuclear Regulatory Commission, and it should learn from the success of the good organizational and safety practices championed by the Naval Reactors Program. The Board needs to be sure that any fundamental reorganization does not degrade nuclear safety, and that the likelihood of a serious accident, facility failure, construction problem, or nuclear incident will not be increased as a result of well-intentioned changes.

As a result of testimony received at the public hearings and the potential effects on safety at defense nuclear facilities outlined above, the Board recommends:

1. That delegation of authority for nuclear safety matters to field offices and contractors be contingent upon the development and application of criteria and implementing mechanisms to ensure that:

- a. oversight responsibility includes the capability for examining, assessing, and auditing by all levels of the DOE organization,
 - b. the technical capability and appropriate experience for effective safety oversight is in place, and
 - c. corrective action plans consistent with recommendations resulting from internal DOE and NNSA reviews of the Columbia accident and the Davis-Besse incident are issued.
2. That to ensure that any features of the proposed changes will not increase the likelihood of a low-probability, high-consequence nuclear accident, DOE and NNSA take steps to:
 - a. empower a central and technically competent authority responsible for operational and nuclear safety goals, expectations, requirements, standards, directives, and waivers;
 - b. ensure the continued integration and support of research, analysis, and testing in nuclear safety technologies; and
 - c. require that the principles of Integrated Safety Management serve as the foundation of the implementing mechanisms at the sites.
 3. That direct and unbroken line of roles and responsibilities for the safety of nuclear operations—from the Secretary of Energy and the NNSA Administrator to field offices and sites—be insured according to appropriate Functions, Responsibilities, and Authorities documents and Quality Assurance Implementation Plans.
 4. That prior to final delegation of authority and responsibility for defense nuclear safety matters to the field offices and contractors, DOE and NNSA Program Secretarial Officers provide a report to the Secretary of Energy describing the results of actions taken in conformance with the above recommendations.

John T. Conway, Chairman

Appendix E: Secretary's Response Letter to Board Recommendation 2004-1

[SOE LETTERHEAD]

July 21, 2004

The Honorable John T. Conway
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW, Suite 700
Washington, DC 20004-2901

Dear Mr. Chairman:

The Department has thoroughly reviewed Recommendation 2004-1 regarding oversight of complex, high-hazard nuclear operations issued by the Defense Nuclear Facilities Safety Board (Board) on May 21, 2004.

The Department remains firmly committed to its Integrated Safety Management (ISM) program as the foundation for performing work safely throughout the Department. The Department's response will include actions to enhance the effectiveness of our ISM program. We remain committed to safety as our top priority and will not sacrifice safety to meet production goals. In January, we highlighted our commitment to continued safety improvement by establishing safety as one of the seven Department-wide Management Challenges for 2004.

As you observed as background to the recommendation, the Columbia accident and the Davis-Besse incident provide valuable lessons from which the Department can learn as we continue to improve our safety management. The lessons from these events will be key inputs in our action planning in response to your recommendation.

The Department accepts Recommendation 2004- 1 and will develop an implementation plan to accomplish the following actions for nuclear operations at defense nuclear facilities:

1. Clarify and/or establish formal requirements regarding delegation of authority on safety matters to ensure that delegations are made with clear criteria. Ensure that adequate oversight and technical capability are in place to fulfill these safety responsibilities at all levels of the Department.
2. Identify applicable lessons from the Columbia accident and Davis-Besse incident and implement corrective actions to improve safety throughout the organization.
3. Establish a technically-competent, central authority or authorities with core safety responsibilities.

4. Identify safety research, analysis, and testing needs and institute a program to ensure effective management, integration, and execution of efforts to address these needs.
5. Revise and implement the Functions, Responsibilities and Authorities documents and Quality Assurance Plans, as needed, to achieve the actions described above and to ensure direct and unbroken lines of roles and responsibilities for the safety of nuclear operations.
6. Validate that safety responsibilities, capabilities, and authorities are implemented and consistent with requirements.

The Department's understanding is that Recommendation 2004-1 does not require changes to the structure of the directives management system or to the existing DEAR clauses.

Regarding delegations of authority on defense nuclear safety matters, I have directed the Department's senior managers to make no new field delegations, except as approved by me or the Deputy Secretary until the Department completes the applicable actions identified in the Department's 2004-1 implementation plan. To clarify, this restriction does not apply to delegation modifications that may be required as a result of personnel changes or delegation expirations.

I have asked Mr. Ted Sherry, Deputy Manager, National Nuclear Security Administration Y-12 Site Office, to lead the response team that will develop the Department's 2004-1 implementation plan. If you have questions, please contact him at (865) 576-0752.

Sincerely,

Spencer Abraham