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July 19, 2007

To the Congress of the United States:

On September 29, 2006, House Conference Report 109-702 on the John Warner National Defense Authorization Act for Fiscal Year 2007 (H.R. 5122) was released and approved by both houses of Congress. The Conference Report, Section 3201, requested the Defense Nuclear Facilities Safety Board (Board) and the Department of Energy (DOE) to report jointly to the congressional defense committees on their efforts to improve the timeliness of issue resolution, including recommendations, if any, for legislation that would strengthen and improve technical oversight of DOE's nuclear design and operational activities.

This report, prepared jointly by the Board and DOE, describes actions that will provide for more timely identification and resolution of technical issues raised by the Board; some of these actions have already been completed. A summary listing of these actions is provided in Enclosure 1, while the complete report is provided in Enclosure 2. Broadly, the actions described are intended to promote (1) the early identification of safety requirements and strategies at the conceptual and preliminary design phases of a project to avoid cost increases and schedule delays, and (2) more effective processes or protocols for the communication to DOE of issues identified by the Board and for the tracking and management of these issues.

The Board and DOE believe that the actions described will improve the timeliness of the resolution of safety issues resulting from the Board's review of DOE's design and construction projects. Nonetheless, DOE and the Board are mindful of the effort required to complete the actions identified, and of the amount of work that must be accomplished early in the design phase of projects to produce a more complete conceptual design and safety strategy. The Board intends to conduct a fourth public hearing on this topic during 2008, to assess progress towards implementing the actions described.

Sincerely,

Clay Sell, Deputy Secretary
Department of Energy

A. J. Eggenberger, Chairman
Defense Nuclear Facilities Safety Board

Enclosures

ENCLOSURE 1

SUMMARY OF ACTIONS TO IMPROVE THE TIMELINESS OF ISSUE RESOLUTION

Action	Responsibility	Objective	Status	Completion Date
Project Letters	Board	Summarize unresolved safety issues and Board view of safety status of projects at appropriate critical decisions.	Being implemented	Immediate
Quarterly Reports to Congress	Board	Summarize to the Congress unresolved safety issues on a project by project basis.	Being implemented	Immediate
Periodic Joint Reviews of Open Safety Issues	Board/DOE	Track and status safety issues raised as a result of the Board's reviews of projects.	Being implemented	Immediate
Implement Recently Issued Order 413.3A	DOE	Implement changes to the Order related to early integration of safety into design.	Phased implementation underway	Requirements become effective 6 months from issuance of Standard 1189
Implement Newly Developed Standard 1189	DOE	Implement specific actions during the project design phase to achieve the safety-in-design objectives incorporated into DOE Order 413.3A.	Phased implementation underway	Standard 1189 to be issued late 2007. Immediate implementation for new projects; phased implementation for existing projects
Demonstrate requirements incorporated into Order 413.3A and Standard 1189	Board/DOE	Demonstrate the safety-in-design requirements of Order 413.3A and Standard 1189 on two major projects (Uranium Processing Facility and Integrated Waste Treatment Unit).	Being implemented	Immediate
Guides to Support Order 413.3A	DOE	Eighteen guides to be developed to provide additional guidance on implementation of DOE Order 413.3A.	Being implemented	All guides expected to be completed by 2008

ENCLOSURE 2

IMPROVING THE IDENTIFICATION AND RESOLUTION OF SAFETY ISSUES DURING THE DESIGN AND CONSTRUCTION OF DOE DEFENSE NUCLEAR FACILITIES

A Report Prepared Jointly by the
Defense Nuclear Facilities Safety Board and
the Department of Energy

July 2007

PREFACE

This report was prepared jointly by the Defense Nuclear Facilities Safety Board and the Department of Energy, as requested in the Conference Report of the John Warner National Defense Authorization Act for Fiscal Year 2007. The applicable portion of the Conference Report is as follows:

> The conferees note their concern regarding the untimely resolution by the Department of Energy of technical issues raised by the Board. The conferees believe that the Board and the Department would benefit from a more structured process for issue resolution that would allow issues to be raised, evaluated, and adjudicated at logical points in the design and construction process. The conferees urge the Board to evaluate whether more frequent use of the Board's formal recommendation process would drive both parties towards this more structured process. The conferees also encourage the Board to take a constructive role in the problem-solving process by quickly evaluating corrective actions proposed by the Department and its contractors.
>
> The conferees are encouraged by efforts between the Department and the Board to develop a process to provide for more timely identification and resolution of technical differences over design standards and other issues at the Department's nuclear facilities. Specifically, conferees support the pending revision of the Department's Order 413.3 to require critical safety determinations be made prior to Critical Decision 1 in the Department's project management system. The conferees direct the Board and the Department to continue these discussions and to report jointly to the congressional defense committees on their efforts to improve the timeliness of issue resolution, including recommendations, if any, for legislation that would strengthen and improve technical oversight of the Department's nuclear design and operational activities. Until such time as this report is submitted, the conferees further direct the Board to provide to the congressional defense committees quarterly reports to identify and report the status of significant unresolved issues.
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> H.R. Rep. No. 109-702, at 976 (2006) (Conf. Rep.).

EXECUTIVE SUMMARY

The Department of Energy (DOE) is responsible for the design and construction of defense nuclear facilities required to carry out its mission. These defense nuclear facilities are often large, complex projects involving new technology and one-of-a-kind processes. The Defense Nuclear Facilities Safety Board (Board) is responsible for providing external safety oversight of DOE's defense nuclear activities. As directed by its enabling legislation, the Board "shall review the design of a new Department of Energy defense nuclear facility before construction of such facility begins and shall recommend to the Secretary [of Energy], within a reasonable time, such modifications of the design as the Board considers necessary to ensure adequate protection of public health and safety."

In the Conference Report of the John Warner National Defense Authorization Act for Fiscal Year 2007, the conferees noted "their concern regarding the untimely resolution by the Department of Energy of technical issues raised by the Board." This concern arose primarily as a result of significant cost increases and schedule delays due to the untimely resolution of technical safety issues during the design of the Waste Treatment Plant at the Hanford Site. The conferees requested the Board and DOE to report jointly on their efforts to improve the timeliness of issue resolution, including recommendations, if any, for legislation that would strengthen and improve technical oversight of DOE's nuclear design and operational activities.

This report, prepared jointly by the Board and DOE, describes actions identified to provide for more timely identification and resolution of technical issues raised by the Board; some of these actions have already been completed. The significant actions include the following:

- DOE Order 413.3, *Program and Project Management for the Acquisition of Capital Assets*, was revised to incorporate elements that should help ensure the early integration of safety into the design process. The following are examples of significant changes:
  - Safety requirements for each critical decision have been identified.
  - Safety design reports are required at the conceptual and preliminary design stages.
  - A Technical Independent Project Review, which focuses on safety documentation, is required as part of the Critical Decision-1 review for high-risk, high-hazard, and Hazard Category 1, 2, and 3 nuclear facilities.
  - The Integrated Project Team membership now includes technical safety experts.

- Safety responsibilities during the design process are now defined for DOE's Central Technical Authorities, Chief of Defense Nuclear Safety, and Chief of Nuclear Safety.

- DOE Manual 413.3-1, *Project Management for the Acquisition of Capital Assets*, is being revised and converted to a series of guides to clarify the requirements of the associated DOE Order and to make clearer reference to safety standards and requirements.

- A new standard, DOE-STD-1189, *Integration of Safety into the Design Process*, is being developed to provide a detailed description of the safety-related design information required to meet the requirements of DOE Order 413.3A for integrating safety early into the design. Significant elements of this new standard include the following:

  - The development of a Safety Design Strategy that provides a roadmap for addressing important safety issues as the project progresses.

  - The development, in the conceptual design stage, of facility-level design basis accidents to provide the necessary input for the classification of important safety functions and systems.

  - The guidance for the preparation of a Conceptual Safety Design Report, a Preliminary Safety Design Report, and the Preliminary Documented Safety Analysis.

- DOE and the Board are jointly evaluating the effectiveness of DOE Order 413.3A and DOE-STD-1189 by demonstrating their application to two ongoing defense nuclear facility design efforts: the Integrated Waste Treatment Unit at the Idaho National Laboratory Site and the Uranium Processing Facility at the Y-12 National Nuclear Security Complex. These demonstration efforts are providing feedback on the effectiveness of actions taken to improve the early integration of safety into design.

- DOE and the Board have reaffirmed the importance of the Board's ready access to information as described in the Board's legislation: "The Secretary of Energy shall fully cooperate with the Board and provide the Board with ready access to such facilities, personnel, and information as the Board considers necessary to carry out its responsibilities...."

- Pending the submittal of this report, the Board is providing Congress with quarterly reports to identify and report on the status of significant unresolved safety issues at defense nuclear facilities.

- The Board has begun issuing "project letters" early in the design process to apprise DOE of the status of safety issues raised by the Board. These project letters will be updated by the Board as the project situation requires.

- DOE and the Board are conducting joint periodic discussions to review the status of significant unresolved safety issues and to allow the Board to evaluate actions being taken to resolve these issues. DOE and the Board will use joint periodic reviews as a mechanism to maintain senior management awareness of the status of these unresolved issues.

The Board and DOE believe that the above actions will improve the timeliness of the resolution of safety issues resulting from the Board's review of DOE's design and construction projects. The Board and DOE also believe that current law provides adequate mechanisms and authorities to achieve the timely identification and resolution of issues and that additional legislation is not required at this time.

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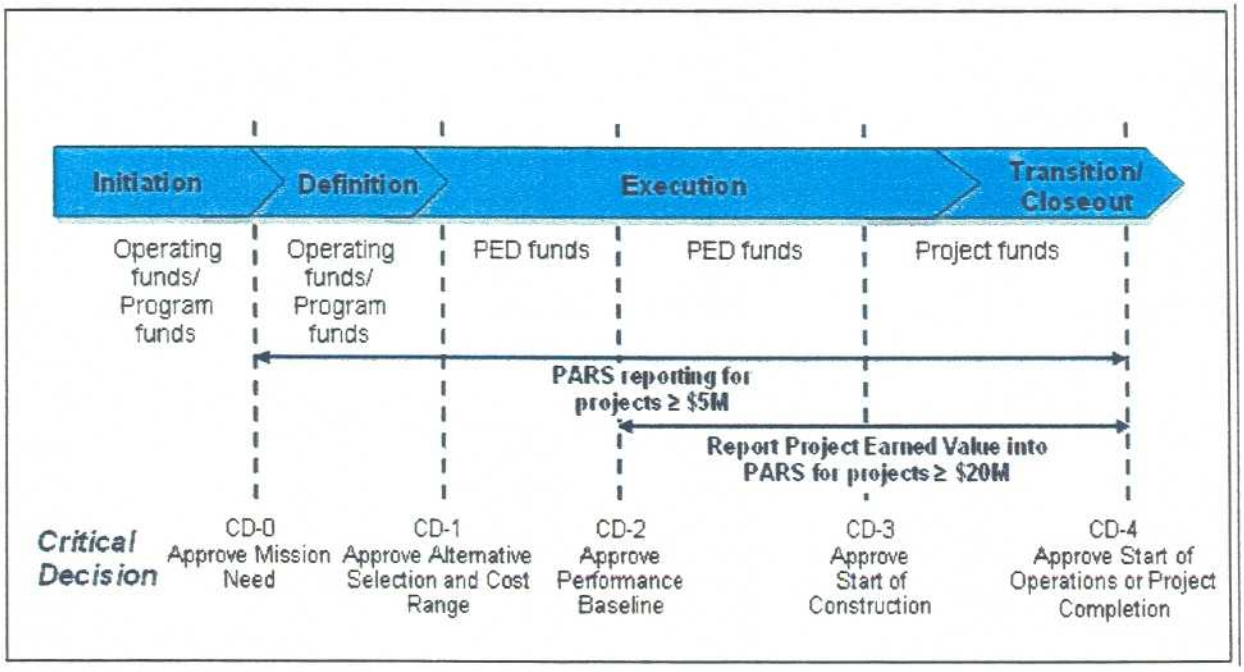
1. INTRODUCTION AND BACKGROUND

In executing its mission, the Department of Energy (DOE) needs to design, construct, or procure new facilities. Most DOE facilities and activities that fall within the purview of the Board's oversight authority are managed by DOE's Office of Environmental Management (EM) and the National Nuclear Security Administration (NNSA). Within these two offices there are currently 25 major defense nuclear facility design and construction projects that are subject to review by the Defense Nuclear Facilities Safety Board (Board). The extent of the Board's review of these projects varies depending on the level of hazard, magnitude, complexity, and risk to public health and safety.

DOE Order 413.3A defines the critical decisions that need to be made during the life cycle of a project, as summarized in Figure 1. These critical decisions are as follows:

- Approve mission need (Critical Decision-0).
- Approve alternative selection and cost range (Critical Decision-1).
- Approve the performance baseline (Critical Decision-2).
- Approve start of construction (Critical Decision-3).
- Approve start of operations or project completion (Critical Decision-4).



Note: CD = critical decision; PARS = Project Assessment and Reporting System; PED = Project Engineering and Design

Figure 1 - Project Life Cycle

The Board's enabling legislation requires that it review the design of new DOE defense nuclear facilities before construction begins and recommend to the Secretary of Energy, within a reasonable time, any modifications of the design the Board considers necessary to ensure adequate protection of the public health and safety. The Board has worked with DOE to carry out this legislative mandate since 1989, and in so doing has reviewed a large number of DOE design and construction projects.

The Board's review of ongoing design and construction projects—in particular the Waste Treatment Plant at the Hanford Site—gave rise to concern about the process for ensuring the expeditious resolution of safety issues. Consequently, the Board and DOE began evaluating elements of DOE's design and construction process to identify actions that could be taken to resolve safety issues in a timely manner. The Board and DOE concluded that the most important actions were related to the early incorporation of appropriate safety features into the design. The goal would be to shift the identification of major hazards and corresponding safety attributes—such as the performance category of the facility and the cost-dominant safety classification of structures, systems, and components—to earlier in the design process.

The joint efforts of the Board and DOE in the safety-in-design area started substantively when the Board held its December 7, 2005, public meeting to explore DOE's policy direction related to the early integration of safety into design. The Board subsequently held two additional public meetings on this topic.

Actions resulting from the preparations for and conduct of these public meetings included the revision of DOE Order 413.3, *Program and Project Management for the Acquisition of Capital Assets*. That Order, now DOE Order 413.3A, is the DOE directive that provides overarching project management requirements for new design and construction projects. The revision of DOE Order 413.3 is being augmented by related efforts to revise the associated DOE Manual 413.3-1, *Project Management for the Acquisition of Capital Assets*, and to develop a new DOE standard, DOE-STD-1189, *Integration of Safety into the Design Process*. The Board and DOE also selected two ongoing design and construction projects—NNSA's Uranium Processing Facility project and EM's Integrated Waste Treatment Unit project (also called the Sodium Bearing Waste Treatment Project)—to demonstrate the application of the concepts being established in the revised Order 413.3A and the new standard DOE-STD-1189.

The Conference Report of the John Warner National Defense Authorization Act for Fiscal Year 2007, requested the Board and DOE to report jointly to the congressional defense committees on efforts to improve the timeliness of issue resolution and to strengthen and improve technical oversight of DOE's nuclear design and operational activities. These efforts by the Board and DOE are organized in this report into two categories: (1) efforts aimed at improving the early integration of safety into design and (2) efforts aimed at improving interaction and communication between DOE and the Board.

Section 2 of this report describes efforts currently under way or completed that have been undertaken by the Board and DOE to improve the early integration of safety into design. These actions will contribute substantially to preventing the recurrence of the untimely issue resolution

that has occurred in the past. The early integration of safety into design provides an opportunity to identify and resolve safety issues before significant project design or construction activities proceed.

Section 3 of this report details efforts directed toward improving the interaction between DOE and the Board with respect to the identification and resolution of safety issues resulting from the Board's review of DOE's design and construction projects. These efforts are aimed primarily at improving the interaction involved in identification of safety issues by the Board, recognition of these safety issues by DOE, management and tracking of the issues, and early issue resolution.

Section 4 of this report reviews other potential actions being discussed by the Board and DOE that would further strengthen and improve the timely identification and resolution of safety issues related to DOE's design and construction projects.

2. ACTIONS BEING TAKEN TO IMPROVE EARLY INTEGRATION OF SAFETY INTO DESIGN

A number of problems have resulted from the untimely identification and resolution of safety issues during the design and construction of new defense nuclear facilities. Both the Board and DOE recognize that untimely identification and resolution of safety issues has resulted in large part from the failure to adequately identify and incorporate safety requirements into the design at the earliest stages of a project. The Board and DOE have pursued several initiatives, discussed below, to improve the effective incorporation of safety earlier in the design process.

2.1 EVOLUTION OF THE SAFETY-IN-DESIGN INITIATIVE

As noted in Section 1, the Board has conducted three public meetings to explore the need to integrate safety early into the design process. The Board's initial public meeting on this topic, held on December 7, 2005, had three objectives: (1) to raise awareness of the problem among senior DOE management; (2) to discuss the problems being encountered with DOE's design and construction projects for Hazard Category 1, 2, and 3 nuclear facilities; and (3) to establish expectations regarding potential corrective actions.

On December 5, 2005, prior to this initial public meeting, the Deputy Secretary of Energy distributed a memorandum titled *Integrating Safety into Design and Construction,* which outlined his expectations regarding the effective integration of safety into the design process. These expectations were summarized in the Deputy Secretary's opening statement to the Board at the December 7, 2005, public meeting, and included the following:

- Acknowledging that DOE can improve on its safety-in-design performance.
- Committing to safety as a core value.
- Identifying and resolving safety issues as early in the design process as is practicable.
- Revising DOE Order 413.3 to better address safety during design.
- Improving project staffing and training of Federal Project Directors.
- Involving the Chiefs of Nuclear Safety in the design development process in an oversight role.
- Improving the Energy System Acquisition Advisory Board (ESAAB) process to ensure proper tailoring and appropriate management attention to safety issues.
- Increasing the effectiveness of lessons learned.

During his testimony, the Deputy Secretary committed to making the improvements noted above to enhance incorporation of safety into design and construction activities.

Following the December 7, 2005, meeting, DOE's Offices of Environment, Safety and Health ([EH] now the Office of Health, Safety, and Security [HSS]), Engineering and Construction Management (OECM), Environmental Management (EM), and the National Nuclear Security Administration (NNSA) developed action plans for responding to the Deputy Secretary's December 5, 2005, memorandum and for implementing commitments included in his December 7, 2005, testimony. On February 24, 2006, DOE's integrated plan "for improving the incorporation of safety considerations into design and construction for both new construction projects and major modifications to existing facilities" was forwarded to the Deputy Secretary.

DOE's integrated plan included a summary-level plan description; a detailed schedule; and the detailed organization action plans of HSS, OECM, EM, and NNSA. The integrated plan addressed revising DOE Order 413.3, increasing expectations for independent project review teams and Federal Project Directors, improving the ESAAB process, evaluating lessons learned from previous projects, and reviewing additional DOE directives for needed improvements. Progress against the schedule is monitored and reported to the Deputy Secretary monthly.

The Board's second public meeting was held July 19, 2006. At this meeting, the Board received information regarding DOE's progress on the initiatives committed to during the first public meeting. The objectives of this second meeting included determining the degree of progress being made toward implementing corrective actions, and identifying the strategy for implementing the revised DOE Order 413.3A and, when developed, the new technical standard DOE-STD-1189.

At the time of the second meeting, DOE's draft revised order generally addressed the commitments made during the first public meeting. For example, the Central Technical Authorities (CTAs) and the Chief of Defense Nuclear Safety were formally involved in the design process, and progress had been made toward qualifying Federal Project Directors. The Board viewed these changes as a positive first step. However, the Board noted that, despite the progress made to this point, there was a need for a long-term commitment to continued senior management leadership, adequate staffing and resources supporting the Integrated Project Teams, and continued cooperation among DOE's major program offices.

During testimony at this second meeting, NNSA addressed how it intended to institutionalize the early incorporation of safety into design and construction. The NNSA actions included organizational changes designed to ensure that uniform practices are applied in the execution of line item projects, more effective involvement by senior line management, support for the proposed technical standard DOE-STD-1189, and a reiteration of NNSA's commitment to executing projects safely.

Testimony presented by EM identified a need for interim guidance to further early safety-in-design objectives while DOE-STD-1189 was being developed. This interim guidance provided an increased emphasis on safety at the conceptual design stage and a more prescriptive

approach for the selection and design of safety systems for Hazard Category 2 and 3 nuclear facilities. In its remarks, the Board expressed its belief that this interim guidance was a strong statement of intent by EM management supporting the objective of integrating safety early in the design process.

Overall, the first two public meetings held by the Board established the need to address safety earlier in the design, outlined actions and commitments by DOE necessary to resolve recognized problems, and provided a vehicle for tracking the progress being made.

The Board's third public meeting, held on March 22, 2007, addressed the Board's early identification of safety issues, communication of these issues to DOE, issue management, and timely issue closure or resolution. During this meeting, DOE outlined process and procedural improvements being pursued or in the early stages of implementation as a result of its safety-in-design initiatives. DOE noted that resolving safety issues early in the design process is central to mitigating cost and schedule risks, and identified the need for strong and persistent federal oversight of new design and construction projects. During the meeting, DOE committed to completing the development of DOE-STD-1189 and the planned revisions to DOE Manual 413.3-1. DOE also committed to developing a strategy for the implementation of DOE-STD-1189; this strategy is described in Section 2.4.

2.2 REVISION OF DOE ORDER 413.3

Prior to the Board's first public meeting, the Secretary of Energy's August 10, 2005, memorandum, *Improving Project Management*, acknowledged the need for DOE to revise its directives on project management and for programs and projects to assume accountability for successful project management. The goal was to develop a culture within DOE that would promote the integration of safety into design and construction; disciplined up-front planning; realistic estimates of cost, schedule, and performance; and straightforward communication between Federal Project Directors and senior DOE management.

In January 2006, DOE began updating DOE Order 413.3 to clarify and strengthen project management, specifically, to integrate safety more clearly into design and construction. The goals of the revised directive included the following:

- Describing more completely safety requirements for design and construction.
- Identifying references to the required safety directives and standards.
- Clarifying the use of tailoring as applied to safety requirements.
- Improving roles, responsibilities, and oversight related to safety.

DOE's approach to integrating safety into design and construction has been a corporate effort. While OECM had the specific responsibility for updating the Order, that Office collaborated with others—including HSS; the Office of Science; EM; NNSA; and the Energy, Science and Environment Field Management Council—in the revision of the Order to ensure that safety would be incorporated in all phases of project management.

DOE affirmed that safety cannot be incorporated into projects through inspection only—it must be part of DOE's project management culture. Consequently, changes related to integrating safety into design and construction were made to the Order. These changes included the following:

- Clarifying and strengthening the means by which safety is integrated into design and construction (particularly for Hazard Category 1, 2, and 3 nuclear facilities).

- Requiring Safety Design Reports at the conceptual and preliminary stages of design.

- Identifying safety requirements at each Critical Decision phase.

- Adding a Technical Independent Project Review, which focuses on safety documentation, as part of the Critical Decision-1 Design Review for high-risk, high-hazard, and Hazard Category 1, 2, and 3 nuclear facilities.

- Requiring technical safety expertise on the Integrated Project Team during each design phase.

- Defining the safety roles of DOE's Central Technical Authorities, Chief of Defense Nuclear Safety, and Chief of Nuclear Safety in the design process.

- Adding explanatory language with respect to "tailoring" and "design-build" projects to emphasize the importance of safety. Aggressive risk mitigation strategies are now required to address the unique characteristics of close-coupled or fast-track design-build projects. Risk management strategies must now be outlined in the risk management plan and at a minimum must address (1) all technical uncertainties, (2) the establishment of design margins to address the unique nature of the design, and (3) increased technical oversight requirements.

OECM has worked closely with HSS to incorporate these safety requirements into the revised Order. The revised Order 413.3A now identifies the safety requirements for each critical decision point. HSS is developing DOE-STD-1189, *Integration of Safety into the Design Process*, which will provide implementation direction for the safety requirements for nuclear facilities mandated in the Order. Implementation of the new requirements identified in DOE Order 413.3A are not required until 6 months after issuance of DOE-STD-1189.

2.3 CREATION OF GUIDES TO SUPPORT DOE ORDER 413.3A

DOE has begun the process of replacing DOE Manual 413.3-1, *Project Management for the Acquisition of Capital Assets*. DOE plans to replace the manual with a series of 18 guides, to be issued according to DOE's priorities among the various topics to be addressed. DOE's goal is to develop and publish all the guides by the end of fiscal year 2008.

A number of these guides will address safety-in-design topics. In particular, DOE Guide 413.3-1, *Managing Design and Construction: A Systems Approach*, will provide Federal Project Directors with guidance on employing a systems engineering approach to the management of DOE projects. The early integration of safety into design and construction is one of the tenets of the systems engineering approach, and this topic will be emphasized within the context of DOE's Integrated Safety Management System. This guide, along with other guides that address safety-in-design topics, will be consistent with DOE-STD-1189.

2.4 DEVELOPMENT OF DOE STANDARD 1189

DOE-STD-1189 is a fundamental element in the integration of safety throughout DOE's acquisition management system and is key to the timely identification, evaluation, and adjudication of safety-related design issues early in a project's life. This new standard will provide expectations for incorporating safety into design for DOE's Hazard Category 1, 2 and 3 nuclear facilities whose intended functions involve the handling of hazardous materials, both radiological and chemical. The standard will ensure that hazards are identified early in a project and that an integrated team approach is used to design safety into a facility from the earliest conceptual phases of facility design. Some of the key concepts included in the draft standard are as follows:

- The importance of the Integrated Project Team (IPT), supported by the design contractor, including a Safety Design Integration Team. The latter team comprises safety and design subject matter experts and is the heart of the safety and design integration effort.

- The development of a Safety Design Strategy for addressing important safety issues as a project progresses and developing key safety documentation. This strategy will be initiated during the preconceptual design stage and updated and refined through the conceptual design stage. It may become part of the Project Execution Plan.

- The development, early in the process, of facility-level Design Basis Accidents that provide the necessary input to the application of guidance for the classification of important safety functions. These classifications (safety-class, safety-significant, seismic design classifications) provide design expectations for safety structures, systems, and components (SSCs).

- The development of objective radiological dose and chemical exposure guidelines for both the public and collocated workers to hazardous materials for the safety and design classification of SSCs. These criteria relate to both the public and collocated worker safety design considerations.

- The development of guidance for the preparation of a Conceptual Safety Design Report for inclusion in the Critical Decision-1 package, a Preliminary Safety Design Report for inclusion in the Critical Decision-2 package, and the Preliminary Documented Safety Analysis at the final design (Critical Decision-3) approval stage. These reports are required by DOE Order 413.3A for new or major modifications of DOE Hazard Category 1, 2, and 3 nuclear facilities. They must be approved by DOE as part of the formal project authorization process. The intent of these reports and their approvals is to ensure that decisions regarding project safety are identified and dealt with in the early stages of design and maintained during construction and startup testing. The objective is to reduce the likelihood of costly late reversals of design decisions involving safety.

- The identification of technical risks involving safety-in-design issues early in a project, along with potential alternatives, should the desired path not prove successful. This includes any impact on the safety strategy resulting from a technology failure.

These concepts and processes will help ensure that project management integrates safety into design and construction activities early in the design process, resulting in improved accuracy of project cost estimates. These activities will also provide the Board a better opportunity to engage with DOE and to bring its expertise to bear earlier in the safety design.

The draft standard was issued for comment into DOE's RevCom System in March 2007, and the comment period ended on May 31, 2007. A large number of comments were received, and the comment resolution process is ongoing. The final standard is expected to be issued by late calendar year 2007.

Once DOE-STD-1189 is issued, DOE plans to implement it into ongoing projects in a phased manner consistent with the design stage of the project. DOE line organizations will identify affected projects and the current design stage, evaluate the current status of each project, its projected hazard category, and the associated safety issues currently identified, and establish the necessary actions to implement DOE-STD-1189. At a minimum, each line organization will take the following implementation actions based on the design stage of ongoing projects:

- For projects in the mission need stage, DOE-STD-1189 will be implemented.

- For projects in the conceptual design stage, DOE-STD-1189 will be implemented based on a specific evaluation of each project. As these projects advance into the

preliminary design stage, the applicable portions of DOE-STD-1189 will be implemented.

- For projects in the preliminary design stage, the applicable content and format specified in DOE-STD-1189 will be used in the preparation of the Preliminary Safety Design Report.

- For projects in the final design stage, the applicable content and format specified in DOE-STD-1189 will be used in the preparation of the Preliminary Documented Safety Analysis.

2.5 NEW DESIGN DEMONSTRATION EFFORTS

DOE and the Board are being proactive in promoting the early integration of safety into design and the timeliness of issue resolution. The Board, the Assistant Secretary for Environmental Management, and the Deputy Administrator for Defense Programs agreed to select two projects to demonstrate the early integration of safety into design, as well as better communication and more timely issue resolution. The goal is to develop a common understanding of a process that will serve as a template for future defense nuclear projects and to evaluate DOE's revised directives on project management through application to specific projects. The two projects selected for this demonstration effort are:

- The Uranium Processing Facility at the Y-12 National Security Complex. This project is in the conceptual design stage and awaits Critical Decision-1 approval by DOE's Deputy Secretary.

- The Integrated Waste Treatment Unit (also called the Sodium Bearing Waste Treatment Project) at Idaho National Laboratory. DOE-EM approved Critical Decision-2/3B for this project in late December 2006.

The Board, DOE headquarters personnel, federal project personnel, and contractor personnel are meeting periodically to discuss the Uranium Processing Facility and the Integrated Waste Treatment Unit. These meetings focus on developing a mutual understanding of the safety requirements for these new facilities and establishing, in detail, common expectations for early design maturity and early identification of safety issues and their resolution.

The Uranium Processing Facility is an ideal candidate since it is a large, complex nuclear project for which the conceptual design was being completed. The project is currently awaiting authorization to proceed to preliminary design. The demonstration process included both a formal component at the executive level between the organizations and a complementary informal element operating between the staffs. As a result of this process, lines of communication were opened at multiple levels, and issues raised by the Board relating to the

project were identified early. DOE has committed to considering all of these formal and informal discussions before authorizing the project to move forward into its preliminary design phase. The process has enabled the Board's staff to provide its observations on seismic criteria, structural details, accident modeling and dispersion algorithms, confinement, quality assurance, and fire protection. The discussions have also resulted in the project team incorporating rigorous analysis and detail into the Conceptual Safety Design Report in preparation for approval of the conceptual design. As a result of these interactions and progress made in the past several months, the Board has been able to conclude that the safety basis controls now identified for the facility provide an adequate basis for continuing the design process from the conceptual design phase into the preliminary design phase.

The design for the Integrated Waste Treatment Unit was at a level of maturity that allowed the Board to review in sufficient detail and agree with its safety posture. At the time the demonstration effort was initiated, the project was working toward completion of the preliminary design (Critical Decision-2) and accordingly had a more complete design than is typical at the end of conceptual design. The Board and DOE believe that this project's success, up through completion of preliminary design, is due to the following:

- A strong, experienced DOE and contractor Integrated Project Team.
- Conservative assumptions made early in the project resulting in a conservative safety design strategy.
- Involvement in the project and in decisions that could affect safety by DOE headquarters personnel.
- A pilot scale plant, constructed and operated to address technical unknowns with the treatment process.
- A DOE commissioned independent peer review by a team of experts to validate the basis of the seismic and structural design.
- Early completion of the facility safety basis to support the facility's preliminary design.
- Timely access by the Board to design documents that allowed early identification of issues.
- Good communication among DOE, the contractor, and the Board that allowed early and frequent discussion of the safety basis, safety controls and analyses as they were being developed.

Among the lessons learned from these demonstration efforts, it is clear that to ensure safety is embedded fully into the design process, the following must be accomplished as early as practicable: (1) definition of safety requirements, (2) identification of safety systems, and (3) management's review and acceptance of the planned facility's safety posture. These are in fact the principles that have been or are being institutionalized in DOE Order 413.3A and DOE-STD-1189. Further lessons learned include the following:

- The Safety Design Strategy offers an approach such that informed decisions can be made by DOE and independently evaluated by the Board as early as possible in the design process.

- More resources may need to be expended during conceptual design to achieve this more complete design and safety strategy earlier in a project's life.

- Appropriately conservative design assumptions need to be made in the early stages of a project to provide an effective safety control strategy and help accommodate project unknowns that are inevitable at this point in the design process.

- DOE should consider further use of detailed technical reviews by independent experts and, as needed, laboratory testing and the development of a pilot plant to address uncertainties and identify possible adverse conditions. DOE should also consider more use of sufficiently developed contingency plans that provide a viable alternative in case the desired outcome is not achieved.

- The Board should be involved as early as possible in the design review process to facilitate early identification of issues.

- DOE, the contractor, and the Board must communicate early and frequently while the safety controls and analyses are being developed.

These demonstration efforts also reinforced some of the fundamental principles of good project management embodied in the revision of DOE Order 413.3, such as the following:

- DOE and the contractor need to have technically strong, experienced project team members who are assigned early in the design process.

- DOE headquarters personnel need to be involved early in the project, including involvement in decisions that could affect safety.

- In addition to cost and schedule risks, project risk management plans need to identify the technical risks due to design assumptions and uncertainties.

3. ACTIONS BEING TAKEN TO IMPROVE INTERACTIONS BETWEEN DOE AND THE BOARD

This section briefly describes interactions between DOE and the Board involved in the identification and resolution of safety issues resulting from the Board's review of DOE's defense nuclear facility designs. The discussion is presented in three parts: (1) the identification of safety issues by the Board, (2) the communication of these issues to DOE, and (3) the subsequent resolution and closure of the issues.

3.1 ISSUE IDENTIFICATION

3.1.1. Safety Reviews of Defense Nuclear Facility Designs

The requirement to design and construct defense nuclear facilities in a manner that will support safe and efficient operations for 20 to 50 years demands an exacting design process, guided by Integrated Safety Management principles that will ensure the identification of appropriate safety controls.

DOE's design process is an iterative process from identification of a mission need through design, construction, and startup of a facility. Several defined key milestones (critical decisions) throughout the process are intended to provide for formal DOE decisions that involve assessing the need for a design, the progress of the design, the schedule for completion, the likelihood of success, and the cost. The project phases represent a logical maturation of the project design. Each critical decision point marks an increased DOE commitment to the next phase of the project.

For each critical decision, certain requirements must be satisfied before the project can proceed. As discussed earlier, DOE Order 413.3A was recently revised as a result of efforts by the Board and DOE to clarify the specific information that must be available at each critical decision. The revised Order will help improve the timely identification of safety issues during the design of defense nuclear facilities by clearly specifying the specific safety and design documents that must be available for each critical decision.

Both DOE and the Board have as a goal resolving outstanding safety issues related to defense nuclear projects as early in the design phase as practicable. The recent changes made to DOE Order 413.3A require earlier development of important safety attributes that are formally approved by DOE. The Order now requires preparation of a Conceptual Safety Design Report and a Preliminary Safety Validation Report to support Critical Decision-1. The Order also identifies formal DOE acceptance of the safety basis of the facility. When final, and in full force, the implementation of DOE-STD-1189 will ensure the timely identification, evaluation, and adjudication of design issues early in a project's life.

DOE and the Board understand and agree that identifying and resolving potential safety issues early in the design process is preferable to identifying and resolving them later. Accordingly, both organizations are committed to being vigilant in reviewing defense nuclear projects early in the design process. Furthermore, as delineated in DOE Policy 450.4, *Safety Management System Policy*, DOE understands that it is better to eliminate hazards through design from the beginning than to mitigate them later in the design. As a result of efforts by the Board and DOE, DOE has placed increased emphasis on establishing a well-qualified, technically competent Integrated Project Team, which specifically includes safety professionals, as early as possible.

Notwithstanding these efforts, potential safety issues can arise during the evolution of a project. As described below, these issues are identified by DOE contractors, DOE line management, and the Board as the project design proceeds.

3.1.2 Factors that can affect the timeliness of issue identification

During discussions between DOE and the Board, several factors were identified that help ensure the timely identification of safety issues. These factors include (1) a clear understanding of what and when certain design information will be available, (2) clear and adequate DOE safety requirements, and (3) early and ready access to information.

A clear understanding of what and when certain design information is to be available is necessary to ensure timely safety reviews. DOE prepared DOE Order 413.3A envisioning that the details for implementing the safety-in-design principles of that order would be incorporated into DOE-STD-1189. Specifically, DOE-STD-1189 includes detailed instructions regarding the purpose and content of the safety and design documents that are required to be issued for each critical decision. Together, DOE Order 413.3A and DOE-STD-1189 will identify the safety and design analyses and documents that are required and when they are required to support approval of specific critical decisions. These requirements will then be translated into real-time deliverables in a project's schedule.

The determination of whether a safety issue exists can also be significantly delayed if there are problems with the clarity or adequacy of safety requirements or uncertainties in their applicability or interpretation. DOE requirements defining the nuclear safety design for a project include, at the top level, the Nuclear Safety Rule (Title 10, Code of Federal Regulations [CFR], Part 830); DOE Order 420.1B, *Facility Safety*; and the documents referenced therein. Also at the top-level tier for nuclear projects are DOE Order 413.3A and DOE-STD-1189, which specify technical documents used by DOE to approve a project's safety approach. This set of DOE rules, directives, and standards establishes the safety design requirements that, when met, result in an appropriately conservative safety basis. Below these top-level requirements are other directives, guides, and standards, including DOE and industry technical standards.

At the project level, site office contracting officers, supported by the requirements described below, are responsible for identifying the set of applicable DOE directives and standards that establish clear contract expectations for safety in design and construction. To ensure that the appropriate contract requirements are invoked, DOE has now established CTAs in each of the major line offices. The CTAs are responsible for concurring on decisions regarding applicability, inclusion, and exceptions to DOE directives and standards related to nuclear safety requirements invoked through Department of Energy Acquisition Regulation (DEAR) clause (Title 48, Code of Federal Regulations [CFR], 970.5204-2), "Laws, regulations and DOE directives." DOE is developing DOE Order 410.1, *CTA Responsibilities Regarding Nuclear Safety Requirements*, to institutionalize its procedures for implementing these responsibilities and ensuring that contracting officers, supported by the CTAs, incorporate all applicable nuclear safety requirements into contracts for DOE facilities.

Concerning uncertainties in the interpretation of safety requirements, the Board is required by its enabling statute to review and evaluate the content and implementation of health and safety standards, including DOE's orders, rules, and other safety requirements, practices, and events relating to system design, construction, operation, and decommissioning of DOE's defense nuclear facilities. In response to the Board's public meetings concerning integration of safety into the design of defense nuclear facilities, DOE acknowledged that safety was not being integrated consistently into its new defense nuclear facilities. Upon issuance of DOE-STD-1189, DOE will make conforming changes to impacted directives and technical standards to provide a coordinated process for the integration of safety early in the design of defense nuclear facilities.

Early identification of safety issues associated with a design requires that information related to the design be available for review. The Board carries out its duties by gathering the kinds of information needed to apply its scientific and engineering expertise. While the Board's enabling legislation provides the broad authority to obtain ready access to information the Board deems appropriate in carrying out its work and the traditional legal instruments that ensure timely access to that information, the legislation emphasizes that a cooperative relationship between the Board and DOE is expected.

DOE and the Board share a common goal of ensuring adequate protection the health and safety of the public, workers, and the environment at DOE defense nuclear facilities. To this end, frequent dialogue between the Board and DOE during the design of defense nuclear projects serves both organizations well. Accordingly:

- The Board's staff routinely attends project engineering, safety, and status meetings during the design process. For example, the staff participated in the technical project review for the Uranium Processing Facility in March 2007—the first of its sort in NNSA after the issuance of DOE Order 413.3A in July 2006.

- The Board's staff and the Board members convene periodic meetings on project design issues during the design process.

- Starting with the preparation of the second quarterly project review report forwarded to Congress by the Board, senior members of the Board's staff and senior DOE staff began sharing status information on active projects that are reported. These quarterly status meetings will continue after the issuance of this joint report to Congress.

- DOE project teams, such as that for the Uranium Processing Facility, and the Board's staff meet regularly to keep one another apprised of the status of safety issues.

- DOE project teams and their headquarters program officials facilitate visits by the Board members and the Board's staff to DOE sites or design firm offices to review the status of design activities. The Board uses these visits and other activities as the basis for "project letters" transmitted periodically to DOE prior to a request for a critical decision to provide an assessment of the Board's position on the project, including the identification of any significant safety issues (these communications are discussed further in the next section).

3.2 ISSUE COMMUNICATION AND MANAGEMENT

An important element of any issue management system is the communication and tracking of issues. The Board identifies issues through a number of different mechanisms, and the management and eventual closure of the issues is a process that requires attention by both DOE and the Board. This section discusses the Board's communication of issues to DOE and mechanisms for tracking these issues.

3.2.1 The Board's Communication of Issues to DOE

The Atomic Energy Act of 1954, as amended, provides the Board with a number of tools for communicating issues, concerns, and information to the Secretary of Energy. These tools include recommendations, public hearings, reporting requirements, letters, and staff-to-staff interaction. In accordance with the letter and intent of the act and other controlling law, the Board's choice of how to communicate issues and information to the Secretary is driven by their significance and immediacy.

The Board's action-forcing authority is most formal in the recommendation process. The act prescribes when and how the Board is to provide to the Secretary of Energy, and ultimately to the President, issues it has identified that have or may adversely affect the health and safety of the public and workers. The act prescribes how and when the public and others are to be informed and given the opportunity for meaningful comment.

The recommendation process is invoked when the Board determines that it has identified an issue or concern that requires action by the Secretary to provide adequate protection of the health and safety of the public and workers. Recommendations typically address issues that are

broad and comprehensive as they affect the DOE's defense nuclear complex. As prescribed by the act, the Board's recommendation is provided to the Secretary, then to the public for comment. Public comments are forwarded to the Secretary. The Secretary then must respond to the Board and, if in agreement with the Board, proceed to develop an implementation plan for the recommendation. This is an iterative process.

The Board has also developed a series of technical reports addressing various aspects of DOE's operation of the defense nuclear complex that impact public health and safety. These reports provide in-depth discussion of current health and safety problems affecting one or more defense nuclear facilities or generic topics such as fundamentals for understanding standards-based safety management at defense nuclear facilities.

Incidental to the Board's work, the Board receives information on health or safety issues from individuals. Many of these issues are raised by workers at the sites or within DOE or contractor organizations. The Board respects all requests for confidentiality. Nevertheless, upon the Board's determination that the concern is valid the concern is communicated to DOE in a way that facilitates timely remediation and protects the identity of the reporting individual.

Besides written communications, the Board and its staff routinely communicate with DOE and its contractors at both the headquarters and field levels. These exchanges provide an effective means for the Board and its staff to gather information on emerging health and safety issues, as well as to provide additional information to DOE staff and contractors concerning health and safety issues and related questions.

As a result of the current effort to improve the timeliness of issue identification and resolution, the Board has begun issuing the project letters mentioned above to apprise DOE, where appropriate, of the status of safety issues raised by the Board. The purpose of these project letters is to ensure that DOE is aware of any unresolved safety issues and to assist DOE at critical decision points in evaluating the readiness of a project to move forward. The project letters can then be updated as design, construction, testing, and startup proceed. The Board has recently issued initial project letters prior to Critical Decision-2 for the Container Surveillance and Storage Capability project at the Savannah River Site, the Integrated Waste Treatment Unit project at the Idaho Closure Project Site, and the Salt Waste Processing Facility project at the Savannah River Site.

The Board continues to be sensitive to the need for public involvement in and awareness of defense nuclear safety issues. The Board's written communications to DOE, as well as weekly reports from the Board's site representatives, are made available to the public via the Board's website. The Board has also used open meetings, described earlier, as a forum for communication on its activities. In addition, the Board has continued its practice of meeting with state and local officials, labor leaders, DOE facility workers, public interest groups, and area residents to exchange information and to inform interested parties about its work.

3.2.2 Mechanisms for Tracking Issues

DOE established its commitment management tool, the Safety Issues Management System (SIMS), in August 1995. The Departmental Representative conducts reviews of DOE's implementation plans and outgoing letters to the Board to identify and capture DOE's commitments to the Board. Incoming letters from the Board are also evaluated to identify those requiring a written response. Commitments and other actions identified from these documents are entered into the SIMS database, along with the required completion date, the party responsible for action, and other pertinent information. Monthly reports on the status of the implementation and completion of commitments are distributed to responsible DOE managers, Secretarial Officers, and other designated personnel. Quarterly SIMS reports are also prepared to focus DOE management attention where needed. DOE and Board personnel can access detailed SIMS information and use various view, sort, and report formats via an online, Internet-based user interface.

DOE Order 226.1, *Implementation of Department of Energy Oversight Policy,* requires DOE site contractors to ensure that a comprehensive, structured issues management system is in place. This system provides for the timely and effective resolution of deficiencies and is an integral part of the contractor assurance system. Program and performance deficiencies, including those identified by the Board, must be captured in a system that provides for effective analysis, resolution, and tracking. Site issues management systems include structured processes for the following:

- Determining the risk, significance, and priority of deficiencies.
- Evaluating the scope and extent of a condition or deficiency.
- Identifying root causes of a deficiency.
- Identifying suitable actions to correct and prevent the recurrence of a deficiency.
- Identifying individuals/organizations responsible for implementing those actions.
- Establishing milestone and completion dates for the correction of deficiencies.
- Tracking progress on the correction of deficiencies.
- Verifying that corrective actions have been completed.

Issues management systems provide a process for determining the impact of identified deficiencies and taking timely action to address conditions of immediate concern, such as stopping work, shutting down activities, or revising a procedure. The systems include processes for communicating issues to senior managers with sufficient information to allow them to make informed decisions.

The heads of DOE's field offices review and concur on descriptions of contractor assurance programs, including issues management programs. Depending on how authority has been delegated, senior DOE and NNSA headquarters personnel or site managers:

- Initially approve and thereafter annually review and approve descriptions of contractor assurance programs.

- Conduct periodic adequacy reviews of contractor assurance programs and processes for consistency across the complex, and ensure that they reflect industry best practices.

Most DOE projects maintain their own issues management systems that include the attributes discussed above. These project-specific systems are typically established by the Federal Project Director and structured to support specific projects needs. For example, some of the projects capture and track to conclusion requests for information made by the Board's site representatives and issues/questions raised by the Board's staff during reviews of design documents. Periodically, project personnel review the open issues within their purview. The frequency of such reviews is determined by current project conditions.

DOE Facility Representatives also identify and track nuclear safety issues. The DOE Facility Representatives are assigned to oversee, but not manage, day-to-day contractor operations at DOE's hazardous nuclear (and non-nuclear) facilities. In addition, DOE's CTAs, through their Chiefs of Nuclear Safety, maintain operational awareness and provide technical support to line managers in the identification and resolution of nuclear safety issues at their respective facilities.

The Board also tracks DOE's progress toward meeting commitments. The Board tracks DOE's actions to implement recommendations, its progress in responding to reporting requirements, and its responses to less formal written communications in a similar manner:

- Each commitment described in DOE's implementation plan for a recommendation, a reporting requirement, or any other written communication is entered into a database.

- For each commitment, the source document is cited, and a staff lead and commitment due date are identified. As data are gathered, date-stamped notes can be entered into the database and associated with a specific commitment.

- The staff lead updates the database as events dictate, but at a minimum on a bimonthly basis.

- When the Board and its staff are satisfied that the actions/deliverables provided in relation to a specific commitment are adequate, the commitment is annotated as "closed" in the database.

- The Board's Technical Director and Group Leads review the status of all open commitments on a regular basis.

The Board rarely issues letters for which no action by DOE is expected in response. Therefore, most of the Board's letters to DOE result in an entry in the tracking database.

3.2.3 Factors That Affect Issue Communication and Tracking

Figure 2 illustrates multiple levels of communication on safety issues within and between DOE and the Board. These communications take place at three primary levels, discussed below.

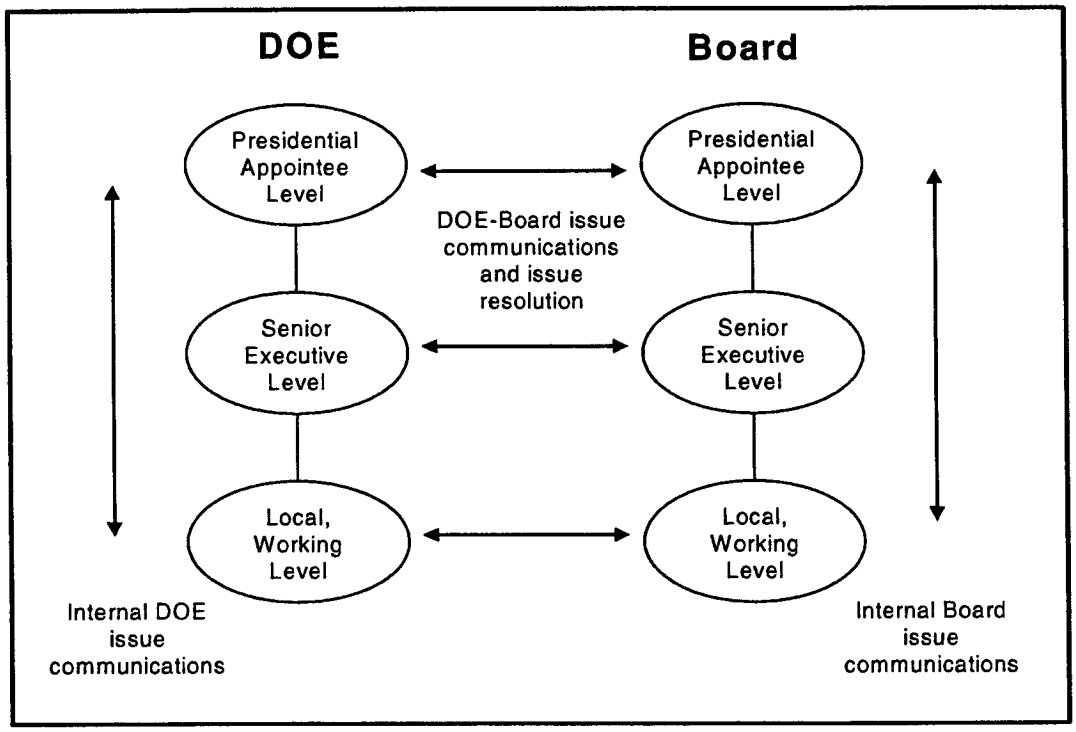


Figure 2. Levels of Communication on Safety Issues within and between DOE and the Board

Presidential Appointee Level (or Institutional Level). This is the highest level of communication on safety issues between DOE and the Board. DOE's presidential appointees include the Secretary of Energy, Deputy Secretary of Energy, Under Secretary of Energy, Under Secretary for Nuclear Security, and Assistant Secretary for Environmental Management. The Board's presidential appointees are the Board members. Only a small portion of safety issues must be communicated at the institutional level because they cannot be adequately resolved at lower levels. The main communication mechanisms at this level are formal letters between senior agency officials (such as from the Chairman of the Board to the Secretary of Energy). In addition, the Board may request briefings by DOE on specific topics, during which issues or concerns may be communicated. As previously described, DOE tracks commitments made in formal letters using the SIMS database.

Senior Staff Level. This is the middle level of communication on safety issues between DOE and the Board. DOE's senior staff includes responsible managers in the agency's line organizations between the cognizant Federal Project Director and the Chief Operating Officer or

Principal Program Deputy. For example, within DOE's Office of Environmental Management, personnel at the senior staff level include Deputy Assistant Secretaries, such as the Deputy Assistant Secretary for Safety Management and Operations. The Board's senior staff members include the Technical Director and the Group Leads for the different topical areas, such as Nuclear Facility Design and Infrastructure and Nuclear Weapons Programs.

At this senior staff level, DOE and the Board are taking additional actions to identify unresolved technical issues more completely, including establishing a formal framework for regular staff-to-staff interaction on the status of such issues, using the Board's initial quarterly report to Congress as a starting point. This process will incorporate appropriate procedures for issue tracking and resolution and include the development of a database tool for design safety issues that will capture additional information for effective management of the resolution of unresolved issues. This database tool will be modeled on SIMS and use technology already proven in this application.

Local, Working Level. This is the lowest level of communication on safety issues between DOE and the Board. DOE and contractor representatives at this level include all personnel directly involved with the design and construction of projects up to the Federal Project Director, who is typically part of DOE's site office organization. The Board's representatives at this level include the local site representatives, as well as various technical experts on the Board's staff. The vast majority of identified safety issues relative to design and construction are communicated and resolved at the local working level between the Board's staff and DOE/contractor staff through a variety of mechanisms, including face-to-face discussions. Issues identified at this level may be entered into local tracking systems specific to the project or site-wide systems established under DOE Order 226.1.

3.3 ISSUE RESOLUTION AND CLOSURE

Once a safety issue has been identified, communicated, and captured in a tracking system, what remains is its resolution and ultimate closure. Discussions between the Board and DOE have explored actions that could improve the mutual understanding of what activities remain to achieve issue resolution and closure.

Based on a review of past practices in issue resolution and closure, DOE and the Board are taking action to improve the timeliness of issue resolution through periodic joint reviews of open issues. These joint reviews should help prevent outstanding issues from languishing, and should provide several additional benefits, such as the following:

- Identifying more completely and accurately those unresolved technical issues related to the incorporation of safety into design and construction projects.

- Promoting open communication and information sharing to characterize and resolve issues more effectively.

- Resolving issues at the lowest possible level while maintaining effective communication and awareness.

To facilitate these joint Board/DOE reviews, a list of significant unresolved issues, derived from the appendix to the Board's quarterly report to Congress, "Summary of Significant Unresolved Issues," will be routinely updated to support periodic discussions between the Board and DOE. During these periodic discussions, the status of unresolved issues will be reviewed. These discussions will include federal project directors or their representatives.

4. OTHER ACTIONS BEING CONSIDERED TO STRENGTHEN AND IMPROVE TECHNICAL SAFETY OVERSIGHT

4.1 ADDITIONAL CHANGES TO DOE'S PROJECT MANAGEMENT DIRECTIVE

During the last two years, the efforts by the Board and DOE to improve the timeliness of identification and resolution of safety issues have resulted in the establishment of several new expectations and requirements, as delineated in DOE O 413.3A and the drafted DOE-STD-1189. The Board and DOE are committed to the continuous improvement of DOE's project management directives. As experience is gained in implementing the requirements of DOE Order 413.3A and DOE-STD-1189, and as the DOE 413.3 Guides are developed, DOE and the Board will continue to identify improvements to the project management directives.

DOE recognizes that a conceptual design and associated early safety strategy needs to be adequately developed so that cost-dominant safety systems are identified and included in the project cost range. DOE-STD-1189 is designed to accomplish this. To this end, DOE and the Board are mindful of the amount of work that must be accomplished early in the design process. DOE and the Board will monitor the implementation of DOE O 413.3A and DOE-STD-1189 to ensure that safety in design issues are adequately addressed.

4.2 CHANGES TO DOE DRAFT ORDER 140 (DOE/BOARD INTERFACE ORDER)

To clarify the interface between DOE and the Board relating to the incorporation of safety into project design and to promote timely issue resolution without having to elevate an issue to the senior management level, DOE draft Order 140 will be revised to describe specific activities DOE will take to improve communication and cooperation with the Board, as outlined in this report. The order will promote more open communication and information sharing, with the objective of promoting effective characterization and the early identification of unresolved issues. Open communication reduces the time required to identify safety issues and facilitates rapid escalation to the necessary level for issue resolution. This will provide a mechanism for resolving issues at the lowest possible level while maintaining effective vertical communication within the organization.

4.3 NEED FOR LEGISLATIVE CHANGES

The Conference Report on the John Warner National Defense Authorization Act for Fiscal Year 2007 asked DOE and the Board to consider whether either or both organizations might benefit from legislative changes to existing law designed to improve the organizational protocols between the two agencies or to improve their respective abilities to embed safety considerations more completely into the designs of defense nuclear facilities. The agencies have also considered whether different organizational structures and authorities than are currently

authorized under law might be useful for managing nuclear safety. The Board and DOE have concluded that rigorous adherence to the existing responsibilities and powers set forth in existing law will foster the early identification and resolution of safety issues without the need for legislative changes. Additionally, both agencies have concluded that rigorous implementation of DOE Order 413.3A, as supported by the issuance of DOE-STD-1189, as well as strengthening of the issue management process as described in this report (i.e., project letters, status reports, periodic status meetings), will enhance the early incorporation of safety into design.

4.4 USE OF THE BOARD'S FORMAL RECOMMENDATIONS

The Conference Report on the John Warner National Defense Authorization Act for Fiscal Year 2007, urged the Board to evaluate whether more frequent use of the Board's formal recommendation process would drive both DOE and the Board to a more structured process for issue resolution. The recommendation process is central to the Board's oversight of public health and safety at defense nuclear facilities. As an initial step in the recommendation process, the Board's enabling legislation requires the Board to determine that a recommendation is necessary to ensure adequate protection of the public health and safety. In most cases, health and safety issues affecting design and construction projects have been raised by the Board and resolved by DOE in a timely manner without the need to resort to formal recommendations. Furthermore, DOE has generally been cooperative with and responsive to the Board's findings. Many important safety issues have been identified and resolved, resulting in important improvements in the safety of defense nuclear facilities and thereby providing for adequate protection of the public health and safety.

The Board and DOE believe that the congressional concerns related to the timeliness of safety issue resolution will be addressed with the process improvements identified in this report. Because these improvements are also expected to facilitate transparency, allowing public and congressional review, the Board and DOE agree that public involvement will also be satisfied. Both the Board and DOE are committed to the timely resolution of safety issues at defense nuclear facilities. Should situations occur in which issues identified by the Board are not being resolved expeditiously or in such a manner as to ensure adequate protection of the public health and safety, the Board will continue to carry out its statutory obligation and issue formal recommendations as are necessary.