10 YEARS OF EXPERIENCE WORKING WITH THE DEFENSE NUCLEAR FACILITIES SAFETY BOARD: A PERSONAL REFLECTION

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ABSTRACT

The Defense Nuclear Facilities Safety Board is the Department of Energy's primary external oversight body on matters of environment, safety and health at the Department's defense nuclear facilities. The Board has significant influence with the Department based on the effective relationship it has developed so that both the Board and the Department can achieve their missions. Four key features of this relationship are: 1) the Board makes relevant safety information and analyses available to the Department's managers, 2) the DOE managers take ownership of pressing safety issues and their resolution, 3) the ensuing improvements are steady and continuous, and 4) the Board remains highly vigilant and persistent in advocating the agreed-upon improvements and building upon these improvements for further safety enhancement.

INTRODUCTION

Good Afternoon. My name is Mark Whitaker and I am from the Department of Energy headquarters in Washington, D.C. I am pleased to be here with you today. I trust that you are enjoying the climate here as much as I am. It surely is a pleasant change from the weather in Washington, D.C. this time of year.

My topic today is lessons learned from successful interaction with the Defense Nuclear Facilities Safety Board. I think you will find this topic fits well with the other fine presentations we have heard this afternoon. The Defense Nuclear Facilities Safety Board is the Department of Energy's primary external oversight body on matters of environment, safety and health at the Department's defense nuclear facilities. The theme of my talk is that the Board has significant influence with the Department based on how it conducts itself, not based on its sheer regulatory powers. In other words, the Board and the Department have developed a way of working together so that both the Board and the Department can be successful in achieving their missions. Four key features of our effective relationship are: 1) the Board makes relevant safety information and analyses available to the Department's managers, so that, 2) the DOE managers take ownership of pressing safety issues and their resolution, 3) the ensuing improvements are steady and continuous, and 4) the Board remains highly vigilant and persistent in advocating the agreed-upon improvements and building upon these improvements for further safety enhancement.

THE BOARD AND ITS POWERS

The Board was established by Congress in 1988 and began operations in 1989. I have been intimately involved in DOE activities related to the Board since its inception. I was in the room

the first time the Board met with DOE personnel at the Savannah River Site in 1989. I have been the Department's representative to the Board since 1993. In this role, I am the principal liaison officer between the Department and the Board. My mission is two-fold: first, to make sure we, the Department, are communicating effectively and cooperating with the Board so that they can perform their statutory duties; and secondly, and more importantly, to make sure that we are doing the right things to investigate and resolve safety issues identified by the Board. In addition to serving as the principal interface point with the Board, the Department's facility representatives program and integrated safety management program also report to me.

The Board is made up of 5 presidential appointees who are respected experts in the field of nuclear safety with a demonstrated competence and knowledge. The Board members are supported by a staff of approximately 100 persons, most of whom are engineers by training. The Board is charged with five major functions: 1) to review and evaluate standards relating to design, construction, operation, and decommissioning of defense nuclear facilities; 2) to conduct investigations; 3) to analyze design and operational data; 4) to review facility design and construction; and 5) to make recommendations to the Secretary of Energy determined to be "necessary to ensure adequate protection of public health and safety."

In establishing the Board, Congress did not see the Board as a panacea for all DOE safety problems. The existence of the Board in no way absolves the Department or its contractors of their fundamental safety responsibilities. In the report of the Senate Armed Services Committee that supported establishment of the Board, the Senate was clear about its expectations: "What the Board can do is provide critical expertise, technical vigor, and a sense of vigilance with the Department at all levels. Above all, the Board must have a primary mission to identify the nature and consequences of any significant potential threats to public health and safety, to elevate such issues to the highest levels of authority, and to inform the public."

To accomplish its mission, the Board was given by Congress a number of powers to investigate safety issues and to compel action to resolve identified safety issues. The Board's greatest power is writing formal recommendations that must be either accepted or rejected by the Secretary of Energy within 45 days. If the Secretary rejects all or part of a recommendation, the Board must either reaffirm or modify its recommendation. Since its establishment, the Board has written 41 formal recommendations, or about 4 per year. The Secretary of Energy has accepted all of the recommendations, although parts of a few have been rejected, and some acceptances have been conditional on agreement with proposed implementation approaches. Whenever the Secretary accepts a recommendation, the Department must also provide within another 90 days an implementation plan to resolve the identified safety issues.

In addition to this main power, the Board also has the following supporting powers:

1) the Board may conduct special studies and prepare technical reports and make their analyses available to the DOE and the public - last year, the Board issued 4 technical reports;
2) the Board may send letters to DOE requesting information and action - this is usually where the Board starts to escalate a given issue - the Board routinely makes 20-30 such requests each year;
3) the Board may conduct public hearings and meetings to obtain information on the record -

last year, the Board called 4 public meetings,
4) the Board may place reporting requirements on the DOE to obtain information on the record - last year, the Board issued 7 sets of reporting requirements; and
5) the Board may subpoena witnesses to obtain information, but they use this power very rarely, mostly because people cooperate.

All of these actions are focused on obtaining information about potential safety issues, and making this information available to DOE decision-makers and the public. The Board largely depends on the DOE decision-makers taking the right action once the Board shines the light on the situation. In most all cases, this works. In the few exceptions, the Board can make the light brighter until the Department takes action.

The Board uses all its powers as needed to accomplish its mission. I believe the judicious use of these powers by the Board is a primary factor in the Board's success. The Board chooses the right level of action based on the significance of their safety concerns and then judiciously and predictably escalates their concerns based on the Department's response and based on the significance of their concerns as new information is uncovered.

For example, a Board member might develop a safety concern as a result of a briefing or a report from one of the Board staff members. The Board members would confer and if they agree that a safety concern may exist, they would likely communicate this concern to the Department through a routine letter asking for more information. If the concern is more significant or if the Board is not satisfied with the Department's response, the Board may use a formal reporting requirement to obtain information. If the issue remains unresolved and the Board is not satisfied with the pace or the scope of the Department's actions, the Board may ultimately write a recommendation to the Secretary.

In general, the Board does not write recommendations until the Department has had multiple opportunities over a period of time to address and resolve an identified safety issue. Professional "Board-watchers" find the Board's behavior to be predictable in many ways. Careful reading of Board letters and reports often shows the Board's level of concern on a given safety issue. When the Department fails to recognize the Board's level of concern or fails to make the appropriate response or perhaps has a legitimate difference of opinion about the severity of a given issue, we can usually predict with great accuracy when and how the Board will use its powers to escalate attention on the matter.

SAFETY MANAGEMENT FRAMEWORK

Perhaps the most important accomplishment over the last 10 years by the Department on a Board-related issue has been the development and implementation of Integrated Safety Management. One of the Board's original charges from Congress was to assist the Department in establishing clear and rational safety standards and Orders. This has been a long, arduous, and evolutionary process. It began with the Board's second recommendation, which we call 90-2 because it was the second recommendation in the year 1990. Through this recommendation, the Board appeared to make a simple and reasonable request: that the Department identify those safety requirements and standards it was using and the degree of compliance to these standards.

Well, it turned out to be not nearly as simple as it sounded. This recommendation forced the Department to confront its reliance on an expert-based safety framework rather than a standards-based safety framework. We were also forced to confront the diversity of facilities within the DOE complex and the simple fact that, unlike the NRC regulations for commercial power reactors, a single set of safety requirements is not right for all DOE facilities - one size does NOT fit all. We were also forced to confront a wide variety of processes and terminology that had propagated over many years so that the safety professionals in different locations and in different programs were barely able to communicate with and understand one another. In response to recommendation 90-2, the Department went through 5 different versions of the implementation plan before developing one that was acceptable to the Board and all the parts of the Department. Ultimately this plan was overcome by events, but the learning we gained during this difficult period, 1990-1994, was critical to opening the way to the future.

In 1991, the Board wrote a related recommendation that led to the Department tightening up its technical standards program. In 1993, the Board expanded their original 1990 recommendation to include those facilities that performed weapons testing, assembly and disassembly. In 1994, the Board wrote a follow-up recommendation to their 1990 recommendation; this 1994 recommendation emphasized the tie between safety requirements and contract provisions. When this recommendation 94-5 got off to a slow start, the Board issued a much more comprehensive recommendation, number 95-2, in October 1995. This recommendation, and the Department's implementation plan, led to the development of the Department's Integrated Safety Management program, which is accepted today by DOE and contractor managers throughout the nation as our enduring safety management framework. Among other objectives, this framework ensures full incorporation of environment, safety and health considerations into all aspects of how we do work at DOE.

The Department did not fully accept Board recommendation 95-2 at first. As written, the recommendation seemed to require the Secretary to commit to safety management processes defined in two Board technical reports issued during 1995. These processes were overly prescriptive and the Department's senior managers were convinced that these were not in the best interest of the Department if adopted verbatim. We had a good deal of tension for a several months between the Department and the Board as we sought for a middle ground that both sides could accept. After extensive wrangling, the Department was able to develop an approach and implementation plan that was acceptable to all parties. The implementation plan was developed with a high degree of participation and buy-in by DOE and contract safety professionals from throughout the complex. This ownership has been critical to the success of Integrated Safety Management (ISM) and its adoption throughout DOE. As Board Chairman John Conway is fond of saying, "If you do it against your will, you are against me still." It was necessary to take the time to get buy-in and participation on this program because it was indeed so important, so central to our entire safety structure.

The system that we developed combined rigidity and flexibility. We had a common objective, common guiding principles, and a common process at the top level. Every office was required to implement these requirements in their contracts. Each program and each facility was required to develop its own implementation system to achieve the safety management functions and to demonstrate the safety management principles. Each office was able to define its own processes

and standards and approve these. After five years of effort, most all sites and program offices have declared completion of initial implementation by September 2000. We have passed a major milestone. While we still have ongoing work to sustain and improve upon our safety management systems and processes, we, as a Department, are committed to ISM as our enduring safety framework.

Along the way, the Board issued a recommendation in 1998 focused on the feedback and improvement function with ISM. Specifically, this recommendation had to do with how the line managers addressed and resolved the safety issues identified by DOE's own internal oversight group. For this recommendation, we once again brought together a working group of the affected organizations and developed a management process and tracking database to address the situation. This recommendation is essentially complete and we expect it to be closed soon.

More recently, in March of last year, the Board issued recommendation 2000-2 on configuration management of vital safety systems. This major new recommendation addressed a variety of items, including HEPA filters, system engineers, readiness assessments for safety systems, and ongoing program oversight assessments. The Board members clearly view this recommendation as a follow-up of their 95-2 recommendation that led to Integrated Safety Management. Without ISM, we would not have an adequate foundation to address these additional issues. Working with the Board, the Department developed and submitted its implementation plan for this recommendation in October 2000. We have a lot of challenges ahead of us on the 2000-2 implementation plan.

I have really only just touched on the highlights of our efforts to develop a comprehensive, flexible safety management structure within DOE. It has taken many years of effort, many years of give and take. The Board's persistence has paid off - we now have a uniform framework in place. The Department's persistence has paid off - we now have a flexible framework in place that has the support and commitment of managers throughout the DOE complex. Now let me turn my attention to another important topic, improving the technical capability of DOE's federal workforce.

TECHNICAL CAPABILITY - FACILITY REPRESENTATIVES

Substantially upgrading the Department's technical expertise was one of the primary objectives of Congress when it established the Board. In 1992, the Board wrote a recommendation for the Department to establish a facility representative program to upgrade the Department's technical capability to directly oversee contractor performance in the field. The Board's vision of the Department as a demanding customer was derived from the Naval Reactors model in ensuring contractor performance in constructing its nuclear submarines. The Department embraced this recommendation and established a strong standard for facility representative programs at each site. The standard contained detailed technical qualification requirements, including written and oral examinations. Facility representatives were selected and recruited as future leaders for the Department, and then trained and qualified in accordance with the standard. Today we have 190 DOE facility representatives at 22 sites across the country. Requirements for re-qualification training and examinations ensure the facility representatives remain among the most technically capable personnel working for the Department.

Why has this recommendation succeeded? The main reason is that the Board made a compelling case for the need for this program and the Department embraced it and took ownership. The Department has lived up to its qualification requirements and the facility representatives are well regarded for their technical proficiency. The facility representatives are valued as the "eyes and ears" of their DOE site managers. The Board made two major contributions to the success of the implementation: one, they worked very closely with the Department in putting the necessary rigor and discipline into the program standard; and two, the Board's own site representatives served as excellent role models and a challenge regarding what was possible. The Board currently has 9 senior staff members in the field at 5 sites to monitor DOE operations. These Board site representatives are recognized for their technical excellence and their professionalism. The Board's site reps. and the DOE's facility reps. share mutual respect and find themselves often working together to investigate and resolve safety problems.

Since the recommendation closed in 1996, the Board has continued to closely monitor the effectiveness of program implementation. The Board periodically re-emphasizes to the senior DOE managers the significance they place on a successful facility representative program. Thus, the Board helps ensure that management priority and support for this program remains strong. The facility representative recommendation stands as one of the Board's most important success stories in creating lasting structural change to improve safety at DOE facilities.

READINESS REVIEWS

The Board's efforts to improve Operational Readiness Reviews (ORRs) and Readiness Assessments (RAs) performed by the Department shows both the Board's persistence and the Board's persuasion in expanding and propagating successful programs throughout the organization. In the Board's first three years of operation, the Board wrote 4 recommendations directed at ensuring effective reviews of facility operations before these facilities were restarted from extended shutdowns. These recommendations were facility-specific and focused on highly-visible weapons production facilities at the Savannah River Site and Rocky Flats.

In late 1992, the Board broadened its previous recommendations into a general one focusing on the Department's process and directives governing conduct of readiness reviews. Thus, the Board sought to institutionalize what the Board members and the Department had learned about how to conduct quality, defensible readiness reviews. The Department champion on this topic freely embraced the mandate and developed and implemented some excellent review protocols. The Department champion personally led numerous readiness reviews and personally trained several qualified team leaders. The result was that both the Board and the Department's management developed confidence that the readiness reviews were performed with integrity and contributed to safety in a meaningful way. The Department later used these readiness reviews as a model for the process of verifying implementation of Integrated Safety Management Systems. These reviews are also being used as a model for safety system operational readiness assessments that are planned for the coming year.

The Board has always seen these verifications following facility start-up as essential for ensuring safe operations. Even though the Board's 1992 recommendation was closed 3 years later in 1995, to this day, the Board is routinely briefed by DOE team leaders when they return from

conducting either Operational Readiness Reviews or Readiness Assessments. The Board continues to closely monitor the quality of readiness reviews. In August 1999, the Board observed weaknesses with the implementation of the Department's directive on this topic. These issues are demonstrated by a failure to conduct independent reviews; facilities and activities repeatedly declaring readiness to start reviews prematurely; and line managers using readiness reviews to assist in attaining readiness, rather than as an independent confirmation of readiness. The Board issued a letter requiring a report in 60 days to address these issues. In December 1999, the Department issued an action plan to enhance its readiness review process implementation. The Department is making good progress in completing these further upgrades.

NATION-WIDE EFFORT TO MANAGE LOW LEVEL WASTES

In 1994, the Board sent over a recommendation for the Department to improve its low-level waste management program. This was a complex-wide recommendation and required a sustained, dedicated effort over multiple years to implement. The Board's most important contribution was identifying a problem that needed to be addressed and providing a recommendation with a clear road-map for how the Department could effectively address it. The basic steps of this road-map are: 1) do a self-assessment to determine the present state and identify corrective actions, 2) upgrade program requirements, 3) upgrade program implementation at various sites and facilities, 4) review upgrade actions and have DOE authorize continued operations, and then 5) continued monitoring and improvement. This road-map has been used again and again, regardless of the safety issue.

The Department agreed with the Board that this problem existed and needed to be addressed. Nevertheless, the Department got off to a slow start on this implementation plan. The Board kept the heat on by raising questions about missed milestones. Within a short time, new management stepped in and took control, revamping and revising the implementation plan. Strong headquarters ownership of this implementation plan was critical to its success. The headquarters manager recruited a strong cross-disciplinary team from the field, and these experts shared a common vision of the future state. They formed the core of the expert teams that did the complex-wide review on low-level wastes. Once the DOE managers took clear ownership, the Board was content to monitor progress, offering strong input, as usual, on the DOE order, manual, and guidance documents, and periodic observations and encouragement.

The new process made DOE clearly accountable for its low-level waste programs. Department officials had to authorize low-level waste operations through a Disposal Authorization Statement. Similar to approval of contractor safety analysis reports, this DOE approval of contractor performance assessments and composite analyses indicated that contractor plans and commitments were in keeping with established DOE direction and guidance. This program was successfully implemented throughout the DOE over a period of 4-5 years, which is relatively quick considering the magnitude of changes. It also clearly ranks as a success story for DOE and the Board.

STABILIZING NUCLEAR MATERIALS

The last safety topic I want to discuss today is stabilization of nuclear materials. The Board wrote its original recommendation on this topic in 1994 urging the Department to accelerate its plans for stabilizing high-risk left-overs from years of weapons production. This may be the Board's most encompassing recommendation. This is a significant effort; the stabilization, safe-storage, and disposal activities encompassed by the Board's recommendation have been extensive, accounting for 10-20% of the budget of the Environmental Management program. We have had mixed success so far, as with other parts of the environmental clean-up. We have effectively focused on reducing the highest-risk vulnerabilities, such as eliminating all contacts between plutonium and uranium metals with plastic, and harvested some "low hanging fruit" of risk reduction. Lately we have hit some tough obstacles for continued progress. The current plan calls for completion of the identified activities by the year 2010, over 16 years after the original recommendation was written. This is a far cry from Congress's original intent that all Board recommendations would be resolved within 1 year, but this recommendation is clearly more extensive than the Congress originally conceived when it established the Board.

Some of the challenges for continued progress include:

1) money - the work requires significant budget resources as I mentioned,
2) relative priority - integration of these clean-up projects with ongoing missions presents problems of relative prioritization and continued emphasis,
3) technology, which ultimately dictates what can be accomplished - we are using a good bit of one-of-a-kind technology that needs to be developed and troubleshot as we develop it,
4) evolving DOE complex configuration - which impacts decisions about ultimate disposal paths, and
5) complex coordination, across sites, across programs, and across the nation.

This effort has been #1 or #2 on the Board's priority list since recommendation 94-1 was originally issued in May 1994. To keep the pressure up, the Board issued an updated recommendation last year. The Board has held a couple public meetings on this issue. The members have held many talks with DOE officials. Almost every time the Board goes into the field, the Board members discuss progress with field office managers. This is a continuing priority of the Board and while the members recognize that significant work has been accomplished, they also recognize that significant work remains to be accomplished.

CONCLUSION

In conclusion, I'd like to quickly review a few of the main themes I've developed on how the Board and Department have effectively worked together to improve safety:

- Technical Excellence - the Board investigates and summarizes relevant technical information and analysis that makes apparent safety issues that must be addressed.
- Ownership - the implementer must "own" the solution for it to be a long-term fix - strong DOE ownership has been critical to the success of many Board initiatives.

- Incrementalism - we must often improve incrementally. We can't do everything all at once and need to do the most important improvements first. Often we must learn to crawl before we can learn to walk. Success often comes after many years of steady effort.
- Persistence - the Board has been persistent and consistent in urging certain safety improvements and highlighting information that reinforces the need for action.

Working together, we continue to improve safety at DOE defense nuclear facilities. Thank-you.