

TESTIMONY OF
THE DEFENSE NUCLEAR FACILITIES SAFETY BOARD
A.J. EGGENBERGER, CHAIRMAN

CONGRESSIONAL REVIEW OF GAO'S FINDINGS AND RECOMMENDATIONS
REGARDING THE DEPARTMENT OF ENERGY'S EFFORTS TO
CONSOLIDATE SURPLUS PLUTONIUM INVENTORIES

SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS
COMMITTEE ON ENERGY AND COMMERCE
UNITED STATES HOUSE OF REPRESENTATIVES

OCTOBER 7, 2005

Introduction

Mr. Chairman and Members of the Subcommittee, I appreciate the opportunity to present testimony on the Defense Nuclear Facilities Safety Board's (Board) review of the Department of Energy's (DOE) efforts to consolidate surplus plutonium inventories.

Today's hearing addresses the Government Accountability Office (GAO) audit report, "Securing U.S. Nuclear Materials: DOE Needs to Take Action To Safely Consolidate Plutonium." As indicated in the report, the Board provided substantial technical input to the GAO auditors. GAO found that DOE needed to develop a comprehensive strategy to consolidate, store, and eventually dispose of its plutonium and needed to ensure that its cleanup plans are consistent with its plutonium consolidation plans. The Board agrees with GAO's findings and conclusions that are relevant to the Board's nuclear health and safety jurisdiction.

I would like to summarize the statutory nuclear safety oversight mission of the Board, and then briefly review the Board's recent activities that are relevant to consolidated plutonium storage and disposition. I will also review the Board's Congressionally mandated study of plutonium storage at the Department of Energy's Savannah River Site (SRS) and our suggestions for the safe storage and disposition of excess plutonium.

The Board's Statutory Oversight Mission

Congress created the Board as an independent technical agency within the Executive Branch, external to DOE, to identify the nature and consequences of potential nuclear threats to

public health and safety at the Department of Energy's defense nuclear facilities, to elevate such issues to the highest levels of authority, and to inform the public. Broadly speaking, the Board provides nuclear safety oversight of DOE's defense nuclear facilities from design through construction, operation (including storage), and decommissioning. The Board is not a regulatory, but an advisory agency with approximately 60 technical staff.

The Board's approach to conducting its nuclear safety oversight mission is to identify to DOE conditions or deficiencies which could adversely affect the public, including workers', health and safety. The Board provides advice and recommendations to DOE primarily by way of letters, reporting requirements, and formal recommendations to the Secretary of Energy. DOE can accept or reject the Board's advice and recommendations. Although DOE's contractors implement most of the nuclear health and safety improvements identified by the Board, the Board works primarily through DOE—both headquarters and site office staff. To date, all Board recommendations have been accepted by the Secretaries of Energy.

The Board conducts its nuclear safety oversight of DOE-National Nuclear Security Administration activities at the Los Alamos, Lawrence Livermore, and Sandia National Laboratories; the Pantex Plant, the Y-12 National Security Complex, the Savannah River Site, and the Nevada Test Site. The Board also conducts nuclear safety oversight of DOE's Environmental Management activities at these sites as well as the Hanford Site, Idaho National Laboratory and Idaho Cleanup Project, Oak Ridge National Laboratory, Waste Isolation Pilot Plant, and the Fernald and Mound Sites in Ohio. Operations at DOE's defense nuclear facilities

include assembly, disassembly, and dismantlement of nuclear weapons; and maintenance and surveillance of the aging nuclear weapons stockpile. Operations at defense nuclear facilities also include the stabilization and storage of nuclear materials, the deactivation and decommissioning of facilities, and the processing and storage of radioactive waste.

The Board's jurisdiction covers only nuclear safety oversight of DOE's defense nuclear facilities and activities; including the safe storage of plutonium in defense nuclear facilities. As such, some of the issues that are discussed in this hearing, like those directly related to safeguards and security, are beyond the Board's jurisdiction. There may, however, be causal elements associated with these issues that affect nuclear safety and are of interest to the Board. Moreover, there are often important relationships between nuclear safety and security, and between nuclear and industrial safety. Consolidation of nuclear materials is a prime example. It can have both nuclear safety and security components; however, the Board's jurisdiction is limited to nuclear health and safety issues.

Background

In the mid-1990s, DOE developed a plan for storage of its excess plutonium materials. The inventories of material at the Rocky Flats Environmental Technology Site (Rocky Flats) and SRS were to be stored in a state-of-the-art facility—the Actinide Packaging and Storage Facility (APSF) at SRS. This facility was designed to allow for expansion to accommodate additional nuclear materials from other DOE sites. Advanced monitoring and

handling features of this facility would have minimized manual inspection and movement of containers, thereby reducing worker radiation doses and criticality risks.

Additionally, in our Recommendations 94-1, *Improved Schedule for Remediation in the Defense Nuclear Facilities Complex*, and 2000-1, *Prioritization for Stabilizing Nuclear Materials*, the Board encouraged DOE to stabilize and package its excess plutonium into robust storage containers. This action provided DOE time to decide the best course of action for future storage and ultimate disposition of plutonium.

The K-Area reactor facility was built at SRS in the 1950s. The reactor was shut down in the early 1990's. In 1998, DOE decided to modify the facility to accommodate early de-inventory of Rocky Flats. This K-Area facility, also known as KAMS (K-Area Material Storage), was intended to be used for a limited time, less than 10 years, until APSF was to become operational.

In 2000, DOE completed a study of plutonium stabilization and storage options. This study assumed that a proposed plutonium immobilization facility would provide a near-term disposition pathway for DOE's excess plutonium metal and oxides not slated for use in mixed-oxide (MOX) fuel. Given the assumed short storage period, the DOE study team concluded it would be more cost-effective and timely to modify existing facilities to provide the capability for stabilization and storage than to construct a new facility. Accordingly, the recommendation of the study was to cancel the APSF project and modify Building 235-F (235-F)—originally built in the 1950s—to install a stabilization and packaging capability.

Even though APSF had been designed and excavation begun, DOE canceled construction of the facility in 2001. DOE's decision was based primarily on budget constraints and expectations that a disposition path for the plutonium (MOX and immobilization facilities) would be available in the relatively near future. The immobilization facility was delayed shortly after this decision, and then canceled in 2002. In conjunction with this cancellation, DOE decided that storage of the Rocky Flats plutonium materials in KAMS could extend beyond the 10 years previously estimated.

Since DOE had planned to utilize APSF to provide a means to stabilize, package, store, and conduct surveillance and monitoring of SRS's inventory of plutonium, the decision to cancel APSF left DOE without clear provisions for the safe stabilization and storage of excess plutonium at SRS. To achieve timely stabilization for plutonium at the SRS site, the Board suggested that these materials could be stabilized and packaged efficiently with some minor modifications to the FB-Line. DOE agreed and has now completed stabilization and packaging of the SRS excess plutonium. DOE concluded that storage of the SRS materials could be provided by modifying storage vaults in 235-F and increasing storage capacity in KAMS. In 2002, Congress directed the Board to study the adequacy of plutonium storage at SRS.

Congressionally Mandated SRS Plutonium Storage Study by the Board

In section 3183 of the FY 2003 National Defense Authorization Act, Congress directed the Defense Nuclear Facilities Safety Board to conduct a study of the "adequacy of the K-Area

Materials Storage facility (KAMS), and related support facilities such as Building 235-F, at the Savannah River Site, Aiken, South Carolina, for the storage of defense plutonium and defense plutonium materials” The statute required the Board to:

(1) address –

(A) the suitability of KAMS and related support facilities for monitoring and observing any defense plutonium or defense plutonium materials stored in KAMS;

(B) the adequacy of the provisions made by the Department for remote monitoring of such defense plutonium and defense plutonium materials by way of sensors and for handling of retrieval of such defense plutonium and defense plutonium materials; and

(C) the adequacy of KAMS should such defense plutonium and defense plutonium materials continue to be stored at KAMS after 2019; and

(2) include such proposals as the Defense Nuclear Facilities Safety Board considers appropriate to enhance the nuclear safety, reliability, and functionality of KAMS.

Congress also required both the Secretary of Energy and the Board to submit annual reports on the actions taken by DOE in response to the Board’s proposals. The first annual report was required to be submitted six months after the Board’s study was submitted. Subsequently, the Board has submitted a 2004 and 2005 annual report to Congress pursuant to this statute.

Board Plutonium Study Findings

In our study, *Plutonium Storage at the Department of Energy's Savannah River Site*, dated December 1, 2003, the Board made proposals concerning DOE's plutonium disposition program, the suitability of 50-year-old facilities planned for storing plutonium at the SRS, and the remote monitoring and retrieval of plutonium. The Board proposed safety upgrades to ensure the nuclear safety, reliability, and functionality of the existing facilities (KAMS and 235-F) proposed for plutonium storage. The Board also proposed that DOE expedite the development of a complete, well-considered plan for the final disposition of all excess plutonium to minimize unnecessary extended storage of plutonium at SRS. Even with a sound disposition plan, excess plutonium is expected to be stored for several decades at SRS; therefore, the Board additionally proposed that DOE conduct a new study of available options for the storage of plutonium at SRS.

In April 2005, DOE decided to consolidate the excess plutonium currently at SRS into the KAMS facility and not utilize 235-F for extended storage. This decision obviates the need for nuclear safety upgrades to 235-F related to extended storage.

The Board considers the KAMS facility to be a robust structure that can be made suitable for storage by establishing an appropriate fire protection system and eliminating unnecessary combustibles. DOE has agreed to remove unnecessary combustibles and has recently directed that needed upgrades to the facility's fire protection system be made. The combination of these actions and the robust packaging containers required for storage in KAMS, provides a suitable facility for storage of plutonium. To meet existing DOE requirements for extended storage, DOE

will need to add the capability to monitor, stabilize and repackage plutonium in this facility. DOE plans for this activity are in progress.

Current status of plutonium storage and consolidation

In the Board's 2004 and 2005 annual follow-up reports to Congress on the plutonium storage study, the Board stated that DOE had not established a consistent, well-considered plan for storage and disposition of excess plutonium. Rather, DOE's storage plans continue to change. DOE has been unsuccessful in consolidating excess plutonium at SRS. DOE has directed that the Hanford Site plan to store its excess plutonium on site through 2035. DOE's laboratories must also continue to store excess plutonium. Contributing to consolidation difficulties are inconsistencies between Hanford and SRS as to how the plutonium must be packaged before shipping to SRS (i.e., unirradiated Fast Flux Test Facility fuel at Hanford Site). Specific actions to accommodate this new direction for extended storage of excess plutonium at various sites and to address packaging have not been formalized by DOE and have not been evaluated by the Board. However, this strategy raises potential questions about the nuclear safety of options being considered by DOE to store plutonium in areas never intended for such storage.

For extended storage, consolidation of excess plutonium into a single, robust facility specifically designed for storage is logical from a nuclear safety perspective. Accordingly, the Board has advised DOE to consider broader alternatives for safe and secure storage of its excess plutonium. If unable to consolidate plutonium at existing SRS facilities, DOE should consider other locations for consolidation of plutonium. Options include consolidation in a new facility,

specifically designed for such storage, or consolidation in an existing facility that has been determined suitable for extended storage.

DOE's current disposition strategy for excess plutonium consists primarily of processing into mixed-oxide fuel or vitrifying into lanthanide borosilicate glass for disposal. A small quantity of excess plutonium is to be disposed of as waste either at the Waste Isolation Pilot Plant or through the SRS high level waste system. As envisioned, the vitrification process would be established in areas of the K-Reactor facility at SRS. This vitrification process is preliminary and still years away from being realized.

Given DOE's decision to ultimately dispose of its excess plutonium, the Board advised DOE to consider additional alternatives for its disposition strategy, including the potential for incorporating more of the material into MOX fuel. In lieu of pursuing the vitrification project only, DOE has recently approved the mission need for a plutonium disposition project. This project includes developing disposition alternatives that take into account other ongoing or planned plutonium processing activities. This appears to be an appropriate reconsideration of the path forward on plutonium disposition.

The two Board proposals from its recent 2005 follow-up report to Congress, namely that DOE consider broader alternatives for storage and that DOE consider additional alternatives to disposition, are consistent with the GAO report findings.

In early 2005, DOE formed a new broadly chartered group—the Nuclear Materials Disposition and Consolidation Coordination Committee—comprising senior DOE management personnel, which may provide the strategic planning needed. This group is to provide a forum to perform cross-cutting nuclear material disposition and consolidation planning for DOE. This is a positive development but the committee does not have a clearly identified set of goals, objectives or schedule nor has this committee, to date, provided any real strategic planning that is obvious to the Board. DOE continues to develop new plans and alternative plans since 1995 but has not implemented any of them to date.

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The Board’s 2005 follow-up report acknowledged DOE’s commitment to make the KAMS facility adequate for extended storage. The report also stated that for extended storage, consolidation of excess plutonium into a single, robust facility specifically designed for storage is logical from a nuclear safety perspective. The Board advised DOE to consider broader alternatives for safe and secure storage of its excess plutonium. If unable to consolidate plutonium at SRS, DOE should consider other locations for consolidation of plutonium. Options include consolidation in a new facility, specifically designed for such storage, or consolidation in an existing facility that has been determined suitable for extended storage.

DOE’s current disposition strategy for excess plutonium consists primarily of processing into mixed-oxide fuel or vitrifying into lanthanide borosilicate glass for disposal. As envisioned, the vitrification process would be established in areas of the K-Reactor facility at SRS. This vitrification process is preliminary and still years away from being realized. Given DOE’s decision to ultimately dispose of its excess plutonium, the Board advised DOE to consider

additional alternatives for its disposition strategy, including the potential for incorporating the excess material into mixed-oxide fuel.