DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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November 14, 2000

The Honorable T. J. Glauthier
Deputy Secretary of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585-1000

Dear Mr. Glauthier

The Defense Nuclear Facilities Safety Board (Board) continues to closely monitor the Department of Energy's (DOE) efforts to manage and disposition both excess and programmatic nuclear materials. DOE's efforts to improve consolidation, treatment, storage, recycling, and disposition of its inventory of fissile materials have the potential to result in a much safer, more efficient, and less costly defense nuclear facilities complex.

Members of the Board's staff recently reviewed DOE's *Integrated Nuclear Materials Management Plan* to evaluate its impact on several of the Board's Recommendations dealing with remediation and storage of special nuclear materials. The enclosed staff report is forwarded for your information and use as you pursue the plan's implementation.

The Board is pleased to note that the plan proposes establishing core groups of experts to manage plutonium, uranium, and other isotopes. However, the plan does not appear to place consistent emphasis on the importance and value of improving the safety posture of the complex through integration of nuclear materials management. For example, the plan highlights the safety benefits of a new highly-enriched uranium storage facility, but similar safety benefits are not recognized as factors that would favor construction of a new plutonium storage facility. The plan makes no reference to previous studies that concluded a new plutonium storage facility would provide many benefits beyond what backfitting older facilities could offer, and the plutonium storage study that forms the basis for the plan's conclusions remains a draft/predecisional document. The report also states that processing facilities need to remain in service until potential orphan materials in the DOE complex are addressed, but does not factor such considerations into the discussions regarding facilities at the Savannah River Site. Plans to quickly phase out F-Area plutonium uranium extraction (PUREX) operations are contrary to a lesson learned at Hanford, where the premature shutdown of the PUREX plant removed important processing capabilities from service when they could still have been used to stabilize fuel elements, which instead lie deteriorating in the K-Reactor basins.

The Board will continue to focus its attention on this important area as DOE moves to address its long-term nuclear material needs. The Board requests to be kept apprised of DOE's progress in addressing the aforementioned matters and those raised in the enclosed report.

Sincerely,

John T. Conway
Chairman

c: The Honorable Carolyn L. Huntoon
Mr. Mark B. Whitaker, Jr.

Enclosure

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Staff Issue Report

October 12, 2000

MEMORANDUM FOR: J. K. Fortenberry, Technical Director

COPIES: Board Members

FROM: T. L. Hunt

SUBJECT: Review of the Department of Energy's Integrated Nuclear Materials Management Plan, June 2000

This report documents a review by the staff of the Defense Nuclear Facilities Safety Board (Board) of the Department of Energy's (DOE) *Integrated Nuclear Materials Management Plan*. The document review was performed in support of several Board Recommendations dealing with management and disposition of fissile materials. The staff's expectation was that this report would provide a better understanding of DOE's long-term goals for consolidating, storing, recycling, and/or dispositioning its inventory of both excess and programmatic nuclear materials.

Background. The plan was developed in response to a directive by Congress (Section 3172 of the Fiscal Year [FY] 2000 National Defense Authorization Act) to identify means of integrating the responsibilities of the various DOE program offices accountable for treatment, storage, and disposition of fissile materials and to identify any expenditures necessary at the sites that are anticipated to have an enduring mission for fissile material management. The plan was completed by the recently chartered Nuclear Materials Stewardship Initiative (carried out by the Stewardship Task Force), whose mission is to promote a responsible corporate approach to cradle-to-grave management of nuclear materials. The Task Force is chaired by the director of the Office of Nuclear Materials Management Policy within the DOE Office of Policy.

DOE's stated goals for the plan were to provide an account to Congress of its unclassified inventory of nuclear material, a chronicling of how and where these materials are managed, a description of integrating activities of the various programmatic and field offices, and opportunities for achieving greater integration and efficiencies in the management of nuclear materials. The mandated scope of the plan to address fissile material was broadened by DOE to also include other nuclear materials (e.g., neutron sources, special isotopes, thorium, light nuclear materials, orphans), excluding material streams classified as waste. Although the plan is not a decision document, and does not establish new policy, the plan states that the desired outcomes are reduced costs, enhanced efficiencies, and strengthened long-term management of nuclear materials.

Discussion. The plan is a very high-level document. Little in the way of original information is provided. It provides an overall view of current DOE programs for plutonium, uranium, and spent nuclear fuel, and advocates increased integration of DOE's programs. Several specific opportunities for improvement are identified, but the report states that each would require further review and evaluation. It references dozens of assessments, analyses, policies, and evaluations that must be completed before important decisions on material use or disposition are made. The plan is essentially silent (except for a short section on pertinent Defense Nuclear Facilities Safety Board Recommendations) or inconsistent on the issue of improving the safety posture of the complex by integrating nuclear materials management. For example, the safety benefits of a new highly-enriched uranium (HEU) storage facility are extolled, but similar benefits are not recognized as factors that would favor construction of a new plutonium storage facility.

A positive development that may fall out from the Task Force's plan is the potential establishment of nuclear material management groups for plutonium, uranium, and other isotopes. The intent is to maintain a core expertise and capability for managing special DOE materials, provide centralized planning, and track the nuclear material inventory.

"Identify expenditures at sites that have enduring missions for plutonium management." The plan fails to quantitatively answer this fundamental request put forth by the National Defense Authorization Act. The estimated costs of managing nuclear materials are presented in the plan by showing the relative distribution of projected expenditures for FY 2001. Budgets for anticipated future plutonium handling operations at Hanford, Los Alamos National Laboratory, Lawrence Livermore National Laboratory, and the Savannah River Site (SRS) have not been delineated. Since long-range planning for nuclear materials management has not been completed, it is difficult to define future requirements.

Statements such as "long-term plutonium storage by a new facility would not be cost effective" go unchallenged and unexplained. The report does not give details on the cumulative costs of not building the Actinide Packaging and Storage Facility (APSF). Comparisons are made to discrete components of a packaging and storage system (e.g., facility modifications or alternative storage), but an overall comparison is missing. The plan makes no reference to SRS studies that concluded APSF would provide many benefits beyond what backfitting older facilities could offer. Also, no indication is given as to where a new pit fabrication facility might be constructed or what criteria will factor into the decision.

The plan states that there is no financial incentive to accelerate relocation of Hanford's plutonium. The plan asserts that the cost of consolidating Hanford material in APSF at SRS would approximate the cost of modifying the Plutonium Finishing Plant's (PFP) storage vaults and furnishing storage in the proposed immobilization facility; thus, consolidation is not fiscally justified. It goes on to say that operating costs of an SRS facility and PFP are equal, although cost analyses at Hanford's PFP indicate that extended storage of plutonium results in more than $100 million in safeguards and security cost increases alone. Hanford and SRS trade studies on plutonium disposition concluded that consolidating PFP's material into APSF would reduce life cycle costs by close to $200 million.

The report states that processing facilities need to remain in service until potential orphan materials elsewhere in the DOE complex are addressed, but does not factor such considerations into the discussions regarding plutonium at SRS. DOE plans to phase out plutonium-uranium extraction (PUREX) operations at the SRS F-Area despite a lesson learned at Hanford, where the PUREX plant was shut down prematurely, taking important processing capabilities out of service when they could still have been used to stabilize irradiated materials.

The plan reports that budgeting for plutonium management operations is expected to remain constant for the next several years, but could experience a funding shortfall of between 5 and 20 percent during the FY 2001 to FY 2006 timeframe. No details are provided as to where the impacts would most likely be felt and what plutonium treatment and storage activities are liable to suffer most.

In contrast to the plan's discussion of plutonium management, cost considerations are not an overriding factor in its evaluation of HEU management. Only a brief rationalization is given for building the Highly-Enriched Uranium Materials Facility (centralized storage) and the proposed Enriched Uranium Manufacturing Facility (recovery, processing, and blending) at the Y-12 Plant. DOE plans to stabilize, package, and store plutonium at vintage facilities at Hanford and SRS following extensive upgrades, but a new HEU storage facility with capacity for only a portion of DOE's HEU is evolving at the Oak Ridge Y-12 Plant with seemingly little comparative analysis.

"Identify means of integrating responsibilities of the various program offices for treatment, storage, and disposition of fissile materials." The plan divides opportunities to improve coordination and integration among program offices for handling nuclear materials into two categories: (1) policy and organizational changes and (2) operational improvements.

DOE proposes to store as much uranium as possible in the hope that it can be recycled for use as commercial nuclear reactor fuel. Similar programs have not gone smoothly of late (e.g., disposition of HEU solutions at SRS) due to various reasons—sometimes beyond DOE's control. A more aggressive effort to pursue disposal options is probably warranted.

There is no integrated long-term storage plan for some special isotope materials. For example, use of neptunium may not occur for many years, but its interim storage demands may impact DOE's capacity to store other excess nuclear materials. Many decisions needed to integrate the isotope program with the other nuclear materials programs remain unresolved and depend heavily on developing production sources, recovery facilities, and storage facilities. These issues have garnered relatively little attention or commitment from DOE to date and are the subject of future determinations.

Overall, the report did not achieve fully the objective specified by Congress. It reaffirms DOE's commitment to its current path forward and outlines a multi-year "action agenda" for working toward improved integration over the next several years.