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DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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July 12, 2006

The Honorable Samuel W. Bodman
Secretary of Energy
U. S. Department of Energy
1000 Independence Ave., SW, Room 7A-257
Washington, DC 20585-1000

Dear Secretary Bodman:

The Defense Nuclear Facilities Safety Board (Board) is pleased to enclose a copy of our Third Annual Report to Congress on Plutonium Storage at the Department of Energy's Savannah River Site. Congress mandated the Board to write this report in Section 3183 of the Defense Authorization Act for Fiscal Year 2003, Public Law 107-314.

The annual report addresses actions taken by the Secretary of Energy in response to the proposals included in the Board's initial report to Congress on this topic, issued December 1, 2003. The initial report dealt with the adequacy of the K-Area Materials Storage (KAMS) facility and related support facilities such as Building 235-F at the Savannah River Site, Aiken, South Carolina, for the storage of defense plutonium materials.

Sincerely,

A handwritten signature in black ink, appearing to read "A. J. Eggenberger".

A. J. Eggenberger
Chairman

Enclosure: as stated

**PLUTONIUM STORAGE
AT THE
DEPARTMENT OF ENERGY'S
SAVANNAH RIVER SITE**

**THIRD ANNUAL REPORT
TO CONGRESS**

**DEFENSE NUCLEAR FACILITIES
SAFETY BOARD**



JUNE 2006

A.J. Eggenberger, Chairman
Joseph F. Bader
John E. Mansfield

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

625 Indiana Avenue, NW, Suite 700 Washington, D.C. 20004-2901
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June 27, 2006

To the Congress of the United States:

Congress required the Defense Nuclear Facilities Safety Board (Board) and the Secretary of Energy to submit to Congress annual reports on the actions taken by the Secretary in response to the proposals made in the Board's study *Plutonium Storage at the Department of Energy's Savannah River Site*, dated December 1, 2003. Herewith is the Board's third annual report, as required by Section 3183(d) of the Defense Authorization Act for Fiscal Year 2003, on the Department of Energy's (DOE) actions to address the Board's proposals from this study.

For excess plutonium currently at the Savannah River Site, the K-Area Materials Storage (KAMS) facility will provide adequate extended storage when excess combustibles are removed and fire protection capability is enhanced, as proposed by the Board. Removal of excess combustibles is expected to be completed this fiscal year. DOE is currently designing the proposed fire protection modifications.

For excess plutonium located at other sites, DOE has not made progress in consolidating this plutonium at the Savannah River Site. Therefore, each site continues to maintain its excess plutonium inventory.

DOE continues to languish in making a decision on ultimate disposal of its excess plutonium. Until this decision is made and executed, the Board believes consolidation of excess plutonium into a single, robust facility suitable for extended retrievable storage is logical from safety, security, and economic perspectives. DOE should aggressively pursue consolidation of its excess plutonium.

The Board will continue to follow fire protection modifications to the KAMS facility and DOE's efforts to develop a plutonium consolidation strategy as well as a plutonium disposition strategy.

Respectfully submitted,

A. J. Eggenberger
Chairman

Joseph F. Bader
Member

John E. Mansfield
Member

PREFACE

DEFENSE AUTHORIZATION ACT FOR FISCAL YEAR 2003 PUBLIC LAW 107-314

SEC. 3183. STUDY OF FACILITIES FOR STORAGE OF PLUTONIUM AND PLUTONIUM MATERIALS AT SAVANNAH RIVER SITE.

(a) **STUDY.**—The Defense Nuclear Facilities Safety Board shall 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 in connection with the disposition program provided in section 3182 and in connection with the amended Record of Decision of the Department of Energy for fissile materials disposition.

(b) **REPORT.**—Not later than one year after the date of the enactment of this Act, the Defense Nuclear Facilities Safety Board shall submit to Congress and the Secretary of Energy a report on the study conducted under subsection (a).

(c) **REPORT ELEMENTS.**—The report under subsection (b) shall—

(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 safety, reliability, and functionality of KAMS.

(d) **REPORTS ON ACTIONS ON PROPOSALS.**—Not later than 6 months after the date on which the report under subsection (b) is submitted to Congress, and every year thereafter, the Secretary and the Board shall each submit to Congress a report on the actions taken by the Secretary in response to the proposals, if any, included in the report.

EXECUTIVE SUMMARY

In its study *Plutonium Storage at the Department of Energy's Savannah River Site*, dated December 1, 2003, the Defense Nuclear Facilities Safety Board (Board) made proposals concerning the Department of Energy's (DOE) plutonium disposition program, the suitability of facilities planned for plutonium storage at the Savannah River Site (SRS), and the remote monitoring and retrieval of plutonium.

PROPOSALS CONCERNING THE PLUTONIUM DISPOSITION PROGRAM

The Board proposed that DOE expedite the development of a complete, well-considered plan for the final disposition of all excess plutonium to preclude 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 proposed that DOE conduct a new study of available options for the storage of plutonium at that site.

Status of DOE Actions. DOE has to date been unsuccessful in consolidating excess plutonium at SRS. DOE has yet to establish a consistent, well-considered plan for storage and disposition of excess plutonium as envisioned by the Board. Rather, DOE's storage plans continue to change. The Hanford Site initially started its planning process for construction of a new facility for storage of its excess plutonium, but recently ceased this effort because of the expectation that its plutonium will be moved to a consolidation site in the near future. DOE's laboratories must also continue to store excess plutonium.

The Board believes that DOE should aggressively pursue consolidation of its excess plutonium. DOE has reconfigured the K-Area Materials Storage (KAMS) facility such that SRS could now consolidate all of DOE's excess plutonium into this facility. DOE currently does not have the capability at SRS to perform all of the surveillance, stabilization, and packaging required by the long-term plutonium storage standard, but is in the initial planning process for adding this capability to the K-Reactor facility.

If unable to consolidate plutonium at SRS, DOE should consider other locations that might serve the purpose. 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.

Last year, DOE established a broadly chartered group—the Nuclear Materials Disposition and Consolidation Coordination Committee—comprising senior DOE management personnel, intended to provide strategic planning for storage and disposition of excess plutonium and other nuclear materials. To date, the Board has not seen any real progress from this group toward establishing a firm strategic plan that could be implemented across the DOE complex to consolidate, store, and disposition excess plutonium.

PROPOSALS CONCERNING THE SUITABILITY OF FACILITIES

DOE originally planned for extended storage of plutonium at SRS in two facilities—the KAMS facility and Building 235-F (235-F). Both are 50-year-old facilities that currently do not meet modern safety standards. The Board proposed safety upgrades to ensure the safety, reliability, and functionality of these facilities for plutonium storage.

Status of DOE Actions. As noted in the Board's last annual report, DOE decided to consolidate the excess plutonium currently at SRS into the KAMS facility and not to utilize 235-F for extended storage. The Board agreed with this decision, which obviates the need for safety upgrades to 235-F related to extended storage. The Board's proposals to enhance the safety and reliability of 235-F for extended storage are no longer applicable.

The Board considers the KAMS facility to be a robust structure that can be made suitable for extended storage if an appropriate fire protection system is established and unnecessary combustibles are eliminated. DOE is now working toward upgrading the facility's fire protection system and removing unnecessary combustibles.

Sampling of the combustible materials has revealed that they are not contaminated with radionuclides, asbestos, or polychlorinated biphenyls, which simplifies their removal. Removal of the materials is expected this fiscal year. DOE is designing a fire detection system for the storage areas and a limited fire suppression system in a small analytical area of KAMS, but needs to provide funding for implementation of these systems.

PROPOSAL CONCERNING REMOTE MONITORING AND RETRIEVAL

As stated in the Board's first annual report on this subject, DOE has completed all necessary actions concerning this proposal.

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1. INTRODUCTION

1.1 CONGRESSIONAL MANDATE TO THE DEFENSE NUCLEAR FACILITIES SAFETY BOARD

In Section 3183 of the National Defense Authorization Act for Fiscal Year 2003 (Public Law 107-314),¹ Congress directed the Defense Nuclear Facilities Safety Board (Board) to conduct a study of the adequacy of the K-Area Materials Storage (KAMS) facility and related support facilities at the Savannah River Site (SRS) in South Carolina, in which the Department of Energy (DOE) proposes to store defense plutonium and defense plutonium materials. The Board was also required to address the suitability of KAMS and related support facilities for monitoring and observing plutonium materials stored in KAMS, the adequacy of provisions for remote monitoring and for retrieval of material, and the adequacy of KAMS for plutonium storage beyond 2019. Congress required that the Board include in its report proposals the Board considered appropriate to enhance the safety, reliability, and functionality of KAMS.

1.2 BACKGROUND

A lack of consistent planning has forced managers at SRS to focus on what can be done with existing facilities, foreclosing consideration of other options that might have been more cost-effective and safety-conscious. DOE's past decisions concerning plutonium storage at SRS were based on a study (Sena, 2000) that is no longer consistent with present circumstances. DOE's storage plans were based on the assumption that planned immobilization and mixed-oxide (MOX) fuel fabrication facilities would provide a near-term disposition path for all excess plutonium metal and oxide. In 2001, primarily as a result of short-range budget constraints, site plans changed from having one new, state-of-the-art facility for stabilization, packaging, and storage of materials to using multiple 50-year-old facilities (KAMS facility and Building 235-F). Subsequently, DOE decided to not utilize 235-F and modified the KAMS facility such that it can accept all current excess plutonium.

DOE's current plutonium disposition plan relies on successful licensing, construction, and operation of the MOX fuel fabrication facility for disposal of the bulk of excess plutonium. However, the planned immobilization facility has been canceled. Therefore, DOE needs to establish disposition plans for up to 13 metric tons of excess plutonium that would have been processed in that facility. DOE is currently working to establish a disposition path.

Although KAMS is a 50-year-old facility, the Board considers it to be a robust structure that can be made suitable for extended storage of plutonium. Fires are the most significant accidents of concern in the facility, yet it lacks fire protection systems.

¹ See the appendix for the statutory text of Sections 3181, 3182, and 3183.

1.3 THE BOARD'S PROPOSALS

The Board's report on its study of plutonium storage at SRS was provided to Congress and to the Secretary of Energy on December 1, 2003 (Conway, 2003).² In that report, the Board concluded that plutonium can be stored safely in the KAMS facility for a limited period of time (4–5 years). For storage beyond this time, the Board made proposals to enhance the safety, reliability, and functionality of the plutonium storage facilities at SRS. The Board further concluded that DOE should expedite decisions on disposal of excess plutonium and reevaluate its plutonium storage plan to determine whether there are better options for extended storage of plutonium at SRS. The Board's study included the following proposals.

Plutonium Disposition Program

Expedite the development of a complete, well-considered plan for the disposition of all excess plutonium to preclude unnecessary extended storage at SRS.

Conduct a new study of available options for the storage of plutonium at SRS.

Suitability of Facilities

K-Area Materials Storage Facility

Install fire protection systems and eliminate unnecessary combustibles in KAMS.

Building 235-F

Establish an acceptable safety basis for stabilization and packaging of plutonium, and for extended storage of plutonium in the facility.

Conduct a systematic evaluation of the facility's safety systems to determine needed upgrades.

Perform a structural analysis assessing the seismic adequacy as measured by current acceptance criteria.

Decontaminate unused process cells.

Remote Monitoring and Retrieval of Material

Develop and implement validated procedures for the handling and intrasite shipment of plutonium containers, including damaged containers.

² The Board's study is available on the Board's website at: www.dnfsb.gov/pub_docs/dnfsb/rc_20031201.pdf.

2. DEPARTMENT OF ENERGY'S ACTIONS ON THE BOARD'S PROPOSALS

This section presents the status of and the Board's observations on actions being taken by DOE to address the Board's proposals for enhancing the safety, reliability, and functionality of plutonium storage facilities at SRS. Information on the status of DOE's actions is based on discussions between the Board's staff and representatives of DOE-Headquarters and DOE's Savannah River Operations Office (DOE-SR) and the site contractor.

2.1 PLUTONIUM DISPOSITION PROGRAM

Proposal 1. Expedite the development of a complete, well-considered plan for the disposition of all excess plutonium to preclude unnecessary extended storage at SRS.

It is important for DOE to establish a consistent, technically feasible disposition path for excess plutonium not planned for use in MOX fuel. Without a clearly defined disposition path, plutonium storage at SRS could be unnecessarily prolonged and located in facilities not specifically designed for such storage.

Status. DOE's tentative plan has been to consolidate its complex-wide excess plutonium at SRS. Doing so requires that DOE develop a disposition plan for this excess plutonium. DOE's preliminary disposition plan entailed vitrifying plutonium in lanthanide borosilicate glass. As previously envisioned, DOE would locate this vitrification activity in the K-Reactor facility at SRS and operate it for about 7 years. The vitrified plutonium canisters would subsequently be encased in high-level waste containers in the Defense Waste Processing Facility and stored on site for eventual shipment to Yucca Mountain. DOE-SR (Allison, 2005a) requested DOE approval of a mission need (Critical Decision-0) for this vitrification activity.

In response to the request for approval, DOE (Sell, 2005) approved a mission need for a plutonium disposition project. This approval required development of an alternatives analysis for a plutonium disposition project that considered other ongoing or planned plutonium processing activities prior to Critical Decision-1. Submittal of the Critical Decision-1 package is planned for the end of 2006.

Last year, DOE (Hayward, 2005) established a new group—the Nuclear Materials Disposition and Consolidation Coordination Committee—comprising senior DOE management personnel. This group is to provide a forum for performing cross-cutting planning for DOE's nuclear material disposition and consolidation activities.

Board's Observations. DOE has yet to establish a consistent, well-considered plan for storage and disposition of its excess plutonium as envisioned by the Board. Rather, DOE's storage plans continue to change. DOE has to date been unsuccessful in consolidating excess plutonium

material at SRS. In February 2005, DOE (Golan, 2005) directed the Hanford Site to assume for planning purposes that some of its plutonium would remain on site through 2035. Hanford thus initiated planning for construction of a new facility for storage of its excess plutonium, but this effort recently ceased because of the site's expectation that its plutonium will be moved to a consolidation site in the near future. The contractor has been instructed to plan for the shipment of plutonium to a consolidation site starting in 2007 as part its baseline plan. DOE's laboratories must also continue to store excess plutonium.

As previously stated, the Board believes DOE should consider broader alternatives for safe and secure storage of its excess plutonium. If the material cannot be consolidated at SRS, DOE should consider other locations that could be used for this purpose. Consolidation of excess plutonium into a single, robust facility suitable for extended retrievable storage is logical from safety, security, and economic perspectives.

DOE's long-term plutonium storage standard³ requires that storage sites perform periodic surveillance of containers to help ensure that unexpected conditions do not develop. DOE currently lacks the capability at SRS to perform all of the surveillance, stabilization, and packaging required by this standard, but is in the initial planning process for adding this capability to the K-Reactor facility. The Board intends to follow this effort as part of its normal oversight of activities at the site.

During the past year, DOE-SR has been considering various options for the disposition of excess plutonium. At this time, DOE-SR still appears to prefer the vitrification option. The vitrification process appears to be a technically acceptable alternative, but the concept is preliminary, is still years away from being realized, and is expected to require significant new funding for SRS.

Proposal 2. Conduct a new study of available options for the storage of plutonium at SRS.

DOE's plans for storage of plutonium currently at SRS are based on assumptions that are no longer consistent with the current situation. In the Board's view, DOE would benefit from conducting an integrated study of options for storage of plutonium at SRS.

Status. To better meet security requirements, DOE has decided to consolidate the plutonium already at SRS into the KAMS facility and will not utilize 235-F. In its last annual report, the Board suggested DOE should consider whether a new facility would be economically viable. No formal consideration of this suggestion has been performed, but informally site personnel have indicated they do not believe a new facility would be cost-effective given the expected duration of storage following construction of a new facility.

³ DOE-STD-3013, *Stabilization, Packaging, and Storage of Plutonium-Bearing Materials*.

Board's Observations. The Board agrees that if current plans for storage and potential disposition are met, a new facility will likely not be warranted, especially considering the current funding shortages facing DOE. Accordingly, the Board considers this proposal closed.

2.2 SUITABILITY OF FACILITIES

K-Area Materials Storage Facility

Proposal 1. Install fire protection systems.

Accident scenarios involving fires are of great concern in KAMS, yet the facility does not have a fire protection system. The Board believes DOE should establish an appropriate fire protection system—a fire alarm and suppression or, alternatively, fire detection and alarm system with an enhanced firefighting capability.

Status. DOE has now agreed to provide a fire protection system for the KAMS facility. DOE-SR (Allison, 2005c) directed the contractor to submit a baseline change proposal to perform this work by September 30, 2006. DOE is currently designing a fire detection system for the storage areas and a limited fire suppression system in a small analytical area of KAMS.

Board's Observations. The Board has not reviewed the design of the proposed fire protection system modifications due to its current incomplete status. However, the modifications are straightforward and should not be difficult to design and install. Funding for completion of the modifications still needs to be provided.

Proposal 2. Eliminate unnecessary combustibles in KAMS.

Abandoned cables in the actuator tower present a large combustible load and pose a risk of fire. The Board believes it would be better to remove the abandoned cables, rather than accommodate this fire as approved by DOE for the short-term storage mission.

Status. DOE-SR (Allison, 2005c) directed the contractor to submit a baseline change proposal for removal of the abandoned cables by September 30, 2006. Sampling of the combustible materials has revealed that they are not contaminated with radionuclides, asbestos, or polychlorinated biphenyls, which simplifies their removal.

Board's Observations. The combustible cables are expected to be removed this fiscal year. The Board has been told informally that the salvage value of the cables partially offsets the cost of removal.

Building 235-F

As stated in the Board's last annual report (Conway, 2005),⁴ DOE-SR (Allison, 2005b) directed that its site contractor proceed with planning that effectively required 235-F not to be used for extended storage. The Board agreed with that direction. The Board's proposals for enhancing the safety and reliability of this facility are no longer applicable to the extended storage mission.

2.3 REMOTE MONITORING AND RETRIEVAL OF MATERIAL

As stated in the Board's first annual report (Conway, 2004) on this subject, DOE has completed all necessary actions concerning this proposal.

⁴ The Board's annual reports are available on the Board's website at: http://www.dnfsb.gov/pub_docs/dnfsb/rc.html

APPENDIX

PUBLIC LAW 107-314, SUBTITLE E—DISPOSITION OF WEAPONS-USABLE PLUTONIUM AT SAVANNAH RIVER, SOUTH CAROLINA, SECTIONS 3181, 3182, AND 3183

SEC. 3181. FINDINGS.

Congress makes the following findings:

(1) In September 2000, the United States and the Russian Federation signed a Plutonium Management and Disposition Agreement by which each agreed to dispose of 34 metric tons of weapons-grade plutonium.

(2) The agreement with Russia is a significant step toward safeguarding nuclear materials and preventing their diversion to rogue states and terrorists.

(3) The Department of Energy plans to dispose of 34 metric tons of weapons-grade plutonium in the United States before the end of 2019 by converting the plutonium to a mixed-oxide fuel to be used in commercial nuclear power reactors.

(4) The Department has formulated a plan for implementing the agreement with Russia through construction of a mixed-oxide fuel fabrication facility, the so-called MOX facility, and a pit disassembly and conversion facility at the Savannah River Site, Aiken, South Carolina.

(5) The United States and the State of South Carolina have a compelling interest in the safe, proper, and efficient operation of the plutonium disposition facilities at the Savannah River Site. The MOX facility will also be economically beneficial to the State of South Carolina, and that economic benefit will not be fully realized unless the MOX facility is built.

(6) The State of South Carolina desires to ensure that all plutonium transferred to the State of South Carolina is stored safely; that the full benefits of the MOX facility are realized as soon as possible; and, specifically, that all defense plutonium or defense plutonium materials transferred to the Savannah River Site either be processed or be removed expeditiously.

SEC. 3182. DISPOSITION OF WEAPONS-USABLE PLUTONIUM AT SAVANNAH RIVER SITE.

(a) PLAN FOR CONSTRUCTION AND OPERATION OF MOX FACILITY.—(1) Not later than February 1, 2003, the Secretary of Energy shall submit to Congress a plan for the construction and operation of the MOX facility at the Savannah River Site, Aiken, South Carolina.

(2) The plan under paragraph (1) shall include—

(A) a schedule for construction and operations so as to achieve, as of January 1, 2009, and thereafter, the MOX production objective, and to produce 1 metric ton of mixed-oxide fuel by December 31, 2009; and

(B) a schedule of operations of the MOX facility designed so that 34 metric tons of defense plutonium and defense plutonium materials at the Savannah River Site will be processed into mixed-oxide fuel by January 1, 2019.

(3)(A) Not later than February 15 each year, beginning in 2004 and continuing for as long as the MOX facility is in use, the Secretary shall submit to Congress a report on the implementation of the plan required by paragraph (1).

(B) Each report under subparagraph (A) for years before 2010 shall include—

(i) an assessment of compliance with the schedules included with the plan under paragraph (2); and

(ii) a certification by the Secretary whether or not the MOX production objective can be met by January 2009.

(C) Each report under subparagraph (A) for years after 2009 shall—

(i) address whether the MOX production objective has been met; and

(ii) assess progress toward meeting the obligations of the United States under the Plutonium Management and Disposition Agreement.

(D) Each report under subparagraph (A) for years after 2017 shall also include an assessment of compliance with the MOX production objective and, if not in compliance, the plan of the Secretary for achieving one of the following:

(i) Compliance with such objective.

(ii) Removal of all remaining defense plutonium and defense plutonium materials from the State of South Carolina.

(b) CORRECTIVE ACTIONS.—(1) If a report under subsection (a)(3) indicates that construction or operation of the MOX facility is behind the applicable schedule under subsection (a)(2) by 12 months or more, the Secretary shall submit to Congress, not later than August 15 of the year in which such report is submitted, a plan for corrective actions to be implemented by the Secretary to ensure that the MOX facility project is capable of meeting the MOX production objective by January 1, 2009.

(2) If a plan is submitted under paragraph (1) in any year after 2008, the plan shall include corrective actions to be implemented by the Secretary to ensure that the MOX production objective is met.

(3) Any plan for corrective actions under paragraph (1) or (2) shall include established milestones under such plan for achieving compliance with the MOX production objective.

(4) If, before January 1, 2009, the Secretary determines that there is a substantial and material risk that the MOX production objective will not be achieved by 2009 because of a failure to achieve milestones set forth in the most recent corrective action plan under this subsection, the Secretary shall suspend further transfers of defense plutonium and defense plutonium materials to be processed by the MOX facility until such risk is addressed and the Secretary certifies that the MOX production objective can be met by 2009.

(5) If, after January 1, 2009, the Secretary determines that the MOX production objective has not been achieved because of a failure to achieve milestones set forth in the most recent corrective action plan under this subsection, the Secretary shall suspend further

transfers of defense plutonium and defense plutonium materials to be processed by the MOX facility until the Secretary certifies that the MOX production objective can be met.

(6)(A) Upon making a determination under paragraph (4) or (5), the Secretary shall submit to Congress a report on the options for removing from the State of South Carolina an amount of defense plutonium or defense plutonium materials equal to the amount of defense plutonium or defense plutonium materials transferred to the State of South Carolina after April 15, 2002.

(B) Each report under subparagraph (A) shall include an analysis of each option set forth in the report, including the cost and schedule for implementation of such option, and any requirements under the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.) relating to consideration or selection of such option.

(C) Upon submittal of a report under paragraph (A), the Secretary shall commence any analysis that may be required under the National Environmental Policy Act of 1969 in order to select among the options set forth in the report.

(c) CONTINGENT REQUIREMENT FOR REMOVAL OF PLUTONIUM AND MATERIALS FROM SAVANNAH RIVER SITE.—If the MOX production objective is not achieved as of January 1, 2009, the Secretary shall, consistent with the National Environmental Policy Act of 1969 and other applicable laws, remove from the State of South Carolina, for storage or disposal elsewhere—

(1) not later than January 1, 2011, not less than 1 metric ton of defense plutonium or defense plutonium materials; and

(2) not later than January 1, 2017, an amount of defense plutonium or defense plutonium materials equal to the amount of defense plutonium or defense plutonium materials transferred to the Savannah River Site between April 15, 2002 and January 1, 2017, but not processed by the MOX facility.

(d) ECONOMIC AND IMPACT ASSISTANCE.—(1) If the MOX production objective is not achieved as of January 1, 2011, the Secretary shall, from funds available to the Secretary, pay to the State of South Carolina each year beginning on or after that date through 2016 for economic and impact assistance an amount equal to \$1,000,000 per day, not to exceed \$100,000,000 per year, until the later of—

(A) the date on which the MOX production objective is achieved in such year; or

(B) the date on which the Secretary has removed from the State of South Carolina in such year at least 1 metric ton of defense plutonium or defense plutonium materials.

(2)(A) If, as of January 1, 2017, the MOX facility has not processed mixed-oxide fuel from defense plutonium and defense plutonium materials in the amount of not less than—

(i) one metric ton, in each of any two consecutive calendar years; and

(ii) three metric tons total, the Secretary shall, from funds available to the Secretary, pay to the State of South Carolina for economic and impact assistance an amount equal to \$1,000,000 per day, not to exceed \$100,000,000 per year, until the removal by the Secretary from the State of South Carolina of an amount of defense plutonium or defense plutonium materials equal to the amount of defense plutonium or defense plutonium materials transferred to the Savannah River Site between April 15, 2002, and January 1, 2017, but not processed by the MOX facility.

(B) Nothing in this paragraph may be construed to terminate, supersede, or otherwise affect any other requirements of this section.

(3) If the State of South Carolina obtains an injunction that prohibits the Department from taking any action necessary for the Department to meet any deadline specified by this subsection, that deadline shall be extended for a period of time equal to the period of time during which the injunction is in effect.

(e) FAILURE TO COMPLETE PLANNED DISPOSITION PROGRAM.—If on July 1 each year beginning in 2020 and continuing for as long as the MOX facility is in use, less than 34 metric tons of defense plutonium or defense plutonium materials have been processed by the MOX facility, the Secretary shall submit to Congress a plan for—

(1) completing the processing of 34 metric tons of defense plutonium and defense plutonium material by the MOX facility; or

(2) removing from the State of South Carolina an amount of defense plutonium or defense plutonium materials equal to the amount of defense plutonium or defense plutonium materials transferred to the Savannah River Site after April 15, 2002, but not processed by the MOX facility.

(f) REMOVAL OF MIXED-OXIDE FUEL UPON COMPLETION OF OPERATIONS OF MOX FACILITY.—If, one year after the date on which operation of the MOX facility permanently ceases, any mixed-oxide fuel remains at the Savannah River Site, the Secretary shall submit to Congress—

(1) a report on when such fuel will be transferred for use in commercial nuclear reactors; or

(2) a plan for removing such fuel from the State of South Carolina.

(g) DEFINITIONS.—In this section:

(1) MOX PRODUCTION OBJECTIVE.—The term “MOX production objective” means production at the MOX facility of mixed-oxide fuel from defense plutonium and defense plutonium materials at an average rate equivalent to not less than one metric ton of mixed-oxide fuel per year. The average rate shall be determined by measuring production at the MOX facility from the date the facility is declared operational to the Nuclear Regulatory Commission through the date of assessment.

(2) MOX FACILITY.—The term “MOX facility” means the mixed-oxide fuel fabrication facility at the Savannah River Site, Aiken, South Carolina.

(3) DEFENSE PLUTONIUM; DEFENSE PLUTONIUM MATERIALS.—The terms “defense plutonium” and “defense plutonium materials” mean weapons-usable plutonium.

SEC. 3183. STUDY OF FACILITIES FOR STORAGE OF PLUTONIUM AND PLUTONIUM MATERIALS AT SAVANNAH RIVER SITE.

(a) STUDY.—The Defense Nuclear Facilities Safety Board shall 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 in connection with the disposition program provided in

section 3182 and in connection with the amended Record of Decision of the Department of Energy for fissile materials disposition.

(b) REPORT.—Not later than one year after the date of the enactment of this Act, the Defense Nuclear Facilities Safety Board shall submit to Congress and the Secretary of Energy a report on the study conducted under subsection (a).

(c) REPORT ELEMENTS.—The report under subsection (b) shall—

(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 safety, reliability, and functionality of KAMS.

(d) REPORTS ON ACTIONS ON PROPOSALS.—Not later than 6 months after the date on which the report under subsection (b) is submitted to Congress, and every year thereafter, the Secretary and the Board shall each submit to Congress a report on the actions taken by the Secretary in response to the proposals, if any, included in the report.

GLOSSARY

Board	Defense Nuclear Facilities Safety Board
DOE	Department of Energy
DOE-SR	Department of Energy Savannah River Operations Office
KAMS	K-Area Materials Storage
MOX	mixed-oxide
SRS	Savannah River Site
235-F	Building 235-F

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