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## 1. INTRODUCTION

During the Cold War, the United States Department of Energy (DOE) and its predecessor agencies conducted various activities associated with the production of materials for use in nuclear weapons. Several intermediate products and wastes were generated as a result of those operations, some of which are still in storage at various DOE sites. Now that the Cold War is over and the United States has ceased production of fissionable nuclear weapons materials, DOE is conducting activities to safely manage, clean up, and dispose of (where appropriate) those intermediate products and wastes. Among the intermediate products and wastes requiring proper management and preparation for disposal or other disposition are plutonium residues and scrub alloy currently stored at the Rocky Flats Environmental Technology Site (Rocky Flats)<sup>1</sup> near Golden, Colorado.

This Final Environmental Impact Statement (EIS) identifies potential alternatives and impacts associated with the proposed action to process certain plutonium residues and all of the scrub alloy currently stored at Rocky Flats. While ongoing stabilization activities at Rocky Flats are addressing immediate health and safety concerns associated with existing storage conditions, the indefinite storage of these materials, even after stabilization, would continue to present health and safety concerns that could only be eliminated by disposal or other disposition of the materials. Thus, this EIS evaluates alternative processing technologies to prepare these materials for disposal as transuranic waste at the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico, or other disposition.

### 1.1 BACKGROUND

Plutonium residues and scrub alloy were generated during recovery and purification of plutonium and manufacture of components for nuclear weapons.

- Approximately 125,000 kilograms (kg) (275,600 pounds [lb]) of residues (containing about 5,800 kg [12,800 lb] of plutonium) and approximately 700 kg (1,540 lb) of scrub alloy (containing about 200 kg [440 lb] of plutonium) are currently stored at various DOE sites.
- Of this amount in the DOE complex, approximately 106,600 kg (235,000 lb) of the residues (containing about 3,000 kg [6,600 lb] of plutonium) and almost all of the scrub alloy are stored in various types of containers in 6 former plutonium production facilities at Rocky Flats. In order to address health and safety concerns associated with the continued storage of these materials at Rocky Flats, stabilization activities are already underway for these materials. The stabilization activities are being conducted in accordance with the *Environmental Assessment, Finding of No Significant Impact, and Response to Comments—Solid Residue Treatment, Repackaging, and Storage* (the “Solid Residue Environmental Assessment”) (DOE 1996h).
- The remaining approximately 18,400 kg (40,600 lb) of plutonium residues are stored at the Savannah River Site, Hanford Site, Los Alamos National Laboratory, and Lawrence Livermore National Laboratory. Approximately 6 kg (13 lb) of scrub alloy are stored at the Savannah River Site. The residues stored at these sites are not the subject of this EIS. They are addressed in separate National Environmental Policy Act (NEPA) reviews identified in Section 1.5.

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<sup>1</sup>Rocky Flats was previously known as the “Rocky Flats Plant” while it was being used to produce components for nuclear weapons.

This EIS addresses a subset of plutonium residues (42,200 kg, or 93,000 lb) and all of the scrub alloy currently stored at Rocky Flats. Even after the stabilization activities underway at Rocky Flats are completed, this subset of the Rocky Flats plutonium residues and all of its scrub alloy would still continue to present health and safety concerns because they would not be in forms that would allow for their disposal or other disposition. This EIS addresses the processing of this subset of Rocky Flats' plutonium residues and all of the Rocky Flats scrub alloy in order to not only stabilize them but to also prepare them for disposal or other disposition, with the primary goal of eliminating the health and safety issues associated with continued storage of these materials.

The Rocky Flats plutonium residues consist of four broad categories that were described in the Solid Residue Environmental Assessment: ash, salts, wet residues, and direct repackage residues. The residues were grouped into these categories due to chemical similarities or similarities in the manner in which they could be managed. The approximate quantities in each residue category and the scrub alloy inventory requiring further processing to meet the requirements for disposal or other disposition are summarized in **Table 1-1**. A more detailed breakout of these materials is contained in **Table 2-1**.

**Table 1-1 Plutonium Residues (by Category) and Scrub Alloy Inventory Covered under this EIS**

<i>Category</i>	<i>Inventory, kg (lb)</i>	<i>Plutonium Content, kg (lb)</i>
<b>Ash Residues</b> include incinerator ash and firebrick fines; sand, slag, and crucible; graphite fines; and inorganic ash residues.	20,060 (44,200)	1,160 (2,560)
<b>Salt Residues</b> include molten salt extraction salt residues, electrorefining salt residues, and direct oxide reduction salt residues.	14,900 (32,800)	1,000 (2,200)
<b>Wet Residues</b> include wet combustible residues, plutonium fluoride residues, filter media, Raschig rings, sludges, and greases/oily sludges.	4,300 (9,500)	290 (640)
<b>Direct Repackage Residues</b> include dry combustible residues, glass residues, miscellaneous residues, and graphite and firebrick.	2,900 (6,400)	130 (290)
<b>Scrub Alloy</b>	700 (1,540)	200 (440)

## 1.2 PURPOSE AND NEED FOR AGENCY ACTION

The purpose and need for agency action is to process certain plutonium residues and scrub alloy currently in storage at Rocky Flats (summarized in Table 1-1 above) to address health and safety concerns regarding storage of the materials, as raised by the Defense Nuclear Facilities Safety Board (the Board) in Recommendation 94-1, *Improved Schedule for Remediation in the Defense Nuclear Facilities Complex* (DNFSB 1994), and to prepare the materials for offsite disposal or other disposition. These actions would be taken in a manner that supports site closure and limits worker exposure and waste production. Disposal or other disposition would eliminate health and safety concerns associated with indefinite storage of these materials.

The Solid Residue Environmental Assessment (DOE 1996h) addressed the potential environmental impacts associated with stabilizing the entire 106,600-kg (235,000-lb) inventory of Rocky Flats' plutonium residues to provide for safe storage until final disposition of the residues could be decided and implemented. Because of the need for expeditious action to resolve concerns with storage of the plutonium residues at Rocky Flats, the Solid Residue Environmental Assessment addressed neither disposal or other disposition of the residues after these materials were stabilized nor stabilization of the scrub alloy. Furthermore, although stabilization activities to mitigate the risks associated with the current storage condition of the plutonium residues are in

progress at Rocky Flats, based on the Finding of No Significant Impact issued after completion of the Solid Residue Environmental Assessment, less than 10 percent of the Rocky Flats plutonium residues addressed in this EIS and none of the scrub alloy have been stabilized to date. Accordingly, DOE considers it prudent to consider in this EIS processing and other alternatives that not only would stabilize the remaining plutonium residues to address the health and safety concerns raised by the Board’s Recommendation 94-1, if necessary, but that also would convert them into forms that would allow their disposal or other disposition. To that end, the materials must have safeguards terminated.

### ***1.2.1 Safeguards Termination Requirements***

In the process of considering disposal options for the Rocky Flats plutonium residues and scrub alloy, DOE determined that the majority of the residues would be suitable for disposal at WIPP after stabilization. Approximately 42,200 kg (93,000 lb) out of the total 106,600 kg (235,000 lb) of plutonium residues currently stored at Rocky Flats, however, could not be sent to WIPP for disposal in their present forms because they contain plutonium concentrations exceeding DOE safeguards termination limits. Although these plutonium residues would not be directly usable in nuclear weapons, they currently contain plutonium concentrations too high to be transported to and staged for disposal at WIPP unless safeguards controls were maintained.<sup>2</sup> DOE does not plan to maintain such controls for materials transported to and staged at WIPP prior to disposal because WIPP is not designed to allow implementation of such controls. Thus, these materials in their present forms are effectively foreclosed from being disposed of at WIPP unless a variance to safeguards termination limits is applied (see discussion below).

***For the Rocky Flats plutonium-bearing materials to be disposed of as transuranic waste at WIPP, they must meet the following requirements:***

- ***Performance-based requirements contained in the WIPP waste acceptance criteria and***
- ***Safeguards termination requirements, either by having:***
  - plutonium concentrations that are below the safeguards termination limits for those material forms, or***
  - a variance to the safeguards termination limits.***

The term “safeguards” refers to those measures (e.g., recordkeeping, monitoring, and physical protection) that DOE and other organizations holding nuclear materials must take to ensure that the materials are not stolen or diverted for illicit purposes. The safeguards requirements that are applicable to nuclear materials held by DOE are specified in DOE Order 5633.3B, “Control and Accountability of Nuclear Materials” (DOE 1994c). The term “safeguards termination requirements” refers to those steps that must be taken, or conditions that must exist, before nuclear materials are rendered sufficiently unattractive as a source of fissile material for illicit purposes to allow them to be exempted from safeguards controls. These requirements include “safeguards termination limits” that define, for certain categories and forms of material, the maximum weight percentage of special nuclear material that can be present in materials without subjecting them to safeguards controls.

For certain materials that contain a concentration of plutonium or other special nuclear material above safeguards termination limits, special conditions, such as the combination of the processing method, the controls in place for normal handling of transuranic waste, and the limited quantity of special nuclear material present at any particular place and time, may preclude the need for the strict material control and accountability imposed by safeguards. If a DOE site identifies such a special condition, the site may request approval of a

<sup>2</sup>Hereinafter, in this EIS the terms “disposal” or “disposed of” at WIPP include the steps of transporting to and staging prior to disposal.

"variance" to safeguards termination limits from DOE's Office of Nonproliferation and National Security, Office of Safeguards and Security.

When a variance to safeguards termination limits is granted, it is recognized that the materials would no longer need to be subject to strict material control and accountability as special nuclear material. The materials would still be controlled and guarded in accordance with other DOE management practices and physical security procedures, as specified in the documentation explaining the basis for the variance.

If a variance to safeguards termination limits is granted, the materials must still meet WIPP's waste acceptance criteria. WIPP's waste acceptance criteria are performance-based and are independent of safeguards termination requirements.

### **1.2.2 Disposition of Waste and Separated Plutonium**

For approximately 64,400 kg (142,000 lb) of the plutonium-bearing residues currently being stabilized in accordance with the Finding of No Significant Impact issued after completion of the Solid Residue Environmental Assessment, there are no issues of safeguards controls and these materials may be disposed of at WIPP. These residues are not addressed in this EIS.

The processing options for the materials being considered in this EIS could yield transuranic waste and/or plutonium metal or oxide, as well as low-level radioactive waste and other material managed as high-level waste, which are subject to different disposal/disposition options. Disposal of transuranic waste is planned at WIPP. Therefore, the transuranic waste would be required to meet WIPP waste acceptance criteria. For plutonium metal or oxide that would result from processing technologies involving plutonium separation, disposition options under consideration include immobilization of surplus plutonium in glass or ceramic material for disposal in a monitored geologic repository pursuant to the Nuclear Waste Policy Act. Low-level waste that would result from some of the processing options would be disposed of in accordance with the site's low-level waste disposal practices. Impacts from these disposal and other disposition options are addressed in other NEPA documents, as identified in Section 1.5. Additional NEPA review would be required if the scrub alloy is converted directly into transuranic waste (without plutonium separation) and disposed of in WIPP because this material was not included in the WIPP baseline estimates.

***WIPP is designed to incorporate security provisions appropriate to its function (which includes disposal of materials containing small amounts of plutonium), but not to meet the more stringent nuclear material safeguards requirements. As a result, materials must meet safeguards termination requirements before any plutonium residue could be disposed of in WIPP. There are three approaches that could be taken to satisfy the safeguards termination requirements, as described below:***

- The concentration of plutonium, or other fissile elements, in the material must be very low (e.g., 0.1 weight percent). Many of the Rocky Flats residues (i.e., approximately 64,400 kg [142,000 lb]) could be shipped to WIPP after completion of the stabilization processes analyzed in the Solid Residue Environmental Assessment because they contain so little plutonium that they already meet the safeguards termination limits. Other residue materials could be processed by either diluting the residues with materials that are similar, or by removing some or all of the plutonium.***
- Materials with somewhat higher but still small (i.e., up to 5 weight percent) concentrations of plutonium or other fissile elements (e.g., U-233 and U-235) could be immobilized by converting them into a glass or ceramic form, from which it would be very difficult to extract the plutonium or other fissile elements.***
- A variance to safeguards termination limits could be implemented for some materials under special conditions (see text in Section 1.2.1) to allow for disposal at WIPP.***

### 1.3 SCOPE OF THIS EIS

This EIS evaluates technical alternatives for management of approximately 42,200 kg (93,000 lb) of plutonium residues, containing approximately 2,600 kg (5,700 lb) of plutonium, and approximately 700 kg (1,540 lb) of scrub alloy, currently in storage at Rocky Flats, containing about 200 kg (440 lb) of plutonium to facilitate their disposal or other disposition. The four technical alternatives are:

- (1) No Action (Stabilize and Store) -- Under the No Action Alternative, the Rocky Flats plutonium residues and scrub alloy would be stabilized, if necessary, and stored there for an indefinite period pending disposal or other disposition. The materials processed under this alternative would not meet safeguards termination limits (see Section 1.2.1), and the health and safety risks associated with continued storage at Rocky Flats would not be eliminated.
- (2) Processing without Plutonium Separation -- Under this approach, materials covered by this EIS would be processed into forms that meet safeguards termination limits using processes such as immobilization<sup>3</sup> or blend down (without separating the plutonium), and would thus be ready for shipment to WIPP for disposal.
- (3) Processing with Plutonium Separation -- Under this approach, materials covered by this EIS would be processed using approaches that separate the plutonium from the material. DOE would manage the separated weapons-usable surplus plutonium in accordance with decisions made under the *Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement* (DOE 1996a) and the *Surplus Plutonium Disposition Draft Environmental Impact Statement* (DOE 1998a). Transuranic wastes resulting from this alternative would be disposed of in WIPP and low-level wastes would be disposed of in accordance with the processing site's low-level waste disposal practices.
- (4) Combination of Processing Technologies -- Under this approach, a combination alternative comprised of certain elements of the technologies analyzed under Alternatives 1 and 2 would be used.

The objective of the proposed agency action is to process the material, if necessary, into a form and concentration that is suitable for disposal or other disposition for the purpose of eliminating the health and safety impacts associated with continued storage of these materials. DOE would prefer to integrate management decisions regarding the materials within the scope of this EIS with stabilization decisions resulting from the Solid Residue Environmental Assessment. The intent of such integration would be to reduce the need to handle these materials, thereby reducing worker risk and costs associated with achieving a material form suitable for disposal or other disposition.

#### 1.3.1 Changes between the Draft and Final Versions of this EIS

Changes between the draft and final versions of this EIS have been made as a result of comments received on the Draft EIS and further information DOE has gained as a result of continued characterization of the Rocky Flats residues. All revisions and changes made since the issuance of the Draft EIS are indicated by sidebars in this document. Key changes are highlighted in this section.

#### ***Variations***

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<sup>3</sup>The immobilization technologies referred to here consist of processes such as cementation, vitrification, and cold ceramification, and are not a part of the immobilization of weapons-usable plutonium as discussed in Section 1.2.2, "Disposition of Waste and Separated Plutonium."

The Draft EIS, issued in November 1997, identified certain residue categories for which variances to the safeguards termination limits had been approved by the DOE Office of Nonproliferation and National Security, Office of Safeguards and Security. These included combustible residues, glass and graphite residues, most inorganic residues, and some salt (direct oxide reduction) and filter residues. The Draft EIS also identified additional residue categories for which Rocky Flats was considering variance requests. These included ash and sludge residues, molten salt extraction and electrorefining salt residues, and high-efficiency particulate air filter residues.

As a result of further characterization of the residues since the Draft EIS was issued, Rocky Flats concluded that many residues would only need to be repackaged prior to disposal at WIPP because much of the residue inventory would not require further stabilization prior to repackaging to meet WIPP waste acceptance criteria. For the remaining residues, where further stabilization would be required, it could be accomplished by the alternative technologies analyzed in this EIS. Rocky Flats further concluded that, given the nature of the materials, their plutonium concentration, and the waste management controls that would be in effect during the transportation to and storage at WIPP, safeguards controls would not be needed to ensure the absence of proliferation risks. Therefore, Rocky Flats requested and obtained a variance to safeguards termination limits that covers all residues with plutonium concentrations below 10 percent. This includes all the material categories that were specified in the Draft EIS as being covered by a variance or for which DOE indicated that variances were being pursued. DOE chose 10 percent plutonium by weight as the upper limit for Rocky Flats residues being repackaged for direct disposal to WIPP because at that plutonium concentration the material would not be deemed suitable or attractive for use in an improvised nuclear device and would require extensive processing to be converted into a form usable in such a device (DOE 1998c). To achieve this concentration level, limited quantities of relatively high plutonium concentration materials (i.e., in the range of about 20 percent to 50 percent plutonium) could be blended with low plutonium concentration materials having the same characteristics or with inert materials. Therefore, the Final EIS evaluates a new Alternative 4 (see below) to address materials that have an approved variance.

#### ***Alternative 4 - Combination of Processing Technologies***

DOE has combined elements of the processing technologies analyzed in Alternative 1 (stabilization and repackaging) and Alternative 2 (blending) into an additional Alternative 4 (Combination of Processing Technologies) in order to specifically address materials which have received a variance to safeguards termination limits. Specifically, Alternative 4 includes the following:

- stabilization, if necessary;
- blending with similar or inert materials, if necessary, to achieve a 10 percent plutonium concentration limit (up to 6,800 kg (15,000 lb) of the residues, approximately 16 percent, contain more than 10 percent plutonium);
- repackaging for disposal at WIPP; and
- implementation of a variance to safeguards termination limits.

#### ***Preferred Alternative***

The Draft EIS identified preferred processing technologies for all residues except filter media residues and sludge residues. Since issuance of the Draft EIS more has been learned about the materials, and because a variance to safeguards termination limits has been approved for many of the residues subsequent to issuance of the Draft EIS, the preferred processing technologies have changed for many material categories. The Final EIS now identifies preferred processing technologies for all residue categories and scrub alloy, collectively referred to as the “Preferred Alternative” (see Section 2.5.2).

### ***New Processing Technologies***

The Final EIS also introduces two new candidate processing technologies: cold ceramification of incinerator ash residues at Rocky Flats (see Section 2.4.1) and preprocessing direct oxide reduction salt residues at Rocky Flats with acid dissolution/plutonium oxide recovery at Los Alamos National Laboratory (see Section 2.4.2).

Cold ceramification was suggested for inclusion in the EIS during public comments and has recently been successfully demonstrated for Rocky Flats incinerator ash residues. This technology forms a very stable waste form. The processing steps for cold ceramification are similar to those used in cementation, which was analyzed for implementation at Rocky Flats in the Draft EIS. The major difference in these two processes is that they use different binding materials. Because these two processes have similar processing steps, environmental impacts both to workers and to the offsite public population would be similar.

At the recommendation of Los Alamos National Laboratory, the acid dissolution/plutonium oxide recovery process at Los Alamos National Laboratory was added to the Final EIS for direct oxide reduction salt residues. This process is similar to the acid dissolution/plutonium oxide recovery process analyzed in the Draft EIS for implementation at Rocky Flats and would impose similar environmental impacts both to workers and to the offsite public population. This process was previously used at Los Alamos National Laboratory to recovery plutonium from direct oxide reduction salt residues and therefore is considered to have a low technical uncertainty. In the Draft EIS, the water leach process, which has a higher technical uncertainty, was analyzed for separating plutonium oxide from direct oxide reduction salt residues at Los Alamos National Laboratory.

### ***Contingency Storage Analysis***

As a result of public comments, the risks associated with the storage of the plutonium residues and scrub alloy following processing and/or repackaging have been evaluated, and are discussed in Section 4.14 of the Final EIS. The evaluations consider a 20-year storage period for Alternative 1 (No Action - Stabilize and Store) and storage of the product for the other alternatives while waiting for transport of the transuranic waste to WIPP or for final disposition of separated plutonium.

### ***Modified Impact Assessments***

Refinements have been made to the impact analyses in the Final EIS. Some of the changes occurred because DOE re-evaluated many of the processing technologies and introduced some new processing technologies. DOE assumed a higher frequency of severe damage due to earthquakes at Buildings 707 and 707A at Rocky Flats because structural calculations were not completed until after the Draft EIS was published. Furthermore, the calculations of the potential for worker health impacts due to exposure to hazardous chemicals were refined to account for more realistic assumptions.

## **1.4 DECISIONS TO BE MADE BASED ON THIS EIS**

### ***1.4.1 Decisions***

To ensure that the plutonium residues and scrub alloy addressed in this EIS are properly prepared for disposal or other disposition (which would eliminate the health and safety risks associated with further management of these materials) and are stored safely before their disposal or other disposition, the following decisions must be made:

- Whether any repackaging or processing<sup>4</sup> of the plutonium residues and scrub alloy should occur, and if so:
  - How much of the plutonium residues and scrub alloy should be processed?
  - What processing approach should be used for each plutonium residue category and for the scrub alloy?
- Where processing and any subsequent management of the plutonium residues and scrub alloy should occur. Different sites could possibly be chosen for management of different residues and the scrub alloy or for different portions of a single residue category (for example, if differences in the weight percent plutonium contained in a portion of a residue category, or other detailed differences in the residue chemistry, make such distinctions desirable). [This includes consideration of whether various portions of the plutonium residues and scrub alloy should be processed through DOE's existing chemical separation facilities at the Savannah River Site or at Los Alamos National Laboratory in addition to Rocky Flats.]

These decisions will be announced in Records of Decision in accordance with the phased schedule identified in Section 1.4.2.

#### ***1.4.2 Process and Schedule for Decisions***

With the exception of the two new candidate processing technologies identified in Section 1.3.1, above, all of the alternatives analyzed in the EIS for management of Rocky Flats plutonium residues and scrub alloy were either analyzed in the Draft EIS or are composed of elements of alternatives analyzed in the Draft EIS. Nevertheless, since certain alternatives (as described in Section 1.3.1 above) were not presented to the public in the form in which they appear in this Final EIS, and in furtherance of public involvement in the NEPA process, DOE has decided to issue phased Records of Decision for this Final EIS.

The first Record of Decision will cover only those materials for which the preferred processing technology was analyzed in the Draft EIS, and for which any variances to safeguards termination limits discussed in the Draft EIS had already been granted. DOE plans to issue the first Record of Decision no sooner than 30 days after issuance of the Final EIS. The material categories to be covered by the first Record of Decision are as follows:

- Sand, slag, and crucible residues
- Direct oxide reduction salt residues (low plutonium concentration)
- Combustible residues
- Plutonium fluoride residues
- Ful Flo filter media residues
- Glass residues
- Graphite residues
- Inorganic (metal and other) residues
- Scrub alloy

The second Record of Decision will cover all of the remaining materials within the scope of the EIS. The material categories to be covered by the second Record of Decision are as follow:

- Incinerator ash residues

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<sup>4</sup>The term "processing" always includes repackaging. However, in some cases, repackaging may occur without additional processing.

- Graphite fines residues
- Inorganic ash residues
- Molten salt extraction/electrorefining salt residues
- Direct oxide reduction salt residues (high plutonium concentration)
- High-efficiency particulate air (HEPA) filter media residues
- Sludge residues

Prior to issuing the second Record of Decision, DOE will hold a 45-day comment period for the purpose of receiving written comments from the public on the management of these remaining material categories. The 45-day comment period will begin when the Environmental Protection Agency publishes the *Federal Register* notice that announces the availability of this Final EIS.

At the end of the 45-day comment period, DOE will determine whether any comments have been received that raise issues that require further analysis. If no comments are received which require further analysis, DOE will issue a second Record of Decision that identifies its management decisions for the material categories. The Record of Decision will include DOE's responses to comments received from the public. If comments are received which require further action by DOE, DOE will determine and implement appropriate actions to address the comments and inform the public of the Department's decisions.

## **1.5 RELATIONSHIP TO OTHER NEPA DOCUMENTS AND REPORTS**

Completed and ongoing NEPA documents and other reports that may relate to the scope of this EIS include the following:

### ***1.5.1 Environmental Assessment, Finding of No Significant Impact, and Response to Comments—Solid Residue Treatment, Repackaging, and Storage (DOE 1996h, April 1996)***

This Environmental Assessment addressed the stabilization of the plutonium residue inventory currently at Rocky Flats. It was developed in response to the Defense Nuclear Facilities Safety Board's Recommendation 94-1 (DNFSB 1994), which addressed safety issues associated with storage of residues. The Environmental Assessment described and analyzed the environmental effects of DOE's proposed action of treating and/or repackaging the residues and storing them at the site until their final disposition could be decided and implemented. The Environmental Assessment was the subject of a public comment period from March 5 to April 5, 1996. Based on the information and analyses in the Environmental Assessment, DOE determined that the proposed treatment, repackaging, and storage of solid residues at Rocky Flats did not constitute a major Federal action significantly affecting the quality of the human environment and issued a Finding of No Significant Impact for the proposed action on April 15, 1996. The actions analyzed and selected after the completion of this Environmental Assessment are included in the No Action Alternative.

### ***1.5.2 Rocky Flats Site-Wide Environmental Impact Statement Notice of Intent (DOE 1994d, August 5, 1994)***

This Notice announced DOE's intention to prepare a Site-Wide EIS for Rocky Flats. The Notice described the intended scope of the Site-Wide EIS as providing a basis for selection of a site-wide strategic approach for nuclear materials storage, waste management, cleanup, and economic conversion, as well as project-level decisions for management of nuclear materials, deactivation of Rocky Flats facilities, and decontamination and decommissioning of existing facilities. DOE has decided not to complete the Site-Wide EIS because the mission of the site has changed to cleanup in preparation for closure, and the environmental review for the cleanup will occur under the Comprehensive Environmental Response, Compensation, and Liability Act.

**1.5.3 *Interim Storage of Plutonium at the Rocky Flats Environmental Technology Site Environmental Impact Statement Notice of Intent (DOE 1996f, July 1996)***

This Notice announced DOE's intention to prepare an EIS to evaluate the alternatives for providing safe interim storage of approximately 10 metric tons (11 tons) of plutonium at Rocky Flats pending implementation of decisions based on the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement* (DOE 1996a). DOE has decided not to complete the Interim Storage EIS because of the decisions announced in the Record of Decision for the Storage and Disposition Programmatic Environmental Impact Statement (see discussion in Section 1.5.6).

**1.5.4 *Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement (DOE 1997c, September 1997)***

This is the second Supplemental EIS (referred to as the WIPP SEIS-II) for the DOE Waste Isolation Pilot Plant (WIPP) project that is proposed for the disposal of transuranic waste. In the Record of Decision for the 1990 Supplemental EIS (DOE 1990), DOE indicated it would issue a second Supplemental EIS analyzing the impacts of processing and handling transuranic waste at the generator/storage sites and the long-term performance of WIPP before deciding whether to proceed to the WIPP disposal phase. DOE's proposed action is to dispose of transuranic waste at WIPP. The Rocky Flats plutonium residues are considered in the scope of the 1997 Supplemental EIS (DOE 1997b). The wastes from processing scrub alloy, to the extent they are similar to other transuranic waste from processing operations and do not exceed 25,000 cubic meters (880,000 cubic feet) in volume, are covered by the EIS. Direct disposal of scrub alloy at WIPP (without plutonium separation) is not covered by the WIPP Disposal Phase Supplemental EIS because their plutonium content was not considered in the WIPP disposal inventory. The Record of Decision for this EIS was published on January 23, 1998 (63 *Federal Register* 3624). This Record of Decision documented the Department's decision to implement the Proposed Action Alternative, contingent upon obtaining a Compliance Certification from the U.S. Environmental Protection Agency (EPA), which was issued on May 13, 1998 (EPA 1998). DOE has decided to open WIPP and dispose of 175,600 cubic meters of post-1970 defense transuranic waste, including the Rocky Flats residues and transuranic waste generated from processing the residues, as analyzed in the current EIS (DOE 1998e). Preparation of the transuranic waste (i.e., treatment, as necessary, including packaging) would be required to meet the WIPP Waste Acceptance Criteria.

**1.5.5 *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste (DOE 1997g, May 1997)***

The *Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE 1997g, May 1997) considered reasonable alternatives for the integrated treatment, storage, and/or disposal of DOE's low-level, low-level mixed, hazardous, transuranic, and high-level waste. The entire inventory of plutonium residues currently stored at Rocky Flats is included in the Waste Management Programmatic EIS under the assumption that it may be managed as transuranic waste. The Waste Management Programmatic EIS analyzes storage and treatment configurations for transuranic wastes (e.g., centralized, regionalized, and decentralized treatment and storage), including DOE's preferred strategies and the Rocky Flats plutonium residues. The Rocky Flats Plutonium Residues and Scrub Alloy EIS was prepared in coordination with the development of the Records of Decision for the Waste Management Programmatic EIS. The Record of Decision for treatment and storage of the transuranic waste was issued on January 23, 1998 (DOE 1998f). This Record of Decision was issued in conjunction with the WIPP Supplemental EIS Record of Decision (DOE 1998e). The Department's decision is to process and store transuranic waste on site prior to disposal.

### ***1.5.6 Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Impact Statement (DOE 1996a, December 1996)***

The *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Impact Statement* (DOE 1996a) analyzes the environmental impacts of alternatives considered for the long-term storage of weapons-usable plutonium and for the disposition of weapons-usable plutonium that has been declared surplus to national security needs. The Record of Decision (DOE 1997i) encompasses two categories of plutonium decisions: (1) the sites and facilities for the storage of nonsurplus plutonium and the storage of surplus plutonium pending disposition and (2) the programmatic strategy for disposition of surplus plutonium. This Record of Decision does not include the final selection of sites for plutonium disposition facilities, nor the extent to which the two plutonium disposition approaches (immobilization and mixed-oxide fuel) will be ultimately implemented. Those decisions will be based in part on the analysis in the Surplus Plutonium Disposition EIS (see Section 1.5.7). However, the Record of Decision states that DOE has narrowed the list of candidate sites for plutonium disposition.

### ***1.5.7 Surplus Plutonium Disposition Draft Environmental Impact Statement (DOE 1998a, July 1998)***

This Draft EIS analyzes the environmental impacts of alternatives considered for the disposition of U.S. weapons-usable surplus plutonium. The disposition strategy being considered by DOE is a twofold strategy involving (1) immobilization of surplus plutonium with glass or ceramic material for disposal in a monitored geologic repository pursuant to the Nuclear Waste Policy Act, as amended, and (2) burning some plutonium as mixed oxide fuel in existing, domestic, commercial reactors, with subsequent disposal of the spent fuel in a monitored geologic repository pursuant to the Nuclear Waste Policy Act, as amended. This EIS is tiered from the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement* (DOE 1996a) and is based on a Record of Decision issued on January 14, 1997 (DOE 1997i). This Record of Decision (62 *Federal Register* 3014) announced DOE's intention to provide for safe and secure storage of weapons-usable fissile materials and DOE's strategy for disposition of surplus weapons-usable plutonium. The Record of Decision also indicated that plutonium metals and oxides currently stored at Rocky Flats would be moved. The plutonium pits (a nuclear weapons component) would be stored at the Pantex site. The non-pit metals and oxides would be moved to the Savannah River Site for storage if DOE decided that these materials should be immobilized at the Defense Waste Processing Facility at the Savannah River Site.

### ***1.5.8 Final Environmental Impact Statement for Continued Operation of Lawrence Livermore National Laboratory (DOE 1992, August 1992)***

This EIS analyzed the potential environmental impacts of the continued operation of Lawrence Livermore National Laboratory and Sandia National Laboratories in Livermore, California. The Lawrence Livermore National Laboratory Site-Wide EIS also analyzed the potential environmental impacts associated with a No Action Alternative to continue operations at FY 1992 funding levels without further growth, an alternative to modify operations to reduce adverse environmental impacts of operations or facilities, and an alternative involving the shutdown and commencement of decommissioning of the Laboratory. The Record of Decision for the Lawrence Livermore National Laboratory Site-Wide EIS (DOE 1993) announced DOE's decision to continue the operation of Lawrence Livermore National Laboratory and Sandia National Laboratories. Alternatives that involve treatment of the Rocky Flats plutonium residues at Lawrence Livermore National Laboratory were not analyzed in the Lawrence Livermore National Laboratory Site-Wide EIS.

**1.5.9 Draft Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory (DOE 1998b, April 1998)**

The Los Alamos National Laboratory Site-Wide EIS (DOE 1998b) analyzes the level of operations and reasonably foreseeable activities that may take place at the Los Alamos National Laboratory during the next ten years. In that document, DOE identified and assessed four alternatives for the operation of the site: (1) No Action, (2) Expanded Operations (DOE's Preferred Alternative), (3) Reduced Operations, and (4) Greener. In the No Action Alternative, DOE would continue the historical mission support activities Los Alamos National Laboratory has conducted at planned operations levels. In the Expanded Operations Alternative, DOE would operate the site at the highest levels of activity currently foreseeable, including full implementation of the mission assignments from recent programmatic documents. Under the Reduced Operations Alternative, DOE would support the site at the minimum levels of activity necessary to maintain the capabilities to support the DOE mission in the near term. Under the Greener Alternative, DOE would operate the site to maximize operations in support of nonproliferation, basic science, materials science, and other nonweapons areas, while minimizing weapons activities. Alternatives analyzed in the Rocky Flats Plutonium Residues and Scrub Alloy EIS that involve processing of the Rocky Flats plutonium residues at Los Alamos National Laboratory are within the levels of operation addressed in the Los Alamos National Laboratory Site-Wide EIS.

**1.5.10 Final Interim Management of Nuclear Materials Environmental Impact Statement (DOE 1995b, October 1995)**

The Interim Management of Nuclear Materials EIS (DOE 1995b) analyzes the potential environmental impacts associated with alternatives for the management of a variety of nuclear materials at the Savannah River Site. This EIS also includes an evaluation of alternatives for processing approximately 1,000 kg (2,200 lb) of plutonium residues and scrub alloy currently stored at the Savannah River Site (see *Final Environmental Impact Statement, Interim Management of Nuclear Materials, Savannah River Site, Aiken, South Carolina*, Section 2.3.3, "Plutonium and Uranium Stored in Vaults"), much of which originated at Rocky Flats. Five Records of Decision, each covering different materials, have been issued for the Interim Management of Nuclear Materials EIS (DOE 1995a, DOE 1996i, DOE 1996c, DOE 1997b, and DOE 1997h). DOE decided to use a variety of technologies to stabilize these residues (repackage and heat treat, dissolve and stabilize) through the Canyon facilities to forms that meet DOE's storage criteria (DOE-STD-3013-94) (DOE 1994a) and to store the plutonium at the Savannah River Site (DOE 1995a).

**1.5.11 Accelerating Cleanup: Paths to Closure (DOE 1998d, June 1998)**

DOE's Office of Environmental Management is developing a strategy to accelerate site cleanup and to reduce long-term economic and environmental liabilities associated with the cleanup of sites and facilities no longer needed by the Department. The particular focus of this effort is on completing work at as many sites as possible by 2006. A discussion draft of *Accelerating Cleanup: Focus on 2006 Plan* was issued for public review and comment in June 1997 (DOE 1997f). The *Accelerating Cleanup: Paths to Closure*, issued in June 1998 (DOE 1998d), represented a significant refinement in the data quality and took into consideration comments received from stakeholders, regulators, and Tribal Nations during the "Discussion Draft" comment period. The "Paths to Closure" Plan is designed to give Tribal Nations, States, regulators, and other stakeholders an opportunity to participate in the development of the Environmental Management program, including helping to define innovative approaches to streamline cleanup and to save taxpayer dollars. The Plan is not a decision-making or budgetary document. It is designed, however, to be an integral part of the annual and multi-year DOE budget development process. Decisions on proposed actions to carry out the Environmental Management program, whether the actions are site-specific or national in scope, will be reported in the Plan. Appropriate NEPA reviews, such as preparation of this EIS, will be conducted prior to making any such decisions. The Office of Environmental Management's strategic goal of accomplishing as much work

as possible by 2006 will be one of the factors that will influence decisions being evaluated in this EIS. Subsequent versions of the Plan will reflect the decisions made as a result of this EIS.

#### ***1.5.12 DOE Nonproliferation Study (Pending)***

The Department of Energy is preparing a report on the nuclear nonproliferation implications that under certain circumstances could be associated with chemical separation (a process that chemically extracts plutonium and uranium from other elements or compounds) of spent nuclear fuel of both domestic and foreign origin. This report, which DOE announced it would prepare in the *Record of Decision on a Proposed Nuclear Weapons Nonproliferation Policy Concerning Foreign Research Reactor Spent Nuclear Fuel* (61 Federal Register 25092, May 17, 1996), is intended to assist the Department of Energy in its ongoing efforts to manage nuclear materials under its jurisdiction in a manner consistent with broad United States nonproliferation and arms control objectives. These policies have been laid down by successive Presidents in a series of Presidential Decision Directives.

DOE believed at the time the Draft EIS was issued for public comment that the report would be completed in time to allow it to be considered, if appropriate, in conjunction with this EIS in deciding on the stabilization and disposition options for materials within the scope of this EIS. The current schedule for completion of the report, however, makes it clear that the report will not be completed in time to be available for consideration as intended.

The report focuses on potential nuclear nonproliferation benefits and vulnerabilities associated with various nuclear material handling technologies, including chemical separation, in instances other than to address health and safety vulnerabilities. All of the materials being considered in this EIS are covered by Defense Nuclear Facilities Safety Board Recommendation 94-1 and must be stabilized to address health and safety concerns. Any chemical separation operations performed on these materials would be conducted in the process of accomplishing this health and safety related stabilization, and to allow the materials to be disposed of, thus ending ongoing health and safety risks associated with their continued storage. Thus, although the results of the report will not be available for consideration in making decisions under this EIS, DOE believes that the concerns that led to the decision to prepare the report are being appropriately addressed by this EIS.

#### ***1.5.13 Savannah River Site Chemical Separations Facilities Multi-Year Plan (DOE 1997d, September 1997)***

This document describes the results of an evaluation of various operational strategies for the nuclear materials chemical separation facilities (F- and H-Canyon facilities). The Canyon facilities, which have unique but complementary capabilities, were designed to reprocess, purify, and solidify large quantities of nuclear materials for the nuclear weapons program and civilian application. With the end of the Cold War, these facilities are no longer needed for the production of nuclear materials for the weapons program. Phaseout of these facilities includes the stabilization and processing of certain nuclear materials remaining from previous activities, including stabilization of limited quantities of plutonium materials from Rocky Flats. The strategy developed to phase out canyon operations allows DOE to conduct materials stabilization activities in facilities designed and currently configured to carry out such activities. This approach reduces construction/facility modification costs, enhances safety by keeping operations efficient and as simple as possible, and minimizes impacts to the operations workforce. This strategy permits the best utilization of available facilities, personnel, and resources to meet currently defined material processing requirements and provides sufficient capability to meet potential future processing missions.

***1.5.14 Recommendation 94-1, Improved Schedule for Remediation in the Defense Nuclear Facilities Complex (DNFSB June 1994)***

The halt in the production of nuclear weapons and the materials used in nuclear weapons froze the manufacturing pipeline in a state that the Board considered unsafe and in need of remediation. The Board issued Recommendation 94-1 on May 26, 1994, addressing the stabilization of these materials. DOE accepted the Board's Recommendation on August 31, 1994, and submitted its Implementation Plan in response to the recommendation on February 28, 1995. With respect to the plutonium residues at Rocky Flats, the Board recommended that preparations be expedited to process the containers of possibly unstable residues at Rocky Flats and to convert constituent plutonium to a form suitable for safe interim storage. Rocky Flats prepared an Environmental Assessment/Finding of No Significant Impact for stabilizing these materials in April 1996 (see Section 1.5.1, above). DOE subsequently determined that certain of these plutonium residues may require further processing prior to disposal or other disposition. Those materials are the subject of this Final EIS.

***1.5.15 Plutonium Finishing Plant Stabilization Final Environmental Impact Statement (DOE 1996g, May 1996)***

The actions evaluated in this EIS would stabilize Plutonium Finishing Plant Facility materials, including Hanford Site plutonium residues, that represented environmental, safety, or health vulnerabilities in their then-existing conditions. These vulnerabilities were the result of discontinuing nuclear materials production and processing operations following the end of the Cold War. At the time the Plutonium Finishing Plant Stabilization FEIS was prepared, DOE had already initiated programmatic environmental evaluations on the ultimate disposition of materials in the DOE complex that are surplus to national defense requirements. However, the implementation of decisions regarding ultimate disposition would take several years. In the interim, DOE wanted to eliminate vulnerabilities associated with certain current nuclear material storage configurations in order to protect the environment and the health and safety of workers and the public.

***1.5.16 Rocky Flats Environmental Technology Site Cumulative Impacts Document (DOE 1997e, June 1997)***

The Cumulative Impacts Document for the Rocky Flats Environmental Technology Site was prepared to provide an updated baseline of the cumulative impacts to the worker, public and environment due to Rocky Flats operations, activities, and environmental conditions in light of Rocky Flats' change in mission. Specifically, Rocky Flats has gone from production of nuclear weapons components to materials and waste management, accelerated cleanup, reuse and closure of the site. In addition, the document projects the cumulative impacts to the worker, public and environment due to implementing Rocky Flats' plans for achieving accelerated cleanup and closure of the site. The plans also include the planning assumptions, which are expected to reduce the overall site risk to the worker, public, and environment.

**1.6 PUBLIC COMMENT PROCESS**

The public has had two opportunities to comment on this EIS. The first opportunity was during the public scoping process, which was announced in the *Federal Register* Notice of Intent to prepare this EIS (November 19, 1996, 61 *Federal Register* 58866) (DOE 1996b). The second opportunity was during the public comment period for the Draft EIS, which was announced in the *Federal Register* Notice of Availability (DOE 1997a, EPA 1997) for the Draft EIS ("Notice of Availability of the *Draft Environmental Impact Statement on Management of Certain Plutonium Residues and Scrub Alloy Stored at the Rocky Flats Environmental Technology Site*," November 25, 1997, 62 *Federal Register* 62761).

During the scoping period, comments were received from about 30 individuals and organizations in the Rocky Flats and Savannah River Site areas. During the comment period for the Draft EIS, comments were received from 39 individuals and organizations from areas surrounding the Rocky Flats, Savannah River Site, and Los Alamos National Laboratory, as well as national organizations and individuals along potential transportation corridors. Most commentors provided their positions on one or more of the alternatives and most comments dealt with associated issues such as storage; ultimate disposition; proliferation; transportation; environmental, safety and health risks; and costs.

A summary of the public comment process and the public comments received during scoping and the Draft EIS public comment period is provided in Chapter 9 of this EIS. Chapter 9 also includes the specific public comments received on the Draft EIS, along with DOE's responses to those comments.

## **1.7 STRUCTURE OF THIS EIS**

The remainder of this EIS is structured as follows:

- Chapter 2 describes the proposed action, alternatives for implementation of the proposed action, and a No Action Alternative.
- Chapter 3 describes the potentially affected environments at the sites that may be involved in implementation of the alternatives for management of the Rocky Flats plutonium residues and scrub alloy.
- Chapter 4 addresses the policy considerations and potential environmental impacts of the No Action Alternative and of each alternative for implementation of the proposed action.
- Chapter 5 describes the regulations applicable to actions that DOE might take under this EIS.
- Chapters 6, 7, and 8 contain reference information (the list of preparers, agencies consulted, and glossary).
- Chapter 9 describes the public participation process for this EIS and contains written public comments and a summary of issues raised during the public hearings, as well as DOE responses.
- The appendices to this document present descriptions of reference technologies and details and assumptions of the evaluations and analyses performed for this EIS. Appendix A includes the contractor's NEPA disclosure statement for preparation of the EIS.

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