

1.0 INTRODUCTION

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 the Rocky Flats Environmental Technology Site (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 stabilizing, 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 for other disposition.

This EIS identifies and evaluates alternative processing technologies at three Department of Energy (DOE) sites and identifies DOE's preferred alternative for the various materials. DOE has prepared this EIS in accordance with the National Environmental Policy Act (NEPA), as amended.

Four alternatives are analyzed in this EIS. They include:

- Alternative 1 (No Action - Stabilize and Store)
- Alternative 2 (Processing without Plutonium Separation)
- Alternative 3 (Processing with Plutonium Separation)
- Alternative 4 (Combination of Processing Technologies)

DOE's Notice of Intent to prepare this EIS was published on November 19, 1996 (61 *Federal Register* 58866). Following a public scoping process, the Draft EIS was issued for public comment on November 25, 1997 (62 *Federal Register* 62761). This Final EIS reflects DOE's consideration of public comments and further information DOE has gained about the nature of its residues as a result of continued characterization of the residues. Changes made since the Draft EIS are highlighted by sidebars in the margins of this Summary and of the Final EIS and are summarized in Section 1.4 of this Summary.

1.1 BACKGROUND

During the Cold War, 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 Rocky Flats near Golden, Colorado.

About 85 percent of DOE's plutonium residues and almost all of DOE's scrub alloy are currently stored at Rocky Flats. They are stored in various types of containers in six former plutonium production facilities. The amounts stored are about 106,600 kilograms (kg) (235,000 pounds [lb]) of residues containing about 3,000 kg (6,600 lb) of plutonium, and about 700 kg (1,540 lb) of scrub alloy containing about 200 kg (440 lb) of plutonium.

The DOE sites potentially affected by the proposed action are:

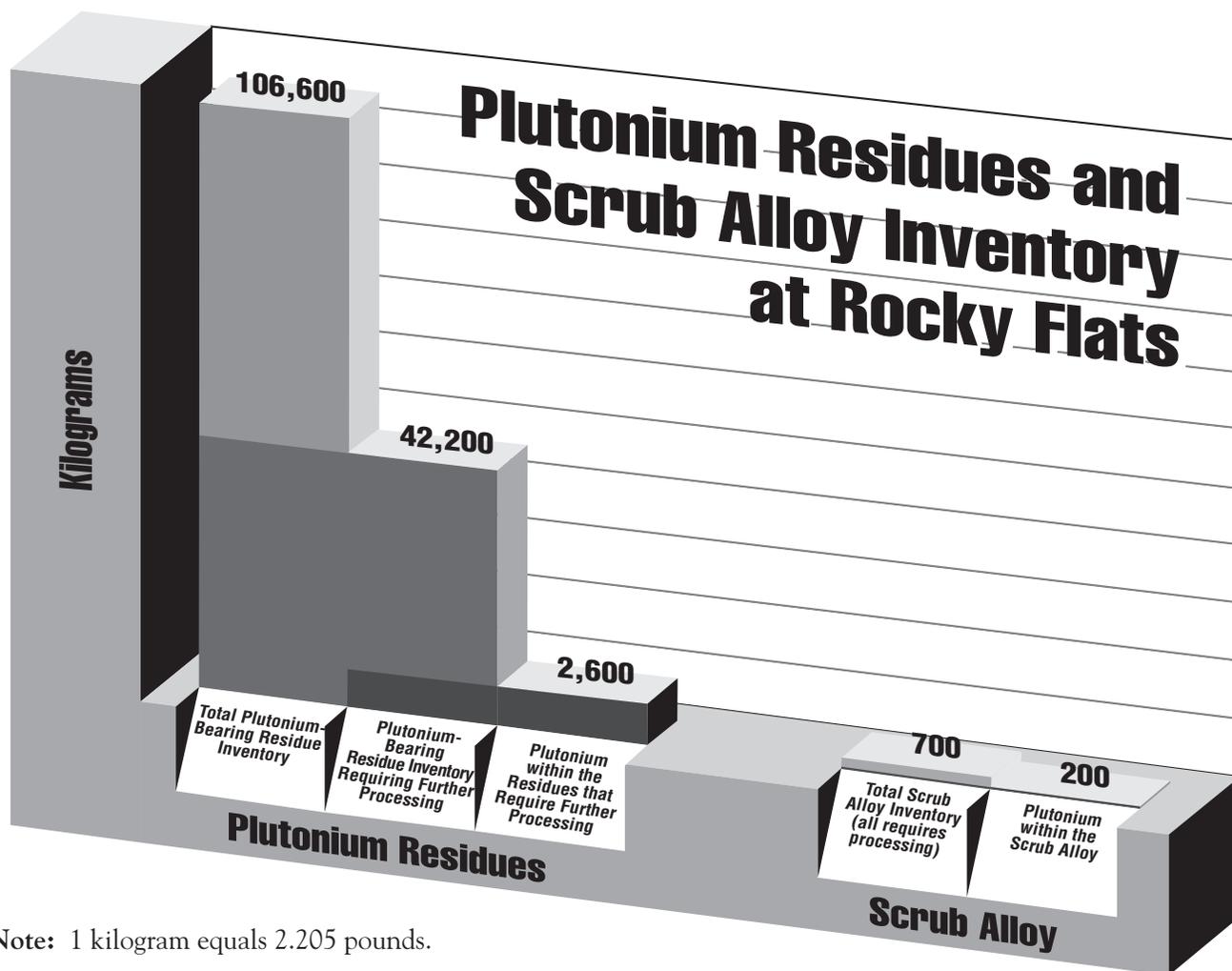
- Rocky Flats Environmental Technology Site, Colorado
- Savannah River Site, South Carolina
- Los Alamos National Laboratory, New Mexico
- Waste Isolation Pilot Plant, New Mexico

The materials covered by this EIS include:

- Plutonium residues, primarily in the form of salts, ash, sludge, and contamination on rags, glass, and metal pieces; and
- Scrub alloy, a magnesium/aluminum/americiu/plutonium metal mixture created as an interim step in plutonium recovery.

In order to address near-term health and safety concerns associated with the continued storage of these materials at Rocky Flats,¹ stabilization activities are already underway for the plutonium residues currently in storage at Rocky Flats. For the majority of these materials, these stabilization activities are sufficient to prepare the materials for ultimate disposition. These stabilization activities are being conducted in accordance with the Finding of No Significant Impact that was issued after completion of the Rocky Flats Solid Residue Environmental Assessment.² The stabilization of Rocky Flats scrub alloy was not addressed in that Environmental Assessment. (Stabilization activities for the remaining plutonium residues at other DOE sites are addressed in other NEPA documents identified in Section 1.7 of this Summary.)

Even with the stabilization contemplated under the Finding of No Significant Impact, a portion of the plutonium residues (42,200 kg [93,000 lb] out of 106,600 kg [235,000 lb]) and all of the scrub alloy (700 kg [1,540 lb]) 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 not only to stabilize them but also to 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.



Note: 1 kilogram equals 2.205 pounds.

¹ Health and safety concerns associated with the continued storage of plutonium residues at Rocky Flats were raised by the Defense Nuclear Facilities Safety Board in Recommendation 94-1, "Improved Schedule for Remediation in the Defense Nuclear Facilities Complex," June 1994.

² Solid Residue Treatment, Repackaging, and Storage Environmental Assessment/Finding of No Significant Impact, DOE/EA-1120, Rocky Flats Field Office, April 1996.

The plutonium residues consist of four broad categories that were described in the Rocky Flats Solid Residue Environmental Assessment: ash, salts, wet residues, and direct repackaging 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 also the scrub alloy inventory requiring further processing to prepare them for disposal or other disposition are summarized in Table S-1. A more detailed break-out of these materials is contained in Table S-2 of Section 1.6.

Table S-1. Plutonium Residues (by Major Category) and Scrub Alloy Inventory Covered Under this EIS

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



Example of Residues in Raw Form



Packaged Residues



Storage in Drums

1 kilogram (kg) equals
2.205 pounds (lb).

1.2 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 containing about 200 kg [440 lb] of plutonium currently in storage at Rocky Flats 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 of time pending disposal or other disposition. The materials processed under this alternative would not meet safeguards termination limits (see Section 1.3.1 of this Summary), 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 immobilization³ 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 would 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* and the *Surplus Plutonium Disposition Environmental Impact Statement* (in preparation). 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 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.

³ 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 1.3.2, *Disposition of Waste and Separated plutonium*.

1.3 PURPOSE AND NEED FOR AGENCY ACTION

Transuranic Waste is contaminated with radioactive elements heavier than uranium (e.g., isotopes of plutonium) with half-lives longer than 20 years in concentrations greater than 100 nanocuries per gram of waste.

Most transuranic waste (about 97 percent by volume) is alpha-emitting and can be safely handled in its packaging (alpha particles can be stopped by shielding as thin as a sheet of paper).

A small percentage of transuranic waste emits sufficient penetrating radiation (gamma rays) to require more shielding (i.e., lead-shielded casks) if it is to be transported for processing or disposal.

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 S-1) 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*, and to prepare the materials for offsite disposal or other disposition. These actions would be taken in a manner that supports Rocky Flats 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 Rocky Flats Solid Residue Environmental Assessment 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 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 Board Recommendation 94-1, if necessary, but also would convert them into forms that would allow for their disposal or other disposition. To that end, the materials must also have safeguards terminated.

1.3.1 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.⁴ 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).

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

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 safeguards termination limits

⁴ Hereinafter, in this Summary, the terms "disposal" or "disposed of" at WIPP include the steps of transporting to and staging prior to disposal.

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.” 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 (plutonium and certain uranium isotopes) 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 “variance” to safeguards termination limits from DOE’s Office of Nonproliferation and National Security, Office of Safeguards and Security. If a variance to safeguards termination limits is granted, this does not necessarily mean that there are no longer any security controls in effect to protect the materials. In particular, in the case of materials such as those within the scope of this EIS, as part of the process of considering whether a variance should be granted, the Office of Safeguards and Security reviews the other DOE management practices and physical security procedures that would remain in effect in place of the strict safeguards requirements, as specified in the documentation explaining the basis for the variance. They would then approve a variance only if they determine that the controls that would remain in effect under the variance would be sufficient to adequately control access to the materials.

In addition, if 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.

1.3.2 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,

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 they 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 applied to some materials under special conditions (see text in Section 1.3.1 of this Summary) to allow for disposal at WIPP.*

there are no issues of safeguards controls and these materials may be disposed of at WIPP. Those residues are not addressed in this EIS.

The processing technologies 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, in southeastern New Mexico. 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 would be by immobilization in glass or ceramic material for disposal in a monitored geologic repository pursuant to the Nuclear Waste Policy Act (refer to Section 2.7 of this Summary). Low-level waste that would result from some of the processing technologies 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 1.7 of this Summary. 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. This is discussed in Section 2.4.10 of the Final EIS.



The Waste Isolation Pilot Plant (WIPP), located near Carlsbad, New Mexico, is a geologic repository in ancient salt beds proposed to be used for disposal of DOE's transuranic waste. WIPP is currently scheduled to open in 1998.



1.4 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 Summary and in the Final EIS. Key changes are discussed in this section.

Variances to Safeguards Termination Limits

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 stabilization prior to repackaging to meet WIPP waste acceptance criteria. For the remaining residues, where 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. To achieve this concentration level, limited quantities of relatively higher plutonium concentration materials (i.e., residues containing 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 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 lbs] 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 of this Summary and Section 2.5.2 of the Final EIS).

New Processing Technologies

This Final EIS also introduces two new candidate processing technologies. One is processing of direct oxide reduction salt residues at Los Alamos National Laboratory by acid dissolution. The other is processing of incinerator ash residues at Rocky Flats by cold ceramification. These are described in Section 2.4 of this Summary and Sections 2.4.1 and 2.4.2 of the Final EIS.

At the recommendation of Los Alamos National Laboratory, the acid dissolution process at Los Alamos National Laboratory was added to the Final EIS for processing direct oxide reduction salt residues. This process is similar to the acid dissolution process analyzed in the Draft EIS for implementation at Rocky Flats and would impose similar environmental impacts to workers and to the offsite public population. This process was previously used at Los Alamos National Laboratory to recover 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.

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 produces a very stable waste form. The process 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 to workers and to the offsite public population would be similar.

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 previously assumed a higher frequency of severe damage due to earthquakes at Building 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.

1.5 DECISIONS TO BE MADE BASED ON THIS EIS

1.5.1 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 the materials, including continued, indefinite storage) and are stored safely before their disposal or other disposition, the following decisions must be made:

- Whether any repackaging or processing⁵ 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 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 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 1.5.2, below.

1.5.2 Process and Schedule for Decisions

With the exception of the two new candidate processing technologies identified in Section 1.4 of this Summary, 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 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 follows:

- Incinerator ash residues
- Graphite fines residues
- Inorganic ash residues
- Molten salt extraction/electrorefining salt residues

⁵ The term "processing" as used in this EIS always includes repackaging. In some cases, repackaging may be the only operation conducted. These cases are specifically identified and described in Section 2.4 of the Final EIS.

- Direct oxide reduction salt residues (high plutonium concentration)
- 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.

1.6 CATEGORIES OF MATERIALS COVERED BY THE PROPOSED ACTION

Section 1.1 of this Summary identifies the five major categories of materials (residues and scrub alloy) that require further processing. These were the major categories identified in the November 1996 Notice of Intent to prepare this EIS (61 *Federal Register* 58866, November 19, 1996). The residue categories are the same as those identified in the Rocky Flats Solid Residue Environmental Assessment, which addresses the existing Rocky Flats stabilization and repackaging efforts. (Scrub alloy was not analyzed in the Solid Residue Environmental Assessment.)

For the purpose of calculating potential environmental impacts for this EIS, DOE has regrouped the plutonium residues and scrub alloy into new categories that require similar processing technologies. Descriptions of the processing technologies and the evaluation of impacts are presented according to these categories. The 10 categories of material are:

- | | |
|--------------------------------|-----------------------|
| 1. Ash Residues | 6. Sludge Residues |
| 2. Pyrochemical Salt Residues | 7. Glass Residues |
| 3. Combustible Residues | 8. Graphite Residues |
| 4. Plutonium Fluoride Residues | 9. Inorganic Residues |
| 5. Filter Media Residues | 10. Scrub Alloy |

Table S-2 compares categories presented in the Notice of Intent with those used in this environmental evaluation. The processing technologies are described in Section 2.4 of this Summary; the potential environmental impacts are presented in Chapter 4.

Table S-2. Material Categories and Subcategories

Notice of Intent Categories	EIS Categories
Ash Residues - Incinerator Ash, Firebrick Heels and Fines, and Soot - Sand, Slag, and Crucible - Graphite Fines	(#1) Ash Residues (20,060 kg [44,200 lb] containing 1,160 kg [2,560 lb] of plutonium) - Incinerator Ash, and Ash Heels and Firebrick Fines ^a - Sand, Slag, and Crucible ^a - Graphite Fines ^a - Inorganic Ash ^a
Salt Residues - Electrorefining (ER) Salts - Molten Salt Extraction (MSE) Salts - Direct Oxide Reduction (DOR) Salts	(#2) Pyrochemical Salt Residues (14,900 kg [32,800 lb] containing 1,000 kg [2,200 lb] of plutonium) - Electrorefining Salts ^a - Molten Salt Extraction Salts ^a - Direct Oxide Reduction Salts ^b
Wet Residues - Wet Combustibles (partial) - Plutonium Fluoride - Wet Combustibles (partial) - Sludge - Greases/Oily Sludge - Raschig Rings	(#3) Combustible Residues (partial)^a - Aqueous/Organic-Contaminated Combustibles (685 kg [1,500 lb] containing 12 kg [26 lb] of plutonium) (#4) Plutonium Fluoride Residues (315 kg [690 lb] containing 142 kg [313 lb] of plutonium) (#5) Filter Media Residues^b (2,630 kg [5,800 lb] containing 112 kg [250 lb] of plutonium) - High Efficiency Particulate Air (HEPA) and Ful-Flo filters (#6) Sludge Residues (620 kg [1,370 lb] containing 27 kg [60 lb] of plutonium) - Sludge ^a - Greases/Oily Sludge ^a (#7) Glass Residues (partial)^a - Raschig Rings (7.3 kg [16 lb] containing 1 kg [2.2 lb] of plutonium)
Direct Repackage Residues - Glass - Dry Combustibles - Graphite, Firebrick - Miscellaneous	(#7) Glass Residues (partial)^a - Other Glass (126 kg [280 lb] containing 4 kg [8.8 lb] of plutonium) (#3) Combustibles Residues (partial)^a - Dry Combustibles (455 kg [1,000 lb] containing 9 kg [20 lb] of plutonium) (#8) Graphite Residues^a (1,880 kg [4,150 lb] containing 97 kg [215 lb] of plutonium) - Graphite, Firebrick (#9) Inorganic Residues (Metal and Others)^a (460 kg [1,000 lb] containing 18 kg [40 lb] of plutonium) - Miscellaneous
Scrub Alloy	(#10) Scrub Alloy (700 kg [1,540 lb] containing 200 kg [440 lb] of plutonium)

^a A variance to safeguards termination limits may be applied to these categories, which would allow for disposal at WIPP.

^b A variance to safeguards termination limits may be applied to a portion of these categories, which would allow for disposal at WIPP.

1.7 RELATIONSHIP TO RELATED NEPA DOCUMENTS AND OTHER REPORTS

Several NEPA documents and other reports have been or are being prepared that relate to DOE's management of plutonium-bearing materials. More detailed information describing the relationship of the NEPA documents and other reports listed below to this EIS can be found in Section 1.5 of the Final EIS.

- *Environmental Assessment, Finding of No Significant Impact, and Response to Comments — Solid Residue Treatment, Repackaging, and Storage* (DOE/EA-1120, April 1996)
- *Rocky Flats Site-Wide Environmental Impact Statement Notice of Intent* (59 FR 40011, August 5, 1994)
- *Interim Storage of Plutonium at the Rocky Flats Environmental Technology Site Environmental Impact Statement Notice of Intent* (61 FR 37247, July 17, 1996)
- *Rocky Flats Environmental Technology Site Cumulative Impacts Document* (June 1997)
- *Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement* (DOE/EIS-0026-S2, September 1997)
- *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200-F, May 1997)
- *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement* (DOE/EIS-0229, December 1996)
- *Surplus Plutonium Disposition Draft Environmental Impact Statement* (DOE/EIS-0283-D, July 1998)
- *Final Environmental Impact Statement for Continued Operation of Lawrence Livermore National Laboratory* (DOE/EIS-0157, August 1992)
- *Draft Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory* (DOE/EIS-0238, April 1998)
- *Plutonium Finishing Plant Stabilization Environmental Impact Statement* (DOE/EIS-0244-F, May 1996)
- *Final Interim Management of Nuclear Materials Environmental Impact Statement* (DOE/EIS-0220, October 1995)
- *Accelerating Cleanup: Paths to Closure* (DOE/EM-0362, June 1998)
- *DOE Nonproliferation Study* (pending - see Section 2.9 of this Summary)
- *Savannah River Site Chemical Separation Facilities Multi-Year Plan* (September 1997)
- *Recommendation 94-1, Improved Schedule for Remediation in the Defense Nuclear Facilities Complex*, Defense Nuclear Facilities Safety Board (59 FR 28848, May 1994)