TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

10.0 DECOMMISSIONING

This chapter presents the AREVA Enrichment Services, LLC (AES) Eagle Rock Enrichment Facility (EREF) Decommissioning Funding Plan. The Decommissioning Funding Plan has been developed following the guidance provided in NUREG-1757 (NRC, 2006). This Decommissioning Funding Plan is similar to the decommissioning funding plan for the National Enrichment Facility (NEF) approved by the NRC in NUREG-1827 (NRC, 2005). The key differences between the EREF and the NEF with respect to decommissioning of the facility and the funding plan, apart from the specifics of dismantling costs due to different facility arrangements are:

- AES will utilize a Letter of Credit to provide reasonable assurance of decommissioning funding rather than a surety bond. Refer to Section 10.2.1, Decommissioning Funding Mechanism.
- The funding assurance for disposition of the depleted uranium byproduct will be based on the costs associated with transporting the tails to the Department of Energy facility for deconversion and disposal under construction at Paducah, Kentucky. Refer to ER Section 4.13.3.6, Cost Associated with Depleted UF_6 Deconversion and Disposal, and SAR Section 10.3, Tails Disposition.
- EREF costs are in 2007 dollars.
- Although no decision has been made regarding selection of a waste disposal facility, waste disposal costs for the EREF are based on the actual costs for disposal at the U.S. Ecology facility near Richland, Washington. The EREF disposal costs are calculated based on weight, volume, quantity of disposal containers, and number of shipments. The NEF costs were based on the cost of disposal at the Envirocare facility near Clive, Utah. The NEF cost is based solely on the volume of waste. As a result of the difference in disposal facility and pricing method, the estimated EREF cost for disposal is considerably greater than that estimated by NEF.

AES commits to decontaminate and decommission the enrichment facility and the site at the end of its operation so that the facility and grounds can be released for unrestricted use. The Decommissioning Funding Plan will be reviewed and updated as necessary at least once every three years starting from the time of the start of operations. In addition to this triennial update, AES has committed to supplemental updates as described in the request for exemption in SAR Section 1.2.5 in order to ensure adequate financial assurance on an incremental basis. Prior to facility decommissioning, a Decommissioning Plan will be prepared in accordance with 10 CFR 70.38 (CFR, 2008a) and submitted to the NRC for approval.

This chapter fulfills the applicable provisions of NUREG-1757 (NRC, 2006) through submittal of information in tabular form as suggested by the NUREG. The information provided in this chapter, the corresponding regulatory requirement and the NRC acceptance criteria from NUREG-1520 (NRC, 2002a), Chapter 10 are summarized below.

SAR Chapter/ Section	Information Category and Requirement	10 CFR Citation	NUREG-1520 Chapter 10 Reference
10.0	Decommissioning: A decommissioning plan must be submitted if required by license condition or if the procedures and activities necessary to carry out decommissioning of the site or separate building or outdoor area have not been previously approved by the Commission and these procedures could increase potential health and safety impacts to workers or to the public.	10 CFR 70.38	10.4.1
10.1, 10.2	Site Specific Cost Estimate: Each decommissioning funding plan must contain a cost estimate for decommissioning and a description of the method of assuring funds for decommissioning from paragraph (f) of this section, including means for adjusting cost estimates and associated funding levels periodically over the life of the facility.	10 CFR 70.25	10.4.1
10.1.4	Decommissioning Strategy: A site will be considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation results in a TEDE to an average member of the critical group that does not exceed 25 mrem (0.25 mSv) per year	10 CFR 20.1402	10.4.1
10.1.5.2	Minimization of contamination: Applicants for licenses shall describe in the application how facility design and procedures for operation will minimize, to the extent practicable, contamination of the facility and the environment, facilitate eventual decommissioning, and minimize, to the extent practicable, the generation of radioactive waste.	10 CFR 20.1406	10.4.1
10.2	Financial Assurance Mechanism: certain applications for specific licenses filed under this part must contain a proposed decommissioning funding plan or a certification of financial assurance for decommissioning	10 CFR 70.22 (a)(9)	10.4.1
10.1.5.8	Record Keeping: commitment to maintain a list of “Restricted Areas” (as defined in the CFR citation) in the EREF Records management system.	10 CFR 20.1003	N/A

SAR Chapter/ Section	Information Category and Requirement	10 CFR Citation	NUREG-1520 Chapter 10 Reference
10.1.5.8	Record Keeping: maintain/retain records of the disposal of licensed materials made under §§ 20.2002 (CFR, 2008f), 20.2003 (CFR 2008k), 20.2004 (CFR 2008l), 20.2005 (CFR 2008m), 10 CFR part 61 (CFR 2008n) land disposal by burial in soil.	10 CFR 20.2108	N/A
10.1.5.8	Record Keeping: maintain records of all areas outside of Restricted Areas that contain material such that, if the license expired, the licensee would be required to decontaminate the area to meet the criteria for decommissioning required by 10 CFR 20, Subpart E (CFR, 2008o) or apply for approval for disposal under 10 CFR 20.2002 (CFR, 2008f).	10CFR 20 Subpart E, 10 CFR 20.2002	N/A
10.1.6.7	Disposal: dispose Confidential and Secret Restricted Data components and documents;	10 CFR 95	N/A
10.2.1	Decommission Funding Mechanism; financial assurance for decommissioning must be provided by one or more of the following methods (included method chosen by AES).	10 CFR 40.36 10 CFR 70.25	N/A

10.1 SITE-SPECIFIC COST ESTIMATE

10.1.1 Cost Estimate Structure

The decommissioning cost estimate is comprised of three basic parts that include:

- A facility description
- The estimated costs (including labor costs, non-labor costs, and a contingency factor)
- Key assumptions.

10.1.2 Facility Description

The Eagle Rock Enrichment Facility (EREF) is fully described in other sections of this License Application and the EREF Integrated Safety Analysis Summary. Information relating to the following topics can be found in the referenced chapters listed below:

A general description of the facility and plant processes is presented in Chapter 1, General Information. A detailed description of the facility and plant processes is presented in the EREF Integrated Safety Analysis Summary.

A description of the specific quantities and types of licensed materials used at the facility is provided in Chapter 1, Section 1.2, Institutional Information.

A general description of how licensed materials are used at the facility is provided in Chapter 1, General Information.

10.1.3 Decommissioning Cost Estimate

10.1.3.1 Summary of Costs

The decommissioning cost estimate for the EREF including decommissioning, tails disposal, and contingency, is approximately $3,523 million (2007 dollars). The decommissioning cost estimate and supporting information are presented in Tables 10.1-1A through 10.1-15, consistent with the applicable provisions of NUREG-1757, NMSS Decommissioning Standard Review Plan (NRC, 2006).

Approximately 97% of the decommissioning costs (except tails disposition costs) for the EREF are attributed to the dismantling, decontamination, processing, and disposal of centrifuges and other equipment in the Separations Building Modules, which are considered classified. Given the classified nature of these buildings, the data presented in the Tables at the end of this chapter has been structured to meet the applicable NUREG-1757 (NRC, 2006)) recommendations, to the extent practicable. However, specific information such as numbers of components and unit rates has been intentionally excluded to protect the classified nature of the data.

A decommissioning cost estimate for the classified portion of the EREF 3.3M SWU facility was developed by the centrifuge supplier, ETC, and was submitted to the NRC under separate cover on December 30, 2008. This cost estimate, factored as discussed in Section 10.1.4, also serves as the basis for the decommissioning cost estimate for a 6.6M SWU facility.

The remaining 3% of the decommissioning costs are for the remaining systems and components in other buildings. The cost data for these systems has also been structured to meet the applicable NUREG-1757 (NRC, 2006)) recommendations.

The decommissioning project schedule is presented in Figure 10.1-1, Eagle Rock Enrichment Facility - Conceptual Decommissioning Schedule. Dismantling and decontamination of the equipment in the four Separations Building Modules will be conducted sequentially over an eight year time frame. Each Separations Building Module will be decommissioned over a 4.5 year period; 3 years are required to dismantle, declassify and decontaminate the equipment and 1.5 years are required to decontaminate the structure. Termination of Separations Building Module 4operations will mark the end of uranium enrichment operations at the EREF. Decommissioning of the remaining plant systems and buildings will begin after Separations Building Module 4 operations have been permanently terminated.

10.1.3.2 Major Assumptions

Key assumptions underlying the decommissioning cost estimate are listed below:

- Inventories of materials and wastes at the time of decommissioning will be in amounts that are consistent with routine plant operating conditions over time with the exception of the tails inventory as explained below.
- Costs are not included for the removal or disposal of non-radioactive structures and materials beyond that necessary to terminate the NRC license.
- Credit is not taken for any salvage value that might be realized from the sale of potential assets (e.g., recovered materials or decontaminated equipment) during or after decommissioning.
- Decommissioning activities will be performed in accordance with current day regulatory requirements.
- AES will be the Decommissioning Operations Contractor (DOC) for all decommissioning operations. However, in the event that AES is not able to fulfill this role, an adjustment to account for use of a third party for performing decommissioning operations is provided in Table 10.1-14, Total Decommissioning Costs. The ETC decommissioning scope is excluded from this adjustment as discussed in Section 10.1.4.
- Decommissioning costs and tails disposition costs are presented in 2007 dollars. Some decommissioning costs were provided by ETC in euros (€). A rate of 0.714 € to $1 (US) is used to convert 2007 € to 2007 $ for those costs.

10.1.4 Decommissioning Strategy

The plan for decommissioning is to promptly decontaminate or remove all materials from the site which prevent release of the facility and site for unrestricted use. This approach, referred to in the industry as DECON (i.e., immediate dismantlement), avoids long-term storage and monitoring of wastes on site. The type and volume of wastes produced at the EREF do not warrant delays in waste removal normally associated with the SAFSTOR (i.e., deferred dismantlement) option.

At the end of useful plant life, the EREF will be decommissioned such that the site and remaining facilities may be released for unrestricted use as defined in 10 CFR 20.1402 (CFR, 2008b). Enrichment equipment will be removed; only building shells and the site infrastructure will remain. All remaining facilities will be decontaminated where needed to acceptable levels for unrestricted use. Confidential and Secret Restricted Data material, components, and documents will be destroyed and disposed of in accordance with the facility Standard Practice Procedures Plan for the protection of classified matter.

Depleted UF_6 (tails), will be removed from the site prior to and during decommissioning. As described in Section 10.3, the tails will be transported to the Department of Energy (DOE) facilities at Portsmouth, Ohio or Paducah, Kentucky for conversion and disposal in accordance with regulatory requirements. Radioactive wastes will be disposed of in licensed low-level radioactive waste disposal sites. Hazardous wastes will be treated or disposed of in licensed hazardous waste facilities. Neither tails conversion, nor disposal of radioactive or hazardous material will occur at the plant site, but at licensed facilities located elsewhere.

Following decommissioning, no part of the facilities or site will remain restricted to any specific type of use.

AES has compared the EREF to the National Enrichment Facility (NEF) in Lea County, New Mexico and fully expects that the decommissioning costs for the EREF are comparable to the decommissioning costs for the NEF, accounting for facility enrichment capacity and minor differences in infrastructure. The supplier of the centrifuges and associated equipment for the EREF i(ETC) has supplied a cost estimate to decommission the centrifuges and associated classified equipment of a 3.3M SWU facility. Costs and quantities associated with decommissioning of a 3.3M SWU facility have been increased by factors based on the particular item to account for the increase in facility capacity to 6.6M SWU. The factors are provided in the appropriate tables associated with this chapter. Decommissioning and decontamination of these components, which is classified, represents approximately 97% of the costs for decommissioning of the EREF.

ETC has decommissioning experience related to the E21 Enrichment Plant (at Capenhurst, UK) for early generations of block-mounted centrifuges and the SP3 Separation Plant at Almelo, Netherlands for early generation centrifuges. ETC has maintained a decommissioning cost model based on costs and methodologies of work previously performed.

Due to the continued high performance of the current generation of gas centrifuges, no site has yet needed, or is likely in the short term, to decommission a plant containing centrifuge machines similar to those proposed for the EREF. ETC has experience in taking both intact and crashed centrifuges from these plants for autopsy and from refurbishment campaigns for its customers. Centrifuges have been manually dismantled, decontaminated and declassified by ETC-D in Jülich, Germany, with the resulting parts safely disposed of – this includes both TC12 and later generation development centrifuges. Work has been performed by ETC scaling the manual methodologies used in Jülich into a semi-automated line using a design concept based on that currently deployed on the SP3 decommissioning line. A cost estimate for this concept was included in the decommissioning cost model.

The remaining structures, systems, and components (SSCs) to be decommissioned account for approximately 3% of the total cost for decommissioning the facility. AES has developed the costs for decommissioning of these SSCs assuming that the costs are approximately the same as for the NEF, accounting for facility enrichment capacity and minor differences in infrastructure. This is based on the following:

- The overall design and quantities of the SSCs at the two facilities (EREF and NEF) that are to be decommissioned are similar when differences in capacity and infrastructure are taken into account.
- The practices and procedures that will be used to decommission and decontaminate the SSCs at EREF will be similar to those to be used at NEF.

Therefore, the decommissioning and decontamination quantities and costs developed for the NEF for non-classified structures, systems, and components are applicable to the EREF on both overall and unit bases, taking into account differences in capacity and minor differences in

facility infrastructure. Where differences do exist, for example more or less floor area, the NEF costs are adjusted as appropriate for the conditions at the EREF.

NRC requested that LES provide a comparison of NEF decommissioning unit costs with the unit costs provided in NUREG/CR-6477 (NRC, 2002b). LES provided the comparison (LES, 2005) and determined that the NEF unit costs and the NUREG unit costs were comparable. Since the EREF decommissioning unit costs are based on NEF decommissioning costs, it can be concluded that the EREF decommissioning unit costs are also comparable to the unit costs computed from NUREG/CR-6477 (NRC, 2002b). Refer to Table 10.1-15 for this unit cost comparison.

Disposal costs for the low level radioactive waste (LLRW) generated during decommissioning may differ between the EREF and the NEF. This is a result of assuming disposal at different LLRW disposal facilities. NEF waste is assumed to be disposed of at the Envirocare Facility in Clive, Utah. However, the state of Idaho is a member of the Northwest Interstate Compact (NWIC) on Low Level Radioactive Waste. Therefore, for the purposes of this analysis, LLRW generated at the EREF during decommissioning is assumed to be disposed of at the U.S. Ecology Washington Low-Level Radioactive Waste site located near Richland, Washington. The unit disposal costs in Table 10.1-10 are based on the current rates for compact members at the US Ecology site.

The US Ecology rates include per container and per shipment charges as well as charges based on volume whereas the NEF estimated costs are based on volume charges only. The EREF disposal costs are based on shipping the LLRW in Sea Land and B25 containers. This is consistent with normal LLRW packaging at both operating and decommissioning nuclear power plants and these containers are acceptable to the disposal facility. Further, the use of Sea Land and B25 containers is in keeping with ALARA principles when compared to use of smaller containers such as 55-gallon (208 liter) drums. The use of the larger containers reduces the man-hours associated with processing, packaging, and shipping the LLRW, resulting in lower personnel doses.

As stated in Section 10.1.3.2, above, AES will be the Decommissioning Operations Contractor (DOC) for all decommissioning operations. However, to provide a contingency if AES is not able to perform this role, Table 10.1.14 includes the additional costs if a third party were to act as the DOC. The third party contractor cost for decommissioning operations associated with planning and preparation, decontamination and dismantling of radioactive facility components, restoration of contaminated areas on facility grounds, and the final radiation survey includes an overhead rate on direct staff labor of 110%, plus 15% profit on labor and its overheads. Costs associated with the decontamination, dismantlement, and declassification of classified components are excluded from application of these overhead and profit factors because: (1) ETC is an independent contractor who, by definition, is a “third party DOC” that will perform this work; (2) the costs associated with this work already include the overhead and profits associated with a third party (ETC in this case) performing this work; and (3) due to the nature of this work, only ETC will perform this work.

The estimate for third party contractor cost was derived as follows:

- The total workdays for each labor category associated with planning and preparation, decontamination and dismantling of radioactive facility components and the final radiation survey in Table 10.1-7 were determined. For each labor category, the total labor cost was then determined by multiplying the total workdays by the associated labor rates from Table 10.1-8. As discussed above, labor costs associated with the decontamination, dismantlement, and declassification of classified components are excluded.

- For each labor category associated with planning and preparation, decontamination and dismantling of radioactive facility components, and the final radiation survey, the total cost including the overhead rate of direct staff labor was then determined by adding 110% to the total labor cost, i.e., multiplying the total labor cost by (1+1.10).
- Multiplying this total cost, including the 110% overhead rate on staff labor, by 1.15, to allow for a 15% profit on labor and overheads, provides the total third party cost.
- This total third party cost was then used to determine the adjustment to SAR Table 10.1-14 for the Cost of Third Party Use associated with planning and preparation, decontamination and dismantling of radioactive facility components, and the final radiation survey. This adjustment was determined by subtracting the non-third party use costs for planning and preparation, decontamination and dismantling of radioactive facility components, and the final radiation survey provided in SAR Table 10.1-14 from the total third party cost.

Financial arrangements are made to cover all costs required for returning the site to unrestricted use. Updates on cost and funding will be provided periodically and will include appropriate treatment for any replacement equipment. A detailed Decommissioning Plan will be submitted at a later date in accordance with 10 CFR 70.38 (CFR, 2008a).

The remaining subsections describe decommissioning plans and funding arrangements, and provide details of the decontamination aspects of the program. This information was developed in connection with the decommissioning cost estimate. Specific elements of the planning may change with the submittal of the decommissioning plan required at the time of license termination.

10.1.5 Decommissioning Design Features

10.1.5.1 Overview

Decommissioning planning begins with ensuring design features are incorporated into the plant's initial design that will simplify eventual dismantling and decontamination. The plans are implemented through proper management and health and safety programs. Decommissioning policies address radioactive waste management, physical security, and material control and accounting.

Major features incorporated into the facility design that facilitate decontamination and decommissioning are described below.

10.1.5.2 Radioactive Contamination Control

The following features primarily serve to minimize the spread of radioactive contamination during operation, and therefore simplify eventual plant decommissioning. As a result, worker exposure to radiation and radioactive waste volumes are minimized as well.

- Certain activities during normal operation are expected to result in surface and airborne radioactive contamination. Specially designed rooms are provided for these activities to preclude contamination spread. These rooms are isolated from other areas and are provided with ventilation and filtration. The Ventilated Room (BSPB), Chemical Trap Workshop (TSB), Mobile Unit Disassembly and Reassembly Room (TSB), Valve and Pump Dismantlement Workshop (TSB), the Decontamination Workshop (TSB), Maintenance Facility (TSB), and the Centrifuge Test and Post Mortem Facility (CAB) meet these specific design requirements.

- All areas of the plant are sectioned off into Unrestricted and Restricted Areas. Restricted Areas limit access for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials. Radiation Areas and Airborne Contamination Areas have additional controls to inform workers of the potential hazard in the area and to help prevent the spread of contamination. All procedures for these areas fall under the Radiation Protection Program, and serve to minimize the spread of contamination and simplify the eventual decommissioning.
- Non-radioactive process equipment and systems are minimized in locations subject to potential contamination. This limits the size of the Restricted Areas and limits the activities occurring inside these areas.
- Local air filtration is provided for areas with potential airborne contamination to preclude its spread. Fume cupboards (hoods) filter contaminated air in these areas.
- Curbing, pits, or other barriers are provided around tanks and components that contain liquid radioactive wastes. These serve to control the spread of contamination in case of a spill.
- Discharges from the facility to surface or groundwater will meet standards for storm water and treated domestic sanitary waste water. No liquid radiological discharges are anticipated.

10.1.5.3 Worker Exposure and Waste Volume Control

The following features primarily serve to minimize worker exposure to radiation and minimize radioactive waste volumes during decontamination activities. As a result, the spread of contamination is minimized as well.

- During construction, a washable epoxy coating is applied to floors and walls that might be radioactively contaminated during operation. The coating will serve to lower waste volumes during decontamination and simplify the decontamination process. The coating is applied to floors and walls that might be radioactively contaminated during operation that are located in the Restricted Areas.
- Sealed, nonporous pipe insulation is used in areas likely to be contaminated. This will reduce waste volume during decommissioning.
- Ample access is provided for efficient equipment dismantling and removal of equipment that may be contaminated. This minimizes the time of worker exposure.
- Tanks are provided with accesses for entry and decontamination. Design provisions are also made to allow complete draining of the wastes contained in the tanks.
- Connections in the process systems provided for required operation and maintenance allow for thorough purging at plant shutdown. This will remove a significant portion of radioactive contamination prior to disassembly.
- Design drawings, produced for all areas of the plant, will simplify the planning and implementing of decontamination procedures. This in turn will shorten the durations that workers are exposed to radiation.
- Worker access to contaminated areas is controlled to assure that workers wear proper protective equipment and limit their time in the areas.

10.1.5.4 Management Organization

An appropriate organizational strategy will be developed to support the phased decommissioning schedule discussed in Section 10.1.3.1, Summary of Costs. The organizational strategy will ensure that adequate numbers of experienced and knowledgeable personnel are available to perform the technical and administrative tasks required to decommission the facility.

AES intends to be the prime Decommissioning Operations Contractor (DOC) responsible for decommissioning the EREF. In this capacity, AES will have direct control and oversight over all decommissioning activities. AES also plans to secure contract services to supplement its capabilities as necessary.

Management of the decommissioning program will assure that proper training and procedures are implemented to assure worker health and safety. Programs and procedures, based on already existing operational procedures, will focus heavily on minimizing waste volumes and worker exposure to hazardous and radioactive materials. Qualified contractors assisting with decommissioning will likewise be subject to facility training requirements and procedural controls.

10.1.5.5 Health and Safety

As with normal operation, the policy during decommissioning shall be to keep individual and collective occupational radiation exposure as low as reasonably achievable (ALARA). A health physics program will identify and control sources of radiation, establish worker protection requirements, and direct the use of survey and monitoring instruments.

10.1.5.6 Waste Management

Radioactive and hazardous wastes produced during decommissioning will be collected, handled, and disposed of in accordance with all regulations applicable to the facility at the time of decommissioning. Generally, procedures will be similar to those described for wastes produced during normal operation. These wastes will ultimately be disposed of in licensed radioactive or hazardous waste disposal facilities located elsewhere. Non-hazardous and non-radioactive wastes will be disposed of consistent with good industrial practice, and in accordance with applicable regulations.

10.1.5.7 Security/Material Control

Requirements for physical security and for material control and accounting will be maintained as required during decommissioning in a manner similar to the programs in force during operation. The AES plan for completion of decommissioning, submitted near the end of plant life, will provide a description of any necessary revisions to these programs.

10.1.5.8 Recordkeeping

Records important for safe and effective decommissioning of the facility will be stored in the EREF Records Management System until the site is released for unrestricted use. Information maintained in these records includes:

1. Records of spills or other unusual occurrences involving the spread of contamination in and around the facility, equipment, or site. These records may be limited to instances when

contamination remains after any cleanup procedures or when there is reasonable likelihood that contaminants may have spread to inaccessible areas as in the case of possible seepage into porous materials such as concrete. These records will include any known information on identification of involved nuclides, quantities, forms, and concentrations.

2. As-built drawings and modifications of structures and equipment in restricted areas where radioactive materials are used and/or stored and of locations of possible inaccessible contamination such as buried pipes which may be subject to contamination. Required drawings will be referenced as necessary, although each relevant document will not be indexed individually. If drawings are not available, appropriate records of available information concerning these areas and locations will be substituted.
3. Except for areas containing only sealed sources, a list contained in a single document and updated every two years, of the following:
    i. All areas designated and formerly designated as Restricted Areas as defined under 10 CFR 20.1003; (CFR, 2008c)
    ii. All areas outside of Restricted Areas that require documentation specified in item 1 above;
    iii. All areas outside of Restricted Areas where current and previous wastes have been buried as documented under 10 CFR 20.2108 (CFR, 2008d); and
    iv. All areas outside of Restricted Areas that contain material such that, if the license expired, the licensee would be required to either decontaminate the area to meet the criteria for decommissioning in 10 CFR 20, subpart E, (CFR, 2008e) or apply for approval for disposal under 10 CFR 20.2002 (CFR, 2008f).
4. Records of the cost estimate performed for the decommissioning funding plan or of the amount certified for decommissioning, and records of the funding method used for assuring funds if either a funding plan or certification is used.

10.1.6 Decommissioning Process

10.1.6.1 Overview

The four Separation Building Modules will be shutdown in sequence starting with Separations Building Module 1. Since only low radiation levels exist at this facility, decommissioning may begin immediately following the permanent shutdown of the first series of cascades in a Separations Building Module. The decommissioning of a single Separations Building Module is assumed to take 4.5 years; 3 years for decommissioning of the centrifuges and associated equipment and 1.5 years for decontamination of the structure. Dismantling and decontamination of the equipment in the four Separations Building Modules will be performed in a phased approach such that the decommissioning of all four Separations Building Modules is completed within an eight year time frame.

Termination of Separations Building Module 4 operations will mark the end of uranium enrichment operations at the facility. Also, decommissioning of the remaining plant systems and buildings will begin after Separations Building Module 4 operations have been permanently terminated. A conceptual decommissioning schedule is provided in Figure 10.1-1, Eagle Rock Enrichment Facility – Conceptual Decommissioning Schedule.

Prior to beginning decommissioning operations, an extensive radiological survey of the facility will be performed in conjunction with a historical site assessment. The findings of the radiological survey and historical site assessment will be presented in a Decommissioning Plan

to be submitted to the NRC. The Decommissioning Plan will be prepared in accordance with 10 CFR 70.38 (CFR, 2008a) and the applicable guidance provided in NUREG-1757 NRC, 2006).

Decommissioning activities will generally include: (1) installation of decontamination facilities, (2) purging of process systems, (3) dismantling and removal of equipment, (4) decontamination and destruction of Confidential and Secret Restricted Data material, (5) sales of salvaged materials, (6) disposal of wastes, and (7) completion of a final radiation survey. Credit is not taken for any salvage value that might be realized from the sale of potential assets (e.g., recovered materials or decontaminated equipment) during or after decommissioning.

Decommissioning, using the DECON approach, requires residual radioactivity to be reduced below specified levels so the facilities may be released for unrestricted use. Current Nuclear Material Safety and Safeguards guidelines for release serve as the basis for decontamination costs estimated herein. Portions of the facility that do not exceed contamination limits may remain as is without further decontamination measures applied. The intent of decommissioning the facility is to remove all enrichment-related equipment from the buildings such that only the building shells and site infrastructure remain. The removed equipment includes all piping and components from systems providing UF_6 containment, systems in direct support of enrichment (such as refrigerant and chilled water), radioactive and hazardous waste handling systems, contaminated HVAC filtration systems, etc. The remaining site infrastructure will include services such as electrical power supply, treated water, fire protection, HVAC, cooling water and communications.

Decontamination of plant components and structures will require installation of new facilities dedicated for that purpose. Existing plant buildings, such as the Centrifuge Assembly Building, are assumed to house the facilities. These facilities will be specially designed to accommodate repetitive cleaning of thousands of centrifuges, and to serve as a general-purpose facility used primarily for cleaning larger components. The new facilities will be the primary location for decontamination activities during the decommissioning process. The small decontamination area in the Technical Support Building (TSB), used during normal operation, may also handle small items at decommissioning.

Decontaminated components may be reused or sold as scrap. All equipment that is to be reused or sold as scrap will be decontaminated to a level at which further use is unrestricted. Materials that cannot be decontaminated will be disposed of in a licensed radioactive waste disposal facility. As noted earlier, credit is not taken for any salvage value that might be realized from the sale of potential assets (e.g., recovered materials or decontaminated equipment) during or after decommissioning.

Any UF_6 tails remaining on site will be removed during decommissioning. Depending on technological developments occurring prior to plant shutdown, the tails may have become marketable for further enrichment or other processes. The disposition of UF_6 tails and relevant funding provisions are discussed in Section 10.3, Tails Disposition. The cost estimate takes no credit for any value that may be realized in the future due to the potential marketability of the stored tails.

Contaminated portions of the buildings will be decontaminated as required. Structural contamination should be limited to structures in the Restricted Areas. Good housekeeping practices during normal operation will maintain the other areas of the site clean.

When decontamination is complete, all areas and facilities on the site will be surveyed to verify that further decontamination is not required. Decontamination activities will continue until the entire site is demonstrated to be suitable for unrestricted use.

10.1.6.2 Decontamination Methodology

The standard decontamination methodology to be used during EREF decommissioning will employ conventional decontamination techniques as follows. As described in Section 10.1.6.1 above, the buildings and components are characterized with respect to radioactive contamination immediately prior to the start of decommissioning. The non-contaminated components are removed, monitored again and free released for disposal offsite. The experience from decommissioning experience in Europe is that all non uranium handling components (e.g. electrical cabinets, cable runs, utility pipe work, etc.) will be free of any contamination. The contaminated components in buildings other than the Separations Building Modules (i.e., Other Buildings) are initially washed down to remove any contamination. The cleaned components are re-monitored and, if found to be clear of contamination, are also free released for disposal offsite. If any component after cleaning and monitoring still shows contamination, then that component will be reviewed and sorted for decontamination feasibility.

For the Separations Building Modules, a section of pipe work is decontaminated in situ by circulating citric acid or other suitable decontamination fluid followed by wash water around the pipes. This pipe work will then be taken down, transferred to the decontamination facility, volume reduced, and made ready for dispatch to a licensed disposal facility.

The remainder of the equipment and piping in the Separations Building Modules is dismantled into sections suitable for transport to the Decontamination Facility. Specifically, the dismantling will strip the facility down to individual centrifuge machine level. In the decontamination facility, the dismantled sections will be dismantled further (i.e., sub-dismantled). The sub-dismantled components will be subject to a decontamination feasibility review. The decontamination feasibility review will check that the item is open to the free flow of decontaminating and cleaning fluids and will allow monitoring of the component after decontamination. Components failing the feasibility review will be consigned to volume reduction and preparation for shipment to a licensed disposal facility. An example of a component failing decontamination feasibility review would be a long thin tube for which there would be no practical means of either passing decontamination fluids through it or of monitoring the internal surfaces after the decontamination process.

Components designated for decontamination will be inspected to determine if any oil or loose bulk contamination are present. In the event of the presence of oil, the components will be degreased. In the event of the presence of loose bulk contamination, the bulk contamination will be removed within a fume hood by the use of hand tools, wire brushes, etc. When the component is determined to be free of oil and loose bulk contamination, it is processed through a series of decontamination and wash water baths. For classified components that pass the decontamination feasibility review, decontamination involves use of the citric acid decontamination and wash water baths. For other buildings components, typically only components in the categories "Ventilation/Ductwork" and “Equipment/Materials," these are decontaminated using the citric acid or other suitable fluid decontamination and wash water baths. Following final drying and radiation monitoring, the item is available for preparation for disposal at a licensed disposal facility.

10.1.6.3 Decontamination Facility Construction

New facilities for decontamination can be installed in existing plant buildings to avoid unnecessary expense. Estimated time for equipment installation is approximately one year. These new facilities will be completed in time to support the dismantling and decontamination of

Separations Building Module 1. These facilities are described in Section 10.1.7, Decontamination Facilities.

10.1.6.4 System Cleaning

At the end of the useful life of each Separations Building Module, the enrichment process is shut down and UF_6 is removed to the fullest extent possible by normal process operation. This is followed by evacuation and purging with nitrogen. This shutdown and purging portion of the decommissioning process is estimated to take approximately three months.

10.1.6.5 Dismantling

Dismantling is simply a matter of cutting and disconnecting all components requiring removal. The operations themselves are simple but very labor intensive. They generally require the use of protective clothing. The work process will be optimized, considering the following:

- Minimizing the spread of contamination and the need for protective clothing
- Balancing the number of cutting and removal operations with the resultant decontamination and disposal requirements
- Optimizing the rate of dismantling with the rate of decontamination facility throughput
- Providing storage and laydown space required, as impacted by retrievability, criticality safety, security, etc
- Balancing the cost of decontamination and salvage with the cost of disposal.

Details of the complex optimization process will necessarily be decided near the end of plant life, taking into account specific contamination levels, market conditions, and available waste disposal sites. To avoid lay down space and contamination problems, dismantling should be allowed to proceed generally no faster than the downstream decontamination process.

The time frame to accomplish both dismantling and decontamination at EREF is estimated to be approximately four and a half years per Separations Building Module. The NEF conceptual decommissioning schedule shows three years for each module. The four and a half years per EREF module is consistent with the NEF estimate given the 24 cascades per EREF module compared with 16 cascades per NEF module. The four EREF Separations Building Modules will be decommissioned in sequence starting with Separations Building 1 and will be phased such that the decommissioning of all four will be completed in eight years. An additional year following decommissioning of the last Separations Building Modules is assumed for the final site survey and other activities.

10.1.6.6 Decontamination

The decontamination process is addressed separately in detail in Section 10.1.7.

10.1.6.7 Salvage of Equipment and Materials

Items to be removed from the facilities can be categorized as potentially re-usable equipment, recoverable scrap, and wastes. However, based on a 30-year facility operating license, operating equipment is not assumed to have reuse value. Wastes will also have no salvage value.

With respect to scrap, a significant amount of aluminum will be recovered, along with smaller amounts of steel, copper, and other metals. For security and convenience, the uncontaminated materials will likely be smelted to standard ingots, and, if possible, sold at market price. The contaminated materials will be disposed of as low-level radioactive waste. No credit is taken for any salvage value that might be realized from the sale of potential assets during or after decommissioning.

10.1.6.8 Disposal

All wastes produced during decommissioning will be collected, handled, and disposed of in a manner similar to that described for those wastes produced during normal operation. Wastes will consist of normal industrial trash, non-hazardous chemicals and fluids, small amounts of hazardous materials, and radioactive wastes. The radioactive waste will consist primarily of crushed centrifuge rotors, trash, and citric cake. Citric cake consists of uranium and metallic compounds precipitated from citric acid decontamination solutions. It is estimated that approximately 7,700 m^3 (10,071 yd^3) of radioactive waste will be generated over the decommissioning operations period. (This waste is subject to further volume reduction processes prior to disposal).

Radioactive wastes will ultimately be disposed of in licensed low-level radioactive waste disposal facilities. Hazardous wastes will be disposed of in hazardous waste disposal facilities. Non-hazardous and non-radioactive wastes will be disposed of in a manner consistent with good industrial practice and in accordance with all applicable regulations. A complete estimate of the wastes and effluent to be produced during decommissioning will be provided in the Decommissioning Plan that will be submitted prior to initiating the decommissioning of the plant.

Confidential and Secret Restricted Data components and documents on site shall be disposed of in accordance with the requirements of 10 CFR 95 (CFR, 2008g). Such classified portions of the centrifuges will be destroyed, piping will likely be smelted, documents will be destroyed, and other items will be handled in an appropriate manner. Details will be provided in the facility Standard Practice Procedures Plan for the protection of classified matter, submitted separately in accordance with 10 CFR 95 (CFR, 2008g).

10.1.6.9 Final Radiation Survey

A final radiation survey must be performed to verify proper decontamination to allow the site to be released for unrestricted use. The evaluation of the final radiation survey is based in part on an initial radiation survey performed prior to initial operation. The initial survey determines the natural background radiation of the area; therefore it provides a datum for measurements which determine any increase in levels of radioactivity.

The final survey will systematically measure radioactivity over the entire site. The intensity of the survey will vary depending on the location (i.e. the buildings, the immediate area around the buildings, and the remainder of the site). The survey procedures and results will be documented in a report. The report will include, among other things, a map of the survey site, measurement results, and the site's relationship to the surrounding area. The results will be analyzed and shown to be below allowable residual radioactivity limits; otherwise, further decontamination will be performed.

For decommissioning funding purposes, it is assumed that 324 samples will be taken within the 242 ha (592 acre) EREF Restricted Area (area within the security fence). This is based on assuming a sampling grid pattern approximately 91 m by 91 m (100 yds by 100 yds). The grid is based on sampling experience of similar areas at decommissioned nuclear power plants. Outside

of the Restricted Area, but within the site boundaries, the likelihood for contamination is extremely remote. Therefore, the grid will be expanded such that samples will be taken on a grid approximately 610 m by 610 m (667 yards by 667 yards). This results in a need for approximately 60 additional samples, bringing the total number of samples to 384. A total of 500 samples are assumed as a conservative measure and for consistency with the reference plant (NEF). The analysis of the samples will be provided by a third party since, at the time of performance of the final radiation survey, no analysis facilities will be available on site.

10.1.7 Decontamination Facilities

10.1.7.1 Overview

The facilities, procedures, and expected results of decontamination are described in the paragraphs below. Since reprocessed uranium will not be used as feed in the EREF, no consideration of ^{232}U, transuranic alpha-emitters and fission product residues is necessary for the decontamination process. Only contamination from ^{238}U, ^{235}U, ^{234}U, and their daughter products will require handling by decontamination processes. The primary contaminant throughout the plant will be in the form of small amounts of UO_2F_2, with even smaller amounts of UF_4 and other compounds.

10.1.7.2 Facilities Description

A decontamination facility will be required to accommodate decommissioning. This specialized facility is needed for optimal handling of the thousands of centrifuges to be decontaminated, along with the UF_6 vacuum pumps and valves. Additionally, a general purpose facility is required for handling the remainder of the various plant components. These facilities are assumed to be installed in existing plant buildings (such as the Centrifuge Assembly Building).

The decontamination facility will have four functional areas that include: (1) a disassembly area, (2) a buffer stock area, (3) a decontamination area, and (4) a scrap storage area for cleaned stock. The general purpose facility may share the specialized decontamination area. However, due to various sizes and shapes of other plant components needing handling, the disassembly area, buffer stock areas, and scrap storage areas may not be shared. Barriers and other physical measures will be installed and administrative controls implemented, as needed, to limit the spread of contamination.

Equipment in the decontamination facility is assumed to include:

- Transport and manipulation equipment
- Dismantling tables for centrifuge externals
- Sawing machines
- Dismantling boxes and tanks, for centrifuge internals
- Degreasers
- Citric acid and/or other suitable decontamination fluids and demineralized water baths
- Contamination monitors
- Wet blast cabinets
- Crusher, for centrifuge rotors

- Smelting and/or shredding equipment
- Scrubbing facility.

The decontamination facilities provided in the TSB for normal operational needs would also be available for cleaning small items during decommissioning.

10.1.7.3 Procedures

Formal procedures for all major decommissioning activities will be developed and approved by plant management to minimize worker exposure and waste volumes, and to assure work is carried out in a safe manner.

At the end of plant life, some of the equipment, most of the buildings, and all of the outdoor areas should already be acceptable for release for unrestricted use. If they are accidentally contaminated during normal operation, they would be cleaned up when the contamination is discovered. This limits the scope of necessary decontamination at the time of decommissioning.

Contaminated plant components will be cut up or dismantled, then processed through the decontamination facilities. Contamination of site structures will be limited to areas in the Separations Building Modules, the Blending, Sampling and Preparation Building, the Centrifuge Assembly Building, and TSB, and will be maintained at low levels throughout plant operation by regular cleaning. Through the application of special protective coatings, to surfaces that might become radioactively contaminated during operation, and good housekeeping practices, final decontamination of these areas is assumed to require minimal removal of surface concrete or other structural material.

The centrifuges will be processed through the specialized facility. The following operations will be performed.

- Removal of external fittings
- Removal of bottom flange, motor and bearings, and collection of contaminated oil
- Removal of top flange, and withdrawal and disassembly of internals
- Degreasing of items as required
- Decontamination of all recoverable items for smelting
- Destruction of other classified portions by shredding, crushing, smelting, etc.

10.1.7.4 Results

Experience with centrifuge enrichment plants in Europe (LES, 2005) having similar levels of contamination, has demonstrated that conventional decontamination techniques are effective for all plant items. Recoverable items have been decontaminated and made suitable for reuse except for a very small amount of intractably contaminated material. The majority of radioactive waste requiring disposal in the EREF will include crushed centrifuge rotors, trash, and residue from the effluent treatment systems.

European experience (LES, 2005) has demonstrated that the aluminum centrifuge casings can be successfully decontaminated and recycled. However, as a conservative measure for this decommissioning cost estimate, the aluminum centrifuge casings for the EREF are assumed to be disposed of as low-level radioactive waste.

Overall, no problems are anticipated that will prevent the site from being released for unrestricted use.

10.1.7.5 Decommissioning Impact on Integrated Safety Analysis (ISA)

As was described in Section 10.1.3.1, Summary of Costs, dismantling and decontamination of the equipment in the four Separations Building Modules will be conducted sequentially over an eight year time frame with an additional one year period for final site surveys and other decommissioning activities. Termination of Separations Module 4 operations will mark the end of uranium enrichment operations at the EREF. Decommissioning of the remaining plant systems and buildings will begin after Separations Building Module 4 operations have been permanently terminated.

Although decommissioning operations are planned to be underway while all the activities considered in the ISA continue to occur in the other portions of the plant, the current ISA has not considered these decommissioning risks. An updated ISA will be performed at a later date, but prior to decommissioning, to incorporate the risks from decommissioning operations on concurrent enrichment operations.

10.2 FINANCIAL ASSURANCE MECHANISM

10.2.1 Decommissioning Funding Mechanism

AES intends to utilize a Letter of Credit to provide reasonable assurance of decommissioning funding as required by 10 CFR 40.36(e)(2) (CFR, 2008h) and 70.25(f)(2) (CFR, 2008i). Finalization of the specific financial instruments to be utilized will be completed, and signed originals of those instruments will be provided to the NRC, prior to receipt of licensed material at the EREF. AES intends to provide continuous financial assurance from the time of receipt of licensed material to the completion of decommissioning and termination of the license. Since AES intends to sequentially install and operate the Separations Building Modules over time, financial assurance for decommissioning will be provided during the operating life of the EREF at a rate that is in proportion to the decommissioning liability for these facilities as they are phased in.

Similarly, AES will provide decommissioning funding assurance for disposition of depleted tails at a rate in proportion to the amount of accumulated tails onsite up to the maximum amount of the tails as described in Section 10.3, Tails Disposition. An exemption request to permit this incremental financial assurance is provided in Section 1.2.5, "Special Exemptions or Special Authorizations."

The Letter of Credit method to be utilized by AES will guarantee that decommissioning costs will be paid in the event it is unable to meet its decommissioning obligations at the time of decommissioning. The Letter of Credit method will also be structured and adopted consistent with applicable NRC regulatory requirements and in accordance with NRC regulatory guidance contained in NUREG-1757 NRC, 2006). Accordingly, AES intends that its Letter of Credit will contain, but not be limited to, the following attributes:

- The amount of the Letter of Credit shall equal or exceed the required coverage level.
- The Letter of Credit shall be from a financial institution that is regulated by a U.S. Federal or State agency.
- The Letter of Credit will be written for a specified one year term and will be renewed automatically unless 90 days or more prior to the renewal date, the issuing bank notifies the NRC, of its intention not to renew. The Letter of Credit will also provide that the full face amount can be paid to the beneficiary prior to the expiration without proof of forfeiture if AES fails to provide a replacement mechanism acceptable to the NRC within 30 days after receipt of notification of cancellation.
- Funds drawn from the Letter of Credit will be placed directly into a standby trust fund.

In addition, the Letter of Credit method will remain in effect until the NRC has terminated the license.

Unexecuted copies of the Letter of Credit documentation are provided in Appendices 10A through 10F. Prior to the EREF receipt of licensed material, the applicable unexecuted copies of the Letter of Credit documentation will be replaced with the finalized, signed, and executed Letter of Credit documentation and a supporting executed Standby Trust Agreement.

10.2.2 Adjusting Decommissioning Costs and Funding

In accordance with 10 CFR 40.36(d) (CFR, 2008h) and 70.25(e) (CFR, 2008i), AES will update the decommissioning cost estimate for the EREF, and the associated funding levels, over the life of the facility. These updates will take into account changes resulting from inflation or site-specific factors, such as changes in facility conditions or expected decommissioning procedures. These funding level updates will also address anticipated operation of additional Separations Building Modules and accumulated tails, if any are anticipated.

As required by the applicable regulations in 10 CFR 70.25(e) (CFR, 2008i), such updating will occur approximately every three years. A record of the update process and results will be retained for review as discussed in Section 10.2.3, below. The NRC will be notified of any material changes to the decommissioning cost estimate and associated funding levels (e.g., significant increases in costs beyond anticipated inflation). To the extent the underlying instruments are revised to reflect changes in funding levels, the NRC will be notified as appropriate.

In addition to the triennial update of the decommissioning cost estimate described above, AES has committed to supplemental updates as described in the request for exemption in SAR Section 1.2.5 in order to ensure adequate financial assurance on an incremental basis. Specifically, AES commits to update the decommissioning cost estimates and to provide to the NRC a revised funding instrument for facility decommissioning prior to the operation of each Separations Building Module at a minimum. AES also commits to updating the cost estimates for the disposition of the DUF_6 on an annual forward-looking incremental basis and to providing the NRC revised funding instruments that reflect these projections of DUF_6 production. If any adjustments to the funding assurance are determined to be needed during this annual period due to production variations, they would be made promptly and a revised funding instrument would be provided to the NRC.

For the first three year period of operations, currently forecast as years 3, 4, and 5 after license issuance, AES intends to provide decommissioning funding assurance for: (1) the tfirst Separations Building Module; (2) all the other potentially radiologically contaminated structures, systems, and components; and (3) the amount of DUF_6 that would be produced by the end of that period. In 2007 dollars, the following cost estimates would be assured: (1) the estimated cost of $94,653,000 to decommission the first Separations Building Module from Table 10.1-16; (2) the estimated cost of $10,226,000 to decommission “Other Buildings” from Table 10.1-14, "Total Decommissioning Costs;" and (3) the estimated cost for disposition of 11,452 MT of DUF_6, the amount conservatively assumed to be produced for purposes of funding assurance by the end of the first three years of operation based on a projected nominal 30 years of operation. Refer to Table 10.3-1 for these nominal production and buildup projections. At a rate of $7.66 per kilogram (kg) of DUF_6, ($7,660 per MT of DUF_6) as discussed in SAR Section 10.3, this results in a cost of $87,722,000 for tails disposal. Applying a 25% contingency factor to the sum of costs for (1), (2), and (3) above, yields a total projected decommissioning cost estimate for the initial three year period of EREF operation for which financial assurance would be provided of $240,751,000.

As described above, however, AES will update the decommissioning cost estimate at least every three years and will provide decommissioning funding assurance on the incremental basis described above, i.e., prior to the operation of each Separations Building Module and on an annual basis for the DUF_6.

10.2.3 Recordkeeping Plans Related to Decommissioning Funding

In accordance with 10 CFR 40.36(f) (CFR, 2008h) and 70.25(g) (CFR, 2008i), the EREF will retain records, until the termination of the license, of information that could have a material effect on the ultimate costs of decommissioning. These records will include information regarding: (1) spills or other contamination that cause contaminants to remain following cleanup efforts; (2) as built drawings of structures and equipment, and modifications thereto, where radioactive contamination exists (e.g., from the use or storage of such materials); (3) original and modified cost estimates of decommissioning; and (4) original and modified decommissioning funding instruments and supporting documentation.

10.3 TAILS DISPOSITION

The disposition of tails from the EREF is an element of authorized operating activities. It involves neither decommissioning waste nor is it a part of decommissioning activities. The disposal of these tails is analogous to the disposal of radioactive materials generated in the course of normal operations (even including spent fuel in the case of a power reactor), which is authorized by the operating license and subject to separate disposition requirements. Such costs are not appropriately included in decommissioning costs (this principle (in the 10 CFR 50 context) is discussed in Regulatory Guide 1.159 (NRC, 2003), Section 1.3, page 1.159-8).

Further, the "tails" products from the EREF are not mill tailings, as regulated pursuant to the Uranium Mill Tailings Radiation Control Act, as amended and 10 CFR 40, Appendix A (CFR, 2008j), and are not subject to the financial requirements applicable to mill tailings.

Nevertheless, AES intends to provide for expected tails disposition costs (even assuming ultimate disposal as waste) during the life of the facility. Funds to cover these costs are based on the amount of tails generated and the unit cost for the disposal of depleted UF_6.

It is anticipated that the EREF will generate 217,193 MT of depleted uranium tails which is equivalent to 321,235 MT DUF_6. This estimate is conservative as it assumes continuous production of tails over 30 years of operation. Actual tails production will cease prior to the end of the license term as shown in Figure 10.1-1, EREF - Conceptual Decommissioning Schedule. In addition, actual production will ramp up and ramp down during the initial and final production periods, respectively. Refer to Table 10.3-1, Tails Production and Buildup During 30-Year License Period.

By statute (USC, 2006), DOE is required to take title to, and to dispose of the "low-level radioactive waste" generated by uranium enrichment facilities. As such, DOE is required to accept DUF_6 for disposal if it is determined to be a low-level radioactive waste generated by an enrichment facility licensed by the NRC. The NRC has determined that DUF_6 is properly considered a low-level radioactive waste (NRC, 2005). As discussed more fully in ER Section 4.13.3, AES has, therefore, decided that, for purposes of providing funding assurance, to assume that DOE will take title to and dispose of the DUF_6 generated by the EREF.

AES requested that DOE provide a cost estimate to accept, convert, and dispose of DUF_6 to be generated by the proposed EREF. In March 2008, the DOE responded as follows: "The Department would accept upon request, such DUF_6 for conversion and disposal (or beneficial reuse) pursuant to authorities granted to DOE under the Atomic Energy Act" (DOE, 2008).

Along with DOE's authorization to accept the DUF_6 for disposal from an NRC licensed generator, upon request by a generator, the requesting company must reimburse the DOE for the disposal of the depleted uranium ". . . in an amount equal to the Secretary's costs, including a pro rata share of any capital costs" (Public Law, 1996). Therefore, DOE performed an analysis of the costs associated with accepting and processing additional material for disposition, and developed a cost per kilogram for providing this service (DOE, 2008). AES confirmed the DOE cost estimate (AES, 2009) is applicable to disposal of DUF_6 for an expanded EREF (6.6 million SWU/year). It was noted by the DOE expert that while the total amount of DUF_6 generated will be larger than that used in the cost analysis, the cost of disposal of a kilogram of DUF_6 generated in the DOE cost estimate (DOE, 2008) would remain essentially the same, and could possibly be reduced by a small percentage. To be conservative, AES utilizes the highest disposal cost per kilogram established in the DOE cost estimate (DOE, 2008) to calculate the cost to dispose of DUF_6 for a 6.6 million SWU/year facility.

According to the DOE response (DOE, 2008), processing and disposal costs for DUF_6 tails at the DOE facility are projected to be a maximum of $5.78 per kg DUF_6 (2007 dollars). Although originally provided for a 3.3M SWU capacity facility, this rate also applies to a 6.6M SWU capacity facility. In addition to the processing and disposal cost, AES has estimated that transport of the tails from the EREF to the DOE facility will cost $0.66 per kg and that cylinder management (handling and disposal) will cost $1.22 per kg, bringing the total cost for disposition of the tails to $7.66 per kg or $7,660 per MT$DUF_6$.

The value of $7.66 per kg of DUF_6 was used to determine the total tails disposition funding requirement and the amount of financial assurance required for this purpose. Assuming the production of 321,235 MT DUF_6 tails during 30 years of operation and a tails transport and dispositioning cost of $7.66 per kg DUF_6 or $7,660 per MT DUF_6, the total tails disposition funding requirement is estimated at $2.461 billion. This sum will be included as part of the financial assurance for decommissioning over the operating lifetime of the EREF (Refer to Table 10.1-14, Total Decommissioning Costs). The Environmental Report Section 4.13.3.6, Costs Associated with UF_6 Tails Conversion and Disposal, provides further details on the costs for the disposition of DUF_6 tails.

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TABLES

Table 10.1-1A Number and Dimensions of Facility Components
(Page 1 of 1)

Separations Buildings (Note 1)			
Component	**Number of Components**	**Dimensions of Components**	**Total Dimensions**
Glove Boxes	None	NA	NA
Fume Cupboards	None	NA	NA
Lab Benches	None	NA	NA
Sinks	None	NA	NA
Drains	None	NA	NA
Floors	None (Note 2)	NA	NA
Walls	None (Note 2)	NA	NA
Ceilings	None (Note 2)	NA	NA
Ventilation/Ductwork	None	NA	NA
Hot Cells	None	NA	NA
Equipment/Materials	(Note 3) (Note 5)	Various sizes of pipe work	139,222 ft. (42,435 m)
	Valves	(Note 4)	(Note 4)
	Other	(Note 4)	(Note 4)
Soil Plots	None	NA	NA
Storage Tanks	None	NA	NA
Storage Areas	None	NA	NA
Radwaste Areas	None	NA	NA
Scrap Recovery Areas	None	NA	NA
Maintenance Shop	None	NA	NA
Equipment Decontamination Areas	None	NA	NA
Other	None	NA	NA

Notes:
1. Approximately 97% of the decommissioning costs for the facility are attributed to the dismantling, decontamination, processing, and disposal of centrifuges and other equipment in the Separations Building Modules, which are considered classified. Given the classified nature of these buildings, the data presented in these tables have been structured to meet the applicable NUREG-1757 recommendations, to the extent practicable. However, specific information regarding numbers of components, dimensions of components, and total dimensions, has been intentionally excluded to protect the classified nature of the data. The classified portion of the decommissioning cost estimate is been provided under separate cover.
2. No floors, walls, or ceilings are anticipated needing decontamination.
3. Total dimensions provided.
4. Total dimension not used in estimating model
5. Length of piping associated with 6 million SWU facility is assumed to be twice that for a 3 million SWU facility.

Table 10.1-1B Number and Dimensions of Facility Components
(Page 1 of 1)

Decommission Decontamination Facility			
Component	**Number of Components**	**Dimensions of Components**	**Total Dimensions**
Glove Boxes	None	NA	NA
Fume Hoods	None	NA	NA
Lab Benches	10	Various sizes of lab and workshop benches ranging from 6.5 to 13 ft long (2 m by 4 m) by 2.5 ft (0.75 m) wide	(Note 1)
Sinks	6	Standard laboratory sinks and hand wash	(Note 1)
Drains	6	Standard laboratory type drains	(Note 1)
Floors	1 Lot (Note 2)	(Note 1)	(Note 1)
Walls	1 Lot (Note 2)	(Note 1)	(Note 1)
Ceilings	1 Lot (Note 2)	(Note 1)	(Note 1)
Ventilation/Ductwork	(Note 3)	Various sizes of ductwork ranging from 3 in (8 cm) to 18 in (46 cm) plus dampers, valves and flexibles	640 ft (195 m)
Hot Cells	None	NA	NA
Equipment/Materials	20	Various pieces of equipment including citric cleaning tanks, centrifuge cutting machines	(Note 1)
Soil Plots	None	NA	NA
Storage Tanks	1 Lot (Note 2)	Various storage tanks	(Note 1)
Storage Areas	1	Storage area for centrifuges and pipe work	(Note 1)
Radwaste Areas	None	NA	NA
Scrap Recovery Areas	None	NA	NA
Maintenance Shop	None	NA	NA
Equipment Decontamination Areas	None	NA	NA
Other	1 Lot (Note 2)	Hand tools and consumables that become contaminated while carrying out dismantling and decontamination work, unmeasured work and scaffolding	(Note 1)

Notes:
1. Total dimensions not used in estimating model.
2. Allocation based on European decommissioning experience .
3. Total Dimensions provided.

Table 10.1-1C Number and Dimensions of Facility Components (Page 1 of 1)

Technical Support Building			
Component	**Number of Components**	**Dimensions of Components**	**Total Dimensions**
Glove Boxes	None	NA	NA
Fume Hoods	18	Standard laboratory fume hoods, approx 6.5 - 8 feet (2 to 2.5 m) high x 5 feet (1.5 m) wide	(Note 1)
Lab Benches	25	Various sizes of lab and workshop benches ranging from 6.5 -13 feet (2 to 4 m) long by 2.5 feet wide (0.75 m)	(Note 1)
Sinks	12	Standard laboratory sinks and hand wash basins	(Note 1)
Drains	12	Standard Laboratory type drains	(Note 1)
Floors	(Notes 3, 4)	Floor area covers all Workshops and Labs in the Technical Services Bldg that may be exposed to contamination	70,440 ft^2 (6,544 m^2)
Walls	(Notes 3, 4)	Wall area covers all Workshops and Labs in the Technical Services Bldg that may be exposed to contamination	146,704 ft^2 (13,629 m^2)
Ceilings	(Notes 3, 4)	Ceiling area covers all Workshops and Labs in the Technical Services Bldg that may be exposed to contamination	70,440 ft^2 (6,544 m^2)
Ventilation/Ductwork	(Note 3)	Various pieces of equipment including, filter banks, extractor fans, vent stack, dampers and approx 1,200 feet (366 m) of large and small ductwork	1,200 ft (366 m)
Hot Cells	None	NA	NA
Equipment/Materials	57	Various pieces of equipment including, mass spectrometers, hydraulic lift tables, cleaning cabinets	(Note 1)
Soil Plots	None	NA	NA
Storage Tanks	16	Waste oil storage tank (53 gal) (201 l) and Liquid Effluent Collection and Treatment System Tanks	NA
Storage Areas	2	Storage area for product removal, dirty pumps	(Note 1)
Radwaste Areas	None	NA	NA
Scrap Recovery Areas	None	NA	NA
Maintenance Shop	4	Third Floor Maintenance Facility	(Note 4)
Equipment Decontamination Areas	4	Third Floor Decontamination Workshop	(Note 4)
Other	1 Lot (Note 2)	Hand tools and consumables that become contaminated while carving out dismantling/ decontamination work, unmeasured work and scaffolding	(Note 1)

Notes:

1. Total dimensions not used in estimating model.
2. Allocation based on European decommissioning experience
3. Total Dimensions provided
4. Floor, wall, and ceiling areas of Third Floor Maintenance Facility and Third Floor Decontamination Workshop are included in overall totals.

Table 10.1-1D Number and Dimensions of Facility Components
(Page 1 of 1)

Gaseous Effluent Ventilation (GEV) System Throughout Plant			
Component	**Number of Components**	**Dimensions of Components**	**Total Dimensions**
Glove Boxes	None	NA	NA
Fume Hoods	None	NA	NA
Lab Benches	None	NA	NA
Sinks	None	NA	NA
Drains	None	NA	NA
Floors	None	NA	NA
Walls	None	NA	NA
Ceilings	None	NA	NA
Ventilation/Ductwork	(Note 3) (Note 4)	Various sizes of ductwork ranging from 3 to18 inches (7.6 to 46 cm) plus dampers, valves and flexibles	15,000 ft (4,572 m)
Hot Cells	None	NA	NA
Equipment/Materials	None	NA	NA
Soil Plots	None	NA	NA
Storage Tanks	None	NA	NA
Storage Areas	None	NA	NA
Radwaste Areas	None	NA	NA
Scrap Recovery Areas	None	NA	NA
Maintenance Shop	None	NA	NA
Equipment Decontamination Areas	None	NA	NA
Other	1 Lot (Note 2)	Hand tools and consumables that become contaminated while carrying out dismantling/ decontamination work, unmeasured work and scaffolding	(Note 1)

Notes:

1. Total dimensions not used in estimating model.
2. Allocation based on European decommissioning experience.
3. Total Dimensions provided.
4. Length of ventilation/ductwork for the 6M SWU facility is assumed to be twice that for the 3M SWU facility.

Table 10.1-1E Number and Dimensions of Facility Components
(Page 1 of 2)

Blending Sampling and Preparation Building			
Component	**Number of Components**	**Dimensions of Components**	**Total Dimensions**
Glove Boxes	None	NA	NA
Fume Hoods	None	NA	NA
Lab Benches	None	NA	NA
Sinks	None	NA	NA,
Drains	None	NA	NA
Floors	(Note 3) (Note 4) (Note 5)	NA	2,176 ft^2 (202 m^2)
Walls	(Note 3) (Note 4) (Note 5)	NA	18,202 ft^2 (1,691 m^2)
Ceilings	(Note 3) (Note 4) (Note 5)	NA	2,176 ft^2 (202 m^2)
Ventilation/Ductwork	Covered in GEV System estimate	Covered in GEV System estimate	Covered in GEV System estimate
Hot Cells	None	NA	NA

Table 10.1-1E Number and Dimensions of Facility Components
(Page 2 of 2)

Component	Number of Components	Dimensions of Components	Total Dimensions
Equipment/Materials	(Note 3) (Note 5)	Various sizes of pipe-work ranging from DN25 (NPS 1) to DN65 (NPS 2.5)	5,615 ft (1,711 m)
	58 Valves	Various types of valves ranging from 0.6 to 2.5 inches (1.5 to 6.5 cm) and manual to control	(Note 3)
	12	Various pieces of equipment including hot boxes and traps	(Note 1)
Soil Plots	None	NA	NA
Storage Tanks	None	NA	NA
Storage Areas	None	NA	NA
Radwaste Areas	None	NA	NA
Scrap Recovery Areas	None	NA	NA
Maintenance Shop	None	NA	NA
Equipment Decontamination Areas	None	NA	NA
Other	1 Lot (Note 2)	Hand tools and consumables that become contaminated while carrying out dismantling/ decontamination work, unmeasured work and scaffolding	(Note 1)

Notes:
1 Total dimensions not used in estimating model.
2. Allocation based on European decommissioning experience.
3 Total dimensions provided.
4. Areas calculated based on dimensions of Ventilated Room and associated Cylinder Airlock. Walls are assumed to extend the full height of the building.
5. Areas to be decontaminated in the 6M SWU facility are assumed to be twice the areas requiring decontamination in the 3M SWU facility. Piping length is assumed to increase by 50%.

Table 10.1-1F Number and Dimensions of Facility Components
(Page 1 of 2)

Centrifuge Test and Post Mortem			
Component	**Number of Components**	**Dimensions of Components**	**Total Dimensions**
Glove Boxes	None	NA	NA
Fume Hoods	None	NA	NA
Lab Benches	4	Various sizes of lab and workshop benches ranging from 6.5 - 13 feet (2 - 4 m) long by 2.5 feet (0.75 m) wide	(Note 1)
Sinks	2	Standard laboratory sinks and hand wash basins	(Note 1)
Drains	2	Standard laboratory type drains	(Note 1)
Floors	None (Note 4)	NA	NA
Walls	None (Note 4)	NA	NA
Ceilings	None (Note 4)	NA	NA
Ventilation/ Ductwork	None	NA	NA
Hot Cells	None	NA	NA
Equipment/Material	(Note 3)	Various sizes of pipe-work ranging from DN16 to DN40 (NPS 0.5 to NPS 1.5)	164 ft. (50 m)
	56 Valves	Various types of valve ranging from 0.6 to 1.6 inches (1.5 to 4 cm) and manual to control	(Note 1)
	7	Various pieces of equipment including feed take off vessels and traps	(Note 1)
Soil Plots	None	NA	NA
Storage Tanks	None	NA	NA
Storage Areas	None	NA	NA
Radwaste Areas	None	NA	NA
Scrap Recovery Areas	None	NA	NA

Table 10.1-1F Number and Dimensions of Facility Components
(Page 2 of 2)

Component	Number of Components	Dimensions of Components	Total Dimensions
Maintenance Shop	None	NA	NA
Equipment Decontamination Areas	None	NA	NA
Other	1 Lot (Note 2)	Hand tools and consumables that become contaminated while carrying out dismantling/ decontamination work, unmeasured work and scaffolding	(Note 1)

Notes:

1. Total dimensions not used in estimating model.
2. Allocation based on European decommissioning experience.
3. Total dimensions provided.
4. No floors, walls or ceilings are anticipated needing decontamination.

Table 10.1-2 Planning and Preparation
(Page 1 of 1)

Activity	Costs ($000)	Labor Shift-worker (mult-functional) (Man-days)	Labor Project Management (Man-days)	Labor Health Physics & Surveys (Man-days)	Activity Duration (Months)
Project Plan & Schedule	132	0	178	0	4
Site Characterization Plan	265	0	356	0	4
Site Characterization	306	82	368	144	4
Decommissioning Plan	463	0	622	0	6
NRC Review Period	67	0	89	0	12
Site Services Specifications	133	0	178	0	2
Project Procedures	133	0	178	0	4
TOTAL	1500	82	1,969	144	(Note 1)

Note:

1. Some activities will be conducted in parallel to achieve a 24 month time frame.

Table 10.1-3 Decontamination or Dismantling of Radioactive Components - (Man-Hours)
(Page 1 of 1)

Other Buildings (Note 1)					
Component	**Decon Method (Note 4)**	**Craftsman**	**Supervision (Note 2)**	**Project Management**	**HP&S/Chem (Note 3)**
Glove Boxes		0	0	0	0
Fume Cupboards		382	76	65	81
Lab Benches		397	78	67	83
Sinks		124	24	21	26
Drains		125	24	21	26
Floors		2,184	435	375	459
Walls		2,126	423	363	448
Ceilings		928	186	159	196
Ventilation/Ductwork/ Piping		20,217	4,042	3,455	4,250
Hot Cells		0	0	0	0
Equipment/Materials		1,877	376	321	394
Soil Plots		0	0	0	0
Storage Tanks		37	8	5	8
Storage Areas		135	27	23	28
Radwaste Areas		0	0	0	0
Scrap Recovery Areas		0	0	0	0
Maintenance Shop		0	0	0	0
Equipment Decontamination Areas		0	0	0	0
Other		2,342	468	400	492
Total Hours		30,873	6,168	5,274	6,491

Notes:

1. Includes the Decontamination Facility, Technical Support Building, Gaseous Effluent Ventilation System throughout Plant, Blending, Sampling, and Preparation Building, and Centrifuge Test and Post Mortem Facilities.
2. Supervision at 20%.
3. Supply ongoing monitoring and analysis service for dismantling teams.
4. Specific details of decontamination method not defined at this time. General decontamination methods to be used at EREF are discussed in Section 10.1.6.

Table 10.1-4 Restoration of Contaminated Areas on Facility Grounds
(Work Days)
(Page 1 of 1)

Activity	Labor Category	Labor Category	Labor Category	Labor Category	Labor Category	Labor Category
Backfill and Restore Site (Note 1)	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
TOTAL						

Note:

1. European experience with the decommissioning of gas centrifuge uranium enrichment plants has been that there is no resulting radiological contamination of the facility grounds. Therefore, restoration of contaminated areas on the facility grounds will not be required and associated decommissioning provisions are not provided.

Table 10.1-5 Final Radiation Survey
(Page 1 of 1)

Activity	Cost ($000)	Labor Shift-Worker (Multi-Functional) (Man Days)	Labor Project Management (Man Days)	Labor Health Physics & Surveys (Man Days)	Activity Duration (Months)
Prepare Survey Plans and Grid Areas	621	439	334	360	8
Collect Survey Readings and Analyze Data (Note 1)	1713	1,261	343	1,013	16
Sample Analysis (Note 2)			535		
Final Status Survey Report and NRC Review	397	0	533	0	8
Confirmatory Survey and Report	264	0	355	0	6
Terminate Site License	132	0	178	0	2
TOTAL	3,127	1,700	2,278	1,373	(Note 3)

Notes:

1. The ≈ $1.7 million cost assigned to the conduct of the final radiation survey includes a cost of $460,250 to conduct the sampling and perform the sample analysis by a contractor. The sampling labor cost component ($56,250) was estimated assuming $75/hr (Health Physics & Surveys man-hour rate) for an estimated 500 samples with an average sample duration of 1.5 hours/sample. This results in approximately 100 man days of Health Physics & Surveys labor which is included in the 1013 man days of Health Physics & Surveys labor estimated.
2. For decommissioning funding purposes, it is assumed that 324 samples will be taken within the 242 ha (592 acre) EREF Restricted Area (area within the security fence). This is based on assuming a sampling grid pattern approximately 91 m by 91 m (100 yards by 100 yards). The grid is based on sampling experience of similar areas at decommissioned nuclear power plants. Outside of the Restricted Area, but within the site boundaries, the likelihood for contamination is extremely remote. Therefore, the grid will be expanded such that samples will be taken on a grid approximately 610 m by 610 m (667 yds by 667 yds). This results in a need for approximately 60 additional samples, bringing the total number of samples to 384. A total of 500 samples are assumed as a conservative measure and for consistency with the reference plant (i.e., NEF). The analysis cost component ($404,000) for the 500 samples was estimated using a conservative $796/sample based on recent actual 2008 lab analysis costs de-escalated to $2007. Because of the modeling for this activity, the sample analysis cost is expressed in terms of equivalent man-hours at the Project Management man-hour rate.
3. Some activities will be conducted in parallel to achieve a 36 month time frame.

Table 10.1-6 Site Stabilization and Long-Term Surveillance
(Work Days)
(Page 1 of 1)

Activity	Labor Category	Labor Category	Labor Category	Labor Category	Labor Category	Labor Category
(Note 1)	N/A	N/A	N/A	N/A	N/A	N/A

Note:

1. European experience with decommissioning gas centrifuge uranium enrichment plants has been that there is no resultant ground contamination. As a result, site stabilization and long-term surveillance will not be required and associated decommissioning provisions are not provided.

Table 10.1-7 Total Work Days by Labor Category
(Based on a 7.5 hr Working Day)
(Page 1 of 1)

Task	Shift-worker (multi-functional)	Craftsman	Supervision	Project Management	Health Physics & Surveys	Cleaner
Planning and Preparation (see Table 10.1-2)	82	0	0	1,969	144	0
Decontamination and/or Dismantling of Radioactive Facility Components (Note 2)	192,270	33,268	27,071	10,587	13,057	9,610
Restoration of Contaminated Areas on Facility Grounds (Note 1)(see Table 10.1-4)	0	0	0	0	0	0
Final Radiation Survey (see Table 10.1-5)	1,700	0	0	2,278	1,373	0
Site Stabilization and Long-Term Surveillance (Note 1) (see Table 10.1-6)	0	0	0	0	0	0

Notes:

1. European experience with the decommissioning of gas centrifuge uranium enrichment plants has been that there is no resulting radiological contamination of the facility grounds. Therefore, restoration of contaminated areas on the facility grounds and site stabilization and long-term surveillance will not be required and associated decommissioning provisions are not provided.
2. The values shown are inclusive of the Separations Building Module.

Table 10.1-8 Worker Unit Cost Schedule
(Page 1 of 1)

Labor Cost Component (Note 3)	Shift-worker (multi-functional)	Craftsman	Supervision	Project Management	Health Physics & Surveys	Cleaner
Salary & Fringe ($/year)	$82,597	$88,579	$117,286	$158,634	$120,419	$79,716
Overhead Rate (%) (Note 1)	excluded	excluded	excluded	excluded	excluded	excluded
Total Cost Per Year ($)	$82,597	$88,579	$117,286	$158,634	$120,419	$79,716
Total Cost/Work Day ($/day) (Note 2)	$387	$415	$550	$744	$564	$374

Notes:

1. Overhead charges are included in third party costs. See Table 10.1-14.
2. Based on 213.33 work days per year at 7.5 hrs a day (1600 hrs/yr).
3. Does not apply to Workers performing ETC scope of decommissioning work, i.e. decommissioning of classified equipment.

Table 10.1-9 Total Labor Cost by Major Decommissioning Task ($000)
(Page 1 of 1)

Task (Note 2)	Shift-worker (multi-functional)	Craftsman	Supervision	Project Management	Health Physics & Surveys	Cleaner
Planning and Preparation (see Table 10.1-2)	$32	0	0	$1,464	$81	0
Decontamination and/or Dismantling of Radioactive Facility Components	106,854	$ 13,814	$ 18,580	$ 7,810	$ 8,379	$ 5,341
Restoration of Contaminated Areas on Facility Grounds (see Table 10.1-4) (Note 1)	0	0	0	0	0	0
Final Radiation Survey (see Table 10.1-5)	$658	0	0	$1,694	$775	0
Site Stabilization and Long-Term Surveillance (see Table 10.1-6) (Note 1)	0	0	0	0	0	0

Notes:

1. European experience with the decommissioning of gas centrifuge uranium enrichment plants has been that there is no resulting radiological contamination of the facility grounds. Therefore, restoration of contaminated areas on the facility grounds and site stabilization and long-term surveillance will not be required and associated decommissioning provisions are not provided.

2. Labor costs include worker wages and benefits only. No profit or overhead costs are included.

Table 10.1-10 Packaging, Shipping, and Disposal of Radioactive Wastes (Excluding Labor Costs)

(Page 1 of 2)

(a) Waste Disposal Costs (includes packaging and shipping costs)

Materials	Disposal Volume ft^3 / (m^3) (Note 4)		Unit Cost ($/$ft^3$) (Note 4)	# of Containers (Note 2)	Total Disposal Costs ($000) (Note 4)
Other Buildings					
Miscellaneous low level waste	5,716	162	410	97	$2,346
Separation Modules:					
Solidified Liquid Wastes	30,512	864	410	519	$12,522
Centrifuge Components, Piping and Other Parts	15,044	426	410	256	$6,174
Aluminum (Note 3)	218,951	6,200	220	1,063	$48,193
TOTAL (Note 1)	270,223	7,652	-	1,935	$69,235

Notes

1. A revenue cap is imposed on the company that operates the US Ecology disposal facility for the Northwest Compact. On reaching this cap, facilities that dispose naturally occurring radioactive materials such as the EREF may be refunded a portion of their disposal costs. The projected costs do not include an allowance for potential refunds and are therefore conservative.
2. Assumes waste is shipped in Sea Land and B-25 containers and either direct buried or buried in the B-25 containers
3. Aluminum Waste is composed of smelted classified equipment (centrifuges).
4. The values provided for Disposal Volume in ft^3, Unit Cost, and Total Disposal Costs reflect rounding.

Table 10.1-10 Packaging, Shipping, and Disposal of Radioactive Wastes (Excluding Labor Costs)

(Page 2 of 2)

(b) Processing Costs

Materials	Disposal Weight tons / (Mt) (Note 2)		Unit Cost ($/lb) (Note 2)	Total Processing Costs ($000) (Note 2)
Aluminum	19,401	17,600	0.218	$8,510
Other materials	589	534	4.18	$4,924
TOTAL	19,989	18,134	-	$13,434

Note:

1. Processing costs represent those costs required to declassify the classified equipment.
2. The values provided for Disposal Volume in tons, Unit Cost, and Total Disposal Costs reflect rounding.

Table 10.1-11 Equipment and Supply Costs (Excluding Container Costs)
(Page 1 of 1)

(a) Equipment

Equipment	Quantity		Unit Cost ($/unit)	Total Cost Equipment ($000)
Separation Building Modules				
Dismantling and decontamination	90,462 ft^2	8,400 m^2	$1,682	$14,128
Special floor and vent system	90,462 ft^2	8,400 m^2	$320	$2,688
Plant equipment				
Basic decontamination equipment	2 lots (Note 1)		$653,154	$1,306
Decontamination line equipment	4 units		$4,255,136	$17,021
Evaporation installation	2 lots (Note 1)		$424,550	$849
Radiation and control equipment	2 lots (Note 1)		$446,322	$893
Electrical and Instrumentation				
Electrical system	2 lots (Note 1)		$544,295	$1,089
Instrumentation	2 lots (Note 1)		$642,268	$1,285
Design and Engineering				
Building	-		20% (Note 1)	$3,363
Plant and equipment	-		15% (Note 1)	$3,010
Electrical and Instrumentation	-		25% (Note 1)	$593
Other Buildings:				
Dismantling/Cleaning Tools, Equipment and Consumables	2 lots (Note 1)		$108,859	$218
TOTAL	-		-	$46,442

(b) Supply

Equipment	Quantity	Unit Cost ($/unit)	Total Cost Equipment ($000)
Electricity kWh (Note 4)	16,430,242	0.058	$953
Gas ft^3 (Note 2)	0	0	$0
Water ft^3 (Note 3)	150,000	0.058	$9
Materials	2 lots (Note 1)		$1,422
TOTAL	-	-	2,383

Notes:

1. Allocation based on European decommissioning experience. Quantities of electricity, gas, and materials required for the 6M SWU facilities are assumed to be twice the quantities required for a 3M SWU facility.
2. A natural gas pipeline is not available near the EREF and based on economic considerations, gas will not be brought to the site. Natural gas requirement of 16,900,000 ft^3 for a 3M SWU facility is based on European experience and is equivalent to 5,304,777 kWh of electricity. This value is added to the electricity needed based on European experience for decommissioning for a total of 8,215,121 kWh. This value is doubled for a 6M SWU facility.
3. Water cost is based on the cost for the electricity needed to pump 13,600 gal per day (1800 ft^3). This is a conservative figure that is based on the quantity of water required for the EREF 3M SWU facility while operating. The quantity estimated for a 3M SWU facility is sufficiently conservative to meet the requirements for a 6M SWU facility.
4. The cost for electricity is based on 2008 power rates provided by Rocky Mountain Power Co., Idaho Falls, Idaho.

Table 10.1-12 Laboratory Costs
(Page 1 of 1)

Activity	Quantity (Note 2)	Unit Cost {$)	Total Costs ($000)
Analysis of samples	1,862	$1,017	$1,894
Total			

Notes:

1. The sampling costs included in Table 10.1-12, "Laboratory Costs," are associated with the processing of the aluminum metal for disposal. The sampling costs are for the associated smelting option and the sampling necessary for comparison with radiological acceptance limits in the disposition of the material waste form. The unit cost for the sampling is the cost of performing the analysis using onsite laboratory equipment and assumes 8 samples for each of the estimated 931 batch melts.
2. The quantity required for a 6M SWU facility is assumed to be twice the quantity required for a 3M SWU facility.

Table 10.1-13 Period Dependent Costs
(Page 1 of 1)

Cost Item	Total Cost ($000)
License Fees	(Note 1)
Insurance	(Note 1)
Taxes	(Note 1)
Other	(Note 1)
TOTAL	$14,000

Note:

1. Period Dependent Costs include management, insurance, taxes, and other costs for the period beginning with the termination of operations of Separations Building Module 2 and the remaining plant facilities. This assumes $2,800,000 per year will be needed for each of the five years at the end of the project. It has been assumed that the period dependent decommissioning costs incurred during concurrent enrichment operations will be funded from operating plant funding and not the decommissioning trust fund.

Table 10.1-14 Total Decommissioning Costs
(Page 1 of 2) (Note 7)

Task/Components	Costs ($000)		Total ($000)	Percentage	Notes
	Separations Modules	Other Buildings			
Planning and Preparation (see Table 10.1-2)	$1,500	$0	$1,500	0%	1
Decontamination and Dismantling of Radioactive Facility Components (see Table 10.1-9)	$190,117	$3,173	$193,290	54%	8
Restoration of Contamination Areas on Facility Grounds (see Table 10.1-4)	$0	$0	$0	0%	2
Final Radiation Survey (see Table 10.1-5):	$3,127	$0	$3,127	1%	3
Cost of Third Party Use	$6,548	$4,490	$11,037	3%	11
Site Stabilization and Long-term Surveillance	$0	$0	$0	0%	4
Waste Processing Costs (see Table 10.1-10b)	$13,434	$0	$13,434	4%	5
Waste Disposal Costs (see Table 10.1-10a)	$66,890	$2,346	$69,235	19%	6
Equipment Costs (see Table 10.1-11a)	$46,225	$218	$46,442	13%	
Supply Costs (see Table 10.1-11b)	$2,383	$0	$2,383	1%	
Laboratory Costs (see Table 10.1-12)	$1,893	$0	$1,893	1%	
Period Dependent Costs (see Table 10.1-13)	$14,000	$0	$14,000	4%	
Total Decommissioning Cost	$346,116	$10,226	$356,342	100%	
Tails Disposition Cost			$2,462,407		9
Total of Decommissioning Cost + Tails Disposition Cost			$2,818,749		
Contingency (25% of total cost for decommissioning and tails disposition)			$704,687		
TOTAL			$3,523,436		10

Table 10.1-14 Total Decommissioning Costs
(Page 2 of 2) (Note 7)

Notes:

1. Includes planning, site characterization, Decommissioning Plan preparation, and NRC review for the entire plant.
2. European experience with the decommissioning of gas centrifuge uranium enrichment plants has been that there is no resulting radiological contamination of the facility grounds. Therefore, restoration of contaminated areas on the facility grounds will not be required and associated decommissioning provisions are not provided.
3. Includes the Final Radiation Survey, NRC review, confirmatory surveys and license termination for the entire plant.
4. Site stabilization and long-term surveillance will not be required.
5. Waste processing costs are based on commercial metal melting equipment and unit rates available from experience in Europe since ETC personnel and equipment will be used.
6. Includes waste packaging and shipping costs.
7. Approximately 97% of the decommissioning costs for the facility are attributed to the dismantling, decontamination, processing, and disposal of centrifuges and other equipment in the Separations Building Modules, which are considered classified. Given the classified nature of these buildings, the data presented in these Tables have been structured to meet the applicable NUREG-1757 recommendations, to the extent practicable. However, specific information such as numbers of components and unit rates has been intentionally excluded to protect the classified nature of the data. The remaining 3% of the decommissioning costs are for the remaining systems and components in Other Buildings.
8. The cost for Other Buildings includes the decontamination and dismantling of contaminated equipment in the TSB, Blending, Sampling, and Preparation Building, Centrifuge Assembly Building, and Gaseous Effluent Vent System.
9. Refer to Section 10.3, for Tails Disposition discussion.
10. Combined total for both decommissioning and tails disposition.
11. An adjustment has been applied to account for use of a third party for performing decommissioning operations associated with planning and preparation, decontamination and dismantling of radioactive facility components, and the final radiation survey. The adjustment includes an overhead rate on direct staff labor of 110%, plus 15% profit on labor and its overheads. As discussed in Section 10.1.4, labor costs associated with the decommissioning of classified components are excluded.

Table 10.1-15 Unit Cost Comparison
(Page 1 of 3)

Component	Decontamination Process Discussion	Unit Cost (2007 Dollars)			Unit Basis
		EREF	H3 Reference Lab (NUREG/CR-6477, Appendix D-1)	C14 Reference Lab (NUREG/CR-6477, Appendix D-1)	
Fume Hoods	Note 1	$2,179	$2,142	$2,155	Per hood
Lab Benches	Note 1	$1,042	$636	$2,062	Per bench
Sinks	Note 1	$632	N/A	$322	Per Sink
Ventilation Ductwork	Note 2	$128	$123	$119	Per meter of ductwork
Drains	Note 3	$635	N/A	N/A	Per drain
Ceilings	Note 4	$1	$45	$45	Per square meter
Floors	Note 4	$3	$52	$60	Per square meter
Walls	Note 4	$1	$41	$42	Per square meter
Storage Tanks	Note 5	$158	N/A	N/A	Per tank
Equipment/ Materials (e.g., stations, autoclaves)	Note 1, 6, 7	$73	N/A	N/A	Per piece
Storage Areas	Note 4	N/A	N/A	N/A	Per square meter
Other (tools and consumables used during decommissioning, e.g., screwdrivers, hammers, wrenches)	Note 1	$715	N/A	N/A	Per piece

Table 10.1-15 Unit Cost Comparison
(Page 2 of 3)

Notes:

1. Lab benches / Sinks / Fume Hoods/ Tools / Equipment / Materials

   Good radiological management procedures will be observed throughout operations within the Separation Building, Technical Support Building (TSB) and the final Decommissioning Facility consistent with AES commitments to maintain occupational doses and doses to members of the public as low as reasonably achievable (ALARA). Consequently contamination occurring on the working surfaces of lab benches / sinks / tools / fume hoods will be monitored, cleaned and maintained in good order through the day-to-day working operation. Therefore, at decommissioning, it is not anticipated that additional decontamination of these items will be required. The items will be dismantled, volume reduced, radiologically characterized and shipped to a licensed disposal facility. For the sinks in the final Decommissioning Facility, at the end of decommissioning, these sinks will be cleaned, volume reduced and shipped to a licensed disposal facility.

   Any contaminated tools, for which it proves not to be cost effective to maintain clean during operations, will be replaced with new tools during operations. Consequently, at close of operations only one set of tools will be required to be decontaminated and shipped to a licensed disposal facility.

2. Ventilation Ductwork

   Experience has shown ventilation ductwork to be only lightly contaminated. As such, the ductwork will be dismantled, volume reduced, radiologically characterized and shipped to a licensed disposal facility.

3. Drains

   There are no process drains in the EREF Separations Building. In the TSB, there are drains from all rooms where operations or processes of a potentially contaminated nature are undertaken to a liquid effluent collection and treatment room. These drains will be removed, decontaminated, volume reduced and shipped to a licensed disposal facility.

4. Floors, Walls, Ceilings and Storage Areas

   All floors, walls, ceilings in potentially contaminated areas are assumed to be contaminated. The estimates for cleaning of the floors, walls, and ceilings are consistent with similar work performed for decontamination of floors, walls, and ceilings at decommissioning nuclear power plants. The levels of contamination encountered during the decommissioning of nuclear power plants far exceed the levels anticipated at EREF; therefore, the estimates are conservative.

   Experience from European decommissioning of Separations Buildings has shown that there is no contamination on walls, ceilings and floors in the buildings at the end of their life. This has been confirmed by radiological characterization at the end of operations and at the end of building strip out prior to demolition. This lack of contamination results from the proven contained nature of the vacuum processes and good operational practices, including implementation of the ALARA program throughout the entire facility, which support maintenance of a clean facility throughout the operational life.

Table 10.1-15 Unit Cost Comparison
(Page 3 of 3)

5. Storage Tanks

   Storage tanks appear both in the TSB and in the final Decommissioning facility. Storage tanks include the open decontamination baths and closed tanks within the Liquid Effluent Collection and Treatment System. During operations these storage tanks are emptied, de-sludged and inspected (closed storage tanks through inspection hatches), routinely. The accumulation of sludge within the storage tanks during operation is not allowed due to criticality considerations. Consequently at the close of operations, the storage tanks are expected to be clean, emptied, inspected and in good order. Prior to removal from the facility, the storage tanks would be flushed in-situ, radiologically characterized, removed, volume reduced, and shipped to a licensed disposal facility. Therefore, extensive decontamination of the storage tanks at decommissioning is not anticipated. With respect to the TSB, all contaminated or potentially contaminated effluents are pumped to the liquid effluent treatment room.

6. Stations / Autoclaves

   Experience from the decommissioning of European Separations Buildings has shown that the cylinder stations, both take-off and feed, and liquid sampling autoclaves are free of contamination. Any small contamination levels, which may occur around the cylinder valve end of the station during change out procedures, are monitored and cleaned during operations consistent with AES commitments for implementation of the ALARA program. Therefore, decontamination of the cylinder stations and autoclaves at the end of their operational life is not required. The stations and autoclaves will be dismantled and shipped to a licensed disposal facility.

7. Cold Traps / Vacuum Pump Trap Sets / Centrifuge Feed and Take-off Vessels

   During decommissioning, cold traps, vacuum pump trap sets and centrifuge test facility vessels will be emptied of process material, purged, removed from the facility, cut open, decontaminated, volume reduced, and shipped to a licensed disposal facility.

Table 10.1-16 Cost Estimate for Decommissioning of the First Separations Building Module

(Page 1 of 1)

Table	Title	Cost ($000)	Notes
Table 10.1-2	Planning and Preparation	$600	40% of planning and preparation cost
Table 10.1-5	Final Radiation Survey	$585	Assumes 50% of Preparation Costs + Costs for 25% of samples within OCA
Table 10.1-10a	Waste Disposal Costs	$16,722	Assumes 25% of SBM disposal costs
Table 10.1-10b	Processing Costs	$3,358	Assumes 25% of Processing Costs associated with declassification of classified equipment
Table 10.1-11a	Equipment Costs	$23,112	Assumes 50% of Equipment Costs in Table 10.1-11a for SBMs
Table 10.1-11b	Supply Costs	$596	Assumes 25% of Supply Costs in Table 10.1-11b
Table 10.1-12	Laboratory Costs	$473	Assumes 25% of Laboratory Costs associated with sampling smelted metal
Table 10.1-13	Period Dependent Costs	$0	Period dependent costs are not applicable until facility is totally shutdown
Table 10.1-14	D&D Radioactive Facility Components	$47,529	Represents 25% of the D&D cost associated with the SBMs
Table 10.1-14	Third Party Cost	$1677	Third Party Cost applied to above Planning and Survey costs only
Total Cost to Decommission the 1st SBM		$94,653	
Cost to Decommission “Other Buildings”		$10,226	From Table 10.1-14, Total Decommissioning Cost, Other Buildings

Table 10.3-1 Tails Production and Buildup During 30-Year License Period
(Page 1 of 1)

		TAILS (MT U)		TAILS (MT DUF_6)		TAILS (48Y Cylinders)	
YEAR # after license is issued	Production (SWU) (Note 1)	Tails Storage (MT U)	Tails Storage Cumulative (MT U)	Tails Storage (MT DUF_6)	Tails Storage Cumulative (MT DUF_6)	48Y Tails Storage (no. Cyls.)	48Y Tails Storage Cumulative (no. Cyls)
1	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0
3	825	1,291	1,291	1909	1909	153	153
4	1,650	2,581	3,872	3817	5727	306	459
5	2,475	3,871	7,743	5,725	11,452	459	918
6	3,300	5,161	12,904	7,633	19,085	611	1,529
7	4,125	6,451	19,355	9,541	28,627	764	2,293
8	4,950	7,741	27,096	11,449	40,076	917	3,210
9	5,775	9,031	36,127	13,357	53,433	1,069	4,279
10	6,600	10,322	46,449	15,267	68,699	1,222	5,501
11	6,600	10,322	56,771	15,267	83,966	1,222	6,723
12	6,600	10,322	67,093	15,267	99,232	1,222	7,945
13	6,600	10,322	77,415	15,267	114,499	1,222	9,167
14	6,600	10,322	87,737	15,267	129,765	1,222	10,389
15	6,600	10,322	98,059	15,267	145,032	1,222	11,611
16	6,600	10,322	108,381	15,267	160,298	1,222	12,833
17	6,600	10,322	118,703	15,267	175,565	1,222	14,055
18	6,600	10,322	129,025	15,267	190,832	1,222	15,277
19	6,600	10,322	139,347	15,267	206,098	1,222	16,499
20	6,600	10,322	149,669	15,267	221,365	1,222	17,721
21	6,600	10,322	159,991	15,267	236,631	1,222	18,943
22	6,600	10,322	170,313	15,267	251,898	1,222	20,165
23	6,600	10,322	180,635	15,267	267,164	1,222	21,387
24	5,775	9,031	189,666	13,357	280,521	1,069	22,456
25	4,950	7,742	197,408	11,451	291,972	917	23,373
26	4,125	6,451	203,859	9,541	301,513	764	24,137
27	3,300	5,161	209,020	7,633	309,146	611	24,748
28	2,475	3,871	212,891	5,725	314,872	459	25,207
29	1,650	2,581	215,472	3,817	318,689	306	25,513
30	894	1,398	216,870	2,068	320,757	166	25,679
31	138	215	217,085	318	321,075	26	25,705
32	69	108	217,193	160	321,235	13	25,718

Notes:

1. The production quantities provided in this table are based on a 30 year production life with appropriate ramp-up/ramp-down in capacity. This is conservative compared to a 30 year operating license for the facility which is assumed to incorporate periods of no production, i.e. during construction.

FIGURES

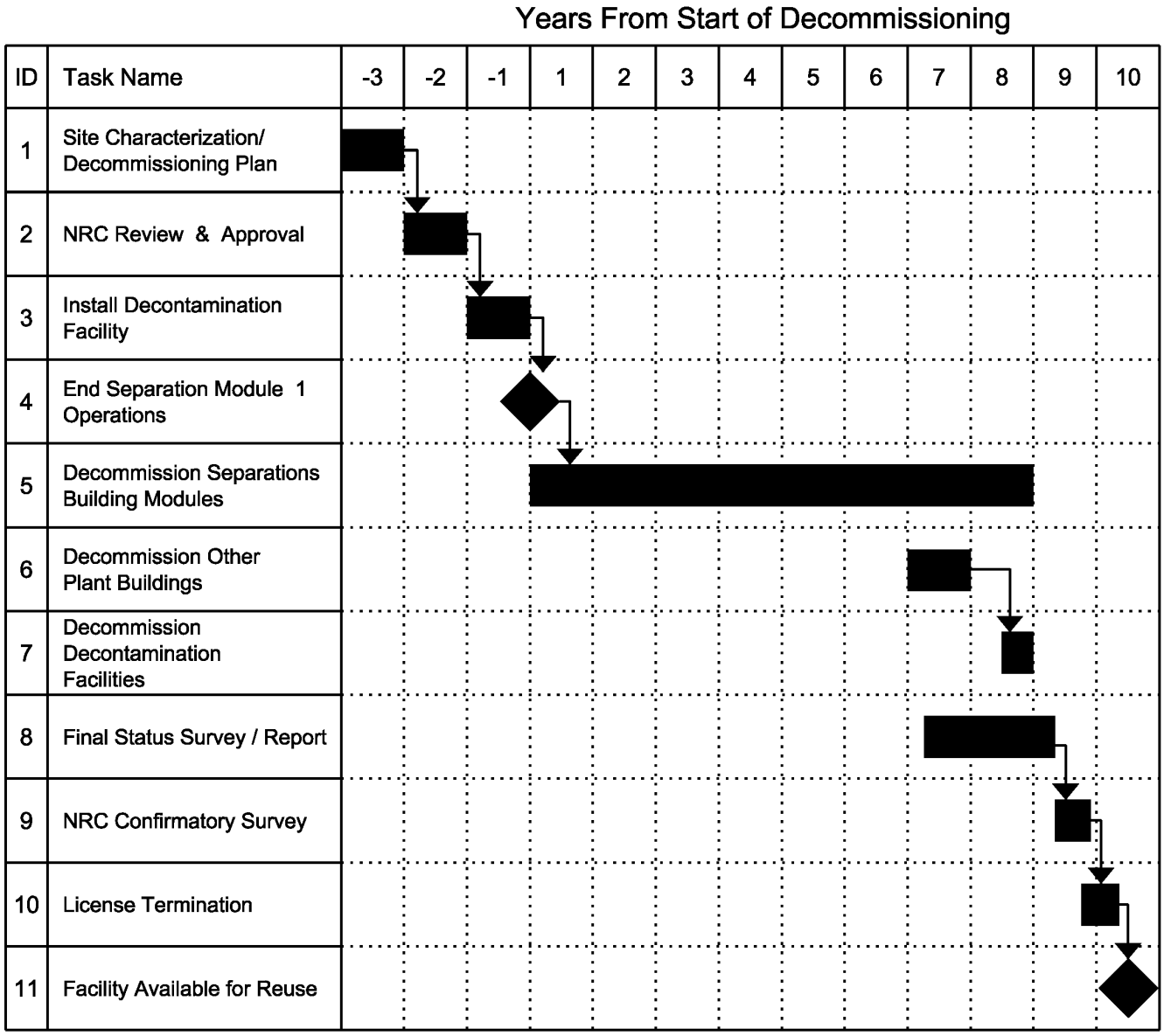

Figure 10.1-1 **Rev. 2**

Eagle Rock Enrichment Facility
Conceptual Decommissioning Schedule

APPENDIX 10A
IRREVOCABLE STANDBY LETTER OF CREDIT NO. [*INSERT NUMBER*]

This Credit Expires [*insert date*]

Issued To: U.S. Nuclear Regulatory Commission,

Washington, DC 20555

Dear Sir or Madam:

We hereby establish our Irrevocable Standby Letter of Credit No. [_____] in your favor, at the request and for the account of AREVA Enrichment Services, LLC (AES), [*insert address, and NRC license and docket numbers of licensee*] up to the aggregate amount of [*insert dollar amount in words*], U.S. dollars $ [_____, available upon presentation of:

(1) your sight draft, bearing reference to this Letter of Credit No. [_____], and

(2) your signed statement reading as follows: "I certify that the amount of the draft is payable pursuant to regulations issued under authority of the U.S. Nuclear Regulatory Commission."

This letter of credit is issued in accordance with regulations issued under the authority of the U.S. Nuclear Regulatory Commission (NRC), an agency of the U.S. Government, pursuant to the Atomic Energy Act of 1954, as amended, and the Energy Reorganization Act of 1974. NRC has promulgated regulations in title 10, Chapter I of the Code of Federal Regulations, Part 30, 40, and 70, which require that a holder of, or an applicant for, a materials license issued under 10 CFR Part 30, 40, and 70 provide assurance that funds will be available when needed for decommissioning.

This letter of credit is effective as of [*insert date*] and shall expire on [*insert date at least 1 year later*], but such expiration date shall be automatically extended for a period of [*insert time period of at least 1 year*] on [*insert date*] and on each successive expiration date, unless, at least 90 days before the current expiration date, we notify both you and AES, by certified mail, as shown on the signed return receipts. If AES is unable to secure alternative financial assurance to replace this letter of credit within 30 days of notification of cancellation, NRC may draw upon the full value of this letter of credit prior to cancellation. The bank shall give immediate notice to the applicant and NRC of any notice received or action filed alleging (1) the insolvency or bankruptcy of the financial institution or (2) any violation of regulatory requirements that could result in suspension or revocation of the bank's charter or license to do business. The financial institution also shall give immediate notice if the bank, for any reason, becomes unable to fulfill its obligation under the letter of credit.

Whenever this letter of credit is drawn on, under and in compliance with the terms of this letter of credit, we shall duly honor such draft upon its presentation to us within 30 days, and we shall deposit the amount of the draft directly into the standby trust fund of AES in accordance with your instructions.

Each draft must bear on its face the clause: "Drawn under Letter of Credit No. [_____], dated [_____, and the total of this draft and all other drafts previously drawn under this letter of credit does not exceed [*insert amount of letter of credit*].

[*Signature(s) and title(s) of official(s) of issuing institution*]

[*Name, address, and phone number of issuing institution*]

[*Date*]

This credit is subject to [*insert "the most recent edition of the Uniform Customs and Practice for Documentary Credits, published by the International Chamber of Commerce," or "the Uniform Commercial Code"*].

APPENDIX 10B

Standby Trust Agreement

TRUST AGREEMENT, the Agreement entered into as of [*insert date*] by and between AREVA Enrichment Services, LLC (AES), a Delaware limited liability corporation, herein referred to as the "Grantor," and [*insert name and address of a trustee acceptable to NRC*], the "Trustee."

WHEREAS, the U.S. Nuclear Regulatory Commission (NRC), an agency of the U.S.

Government, pursuant to the Atomic Energy Act of 1954, as amended, and the Energy

Reorganization Act of 1974 has promulgated regulations in Title 10, Chapter I, of the Code of Federal Regulations, Part 30, 40, and 70. These regulations, applicable to the Grantor, require that a holder of, or an applicant for, a materials license issued pursuant to 10 CFR Part 30, 40, and 70 provide assurance that funds will be available when needed for required decommissioning activities.

WHEREAS, the Grantor has elected to use a letter of credit to provide all of such financial assurance for the facilities identified herein; and

WHEREAS, when payment is made under a letter of credit, this standby trust shall be used for the receipt of such payment; and

WHEREAS, the Grantor, acting through its duly authorized officers, has selected the Trustee to be the trustee under this Agreement, and the Trustee is willing to act as trustee;

NOW, THEREFORE, the Grantor and the Trustee agree as follows:

Section 1. Definitions. As used in this Agreement:

(a) The term "Grantor" means the NRC licensee who enters into this Agreement and any successors or assigns of the Grantor.

(b) The term "Trustee" means the trustee who enters into this Agreement and any successor trustee.

Section 2. Costs of Decommissioning. This Agreement pertains to the costs of decommissioning the materials and activities identified in License Number [*insert license number*] issued pursuant to 10 CFR Part 30, 40, and 70, as shown in Schedule A.

Section 3. Establishment of Fund. The Grantor and the Trustee hereby establish a standby trust fund (the Fund) for the benefit of NRC. The Grantor and the Trustee intend that no third party shall have access to the Fund except as provided herein.

Section 4. Payments Constituting the Fund. Payments made to the Trustee for the Fund shall consist of cash, securities, or other liquid assets acceptable to the Trustee. The Fund is established initially as consisting of the property, which is acceptable to the Trustee, described in Schedule B attached hereto. Such property and any other property subsequently transferred to the Trustee are referred to as the "Fund," together with all earnings and profits thereon, less any payments or distributions made by the Trustee pursuant to this Agreement. The Fund shall be held by the Trustee, IN TRUST, as hereinafter provided. The Trustee shall not be responsible nor shall it undertake any responsibility for the amount of, or adequacy of the Fund, nor any duty to collect from the Grantor, any payments necessary to discharge any liabilities of the Grantor established by NRC.

Section 5. Payment for Required Activities Specified in the Plan. The Trustee shall make payments from the Fund to the Grantor upon presentation to the Trustee of the following:

(a) A certificate duly executed by the Secretary of the Grantor attesting to the occurrence of the events, and in the form set forth in the attached Certificate of Events, and

(b) A certificate attesting to the following conditions:

(1) that decommissioning is proceeding pursuant to an NRC-approved plan;

(2) that the funds withdrawn will be expended for activities undertaken pursuant to that plan; and

(3) that NRC has been given 30 days prior notice of AES's intent to withdraw funds from the trust fund.

No withdrawal from the Fund for a particular license can exceed 10 percent of the remaining funds available for that license unless NRC written approval is attached.

In addition, the Trustee shall make payments from the Fund as NRC shall direct, in writing, to provide for the payment of the costs of required activities covered by this Agreement. The Trustee shall reimburse the Grantor or other persons as specified by NRC from the Fund for expenditures for required activities in such amounts as NRC shall direct in writing. In addition, the Trustee shall refund to the Grantor such amounts as NRC specifies in writing. Upon refund, such funds shall no longer constitute part of the Fund as defined herein.

Section 6. Trust Management. The Trustee shall invest and reinvest the principal and income of the Fund and keep the Fund invested as a single fund, without distinction between principal and income, in accordance with general investment policies and guidelines which the Grantor may communicate in writing to the Trustee from time to time, subject, however, to the provisions of this section. In investing, reinvesting, exchanging, selling, and managing the Fund, the Trustee shall discharge its duties with respect to the Fund solely in the interest of the beneficiary and with the care, skill, prudence and diligence under the circumstances then prevailing which persons of prudence, acting in a like capacity and familiar with such matters, would use in the conduct of an enterprise of a like character and with like aims, except that:

(a) Securities or other obligations of the Grantor, or any other owner or operator of the facilities, or any of their affiliates as defined in the Investment Company Act of 1940, as amended (15 U.S.C. 80a-2(a)), shall not be acquired or held, unless they are securities or other obligations of the Federal or a State government;

(b) The Trustee is authorized to invest the Fund in time or demand deposits of the Trustee, to the extent insured by an agency of the Federal government, and in obligations of the Federal government such as GNMA, FNMA, and FHLM bonds and certificates or State and Municipal bonds rated BBB or higher by Standard & Poor's or Baa or higher by Moody's Investment Services; and

(c) For a reasonable time, not to exceed 60 days, the Trustee is authorized to hold uninvested cash, awaiting investment or distribution, without liability for the payment of interest thereon.

Section 7. Commingling and Investment. The Trustee is expressly authorized in its discretion:

(a) To transfer from time to time any or all of the assets of the Fund to any common, commingled, or collective trust fund created by the Trustee in which the Fund is eligible to participate, subject to all of the provisions thereof, to be commingled with the assets of other trusts participating therein; and

(b) To purchase shares in any investment company registered under the Investment Company Act of 1940 (15 U.S.C. 80a-1 et seq.), including one that may be created, managed, underwritten, or to which investment advice is rendered, or the shares of which are sold by the Trustee. The Trustee may vote such shares in its discretion.

Section 8. Express Powers of Trustee. Without in any way limiting the powers and discretion conferred upon the Trustee by the other provisions of this Agreement or by law, the Trustee is expressly authorized and empowered:

(a) To sell, exchange, convey, transfer, or otherwise dispose of any property held by it, by public or private sale, as necessary to allow duly authorized withdrawals at the joint request of the Grantor and NRC or to reinvest in securities at the direction of the Grantor;

(b) To make, execute, acknowledge, and deliver any and all documents of transfer and conveyance and any and all other instruments that may be necessary or appropriate to carry out the powers herein granted;

(c) To register any securities held in the Fund in its own name, or in the name of a nominee, and to hold any security in bearer form or in book entry, or to combine certificates representing such securities with certificates of the same issue held by the Trustee in other fiduciary capacities, to reinvest interest payments and funds from matured and redeemed instruments, to file proper forms concerning securities held in the Fund in a timely fashion with appropriate government agencies, or to deposit or arrange for the deposit of such securities in a qualified central depository even though, when so deposited, such securities may be merged and held in bulk in the name of the nominee or such depository with other securities deposited therein by another person, or to deposit or arrange for the deposit of any securities issued by the U.S. Government, or any agency or instrumentality thereof, with a Federal Reserve Bank, but the books and records of the Trustee shall at all times show that all such securities are part of the Fund;

(d) To deposit any cash in the Fund in interest-bearing accounts maintained or savings certificates issued by the Trustee, in its separate corporate capacity, or in any other banking institution affiliated with the Trustee, to the extent insured by an agency of the Federal government; and

(e) To compromise or otherwise adjust all claims in favor of or against the Fund.

Section 9. Taxes and Expenses. All taxes of any kind that may be assessed or levied against or in respect of the Fund and all brokerage commissions incurred by the Fund shall be paid from the Fund. All other expenses incurred by the Trustee in connection with the administration of this Trust, including fees for legal services rendered to the Trustee, the compensation of the Trustee to the extent not paid directly by the Grantor, and all other proper charges and disbursements of the Trustee shall be paid from the Fund.

Section 10. Annual Valuation. After payment has been made into this standby trust fund, the Trustee shall annually, at least 30 days before the anniversary date of receipt of payment into the standby trust fund, furnish to the Grantor and to NRC a statement confirming the value of the Trust. Any securities in the Fund shall be valued at market value as of no more than 60 days before the anniversary date of the establishment of the Fund. The failure of the Grantor to object in writing to the Trustee within 90 days after the statement has been furnished to the Grantor and NRC shall constitute a conclusively binding assent by the Grantor, barring the Grantor from asserting any claim or liability against the Trustee with respect to the matters disclosed in the statement.

Section 11. Advice of Counsel. The Trustee may from time to time consult with counsel with respect to any question arising as to the construction of this Agreement or any action to be taken hereunder. The Trustee shall be fully protected, to the extent permitted by law, in acting on the advice of counsel.

Section 12. Trustee Compensation. The Trustee shall be entitled to reasonable compensation for its services as agreed upon in writing with the Grantor. (See Schedule C.)

Section 13. Successor Trustee. Upon 90 days notice to NRC and the Grantor, the Trustee may resign; upon 90 days notice to NRC and the Trustee, the Grantor may replace the Trustee; but such resignation or replacement shall not be effective until the Grantor has appointed a successor Trustee, the successor accepts the appointment, the successor is ready to assume its duties as trustee, and NRC has agreed, in writing, that the successor is an appropriate Federal or State government agency or an entity that has the authority to act as a trustee and whose trust operations are regulated and examined by a Federal or State agency. The successor Trustee shall have the same powers and duties as those conferred upon the Trustee hereunder. When the resignation or replacement is effective, the Trustee shall assign, transfer, and pay over to the successor Trustee the funds and properties then constituting the Fund. If for any reason the Grantor cannot or does not act in the event of the resignation of the Trustee, the Trustee may apply to a court of competent jurisdiction for the appointment of a successor Trustee or for instructions. The successor Trustee shall specify the date on which it assumes administration of the trust, in a writing sent to the Grantor, NRC, and the present Trustee, by certified mail 10 days before such change becomes effective. Any expenses incurred by the Trustee as a result of any of the acts contemplated by this section shall be paid as provided in Section 9.

Section 14. Instructions to the Trustee. All orders, requests, and instructions by the Grantor to the Trustee shall be in writing, signed by such persons as are signatories to this Agreement or such other designees as the Grantor may designate in writing. The Trustee shall be fully protected in acting without inquiry in accordance with the Grantor's orders, requests, and instructions. If NRC issues orders, requests, or instructions to the Trustee these shall be in writing, signed by NRC or its designees, and the Trustee shall act and shall be fully protected in acting in accordance with such orders, requests, and instructions. The Trustee shall have the right to assume, in the absence of written notice to the contrary, that no event constituting a change or a termination of the authority of any person to act on behalf of the Grantor or NRC hereunder has occurred. The Trustee shall have no duty to act in the absence of such orders, requests, and instructions from the Grantor and/or NRC, except as provided for herein.

Section 15. Amendment of Agreement. This Agreement may be amended by an instrument in writing executed by the Grantor, the Trustee, and NRC, or by the Trustee and NRC if the Grantor ceases to exist. All amendments shall meet the relevant regulatory requirements of NRC.

Section 16. Irrevocability and Termination. Subject to the right of the parties to amend this Agreement as provided in Section 15, this trust shall be irrevocable and shall continue until terminated at the written agreement of the Grantor, the Trustee, and NRC, or by the Trustee and NRC if the Grantor ceases to exist. Upon termination of the trust, all remaining trust property, less final trust administration expenses, shall be delivered to the Grantor or its successor.

Section 17. Immunity and Indemnification. The Trustee shall not incur personal liability of any nature in connection with any act or omission, made in good faith, in the administration of this trust, or in carrying out any directions by the Grantor or NRC issued in accordance with this Agreement. The Trustee shall be indemnified and saved harmless by the Grantor or from the trust fund, or both, from and against any personal liability to which the Trustee may be subjected by reason of any act or conduct in its official capacity, including all expenses reasonably incurred in its defense in the event the Grantor fails to provide such defense.

Section 18. This Agreement shall be administered, construed, and enforced according to the laws of the State of [*insert name of State*].

Section 19. Interpretation and Severability. As used in this Agreement, words in the singular include the plural and words in the plural include the singular. The descriptive headings for each section of this Agreement shall not affect the interpretation or the legal efficacy of this Agreement. If any part of this Agreement is invalid, it shall not affect the remaining provisions which will remain valid and enforceable.

IN WITNESS WHEREOF the parties have caused this Agreement to be executed by the respective officers duly authorized and the incorporate seals to be hereunto affixed and attested as of the date first written above.

[*Insert name of licensee (Grantor)*]

[*Signature of representative of Grantor*]

[*Title*]

ATTEST:

[*Title*]

[*Seal*]

[*Insert name and address of Trustee*]

[*Signature of representative of Trustee*]

[*Title*]

ATTEST:

[*Title*]

[*Seal*]

APPENDIX 10C

STANDBY TRUST AGREEMENT SCHEDULES

Schedule A

This Agreement demonstrates financial assurance for the following cost estimates or prescribed amounts for the following licensed activities:

U.S. NUCLEAR REGULATORY COMMISSION LICENSE NUMBER(S)	NAME AND ADDRESS OF LICENSEE	ADDRESS OF LICENSED ACTIVITY	COST ESTIMATES FOR REGULATORY ASSURANCES DEMONSTRATED BY THIS AGREEMENT

The cost estimates listed here were last adjusted and approved by NRC on [insert date].

Schedule B

DOLLAR AMOUNT _____

AS EVIDENCED BY _____

Schedule C

[Insert name, address, and phone number of Trustee]

Trustee's fees shall be $____per year.

APPENDIX 10D

SPECIMEN CERTIFICATE OF EVENTS

[Insert name and address of trustee]

Attention: Trust Division

Gentlemen:

In accordance with the terms of the Agreement with you dated [_____], I, [_____], Secretary of AREVA Enrichment Services, LLC (AES), hereby certify that the following events have occurred:

1. AES is required to commence the decommissioning of its facility located at Bonneville County, Idaho (hereinafter called the decommissioning).

2. The plans and procedures for the commencement and conduct of the decommissioning have been approved by the United States Nuclear Regulatory Commission, or its successor, on [_____] (copy of approval attached).

3. The Board of Directors of AES has adopted the attached resolution authorizing the commencement of the decommissioning.

_____

Secretary of AREVA Enrichment Services, LLC.

_____

Date

APPENDIX 10E

SPECIMEN CERTIFICATE OF RESOLUTION

I, [_____], do hereby certify that I am Secretary of AREVA Enrichment Services, LLC, a Delaware limited liability corporation, and that the resolution listed below was duly adopted at a meeting of this Corporation's Board of Directors on _____ 20_____.

IN WITNESS WHEREOF, I have hereunto signed my name and affixed the seal of this Corporation this [_____] day of _____20_____.

_____

Secretary of AREVA Enrichment Services, LLC

RESOLVED, that this Board of Directors hereby authorizes the President, or such other employee of AREVA Enrichment Services, LLC., as he may designate, to commence decommissioning activities at the Eagle Rock Enrichment Facility in accordance with the terms and conditions described to this Board of Directors at this meeting and with such other terms and conditions as the President shall approve with and upon the advice of Counsel.

APPENDIX 10F

LETTER OF ACKNOWLEDGMENT

STATE OF [_____]

To Wit: [_____]

CITY OF [_____]

On this [_____] day of [_____], before me, a notary public in and for the city and State aforesaid, personally appeared [_____], and she/he did depose and say that she/he is

the *[insert title]* of *[if applicable, insert , national banking association or; State banking association],* Trustee, which executed the above instrument; that she/he knows the seal of said association; that the seal affixed to such instrument is such corporate seal; that it was so affixed by order of the association; and that she/he signed her/his name thereto by like order.

_____

[Signature of notary public]

My Commission Expires:_____

[Date