

Decommissioning Funding Plan

for the American Centrifuge Plant

in Piketon, Ohio



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Revision 14

Docket No. 70-7004

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October 2011

Reviewer: R.S. Lykowski
Date: 10-20-11

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AMERICAN CENTRIFUGE PLANT
DECOMMISSIONING FUNDING PLAN

NR-3605-0006

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for the American Centrifuge Plant
in Piketon, Ohio**

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1.0 INTRODUCTION

The Licensee hereby submits, pursuant to the provisions of the *Atomic Energy Act* of 1954, as amended, and the rules and regulations of the U.S. Nuclear Regulatory Commission (NRC), its Decommissioning Funding Plan (DFP) for the American Centrifuge Plant (ACP) in Piketon, Ohio. This DFP sets forth the information required by 10 *Code of Federal Regulations* (CFR) Part 70 regarding the Licensee's plans for funding the decommissioning of the ACP and disposal of depleted uranium generated as a result of ACP operations.

As indicated below, the Licensee presently intends to provide for decommissioning funding through a surety bond in accordance with applicable requirements of 10 CFR Part 70. However, the Licensee may choose to utilize alternate financial assurance funding methods. Alternate funding methods, if chosen, will be prepared using the guidance provided in NUREG 1757, Volume 3, Appendix A and will satisfy the requirements of 10 CFR Part 70. The actual funding method to be used will be executed prior to the commencement of enrichment operations. In the interim, appropriate model documentation for this funding method is provided in Appendix A and B of this plan. Upon execution of the funding instruments, the Licensee will supplement this portion of its application.

2.0 GENERAL INFORMATION

Plant Description: The ACP is located in the U.S. Department of Energy (DOE) reservation in Piketon, Ohio, in areas and facilities leased from the DOE.¹ The ACP encompasses the construction, start-up, operation, and maintenance of a uranium enrichment process using American Centrifuge technology that will produce 3.8 million separative work units (SWU) annually at full capacity. Chapter 1.0 of the License Application for the American Centrifuge Plant provides a description of the various facilities associated with the ACP.

Licensed Material: The NRC granted a license to construct and operate a uranium enrichment plant to enrich uranium hexafluoride (UF₆) using centrifuge technology. Uranium enriched in the ²³⁵U isotope up to the licensed limit of 10 weight percent ²³⁵U will be withdrawn and shipped from the plant. Material depleted in the ²³⁵U isotope (UF₆ tails) will also be withdrawn and stored on site. At full capacity, the ACP generates approximately 8,400 Metric Tons (MT) of UF₆ tails annually. Therefore, pursuant to 10 CFR 70.25(a), a DFP is required.

Schedule: Construction of the ACP commenced following issuance of the license by the NRC. Based on the unique modular aspects of the centrifuge technology, capacity is brought on line in phases.

¹ Details regarding the planned operations of the ACP may be found in the License Application and the accompanying Environmental Report.

Period of Operation: Construction activities began at the ACP following receipt of the Material License SNM-2011. The materials license provides the expiration date for the license.

Decommissioning Costs: The Licensee has prepared a site-specific decommissioning cost estimate for the decommissioning of the ACP and disposal of the UF₆ tails. This cost estimate utilizes current information regarding the activities and associated costs of decommissioning the 3.8 million SWU plant.

The estimate and associated funding mechanisms will be adjusted over time, in accordance with the applicable provisions of 10 CFR Part 70 as described in Section 5.0 of this plan.

Decommissioning Funding: As set forth in this DFP, the Licensee presently intends to utilize a surety bond to provide reasonable assurance of the availability of decommissioning funds when needed. This funding mechanism is intended to satisfy the provisions of 10 CFR Part 70 with respect to decommissioning financial assurance for license applicants. However, as described in Section 1.0 of this plan, the Licensee may choose to utilize alternate financial assurance funding methods. As described in Section 10.10.4 of the License Application for the American Centrifuge Plant, the financial assurance for a portion of the decommissioning costs to include the disposition of centrifuge machines and UF₆ tails will be provided incrementally as centrifuges are built/installed and UF₆ tails generated. Full funding for decommissioning of the facilities will be provided in the initial executed financial assurance instrument. In this way, financial assurance will be made available as the decommissioning liability is incurred.

3.0 DECOMMISSIONING COST ESTIMATE

Pursuant to 10 CFR 70.25(e) and the guidance provided by the NRC in NUREG-1757, *Consolidated NMSS Decommissioning Guidance*, the Licensee has evaluated the estimated costs of decommissioning the ACP. These estimated costs involve plant decommissioning costs and tails disposal costs. The plant will be decommissioned such that the facilities may be released for unrestricted use. The estimated costs for decommissioning are patterned after NRC guidance in Appendix A of NUREG-1757 Volume 3, as set forth in the tables contained in Appendix C and D of this DFP and noted below (Note: To maintain consistent table sequence numbers with those presented in NUREG-1757, Appendix A, Tables 3.1 through 3.3 are not used):

- Facility Description Summary (Table C3.4 and Table C3.4A)
- Number and Dimensions of Facility Components (Table C3.5 and Table C3.5A)
- Planning and Preparation (Table C3.6)
- Decontamination or Dismantling of Radioactive Facility Components (Table C3.7)
- Restoration of Contaminated Areas on Facility Grounds (Table C3.8)
- Final Radiation Survey (Table C3.9)

- Site Stabilization and Long-Term Surveillance (Table C3.10)
- Total Work Days by Labor Category (Table C3.11)
- Worker Unit Cost Schedule (Table D3.12)
- Total Labor Costs by Major Decommissioning Task (Table D3.13)
- Packaging, Shipping, and Disposal of Radioactive Wastes (Table C3.14)
- Equipment/Supply Costs (Table C3.15)
- Laboratory Costs (Table C3.16)
- Miscellaneous Costs (Table C3.17)
- Total Decommissioning Costs (Table C3.18)
- Total Incremental Decommissioning Costs (Table C3.18A)
- Estimated Volume of Annual Depleted Uranium Generated (Table C3.19)
- Estimated Incremental Machine Disposal Cost (Table C3.19A)
- Total Labor Distribution (Table C3.20)

Chapter 10.0 of the License Application for the American Centrifuge Plant describes specific features that serve to minimize the level and spread of radioactive contamination during operation that simplify the eventual plant decommissioning and minimize worker exposure. The decommissioning estimated costs are based on decontaminating the plant to the radiological criteria for unrestricted use in 10 CFR 20.1402. The total estimated cost of plant decommissioning in 2008 dollars, excluding tails disposition costs, is \$377.3 million (Table C3.18).

The following assumptions are utilized in the decommissioning cost estimate:

- No credit is taken for salvage value of equipment or materials;
- Inventories of materials and wastes at the time of decommissioning will be in amounts that are consistent with routine plant conditions and operations over the 30-year license;
- Decommissioning activities take place immediately on cessation of operations without multiyear storage-for-decay periods.

Cost estimates to dispose of UF₆ tails generated during ACP operation are presented in Table C3.19. The ultimate disposal of UF₆ tails is to be determined. The Licensee intends to evaluate possible commercial uses of UF₆ tails. UF₆ tails, which are not commercially reused, will be converted to a stable form and disposed of in accordance with the USEC Privatization Act and other applicable statutory authorizations and requirements at DOE's DUF₆ conversion facilities and/or other licensed facilities. UF₆ tails are stored in steel cylinders until they can be

processed in accordance with the disposal strategy established and selected by the Licensee. Depending on technological developments and the existence of facilities available prior to ACP shutdown, the tails may have commercial value and may be marketable for further enrichment or other processes. However, for the purposes of calculating the UF₆ tails disposition costs, the Licensee assumes that the total quantity of tails generated during ACP operation are processed by the DOE DUF₆ conversion facility in Piketon, Ohio.

The Licensee provides financial assurance to incrementally fund the estimated cost of conversion and disposal of the UF₆ tails inventory as it is generated during ACP operation. The estimated cost of conversion and disposal is based on the actual accumulated depleted uranium inventory and a conservative forecast of the amount of depleted uranium to be generated for the upcoming period of operation. This funding is in addition to the funding requirements for decommissioning the ACP as described above.

At full capacity, the ACP will generate approximately 8,400 MT of UF₆ tails annually. The Licensee estimates that it will take approximately four years for the ACP to ramp up to the full capacity of 3.8 million SWU per year.

Our examination of the available information has identified that the unit cost to dispose of tails (depleted uranium) for the ACP could range between \$3.66/kilogram (kg) uranium (U) to \$4.95/kg U, depending on a number of factors and assumptions. The unknown factors include: location(s) for processing depleted uranium, transportation costs, escalation rate(s) of various construction cost components; de-escalation rate(s) of future operating costs (to present day dollars); volume of tails disposed; revenue/avoided disposal cost from sale of conversion products (e.g., hydrogen fluoride) or higher assay tails (tail stripping); construction and operations budget contingencies; allocation of decontamination and decommissioning costs (between the Licensee and DOE); and DOE oversight costs.

The Licensee has developed the depleted uranium tails disposal cost estimate for the ACP based on a methodology and supporting data contained in a redacted report prepared by DOE's consultant, LMI². This redacted report was provided by DOE³. Using the methodology and supporting data contained in the redacted LMI report, the Licensee prepared an analysis of the estimated depleted uranium disposal costs specific to the ACP. As documented in this analysis, the Licensee has developed a unit cost of \$4.95/kg U for processing the ACP depleted uranium at the DOE's Portsmouth DUF₆ Conversion Facility. Consistent with NRC guidance regarding decommissioning cost estimates, the estimated unit cost for depleted UF₆ disposal does not assume any resale or reuse of any products resulting from the conversion process. The Licensee believes the unit cost of \$4.95/kg U is a reasonable depleted uranium disposal unit cost for the purposes of ACP decommissioning funding and should be viewed as the conservative upper bound of the range mentioned. Based on the total estimated volume of depleted uranium generated over the 30-years of operation and the estimated cost for disposal, the Licensee's liability for disposal of depleted uranium is \$717.6 million in 2008 dollars. With a 25 percent contingency, this represents a total liability of \$896.9 million in 2008 dollars for 30-years of operation. Although a total liability is provided, the Licensee will incrementally fund the estimated costs associated with disposal of the depleted uranium inventory as the depleted uranium is generated during ACP operation.

² LMI Government Consulting, Report DE523T1, "An Analysis of DOE's Cost to Dispose of DUF₆," Revision 1, July 2005 [Redacted January 31, 2006].

³ Mr. Larry W. Brown (DOE) letter to Mr. Phil Sewell (USEC), "Conversion and Disposal of Depleted Uranium Hexafluoride (DUF₆) Generated by USEC at the American Centrifuge Plant in Piketon, Ohio," dated February 10, 2006.

The Licensee's total decommissioning liability is the sum of the total plant decommissioning costs and the tails disposition costs. The Licensee's total liability for decommissioning the ACP, including applicable contingencies, is \$1,274.2 million.

4.0 DECOMMISSIONING FUNDING MECHANISM

The Licensee presently intends to utilize a surety bond to provide reasonable assurance of decommissioning funding, pursuant to 10 CFR 70.25(f). Accordingly, the Licensee provides with this application model documentation related to the use of the surety method of providing decommissioning financial assurance.⁴ However, as described in Section 1.0 of this plan, the Licensee may choose to utilize alternate financial assurance funding methods. Upon finalization of the specific funding instruments to be utilized and at least 90 days prior to the commencement of enrichment operations, the Licensee will supplement its application to include the signed, executed documentation.

As noted above, the Licensee presently intends to utilize a surety bond to provide financial assurance for decommissioning. The surety bond will provide an ultimate guarantee that decommissioning costs will be paid in the event the Licensee is unable to meet its decommissioning obligations at the time of decommissioning. A copy of a model surety bond is provided in Appendix A to this plan. The Licensee describes below the particular attributes it presently anticipates including in the surety bond.

With respect to the surety bond, the Licensee presently anticipates providing for the following attributes: First, a company that is listed as a qualified surety in the Department of Treasury's most recent edition of Circular 570 for the State where the surety was signed with an underwriting limitation greater than or equal to the level of coverage specified in the bond will issue the bond. Second, the bond will be written for a specified term and will be renewable automatically unless the issuer serves notice at least 90 days prior to expiration of intent not to renew. Such notice must be served upon the NRC, the trustee of the external or standby trust, and the Licensee. Further, in the event the Licensee is unable to provide an acceptable replacement within 30 days of such notice, the full amount of the bond will be payable automatically, prior to expiration, without proof of forfeiture.

The surety bond will require that the surety company will deposit any funds paid under its terms directly into either an external trust or a standby trust. A copy of a model standby trust is provided as Appendix B to this plan.

⁴ The model documentation is derived from Appendix A.9 in NUREG-1757 Volume 3, Consolidated NMSS Decommissioning Guidance, Financial Assurance, Recordkeeping, and Timeliness, September 2003. The Licensee will consider this model documentation as guidance in preparing and executing funding instruments for the ACP. In the event the Licensee ultimately selects another form of decommissioning funding, model documentation from this volume of NUREG-1757 will also be used as guidance in the preparation of funding instruments.

5.0 ADJUSTING DECOMMISSIONING COSTS AND FUNDING

Pursuant to 10 CFR 70.25(e), the Licensee will update the decommissioning cost estimate for the ACP and the financial assurance over the life of the plant. The modular aspect of the American Centrifuge technology allows enrichment operations to begin well before the full capacity of the plant is reached. Thus, the decommissioning liability for centrifuge machines and UF₆ tails is incurred incrementally as more centrifuge machines, and associated equipment, are added to the process, until such time as full capacity of the facility (i.e., 3.8 million SWU) is achieved. Once full capacity of the facility is achieved, the UF₆ tails are generated at a relatively constant rate throughout the life of the plant.

Full funding for decommissioning of the facilities will be provided in the initial executed financial assurance instrument. To ensure adequate financial assurance is in place as centrifuge machines, and associated equipment, are added to the process and placed into operation, the Licensee will forecast and update the cost estimates and provide a revised funding instrument to NRC annually to cover the upcoming year of operation. This incremental funding approach will be utilized until operation at full capacity. Once full capacity of the facility is achieved, the Licensee will annually adjust the cost estimate for UF₆ tails disposal and all other decommissioning costs will be adjusted periodically, and no less frequently than every three years, consistent with the requirements of 10 CFR 70.25(e) and the recent NRC final rule regarding financial assurance for materials licensees (68 FR 57327, October 3, 2003). The method for adjusting the cost estimate will consider the following:

- Changes in general inflation (e.g., labor rates, consumer price index)
- Changes in price of goods (e.g., packing materials)
- Changes in price of services (e.g., shipping and disposal costs)
- Changes in plant condition or operations
- Changes in decommissioning procedures or regulations

A record of the updating effort and results will be retained for review (see further discussion regarding record keeping below).

6.0 RECORD KEEPING PLANS RELATED TO DECOMMISSIONING FUNDING

Pursuant to 10 CFR 70.25(g), the Licensee will keep records of information that could have a material effect on the ultimate costs of decommissioning until termination of the license. Information maintained in these records includes:

- Records of spills or other unusual occurrences involving the spread of contamination in and around the plant, equipment, or site. Records of spills or other unusual

occurrences may be limited only 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 radionuclides, quantities, forms, and concentrations;

- As-built drawings and modifications of structures and equipment in areas where radioactive materials are used and/or stored, including locations that possibly could be inaccessible (e.g., buried pipes which may be subject to contamination); and
- A list contained in a single document that is updated every two years of the following:
 - Areas designated and formerly designated as restricted areas as defined under 10 CFR 20.1003.
 - Areas outside of restricted areas that require documentation under 10 CFR 70.25(g)(1).
 - Areas outside of restricted areas where current and previous wastes have been buried as documented under 10 CFR 20.2108.
 - 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 Part 20, Subpart E, or would apply for NRC approval for disposal under 10 CFR 20.2002.
- Records of the cost estimate performed for the DFP, and records of the funding method used for assuring funds, including a copy of the financial assurance mechanism and any supporting documentation.

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Appendix A

Model Payment Surety Bond

PAYMENT SURETY BOND

Date bond executed: _____

Effective date: _____

Principal: *[Insert legal name and business address of licensee]*Type of organization: *[Insert "proprietorship," "partnership," or "corporation"]*

State of incorporation: _____ (if applicable)

NRC license number, name and address of facility, and amount for decommissioning activities guaranteed by this bond: _____

Surety: *[Insert name and business address]*Type of organization: *[Insert "proprietorship," "partnership," or "corporation"]*

State of incorporation: _____ (if applicable)

Surety's qualification in jurisdiction where license facility is located.

Surety's bond number: _____

Total penal sum of bond: \$ _____

Know all persons by these presents, that we, the Principal and Surety hereto, are firmly bound to the U.S. Nuclear Regulatory Commission (hereinafter called NRC) in the above penal sum for the payment of which we bind ourselves, our heirs, executors, administrators, successors, and assigns jointly and severally; provided that, where the Sureties are corporations acting as co-sureties, we, the Sureties, bind ourselves in such sum "jointly and severally" only for the purpose of allowing a joint action or actions against any or all of us, and for all other purposes each Surety binds itself, jointly and severally with the Principal, for the payment of such sum only as it is set forth opposite the name of such Surety; but if no limit of liability is indicated, the limit of liability shall be the full amount of the penal sum.

WHEREAS, the U.S. Nuclear Regulatory Commission, 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 *[insert 30, 40, 70, or 72]*, applicable to the Principal, which require that a license holder or an applicant for a facility license provide financial assurance that funds will be available when needed for facility decommissioning;

NOW, THEREFORE, the conditions of the obligation are such that if the Principal shall faithfully, before the beginning of decommissioning of each facility identified above, fund the standby trust fund in the amount(s) identified above for the facility;

Or, if the Principal shall fund the standby trust fund in such amount(s) after an order to begin facility decommissioning is issued by NRC or a U.S. District Court or other court of competent jurisdiction;

Or, if the Principal shall provide alternative financial assurance, and obtain NRC's written approval of such assurance, within 30 days after the date a notice of cancellation from the Surety is received by both the Principal and NRC, then this obligation shall be null and void; otherwise it is to remain in full force and effect.

The Surety shall become liable on this bond obligation only when the Principal has failed to fulfill the conditions described above. Upon notification by NRC that the Principal has failed to perform as guaranteed by this bond, the Surety shall place funds in the amount guaranteed for the facility into the standby trust fund.

The liability of the Surety shall not be discharged by any payment or succession of payments hereunder, unless and until such payment or payments shall amount in the aggregate to the penal sum of the bond, but in no event shall the obligations of the Surety hereunder exceed the amount of said penal sum.

The Surety may cancel the bond by sending notice of cancellation by certified mail to the Principal and to NRC provided, however, that cancellation shall not occur during the 90 days beginning on the date of receipt of the notice of cancellation by both the Principal and NRC, as evidenced by the return receipts.

The Principal may terminate this bond by sending written notice to NRC and to the Surety 90 days prior to the proposed date of termination, provided, however, that no such notice shall become effective until the Surety receives written authorization for termination of the bond from NRC.

The Principal and Surety hereby agree to adjust the penal sum of the bond yearly so that it guarantees a new amount, provided that the penal sum does not increase by more than 20 percent in any one year and no decrease in the penal sum takes place without the written permission of NRC.

If any part of this agreement is invalid, it shall not affect the remaining provisions that will remain valid and enforceable.

In Witness Whereof, the Principal and Surety have executed this financial guarantee bond and have affixed their seals on the date set forth above.

The persons whose signatures appear below hereby certify that they are authorized to execute this surety bond on behalf of the Principal and Surety.

Principal

[Signatures]

[Names]

[Titles]

[Corporate Seal]

Corporate Surety

[Name and address]

State of Incorporation: _____

Liability limit: \$ _____

[Signatures]

[Names and titles]

[Corporate Seal]

[For every co-surety, provide signatures, names and titles, corporate seal, and other information in the same manner as for the Sureties above].

Bond Premium: \$ _____

Model Certification of Financial Assurance**CERTIFICATION OF FINANCIAL ASSURANCE**

Principal: *[Legal names and business address of licensee]*

NRC license number, name and address of the facility

Issued to: U.S. Nuclear Regulatory Commission

I certify that *[insert name of licensee]* is licensed to possess the following types of *[insert all that apply: "sealed sources or plated foils with a half-life great than 120 days licensed under 10 CFR Part 30," "unsealed byproduct material with a half-life greater than 120 days licensed under 10 CFR Part 30," "source material in a readily dispersible form licensed under 10 CFR Part 40," and "unsealed special nuclear material licensed under 10 CFR Part 70"]* in the following amounts:

Type of MaterialAmount of Material

*[List materials and quantities of materials noted above. For **byproduct materials** and **special nuclear materials**, list separately the type and amount of each isotope authorized by the license.]*

I also certify that financial assurance in the amount of *[insert the total of all prescribed amounts calculated from Checklist 2, or the amount of the site-specific cost estimate, in US dollars]* has been obtained for the purpose of decommissioning as prescribed by 10 CFR Part *[insert 30, 40, or 70]*.

[Signatures and titles of officials of institution]

[Corporate seal]

[Date]

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Appendix B

Model Standby Trust Agreement

STANDBY TRUST AGREEMENT

TRUST AGREEMENT, the Agreement entered into as of [insert date] by and between [insert name of licensee], a [insert name of State] [insert "corporation," "partnership," or "proprietorship"], 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 [insert 30, 40, 70, 72]. These regulations, applicable to the Grantor, require that a holder of, or an applicant for, a materials license pursuant to 10 CFR Part [insert 30, 40, 70, or 72] provide assurance that funds will be available when needed for required decommissioning activities.

WHEREAS, the Grantor has elected to use a [insert "letter of credit," "line of credit," "surety bond," "insurance policy," "parent company guarantee," or "self-guarantee"], to provide [insert "all" or "part"] of such financial assurance for the facilities identified herein; and

WHEREAS, when payment is made under a [insert "letter of credit," "line of credit," "surety bond," "insurance policy," "parent company guarantee," or "self-guarantee"], 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 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 [insert 30, 40, 70, 72], 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 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 *[insert name of licensee]*'s intent to withdraw funds from the escrow 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 which 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 the 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. The 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 and 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]

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 <u>LICENSE NUMBER(S)</u>	NAME AND ADDRESS OF <u>LICENSEE</u>	ADDRESS OF LICENSED <u>ACTIVITY</u>	COST ESTIMATES FOR REGULATORY ASSURANCES DEMONSTRATED BY <u>THIS AGREEMENT</u>
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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.

Model Specimen Certificate of Events

[Insert name and address of trustee]

Attention: Trust Division

Gentlemen:

In accordance with the terms of this Agreement with you dated _____, I, _____, Secretary of [insert name of licensee], hereby certify that the following events have occurred:

1. [Insert name of licensee] is required to commence the decommissioning of its facility located at [insert location of facility] (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 [insert name of licensee] has adopted the attached resolution authorizing the commencement of the decommissioning.

Secretary of [insert name of licensee]

Date

Model Specimen Certificate of Resolution

I, _____, do hereby certify that I am Secretary of [*insert name of licensee*], a [*insert State of incorporation*] 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

RESOLVED, that this Board of Directors hereby authorizes the President, or such other employee of the Company as he may designate, to commence decommissioning activities at [*insert name of 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.

Model 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]

Model Power of Attorney

[Insert Name of Issuing Company]

Principal Bond Office: [Insert Business Address of Issuing Company]

KNOW ALL MEN BY THESE PRESENTS:

That [Insert Name of Issuing Company] does hereby appoint

[Insert Names of Attorney(s)-in-Fact]

its true and lawful Attorney(s)-in-Fact, with full authority to execute on its behalf bonds, undertakings, recognizances and other contracts of indemnity and writings obligatory in the nature thereof, issued in the course of its business, and to bind the respective company thereby.

IN WITNESS WHEREOF, [Insert Name of Issuing Company] have executed these presents

[Affix Company Seal]

this [Insert Date] day of [Insert Month/Year]

[Insert Name of Company Official/Title]

STATE OF [Insert State] }
COUNTY OF [Insert County] } ss.

On this [Insert Date] day of [Insert Month], 200[Insert Year], before me came the above named officer of [Insert Issuing Company], to me personally known to be the individual and officer described herein, and acknowledged that he executed the foregoing instrument and affixed the seals of said corporations thereto by authority of his office.

[Insert Notary Name] Notary

CERTIFICATE

Excerpts of Resolutions adopted by the Boards of Directors of [Insert Issuing Company Name] on [Insert Date of Resolutions]:

“RESOLVED, that the Chairman of the Board, the President, or any Vice President be, and hereby is, authorized to appoint Attorneys-in-Fact to represent and act for and on behalf of the Company to execute bonds, undertakings, recognizances and other contracts of indemnity and writings obligatory in the nature thereof, and to attach thereto the corporate seal of the Company, in the transaction of its surety business;

“RESOLVED, that the signatures and attestations of such officers and the seal of the Company may be affixed to any such Power of Attorney or to any certificate relating thereto by facsimile, and any such Power of Attorney or Certificate bearing such facsimile signatures or facsimile seal shall be valid and binding upon the Company when so affixed with respect to any bond, undertaking, recognizance or other contract of indemnity or writing obligatory in the nature thereof;

“RESOLVED, that any such Attorney-in-Fact delivering a secretarial certification that the foregoing resolutions still be in effect may insert in such certification the date thereof, said date to be not later than the date of delivery thereof by such Attorney-in-Fact.”

I, [Insert Name], Secretary of [Insert Name of Issuing Company] do hereby certify that the foregoing excerpts of Resolutions adopted by the Boards of Directors of this corporation, and the Powers of Attorney issued pursuant thereto, are true and correct, and that both the Resolutions and the Powers of Attorney are in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the facsimile seal of each corporation

[Affix Company Seal]

this [Insert Date] day of [Insert Month/Year]

[Name of Issuing Company] Secretary

APPENDIX C

DECOMMISSIONING COST ESTIMATE TABLES

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Table C3.4 Facility Description Summary

<p align="center">NRC license Numbers and Types (i.e., Part 30, 40, 70, or 72)</p>
<p>- 10 CFR Part 70 - To construct and operate a uranium enrichment facility</p>
<p align="center">Types and Quantities of Materials Authorized Under the Licenses Listed Above</p>
<p>- 300,000 Metric Tons of UF₆ (Uranium Hexafluoride)</p>
<p align="center">Description of How Licensed Materials Are Used</p>
<p>- Uranium is fed to the plant, where it is enriched to the desired ²³⁵U assay. The enriched product is withdrawn and transferred to customer cylinders. The enriched product is shipped to fuel fabricators for further processing and will ultimately be used to generate electricity in nuclear power plants around the world. Tails (uranium depleted in ²³⁵U isotope) will be stored on-site without undue risk. Final disposition of depleted material will be determined pending a future evaluation of the number of existing and potential uses for this material.</p>
<p align="center">Description of Facility, Including Buildings, Rooms, Grounds, and Description of Where Particular Types of Materials Are Used</p>
<ul style="list-style-type: none"> - X-3001 and X-3002 Process Buildings - Buildings that house the centrifuge machines and auxiliary process equipment. - X-3012 Process Support Building - Area that houses the Area Control Room, maintenance shops and stores, and other support areas. - X-3344 Customer Services Building – Area that houses the equipment necessary to liquid sample UF₆ cylinders. - X-3346 Feed and Withdrawal Building - Area that house the equipment necessary to supply UF₆ to the process buildings and to withdraw UF₆ from the process buildings in its enriched and depleted concentrations and the equipment to blend and transfer product material into customer cylinders. This facility utilizes previously existing and refurbished gaseous diffusion plant (GDP) equipment. - X-3346A Feed and Product Shipping and Receiving Building - Area that houses the equipment necessary to receive UF₆ feed material from previous process manufacturers and to ship UF₆ product material to customers, as well as shipping empty feed cylinders. - X-6002 Boiler Building – A building that houses the equipment necessary to supply Recirculating Heating Water (RHW) to requisite buildings on the centrifuge plant site. - X-7725 Recycle/Assembly (R/A) Facility - A large, multiple level building where material and components are shipped, received, stored components or subassemblies are inspected or tested, and centrifuge machines are assembled and a statistical amount gas tested. This facility also stores wrecked contaminated centrifuges and utilizes previously existing and refurbished GDP equipment. - X-7726 Centrifuge Training and Test Facility - Initially, the area where material and components are received; components or subassemblies are inspected and tested; components are assembled into centrifuge machines; final assembled machines are evacuated and leak checked; and limited repairs are performed to the machine or subassemblies. As the X-7725 R/A Facility becomes available, these functions will transfer to the X-7725 facility and X-7726 facility will also be used for contaminated centrifuge machine select repair operations. - X-7727H Interplant Transfer Corridor - Area that provides an enclosed throughway from the X-7725 or X-7726 facilities to the X-3001 and X-3002 buildings. - X-7746S,W and X-745G-2 - Cylinder Storage Yards - Areas that provide UF₆ (Feed, Tails, or Product) cylinders (empty or full) and overpack storage; and allows cylinder handling equipment access.
<p align="center">Quantities of Materials or Waste Accumulated Before Shipping or Disposal</p>
<p>- See Table 3.4 (A)</p>

Table C3.4(A) Quantities of Materials or Waste Accumulated Before Shipping or Disposal

Category	Description	Estimated Quantity
Centrifuges ^{1,2}	Internals: Rotor Assemblies, Motors, Suspensions, and Mounts (classified)	12,000
Service Modules ²	Structural Components	0
Piping	Less than 1 in. Process Piping length (Lft) Includes Tubing ³	0
	1-16 in. Process Piping length (Lft)	271,840
Blowers	Feed/Withdrawal Exhaust Blowers	2
Pumps	Vacuum (Evacuation/Purge) ; RHW Pumps	119
Ventilation	Ductwork; Miscellaneous WISP Ducting (ft ³) ³	3,677
Surfaces	Building Floors, Yards, Equipment (ft ²) ⁴	2,494,819
Valves	Process Valves and MIVs (excluding Sheetmetal)	18,631
	Miscellaneous Valves	1,385
Process Equipment	Feed Ovens, Autoclaves, Cold Boxes	91
Cranes	Ridge Mast (RMC), Bridge, Wall and Jib Cranes; Cylinder Transporters, Trolleys	29
Scales	Process Weighing Equipment	12
Compressors	Process Gas Compressors	4
Heat Exchangers (HX)	Machine Cooling Water HX, Freezer/Sublimers, Tails Coolers	36
Sources	Source and byproduct material sources used at the Lead Cascade	11
Traps	Chemical Traps (8 banks of 4); Cold Traps, Roughing Filters, Miscellaneous Traps	71
Tanks (UF ₆)	Holdup, Surge, and Dump Tanks	3
Uponder	Trailer Uponder (X-7725)(ft ³)	3
Cylinders	Tails – 48G/48X (14, 10 Ton)	17,191
Cylinders	Product and Feed (2.5 Ton) Gas Test Area (12B)	450
Other Equipment	UF ₆ Portable Carts; Buffer Storage Stands; Mass Spectrometers; Contaminant Monitors; Miscellaneous Platforms; and Gas Test Center (GTC) Stand Structures	69
Decontamination Equipment	Centrifuge Transporter ⁵	2
	Cranes (Process Area - RMC) ⁵	8
	Cranes, Bridge X-7725 ⁵	2
	Centrifuge Mobile Equipment ⁵	4
	Centrifuge Dismantling Equipment (6/X-7725 and 2/X-7726 Assembly Stands) ⁶	8
	Cutting Machines ⁶	2
	Degreasers ⁶	2
	Decontamination Tanks ⁶	4
	Wet Blast Cabinets ⁶	2
	Crusher ⁶	1

Note 1: Amount includes 11,520 operational units plus 480 contaminated spare centrifuges.

Note 2: Centrifuge casings and service module structural steel is not considered waste. These items are to be removed, disassembled, decontaminated to NRC 'Free Release' criteria, and stored for later disposition.

Note 3: Piping <1" (assumed to be instrument piping/tubing), ventilation ductwork, and heat exchangers are assumed to not be internally contaminated. Therefore, these components can be externally decontaminated and remain as part of the building BOP.

Note 4: Amount of wall area (ft²) not provided, because it is not anticipated to need decontamination at the time of decommissioning.

Note 5: Equipment re-utilized from operational phase (not new or purchased).

Note 6: Equipment procured (see Table C3.15).

Table C3.5 Number and Dimensions of Facility Components (Total Volume)

COMPONENT	Number of Components	Dimensions of Component (specify units)	Total Volume (ft ³)	Compacted Factor (Volume Remaining)	Total Compacted Volume (ft ³)	Level of Contamination
X-3001 and X-3002						
Centrifuges Casings	12,000 units	~30" dia x 45'	2,650,725			High Alpha
Service Modules – Structure	576 units	~45' x 6' x 13'	2,021,760			High Alpha
Service Modules – Piping (4")	155,520 Lft	~45' x 4" dia x 6 runs	13,572	0.2	2,714	High Alpha
Service Modules – Piping (2")	25,920 Lft	~45' x 2" dia x 1 run	565	0.2	113	High Alpha
Vacuum Pumps	80 ea	4' x 5' x 4'	6,400	1.0	6,400	High Alpha
Chemical Traps	32 ea	8" dia x 8'	89	0.2	18	High Alpha
Building Headers	12,000 Lft	6" and 10" dia	6,545	0.2	1,309	High Alpha
Miscellaneous Piping	48,000 Lft	1", 2", and 4" dia	4,189	0.2	838	High Alpha
Piping <1"; Tubing	640,000 Lft	<1" dia	3,491			High Alpha
Heat Exchangers	16 ea	4' x 4' x 7'	1,792			Low Alpha
HVP Ductwork	24,000 Lft	4' x 3'	288,000			Low Alpha
Valves (12 K MIV + 6K Miscellaneous)	18,000 ea	0.4 ft ³	7,200	1.0	7,200	High Alpha
Valves, Miscellaneous	640 ea	0.4 ft ³	256	1.0	256	High Alpha
Carts	30 ea	3' x 5' x 4'	1,800	0.5	900	Low Alpha
X-3012						
HVAC Ductwork	1,225 Lft	2' x 1'	2,450			Low Alpha
X-3344						
Autoclaves	12 ea	8.6' dia x 20.7'	14,429	0.2	2,886	High Alpha
Piping (evacuation line to X-3346)	400 Lft	6" dia	79	0.2	16	High Alpha
WISP System Ducting	300 Lft	6" dia	59	0.1	6	High Alpha
Cylinder Transporter	1 ea	13' x 3' x 3'	117	0.5	59	Low Alpha
HVAC Ductwork	750 Lft	3' x 2'	4,500			Low Alpha

Table C3.5 Number and Dimensions of Facility Components (Total Volume)

COMPONENT	Number of Components	Dimensions of Component (specify units)	Total Volume (ft ³)	Compacted Factor (Volume Remaining)	Total Compacted Volume (ft ³)	Level of Contamination
X-3346						
Feed Area						
Electric Feed Ovens	28 ea	18' x 15' x 6'	45,360	0.2	9,072	High Alpha
Cold Boxes (Including Dump)	7 ea	22' x 15' x 6'	13,860	0.2	2,772	High Alpha
Freezer/Sublimers	6ea	48" dia x 144" *VF	2,714	1.0	2,714	High Alpha
Piping (Feed)	4,000 Lft	6" dia	785	0.2	157	High Alpha
Valves	625 ea	0.4 ft ³	250	1.0	250	High Alpha
WISP System Ducting	300 Lft	6" dia	59	0.1	6	High Alpha
Cylinder Transporter	3 ea	13' x 3' x 3'	351	0.5	176	Low Alpha
HVAC Ductwork	3,500 Lft	3' x 2'	21,000			Low Alpha
Product/Tails Area						
Cold Boxes (Product)	18 ea	22' x 15' x 6'	35,640	0.2	7,128	High Alpha
Piping (Product)	2,000 Lft	6" dia	393	0.2	79	High Alpha
Vacuum Pumps	24 ea	2' x 5' x 2'	480	1.0	480	High Alpha
Cold Boxes (Tails)	26 ea	22' x 15' x 6'	51,480	0.2	10,296	High Alpha
Compressors	4 ea	6' x 5' x 4' *VF	960	1.0	960	High Alpha
Compressor Train Coolers	10 ea	4' dia x 4' *VF	754	1.0	754	High Alpha
Freezer/sublimers	4 ea	48" dia x 144" *VF	1,810	1.0	1,810	High Alpha
Mass Spectrometers	6 ea	2' x 4' x 2' *VF	192	1.0	192	High Alpha
Chemical Traps	16 ea	8" dia x 96"	45	0.2	9	High Alpha
Cold Traps	15 ea	10" dia x 12'	98	0.2	20	High Alpha
Piping (Tails)	4,000 Lft	6" dia	785	0.2	157	High Alpha
Blowers (Vent Exhaust Sys)	2 ea	4' x 10' x 4'	320	0.2	64	Low Alpha
Roughing Filters	4 ea	3' dia x 4'	113	0.2	23	High Alpha

Table C3.5 Number and Dimensions of Facility Components (Total Volume)

COMPONENT	Number of Components	Dimensions of Component (specify units)	Total Volume (ft ³)	Compacted Factor (Volume Remaining)	Total Compacted Volume (ft ³)	Level of Contamination
Holdup Tanks	2 ea	8' dia x 14'	1,407	0.3	422	High Alpha
Surge Tanks	1 ea	12' dia x 55'	6,220	0.3	1,866	High Alpha
Vacuum Pumps	8 ea	3' x 3' x 3'	216	1.0	216	High Alpha
WISP System Ducting	300 Lft	6" dia	59	0.1	6	High Alpha
Containment Monitors	5 ea	2' x 3' x 2'	60	0.2	12	Low Alpha
Cylinder Transporter (1P, 1T)	2 ea	13' x 3' x 3'	234	0.5	117	Low Alpha
Feed/Tails Area						
HVAC Ductwork	3,500 Lft	3' x 2'	21,000			Low Alpha
Piping <1"; Tubing	24,000 Lft	1" dia	131			High Alpha
Valves	625 ea	0.4 ft ³	250	1.0	250	High Alpha
Common Area						
Tails Cylinders	17,191 ea	139 ft ³	2,389,565			High Alpha
Product Parent Cylinders	444 ea	108.9 ft ³	48,352			High Alpha
Gas Test Area Cylinders (12B)	6 ea	2.38 ft ³	14			High Alpha
Sources (sealed)	11 ea	1.5" Dia x 0.25"	0	1.0	0	None
X-2232C						
IPP (x2)	5,000 Lft	10" dia	2,727	0.2	545	High Alpha
IPP (x4)	10,000 Lft	8" dia	3,491	0.2	698	High Alpha
IPP (x2)	5,000 Lft	20" dia	10,908	0.2	2,182	High Alpha
X-6002						
Boilers	3 ea	24' x 14' x 12'	12,096	0.3	3,629	Low Alpha
Pumps, RHW	3 ea	4' x 4' x 10'	480	1.0	480	Low Alpha
X-7725						
Buffer Storage Pedestals	20 ea	5' x 25' x 1.5'	3,750	0.3	1,125	Low Alpha
Traps, Gas Test Stand	4 ea	8" dia x 8'	11	0.8	9	Low Alpha
HVAC Ductwork	3,800 Lft	3' x 2'	22,800			Low Alpha

Table C3.5 Number and Dimensions of Facility Components (Total Volume)

COMPONENT	Number of Components	Dimensions of Component (specify units)	Total Volume (ft ³)	Compacted Factor (Volume Remaining)	Total Compacted Volume (ft ³)	Level of Contamination
Vacuum Pumps	7 ea	2' x 5' x 2'	140	1.0	140	Low Alpha
Valves Miscellaneous	120 ea	0.4 ft ³	48	1.0	48	Low Alpha
Mass Spectrometers	1 ea	2' x 4' x 2' *VF	32	1.0	32	High Alpha
Upenders	3 ea	40' x 5' x 4'	2,400	0.3	720	Low Alpha
Platform, Steel	1 ea	44' x 20' x 20'	17,600	0.2	3,520	Low Alpha
Trolley (Monorail)	12 ea	5' x 5' x 8'	2,400	0.2	480	Low Alpha
GTC Stand Structures with Platforms	6 ea	44' x 60' x 10'	158,400			Low Alpha
Gas Test Stand Equ't (MIV sets)	6 ea	2' x 5' x 1'	60	1.0	60	Low Alpha
X-7727H						
HVAC Ductwork	23 units	3' x 1' x 50'	3,450			Low Alpha
Total Component Volume			7,913,768		76,388	

Assumptions:

- Centrifuge casings and service module structural steel is not considered waste. These items are to be removed, disassembled, decontaminated to NRC 'Free Release' criteria, and stored for later disposition. Centrifuge machine internals are considered for waste and accounted for in Table C3.14.
- Total Component Volume does not include the centrifuge casing, service modules (structure), piping <1", HVAC ductwork, some heat exchangers, and Tails cylinder component volume in this volumetric calculation; the piping, HVAC ductwork, and heat exchangers are essentially decontaminated to a 'free release' criteria, and remain in the buildings; the centrifuge casings and service module structure are decontaminated to a 'free release' criteria and are stored for later disposition. Tails cylinders are considered to be part of the Tails classified waste disposal costs calculated by a different means in Table C3.19 elsewhere.
- X-7725 Manufacturing areas/items were excluded from the estimate.
- Highlighted rows represent centrifuge casings and service module structure items.
- Highlighted rows represent HVAC ductwork, and heat exchangers.
- Highlighted rows represent Tails cylinders.

Table C3.5(A) Number and Dimensions of Facility Components (Total Area)

Component	Number of Components	Dimensions of Component /Area (specify units) ¹	Total Area (ft ²) ¹	Level of Contamination
X-3001 and X-3002		416' x 730'		
Cranes (RMC)	4/Building	~650' x 2' x 2 rails	20,800	Low Alpha
Floors	2 Buildings	303,680 ft ²	607,360	Low Alpha
X-3012		240' x 201'		
Maintenance Shop	3 (floors only)	100' x 39'	11,700	Low Alpha
Work Bench	5	3' x 5'	75	Low Alpha
Small Parts	Misc.	Varied	11	Low Alpha
Floors (~60%) ²	1 Building	28,950 ft ²	28,950	Low Alpha
X-3344		200' x 200'		
Scales	3 ea	11' x 6'	198	Low Alpha
Cylinder Transport	1 set	~200' x 2 rails	167	Low Alpha
Floors	1 Building	40,000 ft ²	40,000	Low Alpha
X-3346		488' x 352'		
Scales	3 ea	11' x 6'	198	Low Alpha
Cranes	2 ea	~1,200' x 2' x 2 rails	9,600	Low Alpha
Cylinder Transport	4 sets	~352' x 2 rails	1,173	Low Alpha
Floors	1 Building	107,920 ft ²	107,920	Low Alpha
X-3346A		100' x 190'		
Scales	4 ea	11' x 6'	264	Low Alpha
Floors	1 Building	19,000 ft ²	19,000	Low Alpha
Cylinder Storage Yards				
X-745G-2	1 lot	245' x 550'	135,057	Low Alpha
X-745H (Future lot)	1 lot	486' x 2,178'	1,059,150	Low Alpha
X-7746S	1 lot	197' x 163'	32,968	Low Alpha
X-7746W	1 lot	796' x 166'	132,543	Low Alpha

Table C3.5(A) Number and Dimensions of Facility Components (Total Area) (Cont.)

Component	Number of Components	Dimensions of Component (specify units) ¹	Total Area (ft ²) ¹	Level of Contamination
X-2232C		2,500' x 5'		
Housing	1 Equivalent Area	12,500 ft ²	12,500	Low Alpha
X-6002		120' x 160'		
Floors	1 Building	19,200 ft ²	0	None
X-7725		540' x 820'		
Scales	2 ea	3' x 3'	18	Low Alpha
Trolley, Monorail	1 ea	~1,350 Lft x 2' x 1 rail	2,700	Low Alpha
Cranes, Double-Girder Bridge (Trolley)	5 ea	~204' x 2.3' x 2 rails (shared)	4,692	Low Alpha
Cranes, Single-Girder Bridge	2 ea	~80' x 1.3' x 2 rails (shared)	416	Low Alpha
Cranes, Bridge (30 abandoned)	0	~100' x 2' x 2 rails	0	Low Alpha
Cranes, Wall (5 abandoned)	0	~50' x 2' x 2 rails	0	Low Alpha
Buffer Storage (~75%) ²	1 lot	~208' x 283'	45,000	Low Alpha
South Bldg Floors	1 lot	536' x 272'	145,792	Low Alpha
X-7726		286' x 84'		
Cranes	4 ea	~50' x 2' x 2 rails	800	Low Alpha
Cranes (x1 Job, x1 Monorail, and x2 Mini-Monorail)	4 ea	189 ft ²	189	Low Alpha
Floors (multiple levels)	1 Building	49,500 ft ²	49,500	Low Alpha
X-7727H		~750' x 30'		
Floors	1 Building	26,078 ft ²	26,078	Low Alpha
Total Area			2,494,819	

Note 1: Actual areas were determined by AutoCAD and vary somewhat from a given straight area calculation (l*w).

Note 2: Percentages/Areas listed are realistic probability of floor space needing potential decontamination.

Highlighted rows represent items/equipment to remain in-place and will be decontaminated to a 'Free Release' criterion.

**Table C3.6 Planning and Preparation
(Productive Work Days)**

Group		Type	# Workers	Dur (#y)	Prod Factor	Total (wd)
Supervision		Salary	3	1	219	657
Engineering		Salary	8	1	219	1,752
Operations		Salary	2	1	219	438
		Hourly	2	1	219	438
Maintenance		Salary	4	1	219	876
		Hourly	0	1	219	0
Support	Plant Support	Salary	2	1	219	438
		Hourly	15	1	219	3,285
	Production Support	Salary	0	1	219	0
		Hourly	0	1	219	0
Total			36			7,884

Assumptions:

- Anticipated duration = 1 y
- Productivity Factor = 219 wd/y = 260 - 41(Paid Absences)

Anticipated tasks considered:

- Develop Project Execution Plan and Schedule (including organization and staffing plan and needed services)
- Develop Decommissioning Plan
- Develop/implement Site Characterization Plan
- Review/approve Site Decommissioning Plan by NRC; Regulatory/License issues
- Develop Decommissioning Activity Procedures
- Design Decommissioning Service Area (DSA)
- Initial Project Support/Organization
- Initial Plant Security

**Table C3.7 Decontamination or Dismantling of Radioactive Facility Components
(Productive Work Days)**

Group		Type	# Workers	Dur (#y)	Prod Factor	Total (wd)
Supervision		Salary	6	5	219	6,570
Engineering		Salary	5	5	219	5,475
Operations		Salary	3	5	219	3,285
		Hourly	21	5	219	22,995
Maintenance		Salary	9	5	219	9,855
		Hourly	44	5	219	48,180
Support	Plant Support	Salary	6	5	219	6,570
		Hourly	17	5	219	18,615
	Production Support	Salary	8	5	219	8,760
		Hourly	13	5	219	14,235
Total			132			144,540

Assumptions:

- Anticipated duration = 5 y
- Productivity Factor = 219 wd/y = 260 - 41 (Paid Absences)

Anticipated tasks considered (Listed percentages are a relative indicator of the amount of phased resource effort for each task):

- Erect Decontamination Facility (Minimal comparative effort)
- Decontamination of facilities - Internals (~1.5%)
- Dismantle centrifuge machines; Waste segregation/staging (~54.5%) [46.6 mh/machine]
- Dismantle facilities/components (~17%)
- Tails Cylinder movement/disposition (~5%) [material title transfer DOE/UDS]
- Continued Project and Security Support (~22%)

**Table C3.8 Restoration of Contaminated Areas on Facility Grounds
(Productive Work Days)**

Group		Type	# Workers	Dur (#y)	Prod Factor	Total (wd)
Supervision		Salary	0	2	219	0
Engineering		Salary	0	2	219	0
Operations		Salary	1	2	219	438
		Hourly	5	2	219	2,190
Maintenance		Salary	0	2	219	0
		Hourly	0	2	219	0
Support	Plant Support	Salary	1	2	219	438
		Hourly	0	2	219	0
	Production Support	Salary	0	2	219	0
		Hourly	0	2	219	0
Total			7			3,066

Assumptions:

- Anticipated duration = 2y
- Productivity Factor = 219 wd/y = 260 - 41 (Paid Absences)
- 1 person cleans ~600 - 900 ft²/d (750 ft²/d used avg value) loose contamination (minimal amount of loose contamination anticipated)
- Shares resource allocation coincident with Decontamination or Dismantling phase effort
- Minimal loose contamination and cleanup anticipated
- Labor estimate includes non-labor costs for analytical sampling/surveying efforts

Anticipated tasks considered:

- Decontamination of facilities - external/outside; cylinder
- Perform HP surveys
- Remove fixed contamination; Scarify cylinder storage yards surfaces
- Collect/dispose of yard debris

**Table C3.9 Final Radiation Survey
(Productive Work Days)**

Group		Type	# Workers	Dur (#y)	Prod Factor	Total (wd)
Supervision		Salary	0	2.5	219	0
Engineering		Salary	1	2.5	219	548
Operations		Salary	0	2.5	219	0
		Hourly	0	2.5	219	0
Maintenance		Salary	0	2.5	219	0
		Hourly	1	2.5	219	548
Support	Plant Support	Salary	3	2.5	219	1,641
		Hourly	1	2.5	219	548
	Production Support	Salary	0	2.5	219	0
		Hourly	0	2.5	219	0
Total			6			3,285

Assumptions:

- Anticipated duration = 2.5y
- Productivity Factor = 219 wd/y = 260 - 41 (Paid Absences)
- Work period occurs coincident with the last 2.5 years of the D&D phase.
- Labor estimate includes non-labor costs for analytical sampling/surveying efforts.

Anticipated tasks considered:

- Develop/implement survey plans
- Collect/analyze data
- Perform confirmatory surveys
- Develop final survey report
- Terminate license

**Table C3.10 Site Stabilization and Long-Term Surveillance
(Productive Work Days)**

Group		Type	# Workers	Dur (#y)	Prod Factor	Total (wd)
Supervision		Salary	0	6	219	0
Engineering		Salary	1	6	219	1,314
Operations		Salary	1	6	219	1,314
		Hourly	1	6	219	1,314
Maintenance		Salary	0	6	219	0
		Hourly	2	6	219	2,628
Support	Plant Support	Salary	0	6	219	0
		Hourly	0	6	219	0
	Production Support	Salary	0	6	219	0
		Hourly	0	6	219	0
Total			5			6,570

Assumptions:

- Anticipated duration = 6y (coincident with P&P and D&D)
- Productivity Factor = 219 wd/y = 260 - 41 (Paid Absences)

Anticipated tasks considered:

- Site stabilization - not required
- Maintain maintenance/surveillances on IROFS equipment necessary until license terminated (~ year six)

Table C3.11 Total Work Days by Labor Category

Task	Labor Category Supervision (S)	Labor Category Eng. (S)	Labor Category Operations (S)	Labor Category Operations (H)	Labor Category Maint. (S)	Labor Category Maint. (H)	Labor Category Support (S)	Labor Category Support (H)	Total Phase Labor
Planning and Preparation	657	1,752	438	438	876	0	438	3,285	7,884
Decontamination and/or Dismantling of Radioactive Facility Components	6,570	5,475	3,285	22,995	9,855	48,180	15,330	32,850	144,540
Restoration of Contaminated Areas of Facility Grounds	0	0	438	2,190	0	0	438	0	3,066
Final Radiation Survey	0	548	0	0	0	548	1,641	548	3,285
Site Stabilization and Long-Term Surveillance	0	1,314	1,314	1,314	0	2,628	0	0	6,570
Total	7,227	9,089	5,475	26,937	10,731	51,356	17,847	36,683	165,345

Assumptions:

- Individual tables describe other assumptions; this table is a summation of previous table information categorized by Salary or Hourly per phase.

Table C3.14 Packaging, Shipping, and Disposal of Radioactive Wastes

Waste Type	[A] Disposal Volume (ft ³); # Centrifuges	[B] Number of Containers	[C] Container Volume	[D] Unit Cost (\$/ft ³ or \$/gal)	[E] Total Unclassified Waste Disposal Costs
1: Misc Total Compacted Equ't Solid Waste	76,388	850	90	\$44.20	\$3,381,300
2: Liquid Waste	12,000	295	55	\$73.10	\$1,186,048
Total					\$4,567,348

Assumptions:

- Unclassified, Low-Level Contaminated waste; Liquid waste from machine disassembly
- [A¹] = Total Compacted Volume (Table C3.5); [A2] = # centrifuges (Installed plus Spares) (Table C3.4a)
- [B¹] = A¹/C¹; [B²] = A²*5.4 qt/machine/220 qt/barrel; [C¹] = B-25 boxes volume = 90 ft³; [C²] = 55 gal/barrel
- [D¹] = Unit Cost¹ = \$44.20/ft³ = \$30.08 (Current disposal and transportation cost – Energy Solutions, Clive, UT [1,791 miles one way trip and Brokerage Costs]) + \$13.34/ft³ (Labor costs - Handling, Waste Engineering, Radiological Waste NDA Characterization, and HP Support) + \$0.78/ft³ (Rad Characterization Equipment); [D²] = Unit Cost² = \$73.10 = \$70.00/gal (incineration and disposal @ Diversified Scientific Services Inc. {DSSI}, Oak Ridge, TN) + \$0.95/gal (Transportation and Brokerage cost [350 miles one way trip to DSSI]) + \$2.15/gal (Labor costs - Handling, Sampling, Lab Analyses) [\$2008]
- [E¹] = B¹C¹D¹; [E²] = B²C²D²
- Unclassified Waste Disposal Prorated Ratio [only used in computation for contractor profitability] = amount of waste cost that is directly associated with waste disposal and not subject to contractor profit: ¹(Current disposal and transportation cost)/(Total compacted solid waste cost) = 0.68; ² (incineration and disposal cost + transportation cost)/(Total liquid waste cost) = 0.97
- Unit cost information is based upon current design information and cost information from United States Enrichment Corporation gaseous diffusion operations, specifically Gas Centrifuge Enrichment Plant cleanup.
- Radioactive source and byproduct material sources total compacted volume is less than 1 ft³ and is accounted in [A¹]. Disposing of sources are estimated to cost \$12,559 which includes profile development/approval, two separate shipment paths, transportation cost and material handling markups. The cost of disposing of the sources is included in [E¹]. (see Table C3.18)

Waste Type	[F] # of Centrifuges	[G] Factor (B-25/ma)	[H] Number of Containers	[J] Containers Volume	[K] Unit Cost (\$/ft ³)	[M] Total Classified Waste Disposal Costs
3: Classified Waste	12,000	1.6	19,200	90	\$33.02	\$ 57,058,560
Total			19,200			\$ 57,058,560
Grand Total						\$ 61,625,908
Grand Total (Rounded)						\$ 61.6M

Assumptions:

- Classified, Low-Level Contaminated Waste
- [G] - historical event = 1.6 B-25 boxes/machine
- [H] = number of B-25 boxes = FG
- [J] = B-25 boxes volume = 90 ft³
- [K] = Unit Cost = \$32.02/ft³ = \$14.51/ft³ (Current DOE classified disposal cost - NTS, NV) + \$4.39/ft³ (Transportation [2,136 miles one way trip and Brokerage Costs]) + \$13.34/ft³ (Labor costs - Handling, Waste Engineering, Radiological NDA Waste Characterization, and HP Support) + \$0.78/ft³ (Rad Characterization Equipment) [\$2008]
- [M] = HJK
- B-25 boxes contain volume gaps, which are filled to capacity from scarified yard materials/debris.
- Classified Waste Disposal Prorated Ratio [only used in computation for contractor profitability] = amount of waste cost that is directly associated with waste disposal and not subject to contractor profit: (Current DOE Disposal cost + Transportation cost)/(Total Classified waste cost) = 0.57
- Unit cost information is based upon current design information and cost information from United States Enrichment Corporation gaseous diffusion operations, specifically Gas Centrifuge Enrichment Plant cleanup.

Table C3.15 Equipment/Supply Costs

Equipment/Supplies	[A] Quantity	[B] Unit Cost	[C] Total Equ't/Supply Cost
Centrifuge Dismantling Equipment ¹	8	\$27,946	\$223,568
Cutting Machines ²	2	\$27,946	\$55,892
Degreasers ³	2	\$16,768	\$33,536
Decontamination Tanks ⁴	4	\$27,946	\$111,784
Blast Cabinets ⁵	2	\$27,946	\$55,892
Crushers ⁶	1	\$279,461	\$279,461
Negative Air Machines ⁷	2	\$14,532	\$29,064
B-25 Containers ⁸	20,050	\$938	\$18,806,900
55 gallon Barrels ⁹	295	\$74	\$21,830
TOTALS			\$19,617,927
TOTAL (Rounded)			\$19.6M

Note 1: Specialized tooling and lift fixtures for handling various machine components. Estimate based on in-house design and fabrication.

Note 2: 10" heavy-duty metal band saws, floor mounted, for cutting long parts into manageable size. Estimate cost includes electrical hook-up and anchoring.

Note 3: All electric pressure cleaner for removing residue from the machines. Estimated cost includes electrical hook-up and anchoring.

Note 4: Geometrically safe stainless steel holding tanks for supporting the cleaning operation. Cost includes tank supports, suction pumps, associated valves and piping.

Note 5: Booth enclosures to support the degreasing operation.

Note 6: Heavy-duty metal hydraulic crusher for volume reduction, surface mounted. Estimated cost includes associated components, utility hook-ups, and anchoring.

Note 7: Heavy-duty air filtration device to maintain negative air differential and filtration between an enclosure and atmosphere.

Note 8: Approved metal containers for storage/shipment of dismantled machine and machine components. Quantity is sum of B-25 containers from Table C3.14 (850 + 19,200 = 20,050).

Note 9: Barrels for the capturing of dismantled machine and machine component fluids from Table C3.14 (295).

Assumptions:

- [C] = AB
- Unit costs are derived utilizing industrial standard equipment and Department of Energy Gas Centrifuge Enrichment Plant cleanout project experience.
- Unit costs increased by Inflation Index = CY2005 (3.2%) * CY2006 (3.2%) * CY2007 (2.7%) * CY2008 (2.2%) [Ref. A]; Total Inflation Index (CY 08) = 1.1178; except B-25 containers and 55 gallon barrels, which are listed in actual \$CY08 in lieu of 2004 indexed to 2008 dollars.
[Ref A] = Implicit Price Deflator of the Gross Domestic Product for 2005 (1.032), 2006 (1.032), 2007 (1.027) or Administration (Council of economic Advisors Forecast Inflation) for 2008 (1.022) as amended by the GDP price index on June 6, 2007.

Table C3.16 Laboratory Costs

Phase	Activity	# Workers	# Year	Routine Freq (samples/y)	Recall Freq (samples/y)	Incident Freq (samples/y)	Sample Factor	Unit Cost (\$)	Total Cost
1	Planning and Preparation	36	1	4	0.2	2	6.2	115	\$25,668
2	Decontamination or Dismantling	132	5	12	0.6	6	18.6	115	\$1,411,740
3	Restoration of Contaminated Areas	7	2	12	0.6	4	16.6	115	\$26,726
4	Final Radiation Survey	6	2.5	12	0.6	4	16.6	115	\$28,635
5	Long Term Surveillance	5	6	4	0.2	2	6.2	115	\$21,390
TOTALS		186							\$1,514,159
TOTAL (Rounded)									\$1.5M

Assumptions:

- The utilization of the 'on-site' laboratory facility is anticipated; therefore, there are no associated transportation costs included in the derivation of the Unit Cost.
- Routine frequency is the anticipated number of samples per individual per year (see Table 4.7-3 of the License Application).
- Recall Frequency assumes 5 percent recall rate; Recall = an individual sample submitted when analysis results exceed a predetermined urinalysis program action level (see Table 4.7-3 of the ACP License Application).
- Incident Frequency assumes two samples submitted for each incident; Incident = a special sample submitted for analysis due to an incident (for example, a personnel contamination event or an airborne release of radioactive material event occurs).
- Sample factor = routine freq % + Recall % + Incident %; Total cost = (# worker/phase) * (# yr) * Sample Factor * Unit Cost.
- # samples = (# worker/phase) * (Routine freq % + Recall % + Incident %) * # yr
- Analytical Unit Cost = \$115/sample [Amount based for uranium isotopic analysis by alpha spectrometry and includes analysis performance, labor, and cost of materials plus overheads] (\$CY08).

Table C3.17 Miscellaneous Costs**Other Direct Costs**

Cost Item	Total Cost
Miscellaneous Material for DeCon ¹	\$2,945,500
Total	\$2,945,500
Total (Rounded)	\$2.9M

Note 1: Estimate based upon percentage of Decommissioning Cost subtotal (1.5% * Total Other Costs) (values from Table C3.18) [0.015 * (Total Other Indirect Costs)].

Other Indirect Costs

Cost Item	Total Cost
NRC Staff Review and Approval DP ²	\$90,000
License Fees ³	\$24,556,260
DOE Lease	\$12,089,700
Business Ins	\$ 1,922,069
Total	\$38,658,029
Total (Rounded)	\$38.7M

Note 2: Estimate based upon review and approval for Decommissioning Plan (DP).
 Inflation Index = CY2005 (3.2%) * CY2006 (3.2%) * CY2007 (2.7%) * CY2008 (2.2%)[Ref. A].

Note 3: Estimate based upon NRC Annual Operational Fees for plant.

Table C3.18 Total Decommissioning Costs

Ref	Task	Calculated Costs (\$2008, M)	Percentage
D3.13	Planning and Preparation	\$ 3.3	1%
D3.13	Decontamination and/or Dismantling of Radioactive Facility Components	\$ 51.5	20%
D3.13	Restoration of Contaminated Areas on Facility Grounds	\$ 0.9	1%
D3.13	Final Radiation Survey	\$ 1.6	1%
D3.13	Site Stabilization and Long-Term Surveillance	\$ 3.0	1%
CS-3-6	Indirect Services	\$ 71.9	28%
C3.14	Packaging, Shipping, and Waste Disposal Costs	\$ 61.6	24%
C3.15	Equipment/Supply Costs	\$ 19.6	8%
C3.16	Laboratory Costs	\$ 1.5	1%
C3.17	Other Direct Costs	\$ 2.9	1%
C3.17	Other Indirect Costs	\$ 38.7	15%
	Subtotal¹	\$256.5	100%
	G&A ²	\$ 15.4	
	Contractor Profit ³	\$ 29.9	
	Contingency ⁴	\$ 75.5	
	Total Labor & Materials Cost	\$377.3	
	Tails Disposal Cost	\$ 717.6	
	Tails Contingency ⁵	\$179.4	
	Total Tails Disposal Cost	\$896.9	
	Total Decommissioning Cost Estimate (Including Tails Disposal)	\$1,274.2	

Note 1: Subtotal includes labor/materials overhead allocations costs.

Note 2: General and Administrative (G&A) cost assumed to be 6% based upon current company's experience.

Note 3: Contractor Profit assumed to be 15% of the subtotal plus G&A minus other indirect costs ([excluding insurance] minus the outside services portion of the Packaging, Shipping, and Waste Disposal Costs (15% * [256.5 + 15.4 - 36.7 - 36.1] = \$29.9M).

Note 4: Contingency assumed to be 25% on subtotal plus G&A and contractor profit.

Note 5: Contingency assumed to be 25% on Tails Disposal cost.

Note 6: Total cost for disposal of sources = Packaging, Shipping and Waste Disposal Cost, G&A Cost (6%), Contractor Profit (15%) and Contingency (25%) [\$12,559 + \$754 + \$1,997 + \$3,827 = \$19,137] which is included in the costs listed above.

Table C3.18A Total Incremental Decommissioning Costs

Calendar Year	Total Facility Cost	Total Machine Disposal Cost	G&A (6%)	Contractor Profit (15%)	Contingency (25%)	Total Labor and Materials Cost	Tails Disposal Cost (Table C3.19)	Tails Contingency	Total Tails Disposal Cost	Total Incremental Decommissioning Cost
2007	\$176.1	-	\$10.6	\$17.0	\$50.9	\$254.6	-	-	-	\$254.6
2008	\$176.1	-	\$10.6	\$17.0	\$50.9	\$254.6	-	-	-	\$254.6
2009	\$176.1	-	\$10.6	\$17.0	\$50.9	\$254.6	-	-	-	\$254.6
2010	\$176.1	\$4.7	\$10.8	\$17.8	\$52.4	\$261.8	\$1.7	\$0.4	\$2.1	\$263.9
2011	\$176.1	\$29.8	\$12.4	\$21.8	\$60.0	\$300.1	\$10.8	\$2.7	\$13.5	\$313.6
2012	\$176.1	\$62.0	\$14.3	\$26.9	\$69.8	\$349.1	\$22.5	\$5.6	\$28.1	\$377.2
2013	\$176.1	\$77.2	\$15.2	\$29.3	\$74.5	\$372.3	\$28.0	\$7.0	\$35.0	\$407.3
2014-2037	\$176.1	\$80.5	\$15.4	\$29.9	\$75.5	\$377.3	\$654.6	\$163.7	\$818.2	\$1,195.3
Total						\$377.3	\$717.6	\$179.4	\$896.9	\$1,274.2

Note: Values are in \$2008, Million

Assumptions:

- Operational (license) life = 30 years (from 2007 – 2037); 365 days/yr; 24 hr/day; License Receipt = 04/13/2007
- Facility Cost = Total Labor (Planning and Preparation) [D3.13] + Decommissioning and/or Dismantling of Radioactive Facility Components [D3.13] + Restoration of Contaminated Areas on Facility Grounds [D3.13] + Final Radiation Survey [D3.13] + Site Stabilization and Long-term Surveillance [D3.13] + Indirect Services [C3.18] + Equipment/Supply {not associated with Machine Disposal; i.e., total minus B-25 boxes and 55 gallon drums} [C3.15] + Laboratory [C3.16] + Miscellaneous Direct [C3.17] + Indirect Costs [C3.17] {Conservatively assumed to be constant during construction period and needed upon license receipt.}
- Total Machine Disposal Cost = Incremental machine installation captured from Table C3.19A
- Total Labor and Material Cost (Calculated the same as Table C3.18) = Total Facility Cost + Total Machine Disposal Cost + G&A + Contractor Profit + Contingency. The last value under years 2014-2037 is the anticipated Total Labor and Materials Cost including G&A, Contractor Profit, and Contingency. The Total is not the sum of the column, it is based upon the facilities and machine disposal cost, which is at full load by the year 2011.
- Total Tails Disposal Cost = Incremental Tails disposal cost captured from Table C3.19 + 25% Contingency.
- Total Incremental Decommissioning Cost (during initial construction period) by year = sums across Total Labor and Materials Cost + Total Tails Disposal Cost. The Total Incremental Decommissioning Cost is not the sum of the columns.

Table C3.19 Estimated Volume of Annual Depleted Uranium Generated

Calendar Year	[Q] # Machines	[R] DUF ₆ Generated [1,000 MT]	[S] DUF ₆ Accumulated [1,000 MT]	[T] DU Generated [1,000 MT]	[U] Tails Disposal Cost [\$, 2008]	[V] # Tails Cylinders
2010	699	0.5	0.5	0.3	\$1.7	41
2011	4,450	3.2	3.7	2.2	\$10.8	259
2012	9,240	6.7	10.5	4.6	\$22.5	540
2013	11,520	8.4	18.9	5.7	\$28.0	672
2014-2037	11,520	195.6	214.4	132.2	\$654.6	15,679
Total		214.4		145.0	\$717.6	17,191

Assumptions:

- No Lead Cascade contribution considered for production/operation/cost
- Q = # machines – based upon Machine Build Schedule (Revision 6, dated 03/24/2008)
- Operational life = 28 years (from 2010 - 2037); continuous operation
- Tails Output during Operation (@ 3,800 MTSWU/yr) = 2,108 lbs UF₆/hr
- Weight Conversion Factor (WCF) = 0.45359 kg/lb; Tails Material Conversion Factor = 0.30668 kg/lb UF₆; Tails Purity (TP) = 0.67612 gU/g; based upon Tails Assay of 0.30 wt.% U²³⁵
- U disposal cost = \$4.95/kg U (\$2008)
- $R = T / 0.67612$
- $U = T * (\text{U Disposal Cost})$
- 27,500 lbs UF₆ 48G fill limit
- $V = R * 1M / 0.45359 / 27,500$
- ~17,191 Tails cylinders generated plus ~ 444 product and feed cylinders for managing working inventory @ End of Life

Table C3.19A Estimated Incremental Machine Disposal Cost

Calendar Year	[Q] # Machines	[R ²] Estimated Disposal Cost	[S ²] Machine Ratio	[U ²] Incremental Machine Disposal Cost [\$, 2008]
2007	0	\$80.5	0.0	-
2008	0	\$80.5	0.0	-
2009	0	\$80.5	0.0	-
2010	699	\$80.5	0.06	\$4.7
2011	4,450	\$80.5	0.37	\$29.8
2012	9,240	\$80.5	0.77	\$62.0
2013	11,520	\$80.5	0.96	\$77.2
2014-2037	12,000	\$80.5	1.00	\$80.5
Total		\$80.5	1.00	\$80.5

Assumptions:

- Operational (license) life = 30 years (from 2007 – 2037); 365 days/yr; 24 hr/day; License Receipt 04/13/2007
- Calendar year and Q = # Machines; consistent with Table C3.19; The difference in total number of machines is the estimated number of spares needed, which in the Tails computation, do not generate inventory from Table C3.19.
- R^2 = sum of Total Classified and Unclassified Waste Disposal Cost from Table C3.14 plus the cost of the B-25 containers and 55-gallon barrels from Table C3.15 (\$61.6M + \$18.9M = \$80.5M) [Assumed to be a fixed cost over the initial construction period].
- S^2 = machine ratio (incremental installation over construction period) = Q/Total # Machines.
- $U^2 = R^2 * S^2$

Table C3.20 Total Labor Distribution

Group		Type	Job/Personnel Descriptions
Supervision		Salary	Program Manager, Project Manager, Office Manager, QA/Reg Manager, Rad-Environmental-Safety and Health Manager, FNMCA Manager
Engineering		Salary	Design Engineer, Field Support, NCS Engineer, Nuclear Safety, Regulatory
Operations		Salary	Operations FLM
		Hourly	Chemical Operations, UMH
Maintenance		Salary	Maintenance FLM, Scheduler-Planner
		Hourly	Mechanic, Laborer, Field Service Technician
Support	Plant Support	Salary	HP Support
		Hourly	Protection Forces
	Production Support	Salary	Waste Engineer
		Hourly	Waste Handler

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