



June 30, 2006  
AET 06-0082

Mr. Jack R. Strosnider  
Director, Office of Nuclear Material Safety and Safeguards  
Attention: Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

**American Centrifuge Plant  
Docket Number 70-7004  
Submittal of Planned Changes to the License Application and Supporting Documents for the  
American Centrifuge Plant (TAC Nos. L32306, L32307, and L32308)**

Dear Mr. Strosnider:

During a conference call held with the U.S. Nuclear Regulatory Commission (NRC) staff on June 20, 2006, the NRC stated that the escalation factors used in the USEC Inc. (USEC) revised analysis of the estimated depleted uranium disposal costs specific to the American Centrifuge Plant (ACP) should be based, depending on the cost component, on either historical values or specific annual projections used by the U.S. Department of Energy. The NRC requested that USEC revise its analysis accordingly.

Pursuant to this request, the escalation factors utilized in USEC's revised analysis of the estimated depleted uranium disposal costs specific to the ACP have been modified based on the NRC staff's request. USEC hereby submits to the NRC, a revised analysis which reflects the new depleted uranium disposal unit cost for the ACP is \$4.62/kgU. This revised analysis is provided as Enclosure 1 of this letter. Enclosure 2 provides the non-proprietary planned changes for the License Application, Decommissioning Funding Plan (DFP), and Environmental Report for the ACP. These planned changes will be finalized and submitted to the NRC in the next revision of the License Application and supporting documents.

A revised supplemental reference depicting the 2006 calendar year cost estimate for the decommissioning of the 7 million separative work unit capacity plant related to the Request for Additional Information for the Environmental Report for the American Centrifuge Plant will be submitted by USEC letter AET 06-0084.

Mr. Jack R. Strosnider

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If you have any questions regarding this matter, please contact Peter J. Miner at (301) 564-3470.

Sincerely,

A handwritten signature in black ink, appearing to read "Stef. Toelle", with a large, stylized flourish extending to the right.

Steven A. Toelle  
Director, Regulatory Affairs

cc: M. Blevins, NRC HQ  
S. Echols, NRC HQ  
T. Johnson, NRC HQ  
B. Smith, NRC HQ

Enclosures: As Stated

**Enclosure 1 of AET 06-0082**

**Revised Analysis for Depleted Uranium Disposal Unit Cost  
for the American Centrifuge Plant**

**Enclosure 1 of AET 06-0082**

By letter dated March 20, 2006, USEC Inc. (USEC) submitted to the U.S. Nuclear Regulatory Commission (NRC), a revised analysis of the estimated depleted uranium disposal costs specific to the American Centrifuge Plant (ACP) utilizing the methodology and data contained in the U.S. Department of Energy (DOE)/LMI report.

NRC completed an evaluation of USEC's submittal, as well as points discussed during an April 7, 2006 conference call and provided results to USEC by letter dated May 3, 2006. NRC staff requested that USEC modify the Decommissioning Funding Plan for the ACP to use a 25 percent contingency factor and conduct the analysis utilizing 2006-year dollars. NRC indicated that it finds it acceptable to take credit for the contingencies that have been previously applied in the DOE cost estimate for the construction and plant operating costs.

Based upon this guidance, USEC completed a new analysis for the depleted uranium disposal unit cost for the ACP and it was determined to be \$4.60/kgU. This rate was based on the DOE/LMI methodology and adjusted for USEC tails, DOE contingencies, and inflation.

During a conference call held on June 20, 2006, NRC stated that the escalation factors need to be based on historical values, not the DOE projections. It was noted, however, that operating costs are stated in 2008 dollars in the LMI report. Regarding resolution of the appropriate value to be utilized, NRC provided the following recommendations to USEC: 1) use historical data, such as the Implicit Price Deflator, for those costs not stated in 2008 dollars (rather than DOE projections) and 2) only deescalate the 2008 dollars to 2006, rather than deescalating to 2004 and then applying the escalation rate from 2004 to 2006.

Therefore, USEC revised the estimated depleted uranium disposal costs specific to the ACP utilizing the guidance provided on June 20, 2006. USEC's new unit cost is \$4.62/kgU (see Table 1).

**Information contained within  
does not contain  
Export Controlled Information**

**Reviewer: R. Coriell  
Date: June 29, 2006**

**Table 1**  
Revised June 21, 2006

Scenario 2: Process at Portsmouth in "Base" Plant  
Based on "An Analysis of DOE's Cost to Dispose of DUF6 - Revision 1", LMI, July 2005

		<u>per Kg DUF6</u>	<u>2006 dollars per Kg DUF6</u>
<b>Investment costs</b>			
Plant construction (\$000)	\$ 133,800		
Less: Contingency (20%)	\$ (22,300)		
Plant construction, net of contingency	\$ 111,500		
Life of the plant (years)	38		
Plant start	2009		
Start receiving non-DOE tails	2011		
 DOE DUF6 (MT)	 245,700		
USEC-ACP DUF6 (MT)	<u>265,300</u>		
Total	511,000		
 USEC-ACP pro rata share	 52%		
USEC pro rata investment cost	\$ 57,888		
 Investment cost in equivalent annual value (c)	 \$ 2,778		
Investment equivalent annual cost per Kg DUF6		\$ 0.40	\$ 0.42 (d)
 <b>Annual operating costs</b>			
Plant operations	\$ 1.76		
Less: Contingency (10%)	\$ (0.16)		
Plant operations, net of contingency	\$ 1.60	\$ 1.69	(e)
 Plant recapitalization costs	 \$ 0.33	 \$ 0.35	(e)
Transportation to Portsmouth costs	\$ -	\$ -	
Product disposal	\$ 0.37	\$ 0.39	(e)
Surveillance and maintenance costs	\$ 0.003	\$ 0.003	(e)
 <b>Decon &amp; Decommissioning</b>			
Plant D&D cost (\$000)	\$ 47,600		
USEC-ACP pro rata share	52%		
USEC pro rata D&D cost	\$ 24,713		
 Equivalent uniform annual cost (c)	 \$ 1,186		
Equivalent annual cost per Kg DUF6		\$ 0.17	\$ 0.18 (d)
 Federal administrative charge		\$ 0.09	\$ 0.09 (f)
 <b>Total per Kg DUF6</b>		<u>\$ 2.96</u>	<u>\$ 3.12</u>
 <b>Total per Kg DU</b>		<u>\$ 4.38</u>	<u>\$ 4.62</u>

**Assumptions:**

- (a) Plant remains in operation until the DOE backlog and USEC-ACP DUF6 are processed.
- (b) USEC-ACP DUF6 is treated concurrently with other DUF6.
- (c) Using LMI methodology, cost includes a 3.5% annual charge applied to both current capital expenditures and future D&D expenditures over the projected life of the plant.
- (d) Cost escalated from 2004 dollars to 2006 dollars based on (i) the Implicit Price Deflator of the Gross Domestic Product for 2004 (109.099) and 2005 (112.145), for an annual increase in 2005 of 2.8%, and (ii) the Administration's June 8, 2006 estimate of inflation for 2006, as measured by a forecast of the GDP index, of 2.9%.
- (e) DOE's baseline operating costs in 2008 dollars were de-escalated to 2004 dollars by LMI using a DOE-suggested factor of 10.5%, which equals the following annual rates issued by DOE's Office of Engineering and Construction Management in January 2004:

**Escalation Rate Assumptions for DOE Projects - Operations and Management:**

2005 - 2.7%  
2006 - 2.6%  
2007 - 2.4%  
2008 - 2.4%  
Compound Rate - 10.5%

Operating costs above were escalated from 2004 dollars to 2006 dollars using the factor of 2.7% for 2005 and 2.6% for 2006.

- (f) The proposed federal administrative charge of 3% rounds to \$0.09 in both 2004 and 2006 dollars.

**Enclosure 2 of AET 06-0082**

**Planned Changes for the License Application, Decommissioning Funding Plan,  
and Environmental Report for the American Centrifuge Plant**

school aged children is not anticipated to exceed 437. This represents approximately 1 percent of the school population measured in 2000. The manufacturing phase will not significantly impact ROI demand for K–12 educational infrastructure and services.

The additional 2,055 jobs created by the manufacturing phase should not have a significant impact on the local housing market. As shown in Section 3.11, the average occupancy rate in the ROI is 8.6 percent for rental property and there are approximately 22,824 units available; therefore, based upon 2000 census data, there are 1,963 rental units available. There is adequate short-term housing available for the manufacturing phase of the project; therefore, there are no projected negative impacts on short-term housing demand during the manufacturing phase.

### **Decontamination and Decommissioning**

Under the Proposed Action, the facilities utilized for the ACP will undergo decontamination and decommissioning (D&D). The D&D of these facilities is estimated to commence approximately 30 years from the first year of operation. It should be noted that the RMIS II ROI multipliers cannot be predicted over a 30-year period. This is due to changes within the ROI population, tax structure, school and housing developments. Nevertheless, the socioeconomic impacts will be estimated as a baseline estimate using current RMIS II multipliers and facility D&D estimates. D&D estimates for facilities operating with an NRC license are required to be reviewed and revised every two years.

The D&D of Commercial Centrifuge facilities are estimated to cost \$516.7 million and are expected to occur over a six-year period, 30 years from the first year of facility operation. The BEA RIMS II Final Demand Multipliers provide a means of evaluating indirect impacts on employment and earnings that are based upon projected final demand change in the ROI. There are two elements of employment during the D&D phase. One element will consist of USEC employees transitioned from current positions at Piketon that will support management, design, licensing, planning, demolition, reuse, evaluation, quality assurance, nuclear and radiological safety, and operational readiness assessments for the D&D of the Commercial Centrifuge Plant facilities. Because the USEC personnel will be transitioned from current positions at Piketon their employment and wages will have little impact on local resources and earnings. The USEC level of effort would start with 67 full time employees in Year 2030 and peak at approximately 260 in Year 2035. An average USEC employment of 148 was utilized for years 2031 through 2036

The increase in Final Demand (\$516.7 million) created by the D&D project creates average annual earnings of \$26.8 million dollars. The average per capita income that is reported in Section 3.10 of this ER for the ROI is \$25,317. The state income tax rate for incomes between 20,000 and 40,000 is \$445.80 plus 4.5 percent of excess over \$20,000. At this average income, the anticipated revenue from income taxes will be \$576 thousand per year and \$3.5 million (in 2004 dollars) for the D&D phase. Assuming that 75 percent of earnings after taxes are spent in Ohio, the state would receive \$932 thousand in annual revenue from the 6 percent state sales tax and \$5.6 million during the six-year D&D phase of the project (2004 dollars). Pike County would also benefit from its county sales tax of 1 percent. Assuming that half of all transactions occur within Pike County, the county would receive approximately \$103 thousand in annual tax

revenue. The D&D phase will provide a positive impact on the ROI earnings and tax base.

The increase in Final Demand over the six years would lead to the creation of an average of 407 jobs per year (Table 4.10-6). This includes both direct employment related to the ACP D&D and indirect employment created by the additional local demand on goods and services. USEC employment during the D&D phase will be transitioned from present employees at Piketon; consequently, both the USEC employees, estimated to be a maximum average of 148, and the indirect employment currently associated with them is excluded from assessing impacts on the local infrastructure. The number of indirect jobs stemming from the USEC employees will be approximately 286 per year. Excluding the USEC employees and the 286 jobs they indirectly create, leaves 407 direct D&D contractor jobs and the indirect jobs they stimulate.

**Table 4.10-6 Estimated Impacts of D&D at the Preferred Site**

Change in Final Demand (million \$)	516.7
<b><i>Final Demand Multipliers<sup>a</sup>:</i></b>	
Output (\$)	1.47
Earnings (\$)	0.37
Employment (jobs)	11.6
<b><i>Total Impacts:</i></b>	
Total Output (million \$)	639
Average Annual Earnings (million \$)	26.8
Average Annual Employment (jobs)	841
Number of Years Duration for this Phase	6
<b><i>Detailed Impacts:</i></b>	
USEC Construction Employment	148
Indirect Jobs Linked to D&D	286.1
New Jobs	407
Added School aged children	86
Students in ROI	37,700
Percentage of School Population	0.23%
Avg. Income	25,317
Income Tax for each state	685.2
Total Annual Income Tax	\$576,308
Total Income Tax	\$3,457,847
Ohio 6% Sales Tax	\$932,188
Total State Sales Tax	\$5,593,128
Pike County Sales Tax 1%	\$103,576.45
Total County Sales Tax	\$621,458.67

<sup>a</sup> BEA (2004)



- 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 2006 dollars, excluding tails disposition costs, is \$317.6 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; and

Cost estimates to dispose of  $UF_6$  tails generated during ACP operation are presented in Table C3.19. The ultimate disposal of  $UF_6$  tails is to be determined. USEC intends to evaluate possible commercial uses of  $UF_6$  tails.  $UF_6$  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  $DUF_6$  conversion facilities and/or other licensed facilities.  $UF_6$  tails are stored in steel cylinders until they can be processed

in accordance with the disposal strategy established and selected by USEC. 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 UF<sub>6</sub> tails disposition costs, USEC assumes that the total quantity of tails generated during ACP operation are processed by the DOE DUF<sub>6</sub> conversion facility in Piketon, Ohio.

USEC provides financial assurance to incrementally fund the estimated cost of conversion and disposal of the UF<sub>6</sub> 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 9,520 MT of UF<sub>6</sub> tails annually. USEC estimates that it will take approximately four years for the ACP to ramp up to the full capacity of 3.5 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 \$3.29/kilogram (kg) uranium (U) to \$4.62/kg U, depending on a number of factors and assumptions. The unknown factors include: location(s) for processing USEC 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 USEC and DOE); and DOE oversight costs.

USEC 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, LMI<sup>2</sup>. This redacted report was provided to USEC by DOE<sup>3</sup>. Using the methodology and supporting data contained in the redacted LMI report, USEC prepared an analysis of the estimated depleted uranium disposal costs specific to the ACP. As documented in this analysis, USEC has developed a unit cost of \$4.62/kg U for processing the ACP depleted uranium at the DOE's Portsmouth DUF<sub>6</sub> Conversion Facility. USEC believes the unit cost of \$4.62/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, USEC's liability for disposal of depleted uranium is \$828.7 million in 2006 dollars. With a 25 percent contingency, this represents a total liability of \$1,035.9 million in 2006 dollars for 30-years of operation. Although a total liability is provided, USEC will incrementally fund the estimated costs associated with disposal of the depleted uranium inventory as the depleted uranium is generated during ACP operation.

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<sup>2</sup> LMI Government Consulting, Report DE523T1, "An Analysis of DOE's Cost to Dispose of DUF<sub>6</sub>," Revision 1, July 2005 [Redacted January 31, 2006].

<sup>3</sup> Mr. Larry W. Brown (DOE) letter to Mr. Phil Sewell (USEC), "Conversion and Disposal of Depleted Uranium Hexafluoride (DUF<sub>6</sub>) Generated by USEC at the American Centrifuge Plant in Piketon, Ohio," dated February 10, 2006.

USEC's total decommissioning liability is the sum of the total plant decommissioning costs and the tails disposition costs. USEC's total liability for decommissioning the ACP, including applicable contingencies, is \$1,353.5 million.

#### 4.0 DECOMMISSIONING FUNDING MECHANISM

USEC presently intends to utilize a surety bond to provide reasonable assurance of decommissioning funding, pursuant to 10 CFR 70.25(f). Accordingly, USEC provides with this application model documentation related to the use of the surety method of providing decommissioning financial assurance.<sup>4</sup> However, as described in Section 1.0 of this plan, USEC 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, USEC will supplement its application to include the signed, executed documentation.

As noted above, USEC 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 USEC 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. USEC describes below the particular attributes it presently anticipates including in the surety bond.

With respect to the surety bond, USEC 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 USEC. Further, in the event USEC 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.

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<sup>4</sup> 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. USEC will consider this model documentation as guidance in preparing and executing funding instruments for the ACP. In the event USEC 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.

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

Waste Type	[A] Disposal Volume (ft <sup>3</sup> ); # Centrifuges	[B] Number of Containers	[C] Container Volume	[D] Unit Cost (\$/ft <sup>3</sup> or \$/gal)	[E] Total Unclassified Waste Disposal Costs
Compacted Equ't Solid Waste from Table 3.5	59,835	665	90	\$44.57	\$2,666,592
Liquid Waste	12,000	295	55	\$76.29	\$1,235,888
<b>Total</b>		959			\$3,902,480

Assumptions: Unclassified, Low-Level Contaminated waste; Liquid waste from machine disassembly  
 [A<sup>1</sup>] = Total Compacted Volume (Table C3.5); [A<sup>2</sup>] = # centrifuges  
 [B<sup>1</sup>] = A<sup>1</sup>/C<sup>1</sup>; [B<sup>2</sup>] = A<sup>2</sup>\*5.4 qt/machine/220 qt/barrel  
 [C<sup>1</sup>] = B-25 Boxes volume = 90 ft<sup>3</sup> = 2.7 m<sup>3</sup>; [C<sup>2</sup>] = 55 gal/barrel  
 [D<sup>1</sup>] = \$42.13/ft<sup>3</sup> \* [Inflation Index] = \$28.00/ft<sup>3</sup> (Current disposal and transportation cost - EnviroCare, Clive, UT [1791 miles one way trip and Brokerage Costs]) + \$13.41/ft<sup>3</sup> (Labor costs - Handling, Waste Engineering, Radiological Waste NDA Characterization, and HP Support) + \$0.72/ft<sup>3</sup> (Rad Characterization Equipment); [D<sup>2</sup>] = \$72.12/gal \* [Inflation Index] = \$65.00/gal (incineration & Disposal @ DSSI, Oak Ridge, TN) + \$0.34/gal (Transportation & Brokerage cost [350 miles one way trip]) + \$6.78/gal (Labor costs - Handling, Sampling, Lab Analyses);  
 Inflation Index = CY2005 (2.8%) \* CY2006 (2.9%) [Ref. A]  
 [E<sup>1</sup>] = A<sup>1</sup>D<sup>1</sup>; [E<sup>2</sup>] = B<sup>2</sup>C<sup>2</sup>D<sup>2</sup>; Ref. A - Implicit Price Deflator of the Gross Domestic Product for 2005; Administration (Department of Treasury) June 8, 2006 estimate of inflation for 2006

Waste Type	[F] # of Centrifuges	[G] Factor (B-25/ma)	[H] Number of Containers	[J] Containers Volume	[K] Unit Cost (\$/ft <sup>3</sup> )	[M] Total Classified Waste Disposal Costs
Classified Waste	12,000	1.6	19,200	90	\$26.83	\$ 46,355,522
<b>Total</b>			19,200			\$ 46,355.522

Assumptions: Classified, Low-Level Contaminated Waste  
 [G] = GCEP Cleanout estimate ratio = 1.6 B-25 boxes / machine (2,000 boxes / 1,376 machines)  
 [H] = # B-25 Boxes = FG  
 [J] = B-25 Boxes volume = 90 ft<sup>3</sup>  
 [K] = \$25.36/ft<sup>3</sup> \* [Inflation Index] = \$7.25/ft<sup>3</sup> (Current DOE classified disposal cost - NTS, NV) + \$3.97/ft<sup>3</sup> (Transportation [2,136 miles one way trip & Brokerage Costs]) + \$13.41/ft<sup>3</sup> (Labor costs - Handling, Waste Engineering, Radiological NDA Waste Characterization, and HP Support) + \$0.72/ft<sup>3</sup> (Rad Characterization Equipment); Inflation Index = CY2005 (2.8%) \* CY2006 (2.9%) [Ref. A]  
 [M] = HJK  
 B-25 boxes contain volume gaps, which are filled to capacity from scarified yard materials/debris.

Table C3.15 Equipment/Supply Costs

Equipment/Supplies	Quantity	Unit Cost	Total Equ't/Supply Cost
Centrifuge Dismantling Equipment <sup>1</sup>	6	\$26,445	\$158,672
Cutting Machines <sup>2</sup>	2	\$26,445	\$52,891
Degreasers <sup>3</sup>	2	\$15,867	\$31,734
Decontamination Tanks <sup>4</sup>	4	\$26,445	\$105,781
Blast Cabinets <sup>5</sup>	2	\$26,445	\$52,891
Crushers <sup>6</sup>	1	\$264,453	\$264,453
Negative Air Machines <sup>7</sup>	2	\$13,752	\$27,503
B-25 Containers <sup>8</sup>	19,865	\$848	\$16,845,380
55 gallon Barrels <sup>9</sup>	295	\$53	\$15,579
<b>TOTALS</b>	<b>19,884</b>		<b>\$17,554,884</b>

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 sized. 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.

Note 9: Barrels for the capturing of dismantled machine and machine component fluids.

Unit costs are derived utilizing industrial standard equipment and DOE GCEP cleanout project experience.

Unit costs increased by Inflation Index = CY2005 (2.8%) \* CY2006 (2.9%) [Ref. A].

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

<b>Cost Item</b>	<b>Total Cost</b>
Miscellaneous Material for DeCon <sup>1</sup>	\$2,625,000
<b>Total</b>	<b>\$2,625,000</b>

Note 1: Estimate based upon percentage of Decommissioning Cost subtotal (1.5% Direct Labor and Equipment) (C3.18).

**Other Indirect Costs**

<b>Cost Item</b>	<b>Total Cost</b>
NRC Staff Review and Approval DP <sup>2</sup>	\$84,625
License Fees <sup>3</sup>	\$18,690,000
DOE Lease	\$13,479,240
Business Ins	\$ 450,000
Taxes	-
<b>Total</b>	<b>\$32,703,865</b>

Note 2: Estimate based upon review and approval for Decommissioning Plan (DP).  
Inflation Index = CY2005 (2.8%) \* CY2006 (2.9%) [Ref. A].

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

Table C3.18 Total Decommissioning Costs

Task	Calculated Costs	Percentage
Planning and Preparation	\$ 2,732,424	1.27%
Decontamination and/or Dismantling of Radioactive Facility Components	\$ 45,174,244	20.99%
Restoration of Contaminated Areas on Facility Grounds	\$ 800,967	0.37%
Final Radiation Survey	\$ 1,143,643	0.53%
Site Stabilization and Long-Term Surveillance	\$ 2,682,696	1.25%
Indirect Services	\$ 58,101,109	26.99%
Packaging, Shipping, and Waste Disposal Costs	\$ 50,258,002	23.35%
Equipment/Supply Costs	\$ 17,554,884	8.16%
Laboratory Costs	\$ 1,482,074	0.69%
Other Direct Costs	\$ 2,625,000	1.22%
Other Indirect Costs	\$ 32,703,865	15.19%
<b>Subtotal</b>	<b>\$215,258,908</b>	<b>100%</b>
G&A (6%)	\$ 12,915,534	
Contractor Profit (15%)	\$ 25,877,941	
Contingency (25%)	\$ 63,513,096	
<b>Total Labor &amp; Materials Cost</b>	<b>\$317,564,478</b>	
Tails Disposal Cost	\$ 828,720,007	
Tails Contingency (10%)	\$207,180,002	
<b>Total Tails Disposal Cost</b>	<b>\$1,035,900,009</b>	
<b>Total Decommissioning Cost Estimate (Including Tails Disposal)</b>	<b>\$1,353,465,487</b>	

Table C3.19 Estimated Volume of Annual Depleted Uranium Generated

Calendar Year	[Q] # Machines	[R] DUF <sub>6</sub> Generated [1,000 MT]	[S] DUF <sub>6</sub> Accumulated [1,000 MT]	[T] DU Generated [1,000 MT]	[U] Tails Disposal Cost [\$M, 2006]	[V] # Tails Cylinders
2006	200	0	0	0	\$0	0
2007	120	0.099	0.099	0.067	\$309,648	8
2008	2,700	2.23	2.33	1.51	\$6,967,069	179
2009	7,300	6.03	8.36	4.08	\$18,836,891	483
2010	11,520	9.52	17.88	6.43	\$29,726,163	763
2011-2036	11,520	247.43	265.30	167.29	\$772,880,236	19,836
Total		265.30	265.30	179.38	\$828,720,007	21,269

Assumptions: Operational (license) life = 30 years (from 2006 - 2036); 365 days/yr; 24 hr/day  
Tails Output during Operation (@ 3,500 MTSWU/yr) = 2,395 lbs. UF<sub>6</sub>/hr  
Weight Conversion Factor = 0.45359 kg/lb; Tails Material Conversion Factor = 0.30668 kg/lb UF<sub>6</sub>; Tails Purity = 0.67612 gU/g; based upon 0.35% Average Tails  
U disposal cost = \$4.62/kg U  
 $R = Q/11,520 \times \text{number of years} \times 2,395 \times 24 \times 365$ ;  $T = R \times 0.67612$ ;  $U = T \times 4.62$   
 $V = R \times 1,000,000 / 0.45359 / 27,500$   
~21,269 Tails cylinders generated; 27,500 # UF<sub>6</sub> fill weight = 1,000 generated parent cylinders (@ EOL)



Table C3.19A Estimated Incremental Machine Disposal Cost

Calendar Year	[Q] # Machines	[R <sup>2</sup> ] Estimated Disposal Cost	[S <sup>2</sup> ] Machine Ratio	[U <sup>2</sup> ] Incremental Machine Disposal Cost [\$, 2006]
2007	120	\$70,999,242	0.01	\$709,992
2008	2,700	\$70,999,242	0.23	\$15,974,830
2009	7,300	\$70,999,242	0.61	\$43,191,206
2010	11,520	\$70,999,242	0.96	\$68,159,273
2011-2036	12,000	\$70,999,242	1.00	\$70,999,242
Total		\$70,999,242	1.00	\$70,999,242

- Assumptions:
- Operational (license) life = 30 years (from 2006 – 2036); 365 days/yr; 24 hr/day
  - 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 consumption do not generate inventory from Table C3.19.
  - $R^2$  = sum of machine disposal cost identified in Table C3.14 and the associated equipment/supply cost captured from Table C3/15 [basically all the supply costs minus the B-25 containers and 55-gallon barrels] (\$3,878,235 + \$46,067,527 + \$16,845,380 + \$15,482) [Assumed to be a fixed cost over the initial construction period] \* Inflation Index from CY2005 (2.8%) \* CY2006 (2.9%) [Ref. A]
  - $S^2$  = machine ratio (incremental installation over construction period) = Q/Total # Machines
  - $U^2 = R^2 * S^2$

- Destruction of classified parts by shredding, crushing, burial, etc.

### 10.8.3 Results

Recoverable items will be externally decontaminated and suitable for reuse except for a very small amount of internally contaminated items where recovery and reuse is not feasible. There is potentially a small amount of salvageable scrap material. Material requiring disposal will be process piping, trash, and residue from the effluent treatment systems. No problems are anticipated which will prevent the facilities from being released for unrestricted use.

## 10.9 Agreements with Outside Organizations

The decommissioning activities described herein and in the DFP provide for decontamination of the ACP for unrestricted use. As such, no agreements with outside organizations are required for control of access to the plant following shutdown and decommissioning.

## 10.10 Arrangements for Funding

This section provides a general estimate of plant decommissioning costs and UF<sub>6</sub> tails disposition costs, as well as explains the arrangements made to assure funding is available to cover these costs. A more detailed description of these costs and the financial assurance mechanism is provided in the DFP.

### 10.10.1 Plant Decommissioning Costs

Table 10.10-1, provides a summary of the cost estimates of the major decommissioning activities described in Section 10.2. Costs are provided in 2006 dollars with a 25 percent contingency factor added based on the NRC guidance (Reference 4). As noted below, the total estimated cost to decommission the 3.5 million SWU ACP, excluding UF<sub>6</sub> tails disposition, is \$317.6 million. Since costs will likely change between the time of license issuance and actual decommissioning, USEC will adjust the cost estimate annually prior to operation of the facility at full capacity, and after full capacity is reached, no less frequently than every three years consistent with the requirements of 10 CFR 70.25(e) and recent NRC changes to financial assurance requirements for materials licensees (Reference 8). 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);

**Restoration of Contaminated Areas On Plant Grounds: \$0.8 million**

This is based upon utilizing salary and hourly workers at their respective current average cost distribution over a two-year duration. This assumes the contamination of the plant grounds from the ACP operations will be minimal. Activities anticipated during this phase include:

- External decontamination of facilities;
- Perform Health Physics surveys;
- Scarify cylinder storage yard surfaces; and
- Collect/dispose of yard debris.

**Final Status Survey: \$1.1 million**

This is based upon utilizing salary technicians at their current average cost distribution for a period of 2.5 years. Costs do not include any NRC confirmatory surveys to verify the results of the Final Status Survey. Activities anticipated during this phase include:

- Develop/implement survey plans;
- Collect/analyze data;
- Perform confirmatory surveys;
- Develop final survey report; and
- Prepare License Amendment to terminate the license.

**Site Stabilization and Long-Term Surveillance: \$2.7 million**

As previously stated, the intent of decommissioning is to return the plant to the radiological criteria for unrestricted use. To accomplish this activity, stabilization and surveillance is required due to the number of components involved and the duration of the decommissioning effort. This scope of work occurs throughout the six year decommissioning period and involves maintenance and surveillance activities on IROFS, as required, until the license is terminated

**Packing Materials, Shipping, and Waste Disposal: \$50.3 million**

This is based upon shipping and disposal of the internals for 12,000 centrifuge machines (which includes operating machines as well as contaminated spares), feed and withdrawal equipment, and other components totaling approximately 60,000 cubic feet of solid waste, 16,000 gallons of

liquid waste from the centrifuge internals and 1,730,000 cubic feet of classified waste in non-reusable packaging.

**Equipment and Supply: \$17.6 million**

This includes the purchase or lease of dismantling, cutting, degreasing, and crushing equipment; decontamination tanks, wet blast cabinets, and over 20,000 containers (B-25 boxes and 55 gallon drums).

**Laboratory: \$1.5 million**

This includes labor costs for sampling, transport, testing, and analysis of samples.

**Indirect Services: \$58.1 million**

This includes support services (such as laundry, janitorial, etc) and infrastructure costs (such as water, power, etc) not included in other tasks.

**Miscellaneous: \$35.3 million**

This includes direct costs of \$2.6 million for miscellaneous material for decommissioning and \$32.7 million for indirect costs, such as NRC review fees for the submitted DP, license fees, DOE lease fees, business insurance, and taxes.

<b>Subtotal</b>	<b>\$215.3 million</b>
<b>General and Administrative (6 percent)</b>	<b>\$12.9 million</b>
<b>Contractor Profit (15 percent)<sup>4</sup></b>	<b>\$25.9 million</b>
<b>Contingency (25 percent)</b>	<b>\$63.5 million</b>
<b>Total Plant Decommissioning Cost Estimate</b>	<b>\$317.6 million</b>

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<sup>4</sup> Contractor Profit = 0.15[(Subtotal + General and Administrative) - (NRC Review Fees + License Fees + DOE Lease Fees + Waste Disposal Costs)]

### 10.10.2 UF<sub>6</sub> Tails Disposition Costs

Cost estimates to dispose of UF<sub>6</sub> tails generated during ACP operation are separate from the cost estimates to decommission the plant. As noted previously, the ultimate disposal of UF<sub>6</sub> tails remains to be determined. USEC intends to evaluate possible commercial uses of UF<sub>6</sub> tails before having the tails processed by the DOE UF<sub>6</sub> conversion facility in Piketon, Ohio. UF<sub>6</sub> tails are stored in steel cylinders until they can be processed in accordance with the disposal strategy established by USEC. 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 UF<sub>6</sub> tails disposition cost, USEC assumes that the total quantity of tails generated during ACP operation are processed by the DOE UF<sub>6</sub> conversion facility in Piketon, Ohio.

For conservatism, USEC provides financial assurance to fund the estimated cost of conversion and disposal of the depleted uranium inventory as it is generated during ACP operation. This funding is described in the DFP and is in addition to the funding requirements for decommissioning the ACP. As with plant decommissioning, the cost estimate will likely change between the time of license issuance and actual decommissioning. USEC commits to adjust the cost estimate for tails disposal annually. The method for adjusting the cost estimate will consider the same factors as previously described in Section 10.10.1 of this chapter.

At full capacity, the ACP will generate approximately 9,520 MT of UF<sub>6</sub> tails annually. As with other decommissioning costs, the disposal cost estimate for UF<sub>6</sub> tails disposal is provided in 2006 dollars. Consistent with the recommendation in the NRC's guidance on decommissioning (Section A.3.1.2.3 of Reference 4), a 25 percent contingency factor is applied to the tails disposal cost estimate. The total estimated cost to dispose of UF<sub>6</sub> tails over the 30-year license, including a four-year ramp up to full capacity and the 25 percent contingency factor, is \$1,035.9 million. The basis for this estimate is provided in the DFP.

### 10.10.3 Total Decommissioning Liability

USEC's total decommissioning liability is the sum of the total plant decommissioning costs and the tails disposition costs. USEC's total liability for decommissioning the ACP, including applicable contingencies, is:

Plant Decommissioning Cost	\$ 317.6 million
<u>UF<sub>6</sub> Tails Disposition Cost</u>	<u>\$1,035.9 million</u>
Total Decommissioning Liability	\$1,353.5 million

Table 10.10-1 Plant Decommissioning Cost Estimates and Expected Duration

<u>Task/Item</u>	<u>Cost Estimate</u> (Millions, 2006 dollars)	<u>Approx.</u> <u>Percentage</u>
Planning and Preparation	\$2.7	1%
Decontamination and/or Dismantling of Radioactive Facilities	\$45.2	21%
Restoration of Contaminated Areas On Plant Grounds	\$0.8	1%
Final Status Survey	\$1.1	1%
Site Stabilization and Long-Term Surveillance	\$2.7	1%
Packing Materials, Shipping, and Waste Disposal	\$50.3	24%
Equipment and Supply	\$17.6	8%
Laboratory	\$1.5	1%
Indirect Services	\$58.1	27%
Miscellaneous	\$35.3	15%
Subtotal	\$215.3	100%
General and Administrative (6%)	12.9	
Contractor Profit (15%)	25.9	
Contingency (25%)	\$63.5	
Total Plant Decommissioning Cost	\$317.6	
UF <sub>6</sub> Tails Disposal Costs	\$828.7	
UF <sub>6</sub> Tails Contingency (25%)	207.2	
Total UF <sub>6</sub> Tails Disposition Cost	\$1,035.9	
Total Decommissioning Liability	\$1,353.5	