May 18, 2009
AET 09-0037

ATTN: Document Control Desk
Mr. Michael F. Weber
Director, Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

American Centrifuge Plant
Docket Number 70-7004; License Number SNM-2011
Submittal of USEC Inc.'s Response to a Request for Additional Information on the Decommissioning Funding Plan for the American Centrifuge Plant License Amendment for Feed and Withdrawal System Design Changes (TAC L32476)

Dear Mr. Weber:

USEC Inc. (USEC) hereby submits to the U.S. Nuclear Regulatory Commission (NRC) responses to the request for additional information (RAI) regarding the Decommissioning Funding Plan (Reference 1) associated with the License Amendment Request related to feed and withdrawal system design changes for the American Centrifuge Plant (Reference 2) as Enclosure 1 of this letter. Enclosure 2 of this letter provides supplemental information related to RAI question number 2 regarding tails disposal costs.

Proposed changes as identified within the responses for RAIs 1, 3, 4, and 5 of Enclosure 1 are being submitted under separate cover (USEC letter AET 09-0036).

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NMSS01

If you have any questions regarding this matter, please contact me at (301) 564-3470 or Terry Sensue at (740) 897-2412.

Sincerely,

Peter J. Miner
Director, Regulatory and Quality Assurance

cc: J. Downs, NRC HQ
J. Henson, NRC Region II (w/o enclosure)
O. Siurano, NRC HQ
B. Smith, NRC HQ

Enclosures: As Stated

References:

1. Letter to P.J. Miner (USEC) from J.R. Downs (NRC) regarding Revised Decommissioning Funding Plan for the American Centrifuge Plant – Request for Additional Information (TAC L32476), dated April 28, 2009

2. USEC letter AET 08-0084 from P.J. Miner (USEC) to M.F. Weber (NRC) regarding License Amendment Request - Amend Facility License SNM-2011 for Feed and Withdrawal System Design Changes, dated November 17, 2008

Enclosure 1 of AET 09-0037

Response to NRC's Request for Additional Information for the Decommissioning Funding Plan Associated with the American Centrifuge Plant Feed and Withdrawal System Design Changes

Information contained within
does not contain
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Reviewer: Gregg Peed
Date: May 8, 2009

1. Waste Disposal Costs

   Table C3.14 addresses liquid radioactive waste from machine disassembly, compacted solid waste, and low-level contaminated waste such as scarified yard materials/debris. However, certain waste materials resulting from the conversion of DUF_6 to DU, such as hydrogen fluoride, do not appear to be addressed in the DFP. Section 2.0 of the DFP suggests that "revenue/avoided disposal cost from sale of conversion products (e.g., hydrogen fluoride)" might be identified in the future. NRC guidance, however, disallows the use of salvage value as a credit in decommissioning cost estimates. The DFP should discuss whether all waste materials anticipated from the conversion process are accounted for in the cost estimate without any credits for salvage value, and if not how any such wastes would be managed and the estimated costs of such waste management.

USEC Response

Table C3.14 of the Decommissioning Funding Plan (DFP) addresses the direct waste of various categorized plant materials. The disposition of depleted uranium (Tails) is addressed separately in Table C3.19 of the DFP. Under the DFP, depleted uranium produced by the American Centrifuge Plant (ACP) is assumed to be converted at the U.S. Department of Energy (DOE) depleted uranium conversion facility in Piketon, Ohio. DOE has indicated it will sell the hydrogen fluoride co-products derived from tails conversion on the commercial market. However, USEC's cost estimate does not assume any resale or reuse of any products resulting from the conversion process, consistent with the U.S. Nuclear Regulatory Commission (NRC) guidance mentioned above.

DOE provided USEC with guidance regarding the principal cost components of tails disposition using DOE's facilities, including costs for the disposal of waste materials. USEC's unit cost estimate incorporates DOE's guidance and DOE's expectations of waste materials generated.

Section 3.0 of the DFP has the discussion related to "The unknown factors include: ... revenue/avoided disposal cost from sale of conversion products (e.g., hydrogen fluoride) ..." Based upon the above discussion, Section 3.0 of the DFP has been clarified to add the following "Consistent with NRC guidance regarding decommissioning cost estimates, the estimated unit cost for depleted UF_6 disposal does not assume any resale or reuse of any products resulting from the conversion process."

2. Reliance on 2006 Estimate of Tails Disposal Costs for Conversion of DUF_6 to DU

   Section 2 of the DFP explains that the DFP relies as the basis for the 2008 estimated DOE costs to disposition DUF_6 on a report prepared in July 2005 by LMI Government Consulting and redacted in January 2006. The 2008 DFP increases the

estimated unit cost for tails disposition from $2.69/kgU in 2006 dollars to $4.95/kgU in 2008 dollars. Although the DFP states that USEC's "examination of the available information" is the basis for the estimate and USEC "believes the unit cost of $4.95/kgU is a reasonable depleted uranium disposal unit cost" and "should be viewed as the conservative upper bound" it does not describe the analysis used by USEC to reach those conclusions. The DFP should discuss that analysis, and identify whether the costs estimated in the report remain accurate, have been escalated to account for inflation, or require escalation.

USEC Response

For clarification, the 2008 DFP increases the estimated unit cost for tails disposition from $4.62/kgU (not $2.69/kgU) in 2006 dollars (as originally provided within USEC letter AET 06-0082) to $4.95/kgU in 2008 dollars.

The discussion in Section 3.0 of the DFP provides details on the development of the tails disposal cost estimate for the ACP based on a methodology and supporting data contained in the redacted LMI Government Consulting Report DE523T1. 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. USEC letter AET 06-0082 dated June 30, 2006 provided USEC's analysis of the estimated depleted uranium disposal costs specific to the ACP for review.
USEC's estimate of $4.95/kgU as proposed in the change submitted with the Feed and Withdrawal Design Change License Amendment Request captures the escalation to account for inflation (2008 dollars) utilizing the same methodology. To ensure clarity, Enclosure 2 of this letter provides the calculation supporting this revised estimate.

No changes to the DFP were deemed necessary.

3. Reduction in Annual Tails Despite Increase in Annual SWU at Full Production

The DFP explains that the ACP is expected to produce 3.8 million separative work units (SWU) annually at full capacity (the DFP in Table C3.19 uses the more precise figure of 3.828 million SWU annually). This represents an increase from the 2006 estimated production of the ACP of 3.5 million SWU annually at full production. However, the DFP also estimates that the annual production of DUF_6 tails at full production will be approximately 8,400 Metric Tons (MT). This represents a reduction from the estimated annual production of tails in the 2006 DFP, which was estimated at 9,520 MT. In notes to Table C3.19 the DFP indicates that the tails assay will be 0.30 wt % U^{235} which represents a reduction in the tails assay from 0.35% used in 2006. However, the use of the Weight Conversion Factor, Tails Material Conversion Factor, and Tails Purity factor presented in the notes to obtain the estimates for DUF_6 generated and DU generated is not clearly explained in the DFP. In a separate communication to the NRC, USEC explained that the reduction in the

tails estimate was due to a shortened production life of the plant and a reduction in the anticipated assay from 0.35 to 0.30, while full operation at 3.8 M SWU rather than 3.5 M SWU would lead to a slight increase in tails. The combination of these factors seem to explain the overall reduction in the total amount of tails, however, the notes to Table C3.19 should be expanded to clearly explain these results more fully, especially because the tails estimate also affects the estimated number of tails cylinders required.

USEC Response

The difference in the estimate of the amount of tails material generated over the life of the plant is due to the revision of three assumptions; delay in deployment schedule, which reduced the operating duration of the plant, the reduction in the operating tails assay and the increase in plant separative capacity. The 2006 version of the DFP table shows production starting in 2007, achieving full plant capacity in 2010 and ending production in 2036. The 2008 DFP table shows plant production does not start until 2010, full plant capacity is not achieved until 2013 and production ends in 2037. The delay in the deployment schedule and the shorter total operating time (from 30 years to 28 years start to finish) evaluated at the tails assay and plant production capacity used for the present table reduced the total amount of tails generated by 21.6 MT UF_6.

The 2006 version of the DFP assumed that the plant would operate at a tails assay of 0.35 weight percent ^{235}U for the life of the plant. The 2008 version of the DFP table has been adjusted for the fact that the maximum design tails assay for the ACP will be limited to 0.30 weight percent ^{235}U over the plant life. The reduction in design tails assay results in a reduction in the rate of tails generation over the life of the plant. The reduction in tails assay evaluated for the revised plant deployment and operating schedule and the original plant capacity reduced the total amount of tails generated by 47.5 MT UF_6.

The third change was the increase in plant separative capacity from 3.5 million SWU per year to 3.8 million SWU per year. The increase in plant capacity evaluated for the revised plant deployment and operating schedule and the revised tails assay results in an increase in the amount of tails generated of 18.3 MT UF_6.

The sum of the three adjustments (two reductions and one increase) is a net reduction of 50.8 MT UF_6 over the life of the plant.

USEC has revised bullet three provided in the assumptions of Table C3.19 of the DFP to provide clarification. The bullet now states:

- Operational life = 28 years (from 2010 – 2037); continuous operation

USEC has also revised bullet four provided in the assumptions of Table C3.19 of the DFP to provide consistency. The bullet now states:

- Tails Output during Operation (@ 3,800 MTSWU/yr) = 2,108 lbs UF_6/hr

This table itself has been revised to remove calendar years 2007, 2008, and 2009 since the numbers were zero and operation is scheduled to commence in the year 2010.

4. Cost Adjustment Factor for 2008 Costs

The DFP makes use of both current cost estimates and costs adjusted from 2006 to 2008. It correctly provides current cost information obtained from the selected third parties (Energy Solutions, Clive, UT and Diversified Scientific Services, Oak Ridge, TN) for low-level contaminated waste disposal, including packaging, sampling, and transportation. Equipment supply costs reported in Table C3.15, in contrast, are adjusted using an inflation factor based on annual Implicit Price Deflator indices that is described in a note to the table. However, the precise factor used cannot be determined from the note. In order to check the order of magnitude of this factor, an estimated factor was developed by dividing the basic "unadjusted" cost-price index (CPI) index for June 2008 by the same index for August 2006. In addition, the 2008 unit costs in Table C3.15 were divided by their 2006 equivalents. The CPI-based factor is 1.07, which compares quite closely to the implicit factors calculated from the unit costs in Table C3.15, which range from 1.05 to 1.06. To ensure that the adjustment factor used in the 2008 DFP is accurate, however, the note to Table C3.15 should be expanded to include an explanation of how the Implicit Price Deflator indices listed in the note were used and the escalation factor or factors that were obtained from them.

USEC Response

Table C3.15 of the DFP currently has a note describing the Inflation Index. It describes that the specific equipment unit costs are increased by the Inflation Index and it lists the calendar year and the values utilized for that year and where the annual factor can be found. Since the equipment prices were initially valued in calendar year 2004 dollars, these costs have been routinely escalated in value to the current reporting period (i.e., calendar year 2008 dollars). To obtain the current inflation factor, multiply each year through the current year reporting by the applicable listed factor (1.032 * 1.032 * 1.027 * 1.022 = 1.1178). This factor is then multiplied by the initial estimated specific equipment value.

USEC has revised bullet three provided in the assumptions of Table C3.15 of the DFP to provide clarification. The bullet now states:

- Unit costs increased by Inflation Index = CY2005 (3.2%) * CY2006 (3.2%) * CY2007 (2.7%) * CY2008 (2.2%) [Ref. A]; Total Inflation Index (CY08) = 1.1178; except B-25 containers and 55 gallon barrels, which are listed in actual $CY08 in lieu of 2004 indexed to 2008 dollars.

5. Minor Grammatical Issues

There are several instances in Section 2 (General Information) of the DFP that refer that USEC "seeks a license", "seeks authorization to operate", and "intends to utilize a surety bond." Given that this revision is occurring after the issuance of the license, it is recommended that USEC revise this and any similar language accordingly.

USEC Response

USEC has revised Section 2.0 of the DFP as follows:

"**Licensed Material**: The NRC granted a license to construct and operate a uranium enrichment plant to ..."

"**Schedule**: Construction of the ACP commenced following issuance of the license by..."

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

USEC is not revising the statement "intends to utilize a surety bond" at this time, since it is still considered to be prospective.

Additionally, an editorial correction was made for the title of Table 3.5 Number and Dimensions of Facility Components (Total Volume). Titled has been revised to state "Table C3.5..."

Enclosure 2 of AET 09-0037

Supplemental Information Related to Tails Disposal Costs

Information contained within
does not contain
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Reviewer: Gregg Peed
Date: May 8, 2009

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

			per Kg DUF6		2008 dollars per Kg DUF6 (d)	
Investment costs						
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)		214,400				
Total		460,100				
USEC-ACP pro rata share		47%				
USEC pro rata investment cost	$	51,957				
Investment cost in equivalent annual value (c)	$	2,493				
Investment equivalent annual cost per Kg DUF6			$	0.44	$ 0.49	(d)
Annual operating costs						
Plant operations			$	1.76		
Less: Contingency (10%)			$	(0.16)		
Plant operations, net of contingency			$	1.60	$ 1.77	(e)
Plant recapitalization costs			$	0.33	$ 0.36	(e)
Transportation to Portsmouth costs			$	-	$ -	
Product disposal			$	0.37	$ 0.41	(e)
Surveillance and maintenance costs			$	0.003	$ 0.003	(e)
Decon & Decommissioning						
Plant D&D cost ($000)	$	47,600				
USEC-ACP pro rata share		47%				
USEC pro rata D&D cost	$	22,181				
Equivalent uniform annual cost (c)	$	1,064				
Equivalent annual cost per Kg DUF6			$	0.19	$ 0.21	(d)
Federal administrative charge (3%)			$	0.09	$ 0.10	
Total per Kg DUF6			$	3.02	$ 3.34	
Total per Kg DU			$	4.47	$ 4.95	

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 2008 dollars based on the following:

(i) the Implicit Price Deflator of the Gross Domestic Product --

	IPD-GDP	Annual Increase
2004	109.462	
2005	113.000	3.2%
2006	116.567	3.2%
2007	119.664	2.7%

(ii) the Administration's November 29, 2007 estimate of inflation as measured by a forecast of the GDP index --

Q4 2007 - Q4 2008 2.0%

(e) DOE's projected 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 in 2004 dollars are escalated to 2008 dollars using these inflation factors.