USEC
A Global Energy Company

November 29, 2005
AET 05-0094

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 Revision 6 of the Environmental Report for the American Centrifuge Plant in Piketon, Ohio (TAC No. L32308)

Dear Mr. Strosnider:

USEC Inc. (USEC) hereby submits to the U.S. Nuclear Regulatory Commission (NRC) Revision 6 of the Environmental Report for the American Centrifuge Plant. Enclosure 1 provides changed pages for the Executive Summary consistent with the Environmental Report and the NRC's Draft Environmental Impact Statement. Revision bars in the right hand margin depict changes from the previous version submitted to the NRC.

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

Sincerely,

S. A. Toelle

Steven A. Toelle
Director, Nuclear Regulatory Affairs

cc: M. Blevins, NRC HQ
J. Davis, NRC HQ
Y. Faraz, NRC HQ
B. Smith, NRC HQ

Enclosure: As Stated

NMSS01

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Enclosure 1 of AET 05-0094

Changed Pages for the Environmental Report

(Non-Proprietary Information)

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Remove and Insert Instructions

Remove (and properly destroy)	Insert
NR-3605-0001, Environmental Report for the American Centrifuge Plant	
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LA-3605-0002

Environmental Report

for the American Centrifuge Plant
in Piketon, Ohio

The American Centrifuge™
USEC's Advanced Uranium Enrichment Technology

Revision 6

Docket No. 70-7004

Information contained within
does not contain
Export Controlled Information

Reviewer: D. Hupp
Date: 11/22/05

November 2005

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LA-3605-0002

ENVIRONMENTAL REPORT FOR THE AMERICAN CENTRIFUGE PLANT
in Piketon, Ohio

Docket No. 70-7004

Revision 6

Information contained within does not contain Export Controlled Information

Reviewer: D. Hupp
Date: 11/22/05

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UPDATED LIST OF EFFECTIVE PAGES

Revision 0 – 10 CFR 1045 review completed by L. Sparks on 07/29/04 and the Export Controlled Information review completed by R. Coriell on 07/30/04.
Revision 1 - 10 CFR 1045 review completed by J. Weidner on 05/05/05 and the Export Controlled Information review completed by R. Coriell on 04/29/05.
Revision 2 – 10 CFR 1045 review completed by R. Coriell on 06/16/05 and the Export Controlled Information review completed by D. Hupp on 06/16/05.
Revision 3 – 10 CFR 1045 review and the Export Controlled Information review completed by D. Hupp on 07/27/05.
Revision 4 – 10 CFR 1045 review completed by J. Weidner on 08/16/05 and the Export Controlled Information review completed by Len Phillips (DOE) on 08/16/05.
Revision 5 – 10 CFR 1045 review completed by R. Coriell on 10/20/05 and the Export Controlled Information review completed by D. Hupp on 10/20/05.
Revision 5 – 10 CFR 1045 review completed by J. Weidner on 11/28/05 and the Export Controlled Information review completed by D. Hupp on 11/22/05.

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EXECUTIVE SUMMARY

This Environmental Report (ER) is submitted by USEC Inc. (USEC), the applicant for a license to construct and operate the American Centrifuge Plant at the U.S. Department of Energy (DOE) reservation located in Piketon, Ohio (the DOE reservation) in accordance with the *Atomic Energy Act* of 1954, as amended, 10 *Code of Federal Regulations* (CFR) Parts 70, 40 and 30, and other applicable laws and regulations. USEC is the parent company of the United States Enrichment Corporation, which is the current holder of a U.S. Nuclear Regulatory Commission (NRC) Certificate of Compliance issued under 10 CFR Part 76.

This ER is organized in accordance with the guidance in NUREG-1748, *Environmental Review Guidance for Licensing Actions Associated with NMSS Programs.*

Introduction

The American Centrifuge Plant (ACP) encompasses the construction, manufacturing, start-up, operation, maintenance, and decommissioning of a uranium enrichment process using American Centrifuge technology. The license requested is for the construction and operation of an 3.5 million separative work unit (SWU) plant but this ER has also examined the impacts of an annual capacity of 7 million SWU (four process buildings and support facilities) to facilitate licensing for future expansion from a 3.5 million SWU licensed plant. Thus, the anticipated environmental impacts described in this ER are conservative with respect to the initial construction activities and plant operations authorized by the license currently being requested by USEC. USEC would seek future license amendments, as needed, to authorize additional construction or operation authority, but expects the environmental impacts of such additional activities to be bounded by the analysis in this ER. This advanced second-generation enrichment technology was originally developed by DOE. USEC has updated the gas centrifuge technology from that used in the GCEP program, but the American Centrifuge components remain compatible with existing infrastructure and buildings/facilities. It is USEC's plan to utilize existing buildings and adjacent areas that were previously designated, designed and improved as part of earlier construction in the 1980s for a DOE centrifuge uranium enrichment plant, located on the DOE reservation, which includes the Portsmouth Gaseous Diffusion Plant (PORTS) facilities that were built to support the gaseous diffusion process begun in the 1950s. PORTS is operated by USEC's wholly owned subsidiary, the United States Enrichment Corporation, under a Certificate of Compliance issued by the NRC pursuant to 10 CFR Part 76.

USEC is the only non-governmental corporation providing enrichment services to the nuclear industry and the only U.S. producer of enriched uranium. Deployment of the ACP is important to advancing the national energy security goals of maintaining a reliable and economical domestic source of enriched uranium. Secretary Spencer Abraham, U.S. Secretary of Energy, has stated: "As a clean, affordable and reliable energy source, nuclear energy is important to the nation's future energy supply ... USEC, and its partners in the nuclear industry, continue to take important steps enhancing national energy security with private sector development of advanced American technology." In creating USEC and privatizing the U.S. government's enrichment operations, Congress intended that USEC would, among other things,

conduct research and development as required, to evaluate alternative technologies for uranium enrichment, and help maintain a reliable and economical domestic source of enriched uranium. Deployment of the ACP is also important for meeting the commercial needs of the corporation to replace higher cost and aging production with new lower cost production.

To support these statutory and commercial objectives, on June 17, 2002, USEC and the U.S. government, represented by the DOE, entered into an agreement (DOE-USEC Agreement), which has, as one of its fundamental objectives, to facilitate the deployment of cost effective centrifuge enrichment technology in the United States. Assuming the successful demonstration of the technology, the DOE-USEC Agreement requires that USEC begin operation of a commercial centrifuge enrichment plant with an annual capacity of 1 million SWU in accordance with certain milestones.

The DOE-USEC Agreement contemplates three steps toward the deployment of a commercial centrifuge enrichment plant, as discussed below.

The first step, which is already underway, is to upgrade existing American Centrifuge technology and demonstrate an economically attractive gas centrifuge machine and enrichment process using American Centrifuge technology. This is being accomplished through a Cooperative Research and Development Agreement between USEC and University of Tennessee-Battelle through which USEC's demonstration activities in Oak Ridge, Tennessee and Lead Cascade activities in Piketon, Ohio are supported. DOE regulates centrifuge activities in Oak Ridge. DOE prepared an Environmental Assessment regarding USEC's work in Oak Ridge in October 2002 and issued a Finding of No Significant Impact (FONSI) (DOE 2002b).

The second step in the DOE-USEC Agreement is to install and operate a gas centrifuge Lead Cascade inside existing buildings at the DOE reservation based on up to 240 full-scale gas centrifuge machines and components. NRC has performed an Environmental Assessment (USEC 2004b), which resulted in a FONSI. In order to operate the American Centrifuge Demonstration Facility (Lead Cascade), a 10 CFR Part 70 license was issued to USEC on February 24, 2004 to possess and use small quantities of enriched uranium up to 250 kilograms of uranium hexafluoride (UF_6).

While the purpose of the testing in Oak Ridge is focused on the centrifuge machine only, the purpose of the Lead Cascade is to provide reliability, performance, cost, and other vital data of the enrichment process as a full-scale system. The Lead Cascade will not produce enriched uranium for sale to customers. The cascade will operate in a recycling "closed loop" mode where the enriched product stream is recombined with the depleted uranium stream prior to being re-fed in to the cascade. No enriched material will be withdrawn, with the exception of laboratory samples that will be used to assess the performance of the cascade. The information provided during system testing is the principal benefit of the Lead Cascade.

The final step under the DOE-USEC Agreement is to construct and operate a commercial centrifuge plant using American Centrifuge technology.

Proposed Action

A license application for the ACP is being submitted pursuant to the *Atomic Energy Act* of 1954 as amended, 10 CFR Part 70, and other applicable laws and regulations. The ACP is designed to enrich and safely contain and handle UF_6 up to 10-weight (wt.) percent uranium-235 (U-235). USEC is submitting this ER to support the NRC's preparation of an Environmental Impact Statement (EIS) for the commercial centrifuge plant. Deployment of the ACP supports the national energy security goal of maintaining a reliable and economical domestic source of enriched uranium. It also meets the corporation's need to replace aging production facilities with more efficient technology.

Accordingly, the Proposed Action that is the subject of this ER is the licensing of the ACP in Piketon, Ohio. In this ER, the Proposed Action is compared to a range of reasonable alternatives. These alternatives include: the No Action Alternative (i.e., not licensing the ACP) and the siting alternative of Paducah, Kentucky. Since the DOE-USEC Agreement requires that the ACP be sited either at the DOE reservation in Piketon, Ohio, or the Paducah Gaseous Diffusion Plant (PGDP) in Paducah, Kentucky, the only siting alternative considered was PGDP.

Results of Analyses

The results of the analyses in this ER can be summarized as follows. The Proposed Action will satisfy the national energy security goal of maintaining a reliable and economical domestic source of uranium enrichment as well as corporation's commercial need for a new production facility. There is a clear need for the Proposed Action. The No Action Alternative will not meet the national energy goal, will have serious economic impact on the region around the proposed ACP and will not meet the commercial needs of the corporation.

Consideration of reasonable alternatives demonstrates that no alternate enrichment technology, and no other site, is obviously superior to an ACP at the Piketon, DOE reservation. USEC considered alternate technologies—Atomic Vapor Laser Isotopic Separation (AVLIS) and Separation of Isotopes by Laser Excitation (SILEX)—that utilize lasers to enrich uranium. USEC determined in 1999 that AVLIS was not an economically viable technology, and suspended its development. USEC ended its funding for research and development of the SILEX laser-based uranium enrichment process in April 2003 with the decision to focus advanced technology resources on the demonstration and deployment of the American Centrifuge uranium enrichment technology. For siting, the DOE-USEC Agreement requires that the ACP be located at either the DOE reservation in Piketon, Ohio, or PGDP. Regardless, no sites other than the DOE reservation in Piketon, Ohio, or PGDP offer the unique combination of existing skilled work force, and existing environmental data, regulatory programs and infrastructure relevant to uranium enrichment. Both the DOE reservation in Piketon, Ohio and PGDP sites are environmentally suitable. UF_6 production will ultimately cease at PGDP if the Proposed Action is approved and becomes operational, resulting in reduced emissions and resource use at PGDP. The ACP can be located in Piketon, Ohio, within existing buildings, newly constructed facilities and adjacent areas that were previously designated, designed and

improved as part of earlier construction in the 1980s for a DOE centrifuge uranium enrichment plant (ERDA 1977). PGDP could only accommodate the ACP with the construction of a new, 114,380 square meter (1,231,172 square foot) process building and additional buildings for feed, withdrawal and other support functions, and associated infrastructure. This construction would add cost and increase schedule risk, compared to siting the ACP at the DOE reservation in Piketon, Ohio. Accordingly, Piketon, Ohio was chosen as the site for the ACP.

Impacts

Analyses conducted as part of this ER demonstrate that there are no significant environmental impacts resulting from the Proposed Action. The ACP will be located in newly constructed facilities and within several existing buildings and adjacent areas that were previously designated, designed and improved as part of earlier construction in the 1980s for a DOE centrifuge uranium enrichment plant at the DOE reservation in Piketon, Ohio. The uranium enrichment production and operations facilities currently located on the DOE reservation are leased to the United States Enrichment Corporation by the DOE, and comprise about 223 hectares (ha) (550 acres) within the approximately 1,497 ha (3,700 acres) DOE reservation. Although uranium enrichment operations at the DOE reservation in Piketon, Ohio, ceased in May 2001, the area remains industrialized as it has been since enrichment operations began in the 1950s. Uranium enrichment equipment and facilities are being maintained in a Cold Standby status. The area is largely devoid of trees, with grass and paved roadways dominating the open space.

Site utility usage would increase slightly but would still be within existing capacities and historic usages. Existing facilities will be refurbished and a few new buildings constructed to accommodate the ACP.

There are no wetlands, critical habitat, cultural, historical or visual resources that will be adversely affected by the refurbishment, construction or operation of the ACP at the DOE reservation in Piketon, Ohio. Modeling indicates that the maximally exposed individual (MEI) is a hypothetical individual living on the DOE reservation boundary 1.1-kilometers (0.68 mile) south-southwest of the ACP. The maximum individual effective dose equivalent (EDE) rate at this location is modeled to be 0.80 millirem (mrem)/year (yr). The maximum individual EDE rate for the on-reservation tenant organizations is 0.40 mrem/yr. The calculated MEI doses are well below the U.S. Environmental Protection Agency (EPA) National Emissions Standards for Hazardous Air Pollutants (NESHAP) limit of 10 mrem/yr and the NRC Total Effective Dose Equivalent (TEDE) limit of 100 mrem/yr.

Wastes generated during manufacturing and operation will include classified and unclassified low-level radioactive wastes, non-regulated wastes and wastes regulated under the *Resource Conservation and Recovery Act*, including low-level mixed wastes.

Precautions will be taken in accordance with applicable laws and best management practices to avoid accidental releases to the environment (i.e., liquid effluent tanks, holding ponds with oil diversion devices, spill response and equipment, procedures, training, etc).

There are no environmental justice issues associated with the ACP.

Connected to the Proposed Action is the commercial manufacture of centrifuge components. The manufacturing/assembly process will be an ongoing activity through the production of approximately 12,000 completed machines for a 3.5 million SWU plant and 24,000 completed machines and sufficient spares to operate a 7 million SWU plant. The production rate capability will be developed to ramp up to approximately 16 completed machines per day. Manufacturing impacts are evaluated in this ER.

Refurbishment and construction of the ACP will create approximately 518 construction contractor jobs for the 3.5 million SWU plant and 1,036 construction contractor jobs for the 7 million SWU plant. The projected level of employment for the operations phase is projected to be approximately 500 for a 3.5 million SWU plant and 600 full-time equivalents (FTEs) for a 7 million SWU plant.

Conclusion

In conclusion, the environmental impacts of the Proposed Action are clearly outweighed by the benefits of supporting the national energy security goal of maintaining a reliable and economical domestic source of enriched uranium and meeting the corporation's need for a new production facility. The No Action Alternative is denial of a license to construct and operate the ACP at the DOE reservation. The consequence of the No Action Alternative is that the demonstrated need for a domestic advanced technology uranium enrichment facility will not be met. Long-term national energy security goals will be in jeopardy and it will have a significant impact on the reliability of an adequate nuclear fuel supply in the global marketplace and the corporation's need to replace higher cost ageing production will not be met. The No Action Alternative will adversely impact national energy security. The primary benefit of the No Action Alternative is the avoidance of the few insignificant impacts associated with the Proposed Action. The alternative of siting the ACP at PGDP would also meet the need but would result in slightly greater environmental impacts due to the need to construct a larger number of buildings and supporting infrastructure. There would also be cost and schedule impacts associated with constructing the ACP at PGDP. Piketon, Ohio was chosen as the site for the ACP on the basis of USEC's overall assessment of how to meet the need for such a facility considering environmental and other impacts, and cost and schedule. This ER demonstrates that the preferred alternative is clearly the construction and operation of the ACP at the selected location on the Piketon, Ohio DOE reservation.

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