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April 26, 2006
AET 06-0057

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 for the American Centrifuge Plant (TAC Nos. L32306, L32307, and L32308)

Dear Mr. Strosnider:

Based upon a consistency review of our License Application and supporting documents, minor administrative changes have been identified for the License Application, Emergency Plan, Environmental Report, and the Integrated Safety Analysis (ISA) Summary. Therefore, USEC Inc. hereby submits these planned changes to the U.S. Nuclear Regulatory Commission (NRC) as Enclosure 1 of this letter. The planned changes for the ISA Summary are being submitted under separate cover (AET 06-0058). These planned changes will be finalized and submitted to the NRC in the next revision of the License Application and supporting documents.

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, Regulatory Affairs

cc: M. Blevins, NRC HQ
J. Davis, NRC HQ
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Enclosure: As Stated

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Enclosure 1 of AET 06-0057

Planned Changes for the License Application and Supporting Documents for the American Centrifuge Plant

Ordinary Hazard Group 1 occupancies of 0.15 gallon per minute for 3,000 square feet. The systems consist of sprinklers located at the ceilings/roof level and in other areas where needed. The sprinkler heads are supplied by piping fed from a riser connected to the firewater distribution system. This design is sufficient to ensure that credible fire related accident scenarios can be controlled given the building designs, equipment layout, and anticipated combustible loadings.

Existing suppression systems are maintained in accordance with the applicable codes and standards enforced at the time of construction and installation. New suppression systems will meet NFPA 13-2002, *Standard for the Installation of Sprinkler Systems* and NFPA 15-2001, *Standard for Water Spray Fixed Systems for Fire Protection.* When modifying existing buildings/facilities, the safety benefit from applying current codes and standards will be evaluated to determine if the change is justified. The evaluation and decision made will be documented.

7.3.2 Fire Alarms

The sprinkler systems are connected to the Fire Alarm system. This system meets the requirements of NFPA 72-2002, *National Fire Alarm Code.* The system alarms include sprinkler water flow alarms from the sprinkler systems and manual pull stations located in the X-3001, X-3002, X-3012, X-3346, X-3346A, X-3356, X-7725, X-7726 buildings/facilities, and X-7727H corridor. Alarms are received in the X-1020 Emergency Operations Center and the X-1007 Fire Station. Alarm announcement is not local, but a building evacuation system can be manually initiated from the X-1020 Emergency Operations Center, from the X-3012 building, or locally in some areas.

7.4 Process Fire Safety

The ACP has addressed process fire safety through the design of the buildings and operations such that consideration is taken for fire hazards that may be present in order to protect the workforce and public. Hazardous areas are identified to ensure the workforce is cognizant of hazardous material and operations. The ISA has been performed to identify the credible accident scenarios and establish the necessary IROFS to ensure the health and safety of the workforce and public.

The ACP buildings/facilities are designed in accordance with the codes and standards as identified in Section 7.1 above. The ACP hazardous areas are identified as part of the pre-fire plans required in Section 7.1.4 above. The ACP ISA is discussed in Section 7.2.2 of this chapter and Chapter 3.0 of this license application.

Table A-4 American Centrifuge Plant Analyzed Events with Potential Off-Site Consequences Exceeding 10 CFR 70.61 Criteria (Continued)

ISA Event No.	Event Description/Initiator	Unmitigated Off-Site Consequences	
		Rad[1]	Chem[2]
BT3-3	Breach of cylinder, process piping, or coupling to cylinder (e.g., pigtail) results in a release of UF_6 in Sampling and Transfer Area.	High	High
BT3-4	Breach of coupling to cylinder (e.g., pigtail) results in a release of UF_6.	High	High
BT3-4a	Breach of coupling during movement of heated cylinder (e.g., pigtail and/or cylinder valve) from autoclave results in a release of UF_6.	High	High
BT3-5a	Forklift impacts process piping causing a breach and releases UF_6.	High	High
BT3-7	Compressed gas bottle (such as nitrogen) is toppled shearing the valve. The bottle becomes a missile, which impacts a cylinder causing a cylinder breach and releasing UF_6 in Sampling and Transfer Area.	High	High
BT3-11	Release of UF_6 from cylinder containing release of UF_6 through evacuation system to atmosphere.	High	High
BT6-4	Explosion from a vehicle parked or traveling adjacent to the Sampling and Transfer Area damages cylinders, or process piping within the facility resulting in a release of UF_6.	High	High
BT6-10	Errant vehicle impacts Sampling and Transfer Area breaking through the building wall and damaging adjacent process piping resulting in a release of UF_6.	High	High
TA1-2	Transport equipment fire during intraplant transport causes over pressure and rupture of a cylinder.	Int.	High
SR1-2	Spilled/leaked fuel in the X-3346A shipping/receiving area ignites. Subsequent fire over pressure and rupture of cylinders, resulting in a UF_6 release.	Int.	High
SR1-3	Vehicle or combustible material fire occurs in the X-3346A shipping/receiving area or in the vicinity of the bridge crane rail system to X-3346 during cylinder movement. Fire causes over pressure and rupture of cylinders, resulting in a UF_6 release.	Int.	High
WS1-1	Large fire in the Product and Tails Withdrawal Building results in a release of UF_6 from damaged process equipment.	High	High
WS1-4	Large fire in the Product and Tails Withdrawal Building due to ongoing construction activities.	High	High
WS3-12	Release of UF_6 due to a source or tails burp cold trap shell structural failure or failure of associated piping during the regeneration phase of burp operation.	Low	Int.
WS3-13	Release of UF_6 due to a Product and Tails Withdrawal Building cold trap transfer line rupture.	Low	Int.

[1] Definition of High, Intermediate, and Low consequences from Table A-5 of the ISA Summary for the American Centrifuge Plant.
[2] Definition of High, Intermediate, and Low consequences from Table A-6 of the ISA Summary for the American Centrifuge Plant.

and analyzed quarterly. Processing and evaluation are performed by a processor holding current accreditation from the National Voluntary Laboratory Accreditation Program of the National Institute of Standards and Technology (NIST).

Decontamination and Decommissioning

At the end of operations, the ACP is shut down and UF_6 material is removed to the fullest extent possible through normal process operation. This is followed by evacuation and purging of process systems.

USEC anticipates that the majority of the radioactive material will be recovered from the ACP upon completion of the operation; however, material will be dispersed through the cascade components and piping. The resulting radiological impacts during decommissioning activities would be far below the EPA standard of 10 mrem/year and the NRC TEDE limit of 100 mrem/year.

The maximum impact if the remaining radioactive material became airborne would be approximately half that of the predicted annual gaseous effluent.

Decontamination and decommissioning activities will cause short-term impacts to air quality from the release of fugitive dust from site decommissioning activities, including soil excavation. The site is located in a county that is exempt from the restrictions on emissions for fugitive dust specified in Ohio Administrative Code 3745-17-08. However, to avoid nuisance conditions and PM concerns, dust suppression techniques will be used to mitigate excessive releases of dust during excavation under dry conditions. Heavy equipment will result in short-term increases in the release of nitrogen oxides, sulfur oxides, carbon monoxide, and particulates. Air quality impacts associated with decontamination and decommissioning activities will have no lasting significant impacts on air quality.

Accident Analysis

Accident analyses were performed for potential on-site accidents as part of USEC's ACP ISA and documented in the ISA Summary. Off-reservation radiological and chemical impacts from the postulated accidents were evaluated and items relied on for safety (IROFS) to either prevent postulated accidents or to mitigate their consequences to an acceptable level were identified and documented (Appendix F of the ISA Summary for the American Centrifuge Plant).

The unprevented frequency for a fire event (ISA Summary Table CY1-3) was quantitatively determined to be 1.6×10^{-3} occurrences/year. This number was based on a study of fire induced UF_6 cylinder failures. Refer to Appendix E of the ISA Summary for the American Centrifuge Plant for the reference to this study.

The dispersion model calculates that the fire induced rupture of a 14-ton cylinder results in an unmitigated radiological dose of 10.0 rem to the off-reservation receptor and 12.1 rem to the Worker in the Controlled Area (WCA) receptor. The consequence estimate for the off-site receptor is an "Intermediate" consequence level and the consequence estimate for the WCA

receptor is a "Low" consequence level. The unmitigated radiological dose to the Worker in the Restricted Area (WRA) receptor for this event was qualitatively judged as "Low."

The ISA Summary combined the unprevented frequency and unmitigated radiological and chemical consequences for each receptor, which yielded a risk level for each receptor that was compared to the ERPGs and 10 CFR 70.61 performance criteria. For the bounding event, which has an unprevented frequency of "NU," unmitigated radiological consequences of "Intermediate" for the off-reservation receptor, and unmitigated chemical consequences of "High" for all three receptor groups, the risk exceeds the performance criteria in Tables A-7, A-8, and A-9 of the ISA Summary for the American Centrifuge Plant and IROFS must be implemented to reduce the risk below the performance criteria. The chemical consequence classifications are based on the comparison of the modeled release data with ERPGs. The ERPGs are airborne chemical concentration limits used for emergency response personnel, below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing certain health effects.

4.6.3.2.1 Control of Airborne Effluents

X-3346 Feed and Customer Services Building

The Feed Area of this building sublimes UF_6 for feed to the enrichment process as described in Section 1.1 of the license application and contains a variety of potential sources for radioactive effluents, both as gaseous UF_6 and particulate uranyl fluoride (UO_2F_2). These sources are vented to the atmosphere through an evacuation system, which has separate subsystems to control the gaseous and airborne particulate effluents. Both sub-systems exhaust to a continuously monitored combined vent.

The Customer Services area of this building liquefies UF_6 for quality control sampling and transfer of UF_6 material to customer cylinders for shipment as described in Section 1.1 of the license application and also contains multiple potential sources for radioactive effluents, both as gaseous UF_6 and particulate UO_2F_2. These sources are vented through a similar evacuation system with another continuously monitored combined vent.

PGDP Impacts

Emissions from PGDP operations will be reduced after UF_6 operations cease. Impacts of DOE D&D at PGDP are examined in the DOE Final EIS.

The cylinder burping/heeling system, feed ovens, autoclaves, sampling system, and process piping in both areas are manifolded to the gaseous effluent side of their respective evacuation systems. Gases evacuated from process systems, which can contain high concentrations of UF_6, are processed through cold traps to desublime the UF_6 and separate it from the non-UF_6 gases. Residual gases leaving the cold trap have a very low concentration of UF_6, which is further reduced by passing the gas through an alumina trap. When an evacuation system cold trap becomes full, it is valved off from the vent and its contents sublimed to a drum so the material can be fed to the enrichment plant. The cold traps can be bypassed to allow rapid

The CAP88-PC model estimates annual average air concentrations (pCi/m^3) of each isotope at locations (distances from the stack) specified in the input parameters. Converting the activity concentrations of the uranium isotopes to mass concentrations and summing gives an average total uranium concentration of 6.74×10^{-3} $\mu g/m^3$ at the location of the MEI at the site boundary. The NIOSH Time-Weighted Average Recommended Exposure Level (REL) and ACGIH TLV for uranium is 200 $\mu g/m^3$. The maximum average uranium concentration at the plant boundary will be a minimum of 10,000 times less than occupational exposure standards. The CAP88-PC model results indicate that radiological air-quality impacts and/or potential exposures for this alternative would be insignificant.

Accident Analysis

Accident analyses were performed for potential on-site accidents as part of USEC's ACP ISA and documented in the ISA Summary and are assumed to be the same for PGDP. Off-reservation radiological and chemical impacts from the postulated accidents were evaluated and items relied on for safety (IROFS) to either prevent postulated accidents or to mitigate their consequences to an acceptable level were identified and documented (Appendix F of the ISA Summary for the American Centrifuge Plant).

The unprevented frequency for a fire event (ISA Table CY1-3) was quantitatively determined to be 1.6×10^{-3} occurrences/year. This number was based on a study of fire induced UF_6 cylinder failures. Refer to Appendix E of the ISA Summary for the American Centrifuge Plant for the reference to this study.

The dispersion model calculates that the fire induced rupture of a 14-ton cylinder results in an unmitigated radiological dose of 10.0 rem to the off-reservation receptor and 12.1 rem to the Worker in the Controlled Area (WCA) receptor. The consequence estimate for the off-reservation receptor is an "Intermediate" consequence level and the consequence estimate for the WCA receptor is a "Low" consequence level. The unmitigated radiological dose to the Worker in the Restricted Area (WRA) receptor for this event was qualitatively judged as "Low."

The ISA Summary combined the unprevented frequency and unmitigated radiological and chemical consequences for each receptor, which yielded a risk level for each receptor that was compared to the ERPGs and 10 CFR 70.61 performance criteria. For the bounding event, which has an unprevented frequency of "NU," unmitigated radiological consequences of "Intermediate" for the off-reservation receptor, and unmitigated chemical consequences of "High" for all three receptor groups, the risk exceeds the performance criteria in Tables A-7, A-8, and A-9 of the ISA Summary for the American Centrifuge Plant and IROFS must be implemented to reduce the risk below the performance criteria. The chemical consequence classifications are based on the comparison of the modeled release data with ERPGs. The ERPGs are airborne chemical concentration limits used for emergency response personnel, below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing certain health effects.

The worst-case estimated operational emissions are approximately 0.83 mrem/yr, which is a fraction of the EPA 10 mrem/yr standard and of the NRC TEDE 100 mrem/yr limit.

The collective EDE for the population living within an 80 km (50 mile) radius of the ACP would be 4.50 person-rem/yr.

The CAP-88 model predicts that average uranium airborne concentration would be 5.82×10^{-3} $\mu g/m^3$ at the Ohio National Guard X-751 Mobile Equipment Shop. The NIOSH Time-Weighed Average Recommended Exposure Level and ACGIH TLV for uranium is 200 $\mu g/m^3$. The maximum average uranium concentration at the plant boundary will be a minimum of four orders of magnitude (i.e., thousand times less) than the occupational exposure standards. Details of the CAP-88 models and their respective results are discussed in section 4.6.3.2 of this ER.

Accident Analysis

Accident analyses were performed for potential on-site accidents as part of the Integrated Safety Analysis and documented in the ISA Summary for the American Centrifuge Plant. Off-reservation radiological and chemical impacts from the postulated accidents were evaluated and IROFS to either prevent postulated accidents or to mitigate their consequences to an acceptable level were identified and documented (Appendix F of the ISA Summary for the American Centrifuge Plant). The quantity of materials at risk (MAR) for the bounding condition was established as 12,701 kg (28,000 lb), which is the feed cylinder capacity (Appendix D of the ISA Summary for the American Centrifuge Plant). Since the release from fire is more bounding, the ISA analysis uses its results for 48Y cylinders with an inventory of 12,701 kg (48Y has a nominal inventory of 12,501 kg). The ISA identifies this bounding case in the facility's operations, designates IROFS to either prevent accidents or mitigate their consequences to an acceptable level, and describes management measures to provide reasonable assurance of the availability and reliability of the IROFS.

The unprevented frequency for the fire event (ISA Table CY1-3) was quantitatively determined to be 1.6×10^{-3} occurrences/year. This number was based on a study of fire induced UF_6 cylinder failures. Refer to Appendix E of the ISA Summary for the American Centrifuge Plant for the reference to this study.

The ISA combined the unprevented frequency and unmitigated radiological and chemical consequences for each receptor, which yielded a risk level for each receptor that was compared to the 10 CFR 70.61 performance criteria. For the fire bounding event, which has an unprevented frequency of "NU," unmitigated radiological consequences of "Intermediate" for the off-reservation receptor, and unmitigated chemical consequences of "High" for all three receptor groups, the risk exceeds the performance criteria in Tables A-7, A-8, and A-9 of the ISA Summary for the American Centrifuge Plant and IROFS must be implemented to reduce the risk below the performance criteria. The chemical consequence classifications are based on the comparison of the modeled release data with the Emergency Response Planning Guide (ERPGs). The ERPGs are airborne concentration limits used for emergency response personnel, below

which are believed that nearly all individuals could be exposed for up to one hour without experiencing certain health effects.

4.12.3.2.2 Public and Occupational Exposure

Direct exposure to chemicals from the routine ACP operations does not represent a likely exposure pathway for the public. For airborne releases, concentrations off-reservation are too small to present problems through dermal exposure or inhalation pathways. Water discharge outfalls are found in areas of the site that are not readily accessible to the general public. Daily public exposure to water from these outfalls is highly unlikely, and ingestion of water directly from the outfalls is even less likely (DOE 2003a).

Exposures to chemical agents are controlled by administrative and engineering methods and/or personal protective equipment. Exposure results are reported as an 8-hr TWA for the occupational worker, as listed in 29 CFR 1910.1000, Table Z-1.

Environmental monitoring is required by state and federal regulations and/or permits, but is also conducted to reduce public concerns about plant operations. Non-radiological environmental monitoring is conducted by DOE and the United States Enrichment Corporation (DOE 2003a) in 2001.

Accident analyses were performed for potential on-site accidents as part of USEC's ACP Integrated Safety Analysis and documented in the ISA Summary. Off-reservation radiological and chemical impacts from the postulated accidents were evaluated and IROFS to either prevent postulated accidents or to mitigate their consequences to an acceptable level were identified and documented (Appendix F of the ISA Summary for the American Centrifuge Plant). The quantity of MAR for the bounding accident was established as 12,701 kg (28,000 lb), which is the feed cylinder capacity (Appendix D of the ISA Summary for the American Centrifuge Plant).

Radiation dose and airborne chemical concentration resulting from a release directly downwind was calculated using the straight-line Gaussian plume dispersion equation as discussed in Chapter 4.0 of the ISA Summary for the American Centrifuge Plant and documented in Appendix C of this ER. The toxic radiological intake is limited to 30 mg under 10 CFR 70.61(b)(3). The calculated airborne concentrations from the release and dispersion models estimated at the receptors of interest were compared to the chemical consequence limits. The chemical consequence limits selected are the ERPGs given in Table A-6 of Appendix A of the ISA Summary for the American Centrifuge Plant.

The ERPGs are airborne concentration limits used for emergency response personnel, below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing certain health effects. The ERPG-1, ERPG-2, and ERPG-3 values for UF_6 are 5 mg/m^3, 15 mg/m^3, and 30 mg/m^3, respectively. Since UF_6 can readily react with the moisture in the air forming uranium compounds and HF, the chemical effects of HF have to be considered also. The ERPG-1, ERPG-2, and ERPG-3 values for HF are 1.5 mg/m^3, 16.4 mg/m^3, and 41 mg/m^3, respectively. Special ERPG values for 10-minute exposures are also used for HF, with the ERPG-1, ERPG-2, and ERPG-3 values being 1.5 mg/m^3, 41 mg/m^3, and 139 mg/m^3,

respectively. Instead of using the ERPG values for uranium compounds, the ISA uses the uranium intakes of 10 mg, 30 mg, and 40 mg as the equivalency for ERPG-1, ERPG-2, and ERPG-3, respectively. The ISA Summary used a 40 mg intake, which is approximately one fifth of the 50 percent lethal concentration as the equivalency of the ERPG-3. Comparison of the calculated chemical airborne concentrations at the receptor to the appropriate ERPG values (or uranium intake values) allows the assignment of a chemical consequence level of High, Intermediate, or Low to each receptor. Unless otherwise stated, exposures are assumed to be for one hour for all receptors and the one-hour ERPG values will be used.

High consequences for the off-reservation receptor are generally based on airborne concentrations exceeding the ERPG-2 value (or 30 mg uranium intake), while Intermediate consequences to the off-reservation receptor are based on exceeding the ERPG-1 value (or 10 mg uranium intake). High consequences to the WCA and WRA receptors are based on airborne concentrations exceeding the ERPG-3 value (or 40 mg uranium intake), while intermediate consequences to the WCA and WRA receptors are based on concentrations exceeding the ERPG-2 value (or 30 mg uranium intake). For those events that involve only the release of UF_6 from cylinders or pipes in the absence of fire, the rate of diffusion of UF_6 is generally very low such that the UF_6 has sufficient time to react with air and the product UO_2F_2 has time to deposit or plate out. Peak HF concentrations are used to compare with the ERPG values for both on-site and off-reservation receptors during these events in the ISA. The consequence classification for HF is based upon the peak HF concentration at any time during the event.

Both HF airborne concentrations and uranium intake were evaluated in determining the unmitigated chemical consequences to the individual receptor groups. The fire induced rupture of a 14-ton cylinder results in an unmitigated HF airborne concentration of 1,540 mg/m^3 at 100 meters from the point of release (WCA receptor) and 1,100 mg/m^3 at 500 meters from the point of release (off-reservation receptor). The unmitigated uranium intake values from this event are 388 mg at 100 meters from the point of release (WCA receptor) and 321 mg at 500 meters from the point of release (off-reservation receptor). These off-reservation and WCA receptor consequence estimates correspond to a consequence level of "High."

The dispersion model calculates that the fire induced rupture of a 14-ton cylinder results in an unmitigated radiological dose of 10.0 rem to the off-reservation receptor and 12.1 rem to the WCA receptor. The consequence estimate for the off-reservation receptor is an "Intermediate" consequence level and the consequence estimate for the WCA receptor is a "Low" consequence level. The unmitigated radiological dose to the WRA receptor for this event was qualitatively judged as "Low."

The ISA Summary combined the unprevented frequency and unmitigated radiological and chemical consequences for each receptor, which yielded a risk level for each receptor that was compared to the ERPGs and 10 CFR 70.61 performance criteria. For the bounding event, which has an unprevented frequency of "NU," unmitigated radiological consequences of "Intermediate" for the off-reservation receptor, and unmitigated chemical consequences of "High" for the three receptor groups, the risk exceeds the performance criteria in Tables A-7, A-8 and A-9 of the ISA and IROFS must be implemented to reduce the risk below the performance criteria.