March 5, 2007

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
USEC Inc.	)	Docket No. 70-7004
	)	
(American Centrifuge Plant)	)	ASLBP No. 05-838-01-ML

NRC STAFF TESTIMONY RELATED TO
HTE-3/HTS-9: ENVIRONMENTAL MONITORING

Q1: Please state your name, occupation, by whom you are employed and your professional qualifications.

A1: (MB) My name is Matthew Blevins. I am employed as a Senior Project Manager in the Environmental and Performance Assessment Branch, Division of Waste Management and Environmental Protection, Office of Federal and State Materials and Environmental Management Programs Office, U.S. Nuclear Regulatory Commission (NRC). A statement of my professional qualifications is attached.

A1: (SE) My name is Stan Echols. I am employed as a Senior Project Manager in the NRC's Office of Nuclear Materials Safety and Safeguards, Division of Fuel Cycle Safety and Safeguards. A statement of my professional qualifications is attached.

A1: (DH) Donald Hammer. I am employed as a Principal with ICF International (ICF). I am providing testimony under a technical assistance contract with the NRC Staff. A statement of my professional qualifications is attached.

Q2: Please describe your professional responsibilities with regard to the NRC staff's ("Staff") review of the USEC, Inc.'s ("the Applicant") license application ("Application") for the proposed American Centrifuge Plant (ACP) in Piketon, Ohio.

A2: (MB) I am the NRC Senior Project Manager for the environmental review of USEC's ACP application. I was responsible for overseeing the preparation of NUREG-1834, "Environmental Impact Statement for the Proposed American Centrifuge Plant in Piketon, Ohio," April 2006 ("FEIS") attached as Staff Exhibit 2.

A2: (SE) I was the Project Manager (PM) for the Staff's review of the USEC Application from late 2005 until November 2006 and from January 2007 until the present. During the time that I was the PM, I led the effort to complete NUREG-1851, "Safety Evaluation Report for the American Centrifuge Plant in Piketon, Ohio" (2006) (SER), attached as Staff Exhibit 1.

A2: (DH) I served as ICF's Deputy Program Manager on its contract with the NRC Staff to provide technical assistance for the preparation of the FEIS. In this role, I was responsible for overseeing all ICF activities supporting the NRC Staff's review of the USEC Environmental Report (ER) and performed quality assurance reviews of all sections of the FEIS. I also served as the lead ICF analyst responsible for assisting the NRC Staff in its review of aspects of the Applicant's ER that concerned the project description and alternatives, mitigation, and environmental measurement and monitoring programs.

Q3: What is the purpose of your testimony today?

A3: The purpose of our testimony is to discuss the Applicant's environmental monitory program and the Staff's review of the program.

Q4: FEIS Table 6-2 lists the sampling locations for surface water, sediments, soils, vegetation, biota, wildlife, and crops. Please provide maps showing the sampling locations for each of these media.

A4: (DH) Maps showing the sampling locations for the listed media are attached as Staff exhibits. Locations of Routine Surface Water Sampling Points and Biota Samples (RW-1, RW-2, RW-6, and RW-8), Staff Exhibit 34; Stream Sediment Sampling Locations and Surface Water Samples RW-10N, RW-10S, RW-10E, and RW-10W, Staff Exhibit 35; Soil and Vegetation Sampling Locations, Staff Exhibit 36.

Q5: Are the soil sampling locations illustrated in the attached maps?

A5: (DH) Yes, the soil sampling locations are illustrated in Staff Exhibit 36, Soil and Vegetation Sampling Locations.

Q6: How do these 27 sampling locations relate to the list of 46 sampling locations provided in Table 6-2 in the FEIS?

A6: (DH) Of the 46 sampling locations provided on Table 6-2, sampling locations SAS-1, 2, 3, 4, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, and 29; and RS-10N, 10S, 10E, and 10W are shown on Staff Exhibit 36, Soil and Vegetation Sampling Locations. The remaining sampling locations, RIS-1, 3, 5, 12, 15, 17, 19, 22, 25, 26, 32, 33, 34, 35, 36, are not shown because they are not part of the ACP sampling program.

Q7: Please illustrate the locations of the four lagoons, eight holding ponds, and four named streams on the DOE property discussed in the FEIS at page 3-26.

A7: (DH) The figure attached as Staff Exhibit 37 Exhibit X illustrates the location of the four lagoons, eight holding ponds, the four named streams on the DOE property.

Q8: How do the sediment samples relate to the surface water samples?

A8: (DH) The sediment sample locations and the surface water sample locations are co-located, as depicted in Staff Exhibit 35 provided in response to Question 4 above.

Q9: Show the locations of the 14 surface water monitoring points and summarize the information in the tables regarding the 2001 water quality and sediment concentrations.

A9: (DH) The surface water monitoring points are identified in Staff Exhibit 35 above. Samples collected at the surface-water monitoring points in 2002 were analyzed for total uranium, isotopic uranium ($^{233/234}U$, ^{235}U, ^{236}U, and ^{238}U), ^{99}Tc and selected transuranic radionuclides (^{241}Am, ^{237}Np, ^{238}Pu, and $^{239/240}Pu$). 241Am was detected in only one sample, from Big Beaver Creek, at a concentration of 0.184 pCi/L. ^{99}Tc was detected in two samples from different locations in Little Beaver Creek at a maximum concentration of 22 pCi/L, which is below the DOE-derived concentration guide of 100,000 pCi/L for ^{99}Tc in ingested water.

$^{233/234}U$ was detected at a maximum concentration of 2.4 pCi/L. 235U was detected at a maximum concentration of 0.095 pCi/L. ^{238}U was detected at a maximum concentration of 0.51 pCi/L. Each of these detections is well below the DOE-derived concentration guide for the respective uranium isotope in drinking water (500 pCi/L for $^{233/234}U$ and 600 pCi/L for ^{235}U and ^{238}U). Neither ^{236}U nor any of the other transuranics (^{237}Np, ^{238}Pu, $^{239/240}Pu$) were detected in any 2002 surface water samples. U.S. Department of Energy, Portsmouth Annual Environmental Report for 2002, DOE/OR/11-3132 & D1, October 2003.

Q10: Verify whether these surface waters were only monitored in 2001 and, if so, is there a reason that they were not monitored since 2001.

A11: (DH) As defined in the U.S. Department of Energy, Portsmouth Annual Environmental Report for 2003, sediment and surface water samples are collected from the same locations upstream and downstream from the reservation and at the NPDES outfalls on the east and west sides of the reservation (see Staff Exhibits 34 and 35). Samples are collected annually and analyzed for transuranic radionuclides (Am^{241}, Np^{237}, Pu^{238}, and $Pu^{239/240}$), Tc^{99}, total uranium, and uranium isotopes ($U^{233/234}$, U^{235}, U^{236}, and U^{238}) in accordance with the DOE Environmental Monitoring Plan for the Portsmouth Gaseous Diffusion Plant.

In addition, Ohio EPA requires monthly collection of surface water samples from two locations (X-745C1 and X-745E1) at the X-745C and X-745E Depleted Uranium Hexafluoride Cylinder Storage Yards, and DOE voluntarily collects samples at three additional locations (X-745C2, X-745C3, and X-745C4). Samples collected during 2003 were analyzed for total uranium, uranium isotopes ($U^{233/234}$, U^{235}, U^{236}, and U^{238}), Tc^{99}, and transuranic radionuclides (Am^{241}, Np^{237}, Pu^{238}, and $Pu^{239/240}$). During 2003, maximum detections of uranium and uranium isotopes were as follows: uranium at 7.442 Fg/L, $U^{233/234}$ at 3.499 pCi/L, U^{235} at 0.2218 pCi/L, U^{236} at 0.059 pCi/L, and U^{238} at 2.495 pCi/L. Tc^{99}, Am^{241}, Np^{237}, Pu^{238}, and $Pu^{239/240}$ were not detected in any of the samples collected in 2003. Surface water from the cylinder storage yards flows to USEC NPDES outfalls prior to discharge from the site.

Q11: Show the locations of the on-site monitoring well locations, general location of the projected groundwater flow paths (i.e., the five ground water contamination plume, including beryllium, chloroethane, trichloroethylene, americium, and uranium), and the locations where alpha and beta activity exceeded standards.

A11: (DH) The Staff has prepared figures, which are attached as Staff exhibits, that show:

1. The ground water monitoring areas on the DOE reservation (Staff Exhibit 38);
2. TCE plume and monitoring wells at X-749/X/120/Peter Kiewit Landfill located south of the Proposed ACP (Staff Exhibit 39);
3. TCE plume and monitoring in the Quadrant 1 and X-749A monitoring area east of the proposed ACP (Staff Exhibit 40);
4. TCE plume and monitoring wells at the Quadrant 2 monitoring area north of the proposed ACP (Staff Exhibit 41);
5. TCE plume and monitoring wells at X-701B Holding Pond, located northeast of the proposed ACP (Staff Exhibit 42);
6. TCE plume and monitoring wells at X-740 Waste Oil Handling Facility north of the proposed ACP (Staff Exhibit 43); and
7. Monitoring wells and chromium concentrations at x-616 Chromium Sludge Surface Impoundments (Staff Exhibit 44).

As defined in the U.S. Department of Energy, Portsmouth Annual Environmental Report for 2003, DOE mapped the most extensive and most concentrated constituents associated with each groundwater monitoring area, which in most cases is trichloroethene. The plume perimeter is defined as 5 ug/l of trichloroethene. In addition to trichloroethene, the following constituents make up the contaminant plume:

1. Other volatiles, inorganics (metals) and radionuclides at X-749/X/120/Peter Kiewit Landfill
2. Inorganics (metals) and radionuclides at Quadrant 1 and X-749A Monitoring Area
3. Other volatiles, inorganics (metals) and radionuclides at the Quadrant 2 monitoring area
4. Inorganics (metals) and radionuclides at X-701B Holding Pond
5. Inorganics (metals) and radionuclides at X-740 Waste Oil Handling Facility
6. Trichloroethene at x-616 Chromium Sludge Surface Impoundments

Q12: Summarize the eventual fate of the existing groundwater contamination, specifically in relationship to the ACP facilities, including the cylinder storage yards.

A12: (DH) DOE is conducting a site-wide environmental remediation program under an Agreed Order with the State of Ohio. As part of this program, site groundwater monitoring is under control of DOE and the data is reported as part of DOE's Annual Environmental Report for the DOE reservation. In the U.S. Department of Energy, Portsmouth Annual Environmental Report for 2003, the fate of the contaminant plumes were being monitored and controlled via a number of mechanisms including extraction wells, barrier walls, sumps and collection trenches, and groundwater treatment systems. The groundwater remediation is being accomplished in accordance with the RCRA Corrective Action Program.

For the contaminant plumes near the proposed ACP, X-749/X/120/Peter Kiewit Landfill and Quadrant 1 and X-749A monitoring area, the plume associated with X-749/X/120/Peter Kiewit Landfill has been migrating further south around a barrier wall. DOE is developing a plan to monitor and control the migration. The plume associated with Quadrant 1 and X-749A monitoring area has slightly contracted along the east side due to the ongoing remediation efforts.

In the vicinity of the proposed cylinder storage yard north of the proposed ACP, two monitoring areas (X-734 Landfill and X-533 Switchyard Area) are under investigation. The X-734 Landfills consisted of three landfill units that were used until 1985. Detailed records of materials disposed of in the landfills were not kept. However, wastes known to be disposed at the landfills include trash and garbage, construction spoils, wood and other waste from clearing and grubbing, and empty drums. Other materials reportedly disposed of in the landfills may have included waste contaminated with metals, empty paint cans, and uranium-contaminated soil from the X-342 area.

The X-734 Sanitary Landfill was closed in accordance with the solid waste regulations in effect at that time, and no groundwater monitoring of the unit was required. The X-734 Landfills were capped in 1999-2000 as part of the remedial actions required for Quadrant IV. Fifteen monitoring wells were subsequently installed and are sampled semiannually as part of the monitoring program for this area. Volatile organic compounds were detected in samples collected from three wells in the X-734 monitoring area in 2003; however, trichloroethene is the only compound that exceeded the preliminary remediation goal (5 Fg/L). In the second quarter and fourth quarter samples collected from well X734-21B, trichloroethene was detected at 130 Fg/L and 140 Fg/L, respectively. Cobalt is also monitored in the X-734 Landfills area. Cobalt was detected in three wells in 2003 (X734-03G, X734-06G, and X734-15G) at concentrations above the preliminary remediation goal of 13 Fg/L. These detections ranged from 15 to 76 Fg/L. Additional inorganics (metals) and radionuclides were also detected in 2003. Control and monitoring of groundwater is being accomplished in accordance with the RCRA Corrective Action Program.

The X-533 Switchyard Area consists of a switchyard containing electrical transformers and circuit breakers, associated support buildings, and a transformer cleaning pad. The groundwater area of concern is located north of the switchyard and associated support buildings near the transformer cleaning pad. The X-533 Switchyard Area was identified as an area of concern for potential metals contamination in 1996 based on historical analytical data for groundwater wells in this area. Samples from wells in this area were collected to assess the area for metals contamination. The area was added to the PORTS groundwater monitoring program because the study identified three metals (cadmium, cobalt, and nickel) that may have contaminated groundwater in this area. Three wells are sampled semiannually for cadmium, cobalt, and nickel. Two monitoring wells that monitor the X-533 Switchyard Area were sampled in the second and fourth quarters of 2003 and analyzed for cadmium, cobalt, and nickel. Each of the well samples contained these metals at concentrations above the preliminary remediation goals (6.5 Fg/L for cadmium, 13 Fg/L for cobalt, and 100 Fg/L for nickel). Concentrations of cadmium detected in the wells ranged from 7.6 to 26 Fg/L, concentrations of cobalt detected in the wells ranged from 23 to 62 Fg/L, and concentrations of nickel detected in the wells ranged from 130 to 300 Fg/L. Remediation of groundwater is being accomplished in accordance with the RCRA Corrective Action Program.

Q13: In regard to the planned discharge of effluents discussed in the SER at 9-9 to 9-10, discuss the radioactive and non-radioactive waste stream pathways for air, liquid and solid materials, referencing specific locations at ACP for control facilities, discharge points, and compliance monitoring, including in this discussion the annual estimates of the volumes and mass of the waste at the various stages/locations.

A13: (SE) The radioactive and non-radioactive waste stream pathways for air, liquid, and solid materials effluents are discussed below.

Non-radiological air effluents

As noted in section 4.2.4.2 of the FEIS, the principal non-radioactive pollutants would come from exhaust from the emergency power diesel generators, which would be operated periodically for test purposes. Staff Exhibit 2 at Section 4.2.4.2. A small amount of emissions is also possible from the above-ground storage tanks for #2 diesel fuel (a low-volatility fuel). Although exempt from Federal and Ohio permitting requirements, the generators nevertheless meet the National Ambient Air quality Standards.

Another potential air pollutant is associated with the release of UF_6 because it would react with atmospheric moisture to form corrosive and toxic HF fumes. However, for the ACP, the maximum predicted concentration for HF is about six orders of magnitude below the OSHA Permissible Exposure Limit.

Radiological air effluents

The various buildings that might be sources of airborne radiological effluents are listed in section 4.2.4.2 of the FEIS. Staff Exhibit 2 at Section 4.2.4.2. Ventilation air from all but the X-7227H Interplant Transfer Corridor (which is simply a passageway connecting two other buildings) will be monitored under the ACP Radiation Protection Program. Vent samples will be analyzed for U^{234}, U^{235}, and U^{238}, as well as for Tc^{99}. The maximum airborne radiological effluent concentration anticipated is about 5.4x10-15 microcuries per milliliter, which is less than one percent of the limit in 10 C.F.R. Part 20, Appendix B, Table 2 (Effluent Concentrations).

Average emissions are expected to be much lower and are considered to be insignificant. *See also*, Staff Exhbit 1 at Section 9.3.2.1; and Application Section 9.2.2.1.

Non-radiological liquid effluents

As noted in section 4.2.6.2 of the FEIS, non-radiological liquid discharges from the ACP include sanitary wastewater, discharge from the tower water cooling (TWC) system, storm water runoff, and incidental leaks and spills. Staff Exhibit 2 at Section 4.2.6.2. The flow from sanitary wastewater would feed into the onsite sewerage treatment plant, which in turn discharges into the Scioto River. Even with the added amount from the ACP, the total amount would represent only 56 percent of the treatment plant's capacity during construction and 40 percent during operation, which is why the impact from the added sanitary wastewater is considered to be small.

The TWC system would discharge wastewater to the DOE reservation Gaseous Diffusion Plant (GDP) recirculating cooling water (RCW) system which discharges to the Scioto River. The centrifuges used in the proposed ACP would be cooled via closed-loop machine cooling water system and would not result in any discharges. The heat from the machine cooling water system would be transferred via a heat exchanger to the TWC system. The added amount of water to the TWC system from the proposed ACP represents only about six percent increase from present levels. Discharges to the Scioto River would remain within limits of the National Pollutant Discharge Elimination System (NPDES) permit.

Storm water runoff from the ACP would drain to a pair of existing holding ponds (X-2230N West Holding Pond and X-2230M Southwest Holding Pond). These ponds provide for the settlement of suspended solids, dissipation of chlorine, and oil diversion containment before being discharged into a tributary to the Scioto River. These discharges will continue to be monitored to assure compliance with the NPDES permit.

Any leakage from the machine cooling water (MCW) system and incidental spills of water elsewhere in the ACP would be collected by the Liquid Effluent Collection (LEC) system, which consists of a set of drains and underground collection tanks for the collection and containment of leaks and spills of chemically treated water. The drains would be located throughout the ACP. The tanks would have a capacity of 550 gallons each and would be monitored by liquid level gauges mounted above grade on pipe stands. USEC would sample and analyze the water accumulated in the LEC tanks prior to disposal. If the contents meet the requirements of 10 C.F.R. § 20.2003 (which include concentration limits specified in Table 3 of Appendix B to 10 CFR Part 20), they may be pumped to the reservation sanitary sewer system. Otherwise the tank contents would be containerized for offsite disposal. An integrity assurance plan developed by USEC would assure the integrity of the tanks and inventory monitoring of the tank contents would be used to detect leaks from the LEC System. Staff Exhibit 2 at 4-21.

Radiological Liquid Effluents

As noted in section 9.2.1.2.2 of the Application, the centrifuges are cooled by the MCW system with waste heat discharged through the TWC system, which in turn discharges its blowdown to the GDP RCW system. As noted above, the RCW system discharges to the Scioto River. Discharges from the RCW system are monitored by an automated sampler for liquid effluent radiological analysis and for NPDES-related analysis. Any leaks from the MCW and spills elsewhere in the ACP are collected in the LEC system described above. Water accumulated in the LEC tanks are sampled to determine whether it meets the limits of 10 C.F.R. § 20.2003 (Disposal by release into sanitary sewerage). If the limits are met, then the contents of the LEC tanks would be pumped to the sanitary sewer system and then discharged to the Scioto River. Otherwise the tank contents will be containerized for off-site disposal. These are the only anticipated liquid discharges from the ACP.

The two storage ponds described above capture storm water runoff and some cooling water flows before being discharged to the Scioto River. Radioactive materials are dominated by naturally occurring radioactive materials or existing contamination from previous DOE reservation operations. ACP effluents are not expected to cause any significant difference from historic release levels. *See also* Staff Exhibit 2 at Section 4.2.6.2.

Solid Wastes

As noted in section 9.2.2.3 of the Application, the USEC waste minimization program seeks to reduce the amount of waste generated at the ACP. Waste that is generated is treated to the extent practical to reduce the toxicity, volume, or mobility before being stored or disposed. Wastes are collected, packaged and characterized prior to off-site disposal at a licensed facility. Radiological wastes are labeled pursuant to 10 C.F.R. Parts 20 and 71 requirements. Radiological and mixed wastes are stored prior to shipping at an on-site storage area.

Q14: Summarize and explain the effluent controls to maintain public doses at ALARA, and how the ACP's design procedures for operation will minimize contamination from the facility and generation of radioactive waste.

A14: (SE) As noted in the response to question 13 above, there are no significant liquid radiological pathways or emissions from the ACP. One reason for this is that there will be no movement of liquid UF_6 cylinders on site. Cylinders are to be moved only after the UF_6 has cooled to a solid. This constraint greatly reduces the likelihood of more serious liquid spills and releases.

Also inherent in centrifuge operation is that a cascade operates under less than atmospheric pressure, thus reducing the likelihood of a significant external release of radioactive material that would travel offsite. In addition, only small amounts of enriched material are found at various stages of enrichment. Only gaseous pathways offer a potential for radiological releases. As noted above, operations in a number of buildings do provide an opportunity for gaseous releases. However, the vent system is designed such that gases and airborne particulates first pass through cold traps to desublime UF-6 and through an alumina trap before exiting through a common monitored vent. The resulting releases are estimated to be well below ALARA limits. *See* Application Section 9.2.1.2 (for a detailed description for each building).

Q15: In regard to monitoring for inadvertent releases of radionuclides and to demonstrate that the acceptance criteria of NUREG-1520 § 9.4.3.2.2(2) have been met, present and describe background and baseline concentrations of radionuclides in environmental media that have been established through sampling and analyses.

A15: (DH) Tables attached as Staff exhibits present the background and baseline concentrations of radionuclides in environmental media that have been established through sampling and analyses. Table of Background Air Concentrations, Staff Exhibit 45; Table of Background Concentrations of Radionuclides and Chemicals in Sediment, Staff Exhibit 46; Table of Background Soil Concentration for Selected Radioactive Elements, Staff Exhibit 47; Table of Vegetation Monitoring Program Background Levels, Staff Exhibit 48; Table of Surface-Water Monitoring Background Results, Staff Exhibit 49.

Q16: Also present and describe proposed monitoring including sampling locations, frequencies, analyses and Minimal Detectable Concentration for sampling, and action levels and actions to be taken if levels are exceeded, demonstrating that the action levels are ALARA and below the limits in 10 C.F.R. Part 20, Subpart B.

A16: (DH, SE) The table attached as Staff Exhibit 50 presents the proposed monitoring sampling locations (see Staff Exhibits 34, 35, and 36), frequencies, and the analyses. Specific monitoring and sampling locations are further described in the response to question 13 above. In addition, section 9.2.2 of the Application addresses effluent and environmental monitoring and action levels for control of gaseous radioactive effluents from ACP operations. As noted in section 9.2.2.1.4 of the Application, the action levels ensure operational control system deficiencies are documented and acted upon in a responsible manner and time frame to remain well within the regulatory limits in 10 C.F.R. Part 20, Appendix B, and below ALARA goals identified in section 9.2.1.1 of the Application.

Figures 9.2-1 through 9.2-7 in the Application identify the specific locations of ACP monitored vents and outfalls as well as offsite monitoring and sampling locations of air, water, soil and vegetation sampling. Also in the Application Table 9.2-1 provides action levels for radionuclide effluents. Table 9.2-2 provides BEQs for ACP discharges. Table 9.2-3 identifies discharge points and concentrations for gaseous effluents. Table 9.2-4 identifies discharge points and concentrations for liquid effluents. Tables 9.2-5 through 9.2-8 provide baseline activities and concentrations for various locations for a period from 1998 through 2002.

Q17: Describe the effectiveness of the monitoring program in assessing environmental impacts from radiological and nonradiological releases from high and intermediate consequence accident sequences in the ISA.

A17: (SE) The continuous and periodic monitoring of various on- and off-site locations is intended to verify operations are within regulatory limits and to identify where normal operations are exceeding regulatory requirements. For accidents, readings from the location of an accident as well as from the ACP boundary and off-site locations, together with meteorological data, would enable responsible ACP personnel to calculate the impact of an accident, both onsite and offsite.

Q18: Explain how the use of effluent monitoring and modeling demonstrates consistency with meeting the specific criteria (a) thru (i) in NUREG-1520, § 9.4.3.2.2(2) (NUREG-1520 at 9-14 to 9-15).

A18: (DH) The scope of the applicant's environmental monitoring is commensurate with the scope of activities at the facility and the expected impacts from operations as identified in the environmental report. The environmental report provides or states that:

1. Background and baseline concentrations of radionuclides in environmental media, which have been established through sampling and analysis.

2. Monitoring includes sampling and analyses for monitoring air, surface water, groundwater, soil, sediments, and vegetation
3. Monitoring with adequate and appropriate sampling locations and frequencies for each environmental medium, the frequency of sampling, and the analyses to be performed on each medium.
4. Monitoring procedures employ acceptable analytical methods and instrumentation.
5. Appropriate action levels and actions to be taken if the levels are exceeded are specified for each environmental medium and radionuclide.
6. MDCs for specific sample analyses that are at least as low as those selected for effluent monitoring in air and water. MDCs for sediment, soil, and vegetation are selected on the basis of action levels, to ensure that sampling and analytical methods are sensitive and reliable enough to support application of the action levels.
7. Data analysis methods and criteria to be used in evaluating and reporting the environmental sampling results are appropriate and will indicate when an action level is being approached in time to take corrective actions.
8. A complete and accurate description of the status of all licenses, permits, and other approvals of facility operations required by Federal, State, and local authorities.
9. Environmental monitoring that is adequate to assess impacts to the environment from potential radioactive and nonradioactive releases, as identified in high and intermediate consequence accident sequences in the ISA.

Q19: In regard to the proposed monitoring discussed in Chapter 6 of the FEIS, discuss the regulatory requirements and/or industry guidelines, if any, for monitoring inadvertent releases of radioactivity to soil, sediment, and liquid pathways.

A19: (SE) As noted in chapter 6 of the FEIS, the ACP Radiological Monitoring Program (RMP) is centered on routine measurements of the release of radiological air and liquid effluents during normal operation of the facility. Table 6.1 identifies the guidance documents that apply to the RMP (i.e., Regulatory Guides 4.15, 4.16, and 1.109). These guidance documents are generally applicable to monitoring routine releases. Table 6.2 identifies the sampling locations, parameters, and frequency for the RMP. Air and liquid monitoring of radioactivity is discussed in response to question 13 above and in section 6.1 of the FEIS. The FEIS also provides additional detail regarding soil, biota, and liquid pathways. However, no specific requirements or guidance were identified for environmental monitoring of inadvertent radiological releases.

As noted in response to question 17 above, on-site air and liquid effluent monitoring would be able to detect the origin of an accidental discharge of radioactivity. Parameter monitoring and meteorological data, together with immediate data sampling from various off-site sampling locations, would assist in calculating the location and magnitude of any accidental release.

Although generally applicable to the protection of workers, 10 C.F.R. Part 20 does address environmental radiation. For example, 10 C.F.R. § 20.1101(d) addresses dose limit to an individual member of the public from air emissions, 10 C.F.R. Part 20, Subpart D (sections 20.1301 and 20.1302) addresses individual dose limits for individual members of the public, including requirements for surveys of radiation levels in unrestricted areas, and Subpart L addresses, among other things, records of the results of measurements and calculations used to evaluate the release of radioactive effluents to the environment (section 20.2103(b)(4)) and records to demonstrate compliance with dose limit for individual members of the public (section 20.2107(a)).

Radiological monitoring requirements and guidance generally are applicable to monitoring of nuclear power plants during normal operations, although guidance is also used by facilities other than power plants. Environmental protection regulations under 10 C.F.R. Part 51 do address the need to consider mitigation of site-specific severe accidents (e.g., section 51.53(c)(3)(ii)(L)), but not environmental monitoring. Regulatory Guide 4.2, Preparation of Environmental Reports for Nuclear Power Stations (Rev. 2), 1976, addresses the need for environmental (including radiological) monitoring programs (chapter 6) and environmental effects of radiological accidents (chapter 7), but does not address monitoring inadvertent releases of radioactivity to soil, sediment , and liquid pathways. Regulatory Guide 4.1, Programs for Monitoring Radioactivity in the Environs of Nuclear Power Plants (Rev. 1), 1975, addresses normal plant operational monitoring, but not accident monitoring.

However, the applicant's Emergency Plan (EP) does address how such releases would be detected. As explained in Section 8.3.5 of its SER, Section 2.2 of the Emergency Plan (EP) discusses the methods and systems used for detecting accidents for both radioactive materials and toxic chemical releases at the site, including:

- UF6 detection equipment and associated alarms;
- Fire alarms;
- Radiation monitors;
- Automatic sprinkler systems;
- Chemical detectors;
- Criticality accident alarm system; and
- Visual observation of UF6 release through sight or smell.

The ACP, GDP, and Lead Cascade have Area Control Rooms where process equipment will be monitored, alarms will be received to alert the operating staff, and corrective actions can be performed to mitigate potential consequences of accidents. As discussed in Section 5.0 of the EP, emergency procedures have been established to direct the operating staff's response during anticipated accidents.

The staff reviewed the applicant's detection of accidents against the acceptance criteria in NUREG-1520 (NRC, 2002), Section 8.4.3.1.5, and, found it acceptable.

As explained in Section 8.3.7 of its SER, in Section 5.2 of the EP, the applicant describes the methods that will be used to assess releases both on-site and off-site during an event. The methods include: (a) increasing surveillance of applicable instrumentation and visual observation of conditions; (b) determining resources necessary to mitigate the event; (c) monitoring conditions for potential changes in classification level; (d) assessing on-site and off-site exposures; (e) determining the need for sheltering or evacuation both on-site; and (f) off-site and communicating necessary information to off-site officials. The information communicated to off-site officials during off-site releases includes:

. Specific material information;
. Release information;
. Plume direction;
. Projected plume location;
. Meteorological information; and
. Field monitoring results.

Projected movement and dispersion of chemical release plumes will be determined using the Areal Locations of Hazardous Atmospheres (ALOHA) computer program. The ALOHA code is a well known code for this purpose and acceptable to the staff. Post-accident assessment will include individual monitoring and sampling of water, air, and soil.

The staff reviewed the applicant's assessment of releases against the acceptance criteria in NUREG-1520 (NRC, 2002), Section 8.4.3.1.7, and, based on its review, found it acceptable.

Q20: Discuss the relationship between DOE monitoring and that proposed for the ACP by describing each party's programs, responsibility, anticipated data sharing; any USEC plans to evaluate DOE's annual data; and any protocols or understandings that are anticipated that would allow USEC to augment the program to address current or future needs and procedures to incorporate changes desired by USEC [in reference to the acceptance standards of NUREG-1520 § 9.4.3.2.2(2)].

A20: (SE) USEC and DOE both maintain monitoring systems for environmental radioactivity. The Annual Site Environmental Reports include data from both sets of sampling systems. The 2003 report (DOE/OR/11-3152&D1) describes, in Section 4.3, the sources and doses assigned to both USEC and DOE. The report calculates doses from sources assigned to both DOE and USEC, and sums these doses to produce a total dose to the Maximum Exposed individual.

The relationship between the DOE and ACP monitoring programs is described throughout chapter 9 of the Application. The following are citations to the Application for these programs:

- Section 9.2.1.2.2, Control of Liquid Effluents: Waste heat from the Machine Cooling Water (MCW) system is discharged to the Tower Water Cooling (TWC) system. The TWC system in turn discharges its blowdown to the United States Enrichment Corporation Recirculating Cooling Water (RCW) system, under a service agreement with United States Enrichment Corporation. DOE will decommission the RCW system at some point in the future. The RCW system discharges directly into the Scioto River via an underground pipeline (Outfall 004) pursuant to an NPDES permit. When DOE decommissions the RCW system, USEC will bypass the RCW system and discharge directly to the underground pipeline. At that time, USEC would be responsible for assuring compliance with NPDES discharge requirements. Currently United States Enrichment Corporation monitors the discharge for radiological effluents and makes the data available to the ACP as assurance that no unanticipated discharge of licensed material has occurred.

- Section 9.2.2.1.2, Demonstration of Compliance: Currently, the DOE reservation meteorological tower data is used in computer codes to calculate concentrations of radionuclides in the air and on the ground. The ACP may use data from the National Weather Service in lieu or to supplement DOE reservation meteorological data in the event the DOE tower becomes inoperable.

- Section 9.2.2.1.5, Other Permits and Licenses: Sources of airborne radionuclides at DOE-owned plants are covered by an EPA Permit-By-Rule issued under 40 CFR Part 61, (NESHAP) Subpart H. This rule imposes a limit on airborne effluents, which applies to the entire DOE reservation regardless of who "owns" any individual source within the reservation. A required report to the EPA addressing each source within the reservation (including the ACP) is provided to the NRC.

- Section 9.2.2.2.3, Monitoring of Liquid Release Points: There are two outfalls that discharge directly to publicly accessible areas. In addition, the TWC blowdown discharges to the RCW system that provides a pathway to the Scioto River, but does not provide any radiological treatment. These three discharges are equipped with monitors. The combined discharges of the RCW system, the DOE reservation sewage treatment plant discharge and other reservation holding ponds are also equipped with monitors. The data from these outfalls are available to the ACP as a defense in depth.

- Section 9.2.2.2.5, Other Permits and Licenses: Point discharges are required to be authorized under an NPDES Permit issued by the Ohio EPA. There are currently two Permits that cover all liquid discharges from the ACP. The ACP is required to submit a Permit modification to collect all its discharge points into one or the other of the existing Permits.

- Section 9/2/2/4/1, Air Monitoring: USEC evaluated DOE-supplied air monitoring data for the years 1980 to 1999. Ambient air samples at the DOE reservation for the Gaseous Diffusion Plant (GDP) during those years indicate that the range of gaseous uranium effluent levels did not produce a quantifiable difference in ambient air concentrations in unrestricted areas. Because ACP operations are not expected to exceed these levels, ambient air monitoring is not considered to be useful in detecting or evaluating a public impact due to routine gaseous effluents from the ACP. In addition experience at the GDP indicates that any releases large enough to produce high or intermediate consequences would first produce a large and visible white cloud of smoke at the point of release. As a result, the ACP has written a procedure for dealing with unplanned releases ("See and Flee"), which includes the immediate reporting of observed releases. Effluent monitoring would quantify routine gaseous effluents, but some accidental release scenarios may require additional information/ calculations to quantify an accidental release that did not pass through a monitored vent. Because the air effluent monitoring revealed concentrations too small to be useful to quantify differences in ambient air quality, the program was returned to DOE in 1999, which upgraded the sampling for its own purposes. Reports published by DOE since 1999 indicate that uranium concentrations are very small, at least three orders of magnitude less than the applicable discharge limits for uranium isotopes in 10 CFR Part 20, Appendix B.

- Section 9.2.2.4.2, Soil and Vegetation; Similar results were found for soil and vegetation samples taken from 1980 to2002. Because no statistically significant changes in concentrations were found, atmospheric impacts of ACP operation will have to be assessed using gaseous effluent monitoring data and dispersion modeling. However, the sampling was retained because iit might be useful for assessing the impact of high or intermediate consequence release that had already been detected.

- Section 9.2.2.4.3, Surface Water: The same conclusion for surface water monitoring is essentially the same as for air monitoring and soil and vegetation monitoring. That is, the results of GDP monitoring indicate that levels of effluents in the samples are too small to be useful. Therefore, impacts of ACP operations on local receiving waters, including action levels, will be based on effluent monitoring and pathway modeling. The sampling program will be maintained, however, for other purposes.

- Section 9.2.2.4.4, Sediment Monitoring; Again, the results of GDP monitoring indicate that levels of effluents in the sediment samples are too small to be useful in detecting public impact. Therefore, impacts of ACP operations on local receiving waters, including action levels, will be based on effluent monitoring and pathway modeling. The sampling program will be maintained, however, for other purposes.

As noted above, all of the environmental monitoring conducted on the DOE reservation for the GDP leads to the same conclusion. All releases are so small (orders of magnitude below regulatory requirements) that the ACP must use instead theoretical calculations based on data from building vents and other on-site monitors, together with the use of dispersion models, to develop action levels and to predict environmental impacts. Even for high and intermediate consequence accident releases, the ACP will rely on on-site monitoring and identification of a visible white cloud instead of environmental monitoring results to detect a release, while environmental sampling, along with modeling, may help to assess the impact from a release.

Q21: Explain how the impact from a hypothetical release from ACP could be separated from the historic impacts, and, as a corollary, if a future radiological release was detected, how would it be possible to determine which portion and/or activity at the site was the source of the impact. Discuss the extent that DOE's existing monitoring program might or might not detect unanticipated inadvertent releases of radionuclides to the environment.

A21: (SE) As indicated in the answer to question 20 above, DOE, and now USEC have conducted, and are continuing to conduct, baseline surveys of soil, streams and river, sediments, and vegetation. Although the results from the various surveys are too small to be useful for detecting variations in routine operational releases, the survey locations, together with the deployment of survey teams pursuant to the emergency plan, would be used to determine the extent of any unanticipated inadvertent release. The initial determination of the direction, location and magnitude of such a release would likely be determined via data from the on-site release point, meteorological data and modeling. Environmental data would be used to verify the impact of any such release. However, for an explanation of how the applicant's Emergency Plan addresses monitoring and detection of accidental releases, see our response to question 19, above.

Q22: Does this conclude your testimony?

A22: Yes.

I declare under penalty of perjury that the foregoing is true and correct. Executed on March __, 2007.

Matthew Blevins

I declare under penalty of perjury that the foregoing is true and correct. Executed on March 5, 2007.

Stan Echols

I declare under penalty of perjury that the foregoing is true and correct. Executed on March __, 2007.

Donald Hammer