

Enclosure 1 of AET 07-0050

Radiological Characterization Results for the American Centrifuge Plant

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Reviewer: R.L. Coriell

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The X-7725 Recycle/Assembly Facility and the X-7726 Centrifuge Training and Test Facility Gas Test Stand area were reviewed and assessed for turnover to USEC Inc. (USEC) on July 31, 2007. Other facilities/areas are scheduled for turnover at later dates as shown in Exhibit A of the Gas Centrifuge Enrichment Plant (GCEP) Lease.

Facilities/areas identified with radiological concerns based upon USEC's criteria (defined in Reference 1) were baseline surveyed to establish posting of the area and labeling of identified equipment. This review indicated potential radiation protection issues within areas of the X-7725 and X-7726 facilities. The following summarizes the areas with contamination levels that exceeded the Free Release criteria stated in Section 4.8.2.4 of the License Application for the American Centrifuge Plant (ACP):

1. The Training Cascade area located on the first and second floor of the X-7726 facility (identified as Areas 8 and 9 as depicted in Enclosure 2 of this letter) was used to test centrifuge machines during GCEP operations. The internals of piping and components remaining within this area of the X-7726 facility are contaminated. Removable contamination in this area is less than the Free Release criteria stated in Section 4.8.2.4 of the License Application for the ACP.
2. Area 1 (as depicted in Enclosure 2 of this letter) located on the first floor of the X-7725 facility contains a Californium Shuffler which must be removed by the U.S. Department of Energy (DOE). The Californium (^{252}Cf) source has been removed from the Shuffler by DOE. This area was not leased at this time and will be retained by DOE to allow for disposition of items remaining in the area. Since this area remains under DOE regulatory oversight, USEC has not performed surveys in this area.
3. Multiple areas in the X-7725 facility were used by the DOE for waste storage and repackaging. Since DOE surveys (and area use) indicated potential contamination, the entire building was surveyed by the USEC. General area removable contamination levels and total contamination levels, except as noted below, were less than the Free Release criteria stated in Section 4.8.2.4 of the License Application for the ACP. The following areas contain radioactive contamination from DOE activities and will remain under DOE regulatory oversight until remediated.
 - a. Area 2 (depicted in Enclosure 2 of this letter) located on the first floor of the X-7725 facility was used as a *Resource Conservation and Recovery Act* of 1976 (RCRA) storage area by the DOE. DOE survey data indicates a small Fixed Contamination Area (FCA) on the floor in the center of the room, approximately 5 square feet (ft^2). FCA results were 9,779 dpm/100 cm^2 beta. No removable contamination was detected.
 - b. Area 3 (depicted in Enclosure 2 of this letter) located on the first floor of the X-7725 facility was used as a RCRA storage area by the DOE. DOE survey data indicates a small FCA on the floor approximately 2 ft^2 in the northwest corner of the room. Levels detected during USEC's survey were slightly elevated but less than 5,000 disintegration per minute (dpm)/100 square centimeter (cm^2) for both alpha and beta contamination. No removable contamination was detected.

- c. The Storage Area, designated by DOE as area "B," located on the first floor of the X-7725 facility was used as RCRA storage and contains a FCA on the floor (Area 4 as depicted in Enclosure 2 of this letter) approximately 6 ft². The average reading of the FCA indicates total contamination is approximately 83,500 dpm/100 cm² of beta activity. No alpha or removable contamination was detected.
- d. Area 5 (depicted in Enclosure 2 of this letter) located on the first floor of the X-7725 facility was used as a RCRA storage area by the DOE. USEC surveys indicated that the northeast corner contains two areas on the floor of approximately 140 ft² with elevated fixed contamination readings. The maximum total contamination levels in this area were 3,600 dpm/100 cm² alpha and 20,000 dpm/100 cm² beta. No removable contamination was detected.
- e. The Case Cleaning System was designed to decontaminate a centrifuge machine. Based upon discussions with DOE and former GCEP employees, the system was not operated; however, various components and equipment/piping had been previously used at the gaseous diffusion plant and some are tagged as "Radioactive Material." The ACP has no plans for use of this system. The majority of the piping (labeled "Contaminated Water" and "Contaminated Vent") appears to be uncontaminated based upon limited surveys of accessible piping openings. However, opening of easily accessible components revealed varying levels of removable contamination. This system has piping and components located on the first, second, third, and fourth floors of the X-7725 facility. Survey results of these particular areas are discussed in further detail below.
 - First floor (Area 6 as depicted in Enclosure 2 of this letter) of the X-7725 facility accessible piping and components indicated varying levels of fixed and removable contamination. The maximum levels detected were 800 dpm/100 cm² alpha and 4,200 dpm/100 cm² beta removable and 4,000 dpm/100 cm² alpha and 150,000 dpm/100 cm² beta fixed or total contamination.
 - Inspection of the Mechanical Room including associated "Fan Room" (Area 12 as depicted in Enclosure 2 of this letter) located on the second floor of the X-7725 facility revealed DOE postings on air handlers indicated potential internal contamination. Surveys of air handling components after shut down are anticipated to be free of contamination. No removable contamination was detected during the surveys of the general areas. This area also contains a large quantity of equipment/components that is awaiting final disposition.
 - Inspection of the Mechanical Room (Area 13 as depicted in Enclosure 2 of this letter) area located on the third floor of the X-7725 facility revealed DOE postings on multiple air handlers indicated potential internal contamination. This area also has piping labeled "Contaminated Vent" and "Contaminated Water" and tagged components. A previously unidentified FCA was discovered during USEC's survey, in addition to installed equipment discussed below, with maximum levels of 3,200 dpm/100 cm² alpha and 100,000 dpm/100 cm² beta. No removable contamination was detected during the surveys of the general areas. This area also contains a large quantity of equipment/components that is awaiting final disposition.
 - Areas 11, 14, and 16 (as depicted within Enclosure 2 of this letter) contain piping and components associated with Case Cleaning System located on the second, third, and

fourth floors of the X-7725 facility. The maximum levels detected during a limited survey of this system was on the interior of an installed trap located in the third floor Mechanical Room was 40,000 dpm/100 cm² alpha and 100,000 dpm/100 cm² beta. This trap also exhibited removable contamination levels of 6,000 dpm/100 cm² alpha and 21,000 dpm/100 cm² beta.

- f. The Gas Test Stand (Area 7 as depicted in Enclosure 2 of this letter) located on the first floor of the X-7725 facility contains contaminated piping and components from GCEP operations in two distinct locations. Contaminated piping and components delineated "Radioactive Material Area" posting in Room 148. Piping in the Middle Platform (Area 10 as depicted in Enclosure 2 of this letter) located on first and second floors of the X-7725 facility, was posted by DOE personnel as a "Contamination Area" (CA) and "Radiological Work Permit (RWP) Required to Enter." No DOE surveys or RWP information is available for the CA. USEC's surveys of the posted CA, including the boundary, indicated removable contamination is less than the Free Release criteria stated in Section 4.8.2.4 of the License Application for the ACP. This survey included a through evaluation of the exterior of associated piping as well as the general area within the boundary. Surveys of accessible openings of installed piping indicated maximum direct levels of 2,800 dpm/100 cm² alpha and 50,000 dpm/100 cm² beta. No removable contamination was detected by the standard survey instruments.
- g. Area 15 (as depicted in Enclosure 2 of this letter) located on the fourth floor of the X-7725 facility was used as a RCRA storage area. DOE survey data indicated that this area contains multiple FCAs. The USEC survey revealed approximately 540 ft² of floor space with elevated levels of total contamination >5,000 dpm/100 cm². The maximum levels noted during the USEC survey were 12,000 dpm/100 cm² alpha and 250,000 dpm/100 cm² beta.

General area radiation levels in all areas were at or below background (6-10 µRoentgen/hour). Additional surveys (contact and 30 centimeters readings) were taken in the areas identified with contamination with similar levels recorded.

Although low levels of radioactive material is currently present within the X-7725 and X-7726 facilities being transferred to USEC, the actual locations, amounts, and intensity of activity has been determined to be at normal background radiation levels for whole body exposure. If a worker were to be present in these areas for 2,000 work hours, their annual occupational exposure would not exceed 2.0 millirem.

While removable contamination does exist on the internal of some piping/components. These components and FCAs are readily identified by Radiation Protection postings as established in American Centrifuge procedures. The hazards associated with removing the contaminated components and remediation of the areas with fixed contamination are easily controlled using currently established American Centrifuge procedures and processes.

Reference:

1. USEC letter AET 07-0023 to M.F. Weber (NRC) from P.J. Miner (USEC) regarding Submittal of Information Concerning Radiological Characterization Results for the American Centrifuge Plant, dated April 20, 2007.