NRC FORM 591FF PART 1
(12-2007)
10 CFR 2.201

U.S. NUCLEAR REGULATORY COMMISSION

INSPECTION REPORT

1. LICENSEE OR CERTIFICATE HOLDER/LOCATION INSPECTED:	2. NRC/REGIONAL OFFICE:
United States Enrichment Corporation 6903 Rockledge Road Bethesda, MD 20817 REPORT NO: 2010-004	U.S. Nuclear Regulatory Commission Region II 245 Peachtree Center Ave., Suite 1200 Atlanta, GA 30303-1257

3. DOCKET NUMBER:	4. LICENSE OR CERTIFICATE NUMBER:	5. DATE(S) OF INSPECTION:
70-7002	GDP-2	September 13-17, 2010

LICENSEE OR CERTIFICATE HOLDER:

The inspection was an examination of the activities conducted under your license or certificate as they relate to safety and/or safeguards and to compliance with the Nuclear Regulatory Commission (NRC) rules and regulations and the conditions of your license or certificate. The inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by the inspector. The inspection findings are as follows:

☐ 1. Based on the inspection findings, no violations were identified.

☐ 2. Previous violation(s) closed.

☐ 3. Reported events reviewed

☑ 4. The violation(s), specifically described to you by the inspector as non-cited violations, are not being cited because they were self-identified, non-repetitive, and corrective action was or is being taken, and the remaining criteria in the NRC Enforcement Policy, to exercise discretion, were satisfied.
Non-Cited Violation(s) was/were discussed involving the following requirement(s) and Corrective Action(s):

(See Part 3)

☐ 5. During this inspection, certain of your activities, as described below and/or attached, were in violation of NRC requirements and are being cited. This form is a NOTICE OF VIOLATION, which may be subject to posting in accordance with 10 CFR 19.11.
(Violations and Corrective Actions)

LICENSEE OR CERTIFICATE HOLDER STATEMENT OF CORRECTIVE ACTIONS FOR ITEM 5, ABOVE

I hereby state that, within 30 days, the actions described by me to the inspector will be taken to correct the violation(s) identified. This statement of corrective actions is made in accordance with the requirements of 10 CFR 2.201 (corrective steps already taken, corrective steps which will be taken, date when full compliance will be achieved). I understand that no further written response to the NRC will be required, unless specifically requested.

Title	Printed Name	Signature	Date
LICENSEE/CERTIFICATE HOLDER REPRESENTATIVE			
NRC INSPECTOR	P. Startz	/RA/	10/15/2010

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6. INSPECTOR(S): P Startz

7. INSPECTION PROCEDURES USED: 86740,88030, 88075

EXECUTIVE SUMMARY

Summary of Plant Status

- The Portsmouth Gaseous Diffusion Plant had previously discontinued most uranium hexafluoride (UF_6) enrichment processes. The facility is currently supporting limited equipment operations in X-326 to complete the removal of UF_6 residues. During the inspection, routine cleanup and maintenance operations were being conducted and no incidents were reported.

- This was a routine and announced inspection that included review of the transportation program and the radiation protection program. The inspection involved interviews with plant personnel, review of selected records, and observation of work activities. The inspection evaluated the following certificated program areas.

Transportation (IP 86740)

- The inspector observed the three outbound shipment activities including two product cylinder shipments on 9/15/2010 at building 344, and one waste shipment on 9/16/2010 at building 847. A summary of shipment activities inspected included: preparation of shipping authorization and other shipping documentation, overpack opening/inspection as applicable, truck inspections, cylinder/container inspections and loading, security seal installation, placarding, radiological surveys, final documentation preparations, truck driver briefing, overpack installation and preparations, independent quality control final inspection activities, and security escort out of the protected area. The shipments were appropriately placarded and the vehicle radiation and contamination levels were within the regulatory limits. The personnel performing the shipment activities demonstrated a high level of process knowledge, performed all activities in a safe and professional manner, operated cranes and forklifts in a experienced manner, and were up to date on training requirements. The activities were conducted in accordance with approved procedures including cylinder shipment XP4-TE-FD2400 and under adequate supervision.

- The carrier received the completed shipping papers for the shipment which included the required waste manifest. The carrier was adequately briefed on the materials involved.

- The inspector verified that training of the personnel responsible for inspecting the transportation packages was current and documented in the computerized training database.

- The inspector reviewed procedures for the receipt of a shipment. No findings of significance were observed.

- The inspector verified that the certificate holder was maintaining records of past shipments which included the confirmation of shipment receipt. The inspector reviewed five shipping records from the past year and found them to be consistent with the regulatory requirements. The inspector also reviewed several examples of radiation surveys for past shipments. No findings of significance were identified.

- The inspector reviewed a internal audit of packaging and transportation, training, handling, shipment, receiving and delivery. The inspector also reviewed several issues in the corrective action program. No issues of significance were identified.

- Through a review of procedures, the inspector determined that the responsibilities and roles of Transportation and Packaging personnel and organizations responsible for the transportation of radioactive and hazardous materials were adequately described.

- The inspector determined that personnel responsible for shipping activities were knowledgeable of the licensee's procedural requirements and Department of Transportation (DOT) regulations relating to the preparation, packaging, and labeling of radioactive material shipments. The inspector observed that receipt inspections were thorough and were conducted in accordance with approved procedures, meeting regulatory requirements.

- Adequate controls were established to ensure that material was loaded in designated containers and that container contents were accurately reflected on shipping documentation. Loading activities and shipment preparation activities were performed safely and in accordance with approved procedures.

- The inspector reviewed selected radioactive waste shipment manifests for completeness and accuracy. The reviewed manifests correctly reflected the classification, quantity, and labeling requirements for the respective shipment. Through discussions with personnel responsible for certifying that shipments were prepared in accordance with DOT regulatory requirements, the inspector determined that these personnel were knowledgeable of their duties and associated regulatory requirements.

- The inspector reviewed licensee self assessments and audits of the transportation and radioactive waste handling programs. A review of the licensee's corrective action database did not indicate any adverse trends relating to these program areas.

Radiation Protection (88030)

- The inspector interviewed certificate holder representatives, reviewed radiation protection procedures, and reviewed personnel exposure data to determine if personnel exposures were in compliance with 10 CFR 20.1201 limits. The inspector noted that personnel exposures for 2009 were well below 10 CFR 20.1201 regulatory limits for occupational exposure for the gaseous diffusion facilities. A review of records describing the occupational exposure summary for 2009 versus 2008, indicated a significant reduction of the total effective dose equivalent: 3.014 roentgen for 2009 versus 8.555 roentgen for 2008. The inspector verified that the certificate holder's dosimeter contractor was certified by the National Voluntary Laboratory Accreditation Program. No significant issues were identified.

- Based on interviews, procedural reviews, and observation of plant personnel within the controlled area, the inspector determined that the certificate holder's monitoring program for internal and external exposure was consistent with regulatory requirements. The program was adequate for the type of operations and work activities performed.

- Instrumentation calibration laboratory personnel demonstrated procedures utilized for performing daily source response and operational checks of radiation monitoring equipment, and functional alarm verification of contamination monitors utilized at exit locations of controlled zones. The inspector reviewed calibration sources for appropriate configuration and confirmed suitability of sources for their intended function. Calibration laboratory personnel were knowledgeable of the operational check requirements and activities were performed in accordance with approved procedures. The inspector reviewed the associated calibration and operational check procedures for accuracy and content. No significant issues were identified.

- The inspector observed several examples of field activities requiring radiation work permits. The work area was properly prepared and posted to support the task, contamination control measures were established, air sampling equipment was staged and operable and work crews properly prepared to perform the task. The task was completed in accordance with the radiation work permit, including the use of respiratory protection equipment, and work crews were observed performing work activities in a coordinated and safe manner following established radiological safety procedures. No significant issues were identified.

- The inspector reviewed selected survey records for accuracy and completeness and observed radiological postings within the controlled area and in locations where radioactive material was stored or utilized. No significant issues were identified.

- Plant procedures adequately specified the responsibilities of personnel and organizations responsible for the transportation of radioactive materials. Activities associated with the receipt and preparation of radioactive material shipments were performed in a safe manner maintaining strict procedural adherence. Radioactive material shipment manifests were complete and accurately reflected the contents of shipments.

Event Follow-Up (IP 88075)

On March 8, 2010 (during the course of a routine NRC inspection) the certificate holder's Plant Shift Superintendent's (PSS) office was notified by plant health physics personnel of the discovery earlier that day of an apparent inadvertent release of radioactively contaminated materials to an off-site location in Pike County, OH. The PSS notified the NRC Headquarters Operations Officer (HOO) of this event at 20:03 on March 8, 2010.

The following information was determined through interviews of plant personnel and review of records. The contaminated materials were found in a residence leased by a USEC contractor that was used to house contractor personnel and store equipment when contractor staff were performing work at the Portsmouth facility. The contamination was limited to the interior surfaces of six five-gallon buckets located in the garage structure adjacent to the residence. The maximum level of contamination found in the buckets was 14,000 disintegrations per minute (dpm) removable gross beta (β) activity and 50,000 dpm total (fixed + removable) gross beta (β) activity. Plant health physics personnel surveyed the garage, the residence, as well as equipment, protective clothing, and personnel effects and found no other evidence of radiation or radioactive material in excess of background levels.

On March 8, 2010, plant health physics personnel travelled to the contractor's home office facility located in suburban Atlanta, GA to perform additional surveys of equipment that had been used at the plant and subsequently returned to Atlanta. All survey results were below the certificate holder's maximum contamination limits for the free release of equipment or material from the plant.

The certificate holder launched an initial investigation to assess the causes for the event and determined that the contamination originated from activities that the contractor conducted on site to neutralize a fluorine pipeline that lead from the X-326 process building to the X-760 building. X-760 had been "de-leased" for return to Department of Energy (DOE) control and eventual demolition. Another portion of the same fluorine pipeline had been neutralized and removed as part of the demolition of the adjacent X-770 building in October 2006. Radiation surveys made of the pipeline in October 2006 found no evidence of elevated radiation levels.

In late 2009, planning for the demolition of X-760 and the remainder of the associated fluorine pipeline began. Part of that planning included a review of radiological conditions that might exist in the pipeline as it was opened so that any remaining fluorine could be neutralized. Based on the 2006 survey results and the process knowledge that the entire pipeline had been isolated since the 1990's, plant staff determined that no radiological controls would be necessary during or after the contractor's neutralization activities. Interviews of plant personnel and reviews of planning procedures and records indicated that the certificate holder complied with the plant's job safety planning procedures.

On February 13, 2010, the contractor began work to neutralize the fluorine pipeline by drawing a vacuum on the pipeline. Gas pumped from the pipeline was treated using contractor-owned fluorine treatment system consisting of two drums and a vacuum source on a trailer. The drums were filled with treatment media to capture the fluorine. After completion of the neutralization process, this equipment was subsequently returned to the contractor's home office facility located in suburban Atlanta, GA. Immediately after the vacuum process was completed, the pipeline was opened in a number of places and flushed with steam. Plastic five-gallon buckets were placed under each of these cuts to collect the resultant condensate from the pipeline. Upon completion of the neutralization work, approximately three gallons of condensate was collected from the plastic buckets into another container that the certificate holder then took possession of. On February 15, 2010, the condensate was disposed of into the sanitary sewer. Sampling of sewer effluent found no evidence of elevated concentrations of radioactive materials. The certificate holder also took possession of personal protective clothing and other potentially contaminated materials for disposal.

On March 18, 2010, maintenance personnel were preparing to cut the fluorine pipeline to create an "air gap" and ensure isolation of the pipeline from the rest of the X-326 process building. The maintenance staff encountered a health physics (HP) technician working in the vicinity and asked her if she was supposed to provide HP coverage while they cut the pipeline. The HP technician indicated that she did not know but that she would check with her supervisor. She left the immediate area to contact her supervisor. After several attempts, she succeeded in contacting one of her supervisors, and she was instructed to cover the work on the pipeline. However, in the interim, maintenance personnel proceeded with cutting the pipe. Based on interviews with involved personnel, the inspector concluded that the decision to cut the pipe was made as the apparent result of miscommunication.

Upon her return, the HP technician surveyed the newly opened portion of the fluorine pipeline and discovered the presence of elevated fixed radioactive contamination. Surveys of the equipment used to cut the pipe did not detect any removable contamination. A moment later, an HP supervisor drove by and the HP technician signaled the supervisor and demonstrated the elevated radiation levels.

The HP technician immediately contacted the plant engineering staff which in turn, contacted the contractor regarding the location of equipment used during the neutralization process. This information led to the surveys of the Pike County residence and the contractor's facility in Atlanta, GA.

The certificate holder took possession of the plastic buckets and collected contamination samples. As noted above, surveys found 14,000 disintegrations per minute (dpm) removable gross β activity and 50,000 dpm total gross β activity in the bottom of one plastic bucket. Five other buckets had lower levels of removable and fixed contamination. The certificate holder used the maximum measured values to estimate the resultant occupational and public dose. The bottoms of the six buckets had an approximate total area of 4,400 square centimeters (cm^2). Using the area of the buckets and the maximum measured total contamination level, the certificate holder estimated the total beta-gamma activity as follows:

$$(50{,}000 \text{ dpm}/100 \text{ cm}^2 \times 4{,}440 \text{ cm}^2)/2.22 \times 10^6 \text{ dpm/microcurie } (\mu\text{Ci}) = 0.990991 \ \mu\text{Ci}$$

The certificate holder used this value to estimate the external and internal doses and the resultant Total Effective Dose Equivalent (TEDE) for workers and potentially exposed members of the public. The physical form of the material was rust and scale particles that were relatively large that would not be easily resuspended nor ingested, therefore minimizing the chance that the material could result in an internal exposure. Interviews of contractor personnel indicated that no one entered the garage during the 21-day period between the fluorine neutralization work in February 2010 and the discovery of the contamination event in March 2010. The certificate holder's calculations indicated that the maximum TEDE for any occupational worker was less than 0.1 mRem and the maximum TEDE for any member of the public was less than 0.04 mRem. These results were significantly lower than the applicable limits of 5,000 mRem/year (occupational) and 100 mRem (public) specified in 10 CFR, Parts 20.1201 and 20.1301.

Technical Safety Requirement 3.9.1 required, in part, that approved written procedures be implemented for activities described in Safety Analysis Report (SAR). SAR Section 5.3.1.5, Radiological Protection Procedures, states, in part, that approved written procedures are prepared and issued to implement the radiological protection program. These procedures are prepared consistent with the requirements of 10 CFR 20 and are approved, maintained, and adhered to for operations involving personal radiation exposure. Job Field Instruction JFI-SE-2009-0337, item 2.9 of the instruction stated that continuous HP-IH (health physics-industrial hygiene) coverage was needed for any open system work. Contrary to the above, on February 13, 2010, the Certificate Holder failed to ensure continuous HP-IH coverage during the work that included flushing and neutralization of the fluorine pipeline. The failure to follow Field Instruction JFI-SE-2009-0337 is considered a violation of NRC requirements. The Certificate Holder immediately initiated extensive corrective actions including the immediate recovery of contaminated materials from a private residence near the facility, dispatching radiological personnel to Atlanta, Georgia to conduct radiological surveys of equipment there, conducted two root cause investigations, and implemented extensive internal procedural revisions. Internal corrective actions included revisions of applicable procedures, revisions of training programs, and immediate on-the-job lessons learned presentations to facility employees. This non-repetitive, Certificate Holder identified and corrected violation is being treated as a Non-Cited Violation: (NCV 07007002/2010-01-01). The inspector evaluated the Certificate Holder's corrective actions that had been completed by September 17, 2010, reviewed the longer term corrective actions being implemented into the training programs, and determined that the actions completed were adequate and the non-cited violation is closed.

Interviews of plant personnel indicated that the material taken off site in February 2010 after completion of the fluorine neutralization was not surveyed using radiation survey instruments or sampling. This release of material off site was authorized by a Form A-3337, "Use History Statement for Unconditional Use" that permitted the free release of material based on an evaluation that considered knowledge of

plant processes and history. Based upon previous radiation surveys of the fluorine pipeline and the process knowledge that the entire pipeline had been isolated since the 1990's, the certificate holder determined that no radiological survey would be necessary for the free release of the material from the neutralization work and a Form A-3337 was prepared documenting this determination. As an immediate corrective action after the discovery of contamination off site, the certificate holder suspended the use of all Form A-3337s at the plant on at 3:50 p.m., on March 9, 2010.

Part 20.1003 of Title 10 of the Code of Federal Regulations states, in part, that a radiological survey is an evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal, or presence of radioactive material or other sources of radiation. When appropriate, such an evaluation includes a physical survey of the location of radioactive material and measurements or calculations of levels of radiation, or concentrations or quantities of radioactive material present. Part 20.1501(a) of 10 of the Code of Federal Regulations states, in part, that each licensee (certificate holder) shall make or cause to be made, surveys that may be necessary for the licensee (certificate holder) to comply with the regulations in this part; and that are reasonable under the circumstances to evaluate (i) the magnitude and extent of radiation levels; (ii) concentrations or quantities of radioactive material; and, (iii) the potential radiological hazards. Safety Analysis Report (SAR) Section 5.3.4.3, Release of Materials, Equipment, and Facilities, states, in part, that contamination surveys are performed on materials, equipment, and facilities to be released. Contrary to the above, on February 13, 2010, the Certificate Holder failed to perform an adequate radiological survey to detect the presence of radioactive contamination on material associated with the fluorine pipeline neutralization and prevent its subsequent release to an unrestricted area. This non-repetitive, Certificate Holder identified and corrected violation is being treated as a Non-Cited Violation: (NCV 07007002/2010-01-02). The inspector evaluated the Certificate Holder's corrective actions that had been completed by September 17, 2010, reviewed the longer term corrective actions being implemented into the training programs, and determined that the actions completed were adequate and the non-cited violation is closed.

Exit Meeting Summary

- The inspection scope and results were summarized on Friday, September 17, 2010, with members of the certificate holder staff. No proprietary information was identified.

Key Points of Contact

Name	Title
D. Fogel	Nuclear Regulatory Affairs, Manager
T. Taulbee	Radiation Protection Manager
B. Halcomb	Environmental Compliance and Waste Management

List of Items Opened, Closed, Discussed

Item Number	Status	Description
NCV 07007002/2010-01-01	Closed	Failure to ensure continuous health physics coverage in accordance with procedures.
NCV 07007002/2010-01-02	Closed	Failure to perform radiological survey of tools and materials.