



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

September 8, 2010

Mr. Cary Alstadt
Manager, Columbia Plant
Westinghouse Electric Company
Commercial Nuclear Fuel Division
5801 Bluff Road, Drawer R
Columbia, SC 29250

SUBJECT: NUCLEAR REGULATORY COMMISSION INSPECTION REPORT
NO. 70-1151/2010-005

Dear Mr. Alstadt:

The U.S. Nuclear Regulatory Commission (NRC) conducted an announced, routine inspection from August 9 through August 12, 2010, at your Columbia, South Carolina facility. The enclosed report presents the results of the inspection. The purpose of the inspection was to perform a routine review of the implementation of the following programs: radiation protection, radioactive waste management, and transportation. This review was performed to determine whether activities authorized by the license were conducted safely and in accordance with NRC requirements. At the conclusion of the inspection, the findings were discussed with you and members of your staff at exit meetings held on August 12, 2010.

The inspection was an examination of activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspection consisted of facility walk downs; selective examinations of relevant procedures and records; examinations of safety-related structures, systems, equipment and components; interviews with plant personnel; and observations of plant conditions and activities in progress. Throughout the inspection, observations were discussed with your managers and staff.

Based on the results of this inspection, no violations of regulatory requirements occurred.

In accordance with 10 CFR 2.390 of NRC's "Rules of Practice," a copy of this letter, and its enclosure will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

C. Alstadt

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If you have any questions, please call me at (404) 997-4629.

Sincerely,

/RA/

Marvin D. Sykes, Chief
Fuel Facility Inspection Branch 3
Division of Fuel Facility Inspection

Docket No. 70-1151
License No. SNM-1107

Enclosure: NRC Inspection Report

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No: 70-1151

License No.: SNM-1107

Report No.: 70-1151/2010-005

Licensee: Westinghouse Electric Company

Location: Columbia, SC

Inspection Dates: August 9 through August 12, 2010

Inspectors: Richard Gibson, Senior Fuel Facility Inspectors
Gena Woodurff, Fuel Facility Inspectors
Sandra Mendez-Gonzales, Fuel Facility Inspectors (in-training)

Approved: Marvin D. Sykes, Chief
Fuel Facility Inspection Branch 3
Division of Fuel Facility Inspection

Enclosure

EXECUTIVE SUMMARY

Commercial Nuclear Fuel Division
NRC Inspection Report 70-1151/2010-005

The Westinghouse Facility converts uranium hexafluoride into uranium dioxide and fabricates fuel assemblies for use in commercial nuclear power reactors. During the inspection period, normal production activities were ongoing. This routine, announced inspection included a review of the radiation protection, radioactive waste management, and transportation programs. The inspection involved observation of work activities, a review of selected records, and interviews with plant personnel. The inspection identified the following aspects of the licensee programs as outlined below:

Radiation Protection

- The inspectors concluded that the licensee's self-assessments of the radiation protection program were implemented in accordance with the license and regulatory requirements (Paragraph 2.a).
- The licensee's procedures for Radiation Protection were reviewed, approved, and implemented in accordance with licensed requirements and regulations (Paragraph 2.b).
- The licensee's radiation protection instruments were calibrated and operated in accordance with applicable license and regulatory requirements (Paragraph 2.c).
- Internal and external exposure monitoring program were implemented in a manner to maintain doses as low as reasonably achievable (ALARA). Exposures were less than the occupational limits in 10 CFR 20.1201 (Paragraph 2.d).
- Radiological safety postings and Radiation Work Permits were properly utilized to communicate potential hazards and protective equipment requirements to workers (Paragraph 2.e).
- The radiation and contamination survey programs were appropriately implemented to protect workers, and identify potential work areas posing an internal or external radiation hazard to workers (Paragraph 2.f).
- Based on records review and interviews, the inspectors concluded that the licensee's ALARA program was being properly implemented (Paragraph 2.g).

Radioactive Waste Management

- The licensee's program for the storage, labeling, shipping, and tracking of low level radioactive waste (LLRW) was adequate (Paragraph 3.a).
- The licensee's program for the management and shipment of LLRW for disposal met the requirements of the regulations (Paragraph 3.b).
- The licensee's procedures for radioactive waste control, solid waste packaging, and waste storage met the requirements of the regulations (Paragraph 3.a).

Transportation

- The licensee's preparation of transportation packages met the requirements of the regulations. The hazardous material training program was acceptable and in accordance with requirements specified in 49 CFR Part 172 (Paragraph 4.a).
- Radiation surveys were performed adequately on incoming shipments (Paragraph 4.b).
- The licensee adequately met the Certificate of Compliance requirements for a fuel assembly container (Paragraph 4.c).
- Licensee personnel were adequately trained and knowledgeable of the requirements for transportation of radioactive materials (Paragraph 4.d).
- The licensee was adequately generating and storing the receipt and shipment records for radioactive shipments (Paragraph 4.e).

Attachment:

List of Persons Contacted

Inspection Procedures Used

List of Items Opened, Closed, Discussed

List of Acronyms Used

REPORT DETAILS

1. Summary of Plant Status

This routine, announced inspection included a review of selected aspects of the licensee's programs for radiation protection, radioactive waste management, and transportation. There were no plant upsets or unusual operational occurrences during the onsite inspections.

2. Radiation Protection (IP 88030)

a. Radiation Protection (RP) Program

(1) Scope and Observations

The inspectors reviewed the RP program to determine the adequacy of the RP safety function. The inspectors discussed organizational issues and personnel responsibilities with the Health Physics (HP) Manager. No significant organizational changes were made since the last inspection. The inspectors verified that the HP Manager reports to senior management as required by the site license. The inspectors reviewed audits EHS-08-04 and EHS 08-19 of the RP program performed by the Quality Assurance department.

(2) Conclusions

The RP program was being implemented in accordance with the licensee and regulatory requirements. No safety issues or concerns were identified.

b. Radiation Protection Procedures

(1) Scope and Observations

The inspectors reviewed the following RP procedures to determine that details specified in the procedures were consistent with regulations and license requirements:

- **ROP-01-050**, "Operation of Fit Tester 3000 Personnel Respirator Leak Rate Analyzer," Revision (Rev.) 10
- **ROP-01-032**, "Source Checks for Radiation Survey/Counting Instruments," Rev. 14
- **ROP-02-002**, "Surveys of Outgoing Shipments of Radioactive Materials," Rev. 15
- **ROP-02-011**, "Air Techniques Incorporated RDA 100P Filter/Mask Tester," Rev. 4
- **ROP-02-012**, "Washing Respiratory Protection Equipment," Rev. 10
- **ROP-02-013**, "Inspection and Rebuild of Respiratory Protection Devices," Rev. 5
- **ROP-02-017**, "Protective Clothing Collection, Handling, and Surveying," Rev. 3
- **ROP-03-001**, "Personnel Dosimetry System," Rev. 16
- **ROP-04-007**, "Performing In vivo Counts," Rev. 11
- **ROP-04-008**, "Counting the Chamber Background," Rev. 8

- **ROP-05-014**, "Performing Contamination Surveys of the Westinghouse Facility," Rev. 27
- **ROP-05-028**, "Employee Work Restrictions," Rev. 15
- **ROP-05-055**, "Surveillance Non-Routine Operations," Rev. 13
- **ROP-05-070**, "Air Sampling Representatives," Rev. 6
- **RA-207**, "Radiation Work Permit," Rev. 22
- **RA-205**, "Respiratory Protection Program," Rev. 31
- **RA-204**, "Bioassay Program," Rev. 14
- **RA-223**, "Routine Urine Sampling Program," Rev. 8
- **SYP-218**, "Respiratory Protection," Rev. 6

Through interviews with responsible staff, the inspectors determined that RP procedures were reviewed and updated when necessary and contained reasonable level of detail for the operations involved.

(2) Conclusions

Radiation protection procedures were reviewed, approved, and implemented in accordance with regulations and license requirements. No violations of NRC requirements were identified.

c. Instruments and Equipment

(1) Scope and Observations

The inspectors examined selected portable survey instruments and fixed monitoring equipment to determine operability and calibration status. The inspectors reviewed records associated with the calibration of portable survey instruments and hand-and-foot monitors. Calibration and functional performance check procedures were found to be current and adequate. The inspectors reviewed calibration and source response check sources for appropriate configuration and to confirm suitability of sources for their intended function. The inspectors noted that the licensee uses an offsite contractor to perform instrument calibrations. The inspectors reviewed selected calibration records for accuracy and completeness.

The inspectors observed the performance of daily source response and operational checks of radiation monitoring equipment, and functional alarm verification of contamination monitors located at exit points from controlled areas. Licensee personnel were knowledgeable of the operational check requirements and activities were performed in accordance with approved procedures.

The inspectors also observed the routine weekly calibration of Station 3 Criticality Monitoring System that is located at the dimension and verification table and covers the mechanic areas. During the calibration of the system, the instrument technician noticed that the signal at the computer screen which is located at the main guard station was not producing the correct signal. The computer screen was indicated a reading of

22.5 millirem per hour (mrem /hr) instead of 50 mrem/hr from the calibration source. The licensee determined from troubleshooting the instrument, that the SCXI-1100 (National Instruments) Module's filter jumpers were restricting the signal to the computer screen due to the newly installed computer drivers. The filters were not affecting the old drivers prior to the installation. Once the filter jumpers were removed, the signal was corrected. The licensee entered this issue into their corrective action program (Issue Report #10-221-C005). No other issues were identified during the calibration of the system.

(2) Conclusions

Radiation protection equipment was calibrated and operated in accordance with applicable license and regulatory requirements. No findings of significance were identified.

d. Exposure Controls

(1) Scope and Observations

The inspectors reviewed selected NRC Form 4 records and personnel exposure data to verify that exposures were maintained ALARA and within the limits of 10 CFR 20.1201. The licensee sends thermoluminescent dosimetry badges to an offsite contractor to be read. The data is uploaded into the licensee's Personnel Exposure System (PES). The doses were well below regulatory limits. Selected bioassay records, which are also maintained in the PES, were also reviewed to evaluate individual internal dose assessments. The inspectors performed total effective dose equivalent calculations, using external exposure, air sampling results, and bioassay results as needed, to determine the accuracy of the licensee's total dose calculations. No issues or concerns were identified associated with the monitoring, recording, or calculation of personnel exposures.

The inspectors reviewed the licensee's bioassay program associated with the evaluation of worker intake of uranium and the adequacy of personnel exposure assessments. The inspectors reviewed procedures and documentation associated with bioassay exposure calculations. Personnel were knowledgeable of the procedure for preparing urine samples for uranium analysis. The licensee sends urine samples to an offsite laboratory to be analyzed. The inspectors reviewed procedural requirements with responsible personnel. The inspectors interviewed personnel responsible for the review and maintenance of bioassay exposure records and found individuals to be knowledgeable of program requirements. The inspectors observed the administration of an in vivo lung count and reviewed procedures associated with the lung counting program. No issues were identified.

The inspectors reviewed elements of the licensee's program relating to the use and maintenance of respiratory protection equipment. The licensee's respirators are for single use only and the staff members responsible for maintenance of the equipment break down, clean, and rebuild approximately 88,000 respirators per year. The inspectors noted that the licensee changed the primary cleaner used to disinfect used respirators from a bleach-based cleaner to Oxyvir, a peroxide based solution. Based on field observations

and discussions with responsible personnel, the inspectors determined that respiratory protection equipment was adequately maintained and handled in accordance with approved procedures. Provisions to ensure that only qualified individuals use respiratory protection equipment were adequate and implemented in accordance with approved procedures.

(2) Conclusions

The exposure control program was implemented in a manner to maintain doses ALARA. Exposures were less than the occupational limits in 10 CFR 20.1201. The inspectors concluded that the licensee's respiratory protection program was adequate.

e. Posting, Labeling, and Control

(1) Scope and Observations

The inspectors reviewed radiological sign postings within the controlled area and to entrances leading into the controlled areas to determine compliance with regulatory requirements. Radiological areas were posted in accordance with approved procedures and accurately reflected radiological conditions in the posted area. Radioactive material storage containers and outside radioactive material storage areas were adequately posted and controlled.

The inspectors reviewed several Radiation Work Permits (RWPs) to determine the adequacy of the controls used to ensure worker safety.

(2) Conclusions

Radiological safety postings and RWPs were properly used to communicate potential hazards and protective equipment requirements to workers. No violations of NRC requirements were identified.

f. Surveys

(1) Scope and Observations

The radiation survey program was reviewed to determine if surveys were effective in the identification of radiation and contamination. The inspectors reviewed and determined that the licensee has established schedules for periodic surveys of work areas. The inspectors observed Radiation Protection technicians performing routine surveys at exit locations from the controlled area. The inspectors also observed surveys of a shipment of empty uranium hexafluoride overpacks. Radiation Protection technicians demonstrated adequate contamination survey techniques. The inspectors reviewed selected survey results for accuracy and completeness. Procedures associated with the scheduling and performance of radiological surveillance activities were found to be adequate. No issues or concerns were identified.

The inspectors observed RP technicians in the field collecting air samples from various fixed sampling locations within the controlled area that were counted to determine gross alpha and gross beta counts. The inspectors determined that air sampling collection and handling techniques were performed in accordance with approved procedures. The inspectors reviewed air sample results and found that results above administrative limits were documented and investigated in accordance with approved procedures.

(2) Conclusions

The radiation and contamination survey programs were appropriately implemented to protect workers, and to identify potential work area posing an internal or external radiation hazard to workers. No violations of NRC requirements were identified.

g. ALARA

(1) Scope and Observations

The licensee's ALARA program was reviewed to determine if the program and ALARA goals were developed and implemented in accordance with the license. Managers, RP engineers, operators, and HP technicians were interviewed regarding the implementation of the ALARA program, and demonstrated an adequate knowledge and understanding of the ALARA concepts.

The inspectors reviewed the licensee's 2008 ALARA annual report and several 2009 and 2010 ALARA quarterly meeting minutes. The reports include detailed ALARA goals and exposure summaries to identify undesirable trends. The annual threshold dose limit for 2009 was set at 1.0 rem and the maximum dose was identified as 0.998 rem. The 2010 ALARA goal is 0.95 rem. The licensee had implemented many ALARA initiatives to raise the awareness about ALARA practices among plant operators and floor managers.

(2) Conclusions

Based on a records review and interviews, the inspectors concluded that the licensee's ALARA program was properly implemented.

3. Radioactive Waste Management (IP 88035)

a. Management Controls and Surveys, Adequacy of Storage Area, Package Integrity and Labeling and Radioactive Solid Waste

(1) Scope and Observations

The LLRW storage management program was reviewed for adequacy of proper storage area, waste container integrity, and the safe shipment, processing, and disposal of LLRW. The waste tracking system was also reviewed for completeness and adequacy. The licensee stored contaminated solid waste generated from the fuel areas in drums and in sea-land containers which were sent for burial.

The inspectors toured the radioactive material and waste storage areas and observed that the licensee had stored material containing water glass silica from the waste water stream of the conversion process in 55-gallon drums on the storage pad. The inspectors observed that the dry waste and water glass containers were labeled properly and that there was no significant container degradation or posting discrepancies. However, the inspectors also observed that several rusted 55-gallon drums containing water glass silica were leaking the material onto the pellets and the floor of the storage pad.

No spread of contamination to the environment was occurring, as any effluent from the storage areas would have been directed to holding ponds that are monitored prior to being released. From discussions with licensee representatives and review of records, the inspectors determined that the deteriorating drums containing the water glass silica were being processed through the Warm Caustic Water Glass System, which was shut down during this inspection because of criticality evaluations. Also, the licensee purchased and was currently using 55-gallon drums that were more chemical resistance and lined with three poly bags.

The inspectors reviewed training records for qualified operators to operate the assay systems and discussed the training with the operators and their managers and determined that they were knowledgeable of the requirements associated with the storage and control of radioactive waste. The inspectors reviewed the procedure COP-830250 "Qualification to Operate Assay System," and determined that experienced operators were not re-qualified and re-certified every two years in accordance with the procedure. From discussions with licensee representatives and review of records, the inspectors determined that the licensee had upgraded its training matrix to an Electronic Checklist (Electronic Training and Procedure System) which required the experienced operators to be re-qualified every three years. The licensee immediately stop operation of the Assay System, operators were removed from using the machines until the procedure was revised to reflect the electronic system and requalification of the operators were updated. This finding was entered into the licensee's Corrective Action Program. The inspectors determined that adequate corrective actions were implemented by the licensee. In accordance with Section IV of the NRC Enforcement Policy, this finding constitutes a violation of minor significance and is not subject to formal enforcement action.

The inspectors reviewed selected portions of the following procedures pertaining to the low-level radioactive waste and storage program:

- COP-831001, Rev. 46, "Handling, Processing, & Disposing of LLRW"
- COP-831010, Rev. 27, "Shipping Low Level Radioactive Waste"
- COP-841001, Rev. 17, "Low Level Radioactive Scrap Handling"
- COP-830250, Rev. 10, "Qualification to Operate Assay Systems"
- COP-831012, Rev. 19, "Operation of Assay 2 (Canberra Segmented Gamma Scanner)"

(2) Conclusions

The waste storage management program was adequately implemented and provided the information needed to ensure proper storage, safe shipment, and disposal of waste. Low-level radioactive waste was stored in accordance with regulatory requirements. A negative observation was identified in that several 55-gallon drums containing waste water glass silica were leaking on the floor of the storage pad due to the containers deteriorating. The licensee will process the drums through the Warm Water Caustic System. Also, a violation of minor significance was identified in that experienced operators were not re-qualified to operate the Assay System in accordance with the procedure. The licensee took immediate actions to revise the procedure.

b. Management Controls, Quality Assurance, Waste Manifests, Waste Classification, Waste Form and Characterization, Waste Shipment Labeling, and Tracking of Waste Shipments(1) Scope and Observations

Classification, packaging, shipping, and tracking of LLRW were reviewed to verify that activities were conducted in accordance with the requirements to Appendix G of 10 CFR Part 20, and 10 CFR 61.55 and 61.56.

The inspectors reviewed LLRW shipments made since the last inspection. It involved the examination of shipping manifests, tracking of radioactive shipments, labeling, and quality control records. The inspectors verified that the waste was classified and characterized in accordance with 10 CFR Part 61 requirements, and the licensee provided an acceptable level of information in the shipping papers to determine the quantities of each individual radionuclide shipped. Proper notification was made to the licensed waste facility prior to shipments of the radioactive material. The inspectors verified that the licensee received an acknowledgment of receipt for the waste. No problems were identified.

(2) Conclusions

The licensee's program for the management and shipment of LLRW for disposal met the requirements of the regulations.

4. Transportation (Inspection Procedure (IP) 86740) R4a. Preparation of Packages for Shipment
Delivery of Completed Packages to Carriers(1) Scope and Observations

The inspectors reviewed the preparation and delivery of packages, procedures, shipment records, and radiation surveys, to verify that they were in compliance with requirements. The inspectors observed the preparation of the shipping records for a carrier shipment. The inspectors noted the proper use of procedural checklists. The licensee used the appropriate labels and markings. No issues were identified.

The inspectors reviewed the hazardous material (HAZMAT) training program provided to employees involved with the handling of hazardous materials. The licensee's training program was set up to provide HAZMAT training once per three years in accordance with the requirements of 49 CFR Part 172. The inspectors reviewed training records of the staff performing the transportation activities and noted they were current on their training. In addition, the inspectors reviewed the HAZMAT course material and determined that the HAZMAT training was acceptable and satisfied the requirements.

(2) Conclusions

The licensee's preparation of transportation packages met the requirements of the regulations. The HAZMAT training program was acceptable and in accordance with requirements specified in 49 CFR Part 172.

b. Receipt of Packages

(1) Scope and Observations

The inspectors observed an incoming shipment to verify that adequate radiation surveys were performed and that the shipping records were consistent with the shipment. The inspectors observed the activities involved for an incoming shipment. The radiation surveys performed on the shipment packages were adequate. The inspectors also reviewed the procedures that were used and noted that the licensee staff was in compliance with the procedures. No problems were identified with the handling of an incoming shipment.

(2) Conclusions

Radiation surveys were performed adequately on incoming shipments.

c. Certificates of Compliance (CoC)

(1) Scope and Observations

The inspectors reviewed the CoC for fuel assembly containers. The inspectors verified that the licensee was using the latest revision of the CoC. The inspectors observed the packaging of fuel assemble in shipping container in accordance with the CoC. Operators performing the packaging were knowledgeable of their duties and the requirements. The inspectors noted no CoC compliance issues.

(2) Conclusions

The licensee adequately met the CoC requirements for a fuel assembly container.

d. Management Controls

(1) Scope and Observations

The inspectors interviewed licensee personnel involved with transportation to determine if they were knowledgeable and qualified for their position. These interviews included transportation supervisors. The inspectors noted that these individuals were knowledgeable of 49 CFR transportation requirements, and the site's procedural requirements. The inspectors also verified that the licensee had a program to identify problems and to track them to completion. No issues were identified.

(2) Conclusions

Licensee personnel were adequately trained and knowledgeable of the requirements for transportation of radioactive materials.

e. Records and Reports

(1) Scope and Observations

The inspectors reviewed the records for a receipt shipment of material to verify that the forms were properly completed. The inspectors also reviewed the shipping manifests for several outgoing shipments to verify that the material was properly surveyed and categorized. The inspectors noted that the receipt forms were properly completed. The inspectors also verified that the licensee's procedures for the receipt of shipments were correctly performed. No issues were identified.

The inspectors verified that the hazard category, surface contamination, United Nations (UN) identification number, label name, criticality safety index, and transport index number for the last outgoing shipments were consistent and agreed with the transportation regulations. The inspectors also verified that the licensee maintained records for shipments of material for at least three years. No significant issues were identified.

(2) Conclusions

The licensee was adequately generating and storing the receipt and shipment records for radioactive shipments.

9. Exit Interview

The inspection scope and results were summarized on August 12, 2010, with the licensee. The inspectors described the areas inspected and discussed in detail the inspection results. Although proprietary documents and processes were occasionally reviewed during this inspection, proprietary information is not included in this report. Dissenting comments were not received from the licensee.

ATTACHMENT

1. **LIST OF PERSONS CONTACTED**

Licensee

A. Goldberg, Manager, Uranium Recycle and Recovery System
M. Rosser, Manager, Environmental Health and Safety
D. Precht, Manager, Operations
D. Graham, Criticality Technician, Environmental, Health, Safety
G. Couture, Manager, Environmental, Health and Safety, Licensing
C. Alstadt, Manager Columbia Plant
T. Shannon, Operations Manager, Environmental, Health and Safety

Other licensee employees contacted included engineers, technicians, production staff, security and office personnel

2. **INSPECTION PROCEDURES USED**

IP 88030 Radiation Protection
IP 88035 Radioactive Waste Management
IP 86740 Transportation

3. **LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**

None

4. **LIST OF ACRONYMS USED**

ADAMS	Agency-wide Document Access and Management System
ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
CoC	Certificate of Compliance
EH&S	Environmental Health and Safety
HAZMAT	Hazardous Materials
HP	Health Physics
IP	Inspection Procedure
LLRW	Low-Level Radioactive Waste
mrem/hr	millirem per hour
NRC	Nuclear Regulatory Commission
PES	Personnel Exposure System
REV.	Revision
RP	Radiation Protection
RWP	Radiation Work Permit