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September 19, 2000

Westinghouse Electric Company
ATTN: Mr. R. Monley, Manager
Columbia Plant
Commercial Nuclear Fuel Division
Drawer R
Columbia, SC 29250

SUBJECT: NRC INSPECTION REPORT NO. 70-1151/2000-05

Dear Mr. Monley:

This refers to the inspection conducted on August 21 - 25, 2000, at the Columbia Nuclear Fuel Plant. The purpose of the inspection was 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 those members of your staff identified in the enclosed report.

Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observation of activities in progress.

Within the scope of the inspection, violations or deviations were not cited.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html> (the Public Electronic Reading Room).

Should you have any questions concerning this letter, please contact us.

Sincerely,

/RA/

Edward J. McAlpine, Chief
Fuel Facilities Branch
Division of Nuclear Materials Safety

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

Enclosure: (See Page 2)

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.: 70-1151/2000-05

Licensee: Westinghouse Electric Company

Facility: Commercial Fuel Fabrication Facility
Columbia, SC 29250

Inspection Conducted: August 21-25, 2000

Inspectors: D. Ayres, Senior Fuel Facility Inspector, RII
S. Burrows, Criticality Safety Inspector, NMSS

Approved by: E. McAlpine, Chief, Fuel Facilities Branch
Division of Nuclear Materials Safety

Enclosure

EXECUTIVE SUMMARY

Commercial Nuclear Fuel Division NRC Inspection Report 70-1151/2000-05

The focus of this routine, unannounced inspection was the observation and evaluation of the licensee's programs for criticality safety, operations, maintenance, and training. The inspection also included evaluations of the licensee's responses to previously identified issues and incidents. The report includes inspection efforts of one regional inspector and one headquarters inspector. The inspection identified the following aspects of the licensee programs as outlined below:

Plant Operations

- The facility was operated safely and in accordance with regulatory and license requirements through approved operating procedures and posted safety practices. (Section 2.a)
- The documented engineered safety controls identified for the uranium hexafluoride (UF₆) vaporization system were available and operational. Administrative controls were adequately documented in approved procedures and being properly implemented. (Section 2.b)
- The safety controls for storage of uranium powder in polypaks were adequately implemented in accordance with the documented safety analysis. (Section 2.c)
- Housekeeping at the facility was adequate to ensure emergency egress pathways were clear of debris. Storage of some contaminated equipment and containers in the chemical process area were a potential for the spread of contamination. Flammables at the outdoor low level waste (LLW) drum packaging area were not being stored in the proper storage cabinets. (Section 2.d)
- The licensee's internal audit program was effective in identifying an inconsistency between the safety analysis and the procedure for handling contaminated high efficiency particulate air (HEPA) filters. The licensee properly categorized the situation as a notifiable event. The licensee's root cause evaluation adequately identified causes and proposed appropriate corrective actions. (Section 2.e)

Nuclear Criticality Safety

- The licensee criticality safety function adequately determined risk-significant controls. Assumptions in licensee integrated safety assessment (ISA), criticality calculations, and criticality safety analysis (CSAs) supporting risk significant operations were in place and provided an adequate assurance of safety. (Section 3.a)

Maintenance/Surveillance

- Periodic maintenance and testing of active engineered controls in the UF₆ vaporizer area were adequate to ensure their availability and reliability. (Section 4.a)

Training

- The licensee's nuclear criticality safety (NCS) training program adequately addressed the fundamentals of criticality safety. The examination had been improved from previous versions to include more questions about NCS. (Section 5.a)

REPORT DETAILS

1. **Summary of Plant Status**

This report covered a five day period. Powder, pellet, and fuel assembly production proceeded at normal rates. There were no unusual plant operational occurrences during the onsite inspection.

2. **Plant Operations (O3) (IP 88020)**

a. Conduct of Operations (O3.01)

(1) Inspection Scope

Operations in the chemical manufacturing areas were reviewed to verify adherence to safety requirements and conduct of safe practices.

(2) Observations and Findings

The inspectors observed operations in the chemical process areas and the low level waste (LLW) handling areas. The inspectors also observed the outdoor activities supporting the fuel manufacturing process. The inspectors observed that specific operations were performed safely and in accordance with approved plant procedures and postings. Discussions with operations personnel revealed an understanding of the procedural and posting requirements and had ready access to procedures. The inspectors found that operators demonstrated an awareness of the importance of following procedures.

During tours of the facility, the inspectors noted radiological signs, postings, and procedures were properly posted or readily available. The inspector observed conditions and determined that equipment and devices used to confine and contain radioactive contamination and airborne radioactivity in fuel processing and other material access areas were adequate for the operations that were taking place or planned and were in proper working condition.

(3) Conclusions

The facility was operated safely and in accordance with regulatory and license requirements through approved operating procedures and posted safety practices.

b. Implementation of Process Safety Controls (O3.03)

(1) Inspection Scope

The uranium hexafluoride (UF₆) vaporization system was reviewed to verify that the controls documented in the system safety analysis were being properly implemented.

(2) Observations and Findings

The inspectors reviewed the criticality controls documented in the licensee's Integrated Safety Assessment (ISA) for the UF₆ vaporization system, including steam condensate handling and monitoring. The inspectors observed the operation of the vaporizers and inspected the engineered controls on each process line. The inspectors found that the engineered controls were operational and provided pertinent safety information to the central control room. The inspectors also observed that some of the more crucial controls had backup instrumentation that the floor operators were required to observe per operating procedures. This dual monitoring provided redundancy to better enable the detection of potential process problems before they became safety significant.

The inspectors also reviewed pertinent operating procedures and found that they included the administrative safety controls referenced in the licensee's ISA. The inspector observed operator actions and process records. The inspectors found that the administrative safety controls were being properly implemented.

(3) Conclusions

The documented engineered safety controls identified for the UF₆ vaporization system were available and operational. Administrative controls were adequately documented in approved procedures and being properly implemented.

c. Implementation of Storage Safety Controls (O3.04)

(1) Inspection Scope

The systems for uranium powder and pellet storage were reviewed to verify that the controls documented in the systems safety analyses were being properly implemented.

(2) Observations and Findings

The inspectors reviewed the safety analysis for storage of uranium powder in plastic storage containers "polypaks". Uranium powder in polypaks were typically stored on large, portable racks such that the polypaks were arranged in arrays. These arrays were not horizontal, but slanted a few degrees to ease loading, unloading, and identification of individual polypaks. Several of these portable racks were being stored in the chemical process area. The storage racks can be transported via forklift to the blending area where large quantity powder mixtures are produced. The inspectors observed that when the racks were stored side-by-side, the polypaks were aligned into planar arrays. However, when the racks were stored end to end, the polypaks did not align into planar arrays due to the slanted nature of the storage racks. The inspectors reviewed the criticality analysis for these racks and found that enough conservatism was included in the analysis to account for the apparent misalignment of the polypaks.

(3) Conclusions

The safety controls for storage of uranium powder in polypaks were adequately implemented in accordance with the documented safety analysis.

d. Housekeeping (O3.06)

(1) Inspection Scope

Conditions throughout the facility were reviewed to verify that housekeeping did not adversely affect the radiological safety or emergency egress of the facility.

(2) Observations and Findings

The inspectors observed housekeeping conditions throughout the facility. The site was generally free of clutter except in the staging area for decontamination of non-combustible trash. The auxiliary emergency exit for that area was adequately free from clutter. The inspectors observed other areas where improper storage of contaminated equipment and containers could contribute to the potential spread of contamination. The inspectors also found that flammable solvents in the outdoor LLW drum packaging area were not being stored in the flammable storage cabinets provided in the area. The inspectors identified these items to licensee management who quickly addressed the housekeeping problems.

(3) Conclusions

Housekeeping at the facility was adequate to ensure emergency egress pathways were clear of debris. Storage of some contaminated equipment and containers in the chemical process area were a potential for the spread of contamination. Flammables at the outdoor LLW drum packaging area were not being stored in the proper storage cabinets.

e. Review of Previous Events (O3.07)

(1) Inspection Scope

The inspectors reviewed the licensee's investigation and proposed corrective actions in response to Event No. 37189 concerning an inadequate procedure for handling contaminated high efficiency particulate air (HEPA) filters.

(2) Observations and Findings

The inspectors reviewed the licensee's investigation of Event No. 37189 concerning the procedure for handling contaminated HEPA ventilation filters not being in accordance with the documented safety analysis. The procedure for handling contaminated filter media stated that these filters were to be processed through a shredder prior to incineration. However, the criticality safety for the shredder was analyzed based on preventing certain contaminated filter media from being processed in the shredder, and the procedure for operation of the shredder was consistent with the analysis. Thus, the

procedure for handling contaminated filter media was inconsistent with the criticality analysis and operating procedure for the shredder. The inspectors noted that the issue was identified by the licensee during a routine procedure audit, and that the operations in question were no longer being performed.

The inspectors reviewed the licensee's root cause analysis of the event. The root causes included a deficiency in the procedure review and approval process whereby a change had been made to the procedure for handling contaminated HEPA filters without being reviewed by the criticality safety function. At the time of this inspection, the licensee was still in the process of identifying and implementing the long term recommendations of their investigation into the event. Since the licensee identified the procedural inconsistency through a review of dozens of procedures, it appears that this was an isolated incident and not a programmatic problem.

The inspectors reviewed the equipment used for shredding the contaminated filter media and found that the system could only hold two to three filters. The capacity for the HEPA filters to accumulate material was low enough for the inspectors to determine that a criticality from shredding contaminated HEPA filters was not credible. Therefore, this event resulted in a violation of low safety significance and was not subject to formal NRC enforcement action.

(3) Conclusions

The licensee's internal audit program was effective in identifying an inconsistency between the safety analysis and the procedure for handling contaminated HEPA filters. The licensee properly categorized the situation as a notifiable event. The licensee's root cause evaluation adequately identified causes and proposed appropriate corrective actions.

f. Follow up on Previously Identified Issues (O3.08)

(1) Inspection Scope

The licensee's actions to address previously identified issues were reviewed to determine completion to closure.

(2) Observations and Findings

The inspectors reviewed the licensee's actions on Inspector Follow-up Item (IFI) 99-06-01 concerning the potential disabling of uranyl nitrate (UN) tank concentration monitoring systems. The inspectors found that an effort to upgrade the controls on the UN tank system was planned and scheduled for 2001. This item remained open.

The inspectors reviewed the licensee's actions on IFI 00-02-01 concerning the need to provide a method to monitor certain glove boxes for excessive ventilation. The licensee's system for monitoring glove box ventilation included a monthly check on the air flow through a glove box opening. The licensee implemented a plan to identify significant increases in the glove box air flows to the area engineer so that excessive

ventilation could be corrected. The inspector determined that this action adequately addressed the concern, thus IFI 00-02-01 was closed.

The inspectors discussed Unresolved Item (URI) 99-06-04 concerning the welds on shipping containers not in accordance with Certificate of Compliance requirements. The licensee submitted new safety analyses for the shipping containers that would address the difference in weld patterns. These analyses were under review by the NRC Headquarters transportation group. This item remained open.

(3) Conclusions

The licensee's actions were adequate to close IFI 00-02-01. The licensee continued to work on responses to IFI 99-06-01, thus it remained open. The licensee's submittal to NRC Headquarters on URI 99-06-04 was still under review and remained open.

3. Nuclear Criticality Safety (IP 88015)

(1) Scope of Inspection

The inspectors reviewed the ISA sections specific to the ammonium diuranate (ADU) operations, and one criticality safety analysis (CSA) to determine the adequacy of risk significant controls. The inspectors interviewed the nuclear criticality safety (NCS) staff as well as facility staff to determine the visibility of the criticality safety function at the facility.

(2) Observations and Findings

The inspectors reviewed the ISA sections dealing with the ADU processes, with emphasis on the UF₆ vaporizer system. The inspectors verified that the ISA was properly based on referenced criticality calculations. Several referenced calculational notes were checked, and in each case the inspectors were able to find and verify the detailed criticality calculations and more detailed analysis. The calculations supported the mass limits and spacing requirements for both moderator and fissile material. These limits were consistent with those in use elsewhere at the facility.

The inspectors also reviewed the CSAs for effluent quarantine tanks in the ADU conversion area and for the polypak storage racks. The inspectors determined, based reviews of the analysis, that adequate minimum parametric controls existed during normal and credible abnormal conditions, and all reviewed criticality controls were in place and operational.

The inspectors interviewed one control room worker and two fissile material workers at the facility. The workers were aware of the significance of the posted criticality controls and were knowledgeable about specifics such as exclusion of water in certain areas and the different types of materials in the facility that were considered moderators.

(3) Conclusions

The licensee criticality safety function adequately determined risk-significant controls. Assumptions in licensee ISA, criticality calculations, and CSAs supporting risk significant operations were in place and provided an adequate assurance of safety.

4. Maintenance/Surveillance (F1) (IP 88025)

a. Work Control Procedures (F1.02)

(1) Inspection Scope

Procedures for performing maintenance and testing of engineered safety controls in the UF₆ vaporizer area were reviewed to determine the adequacy of ensuring availability and reliability of the controls.

(2) Observations and Findings

The inspectors reviewed the licensee's procedures that designated the maintenance and testing of the engineered safety controls identified in the ISA for the UF₆ vaporizer area. The inspectors also interviewed maintenance personnel on the methods used to test specific pieces of equipment such as level controls, pressure sensors and transmitters, and conductivity measurement systems. The inspector found that the methods used were adequate to properly determine the functionality of the controls. The inspectors also found that the active engineered safety controls were adequately designated for receiving periodic maintenance and testing.

(3) Conclusions

Periodic maintenance and testing of active engineered controls in the UF₆ vaporizer area were adequate to ensure their availability and reliability.

5. Training (F2) (IP 88010)

a. General Nuclear Criticality Safety Training (F2.02)

(1) Inspection Scope

The inspectors reviewed the licensee's NCS training program. This is part of the initial training for new employees who handle fissile material.

(2) Observations and Findings

The inspectors reviewed the NCS section of the Integrated Safety Training Manual for new employees. The inspectors also completed the interactive computer safety refresher training with particular attention paid to the criticality safety sections. The inspectors reviewed past and current examinations given to trainees and reviewed the training records of selected workers that handle fissile material.

The inspectors found that the NCS section of the Integrated Safety Training Manual was adequate and the NCS scope of the required examination had been improved to include five questions on criticality safety issues, as opposed to the old version which contained only two. The inspectors noted the emphasis by the training staff and the training materials of the importance of following procedures. The recent accident at a fuel cycle facility overseas had been added to the discussion with the emphasis that the main contributing cause was not following procedures.

(3) Conclusions

The licensee's NCS training program adequately addressed the fundamentals of criticality safety. The examination had been improved from previous versions to include more questions about NCS.

6. Exit Meetings

The inspection scope and results were summarized on August 25, 2000, with those persons indicated in the Attachment. The inspectors described the areas inspected and discussed in detail the inspection results. Although proprietary documents and processes were reviewed during this inspection, the proprietary nature of these documents or processes is not included in this report.

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

Licensee Personnel

- *J. Allen, Vice President, U.S. Manufacturing - Westinghouse Nuclear Fuel
- *J. Bush, Manager, Manufacturing
- *D. Goldbach, Manager, Environment, Health & Safety (EH&S)
- *D. Graham, EH&S Technician
- *J. Heath, Manager, Integrated Safety Engineering
- B. Monley, Manager, Columbia Plant
- *C. Perkins, Manager, Maintenance
- D. Williams, Criticality Safety Engineer

INSPECTION PROCEDURES USED

- IP 88010 Operator Training/Retraining
- IP 88015 Headquarters Nuclear Criticality Safety Inspection Program
- IP 88020 Regional Nuclear Criticality Safety Inspection Program
- IP 88025 Maintenance/Surveillance

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

The licensee's actions were adequate to close IFI 00-02-01. The licensee continued to work on responses to IFI 99-06-01, thus it remained open. The licensee's submittal to NRC Headquarters on URI 99-06-04 was still under review and remained open.

Closed

- 00-02-01 IFI Provide method to monitor for excessive ventilation in glove boxes. (Section 2.f)

Discussed

- 99-06-01 IFI Evaluate and correct the disabling of safety alarms and controls caused by a failure of the uranyl nitrate tank level probe system. (Section 2.f)
- 99-06-04 URI Welds on shipping containers not in accordance with Certificate of Compliance. (Section 2.f)

ACRONYMS

ADU	Ammonium Diuranate
CSA	Criticality Safety Analysis
EH&S	Environment Health and Safety
HEPA	High Efficiency Particulate Air
IFI	Inspector Follow-up Item
IP	Inspection Procedure
ISA	Integrated Safety Assessment
LLW	Low Level Waste
NCS	Nuclear Criticality Safety
NRC	Nuclear Regulatory Commission
UF ₆	Uranium Hexafluoride
UN	Uranyl Nitrate
URI	Unresolved Item