



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
SAM NUNN ATLANTA FEDERAL CENTER  
61 FORSYTH STREET SW SUITE 23T85  
ATLANTA, GEORGIA 30303-8931**

February 8, 2002

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

SUBJECT: NRC INSPECTION REPORT NO. 70-1151/2002-001

Dear Mr. Monley:

This refers to the inspection conducted on January 7 -11, 2002, 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.

Based on the results of the inspection, no violations or deviations were identified.

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/reading-rm/adams.html> (the Public Electronic Reading Room).

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

Sincerely,

**/RA/**

Leonard Wert, Acting Chief  
Fuel Facilities Branch  
Division of Nuclear Materials Safety

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

Enclosure: NRC Inspection Report

WEC

2

cc w/encl: (See page 2)

cc w/encl:

Sam McDonald, Manager  
 Environment, Health and Safety  
 Commercial Nuclear Fuel Division  
 Westinghouse Electric Corporation  
 P. O. Box R  
 Columbia, SC 29250

Henry J. Porter, Assistant Director  
 Div. of Radioactive Waste Mgmt.  
 Dept. of Health and Environmental  
 Control  
 Electronic Mail Distribution

R. Mike Gandy  
 Division of Radioactive Waste Mgmt.  
 S. C. Department of Health and  
 Environmental Control  
 Electronic Mail Distribution

Distribution w/encl:

L. Wert, RII  
 D. Ayres, RII  
 M. Crespo, RII  
 O. Smith, RII  
 L. Roche, NMSS  
 J. Muszkiewicz, NMSS  
 P. Hiland, RIII  
 W. Britz, RIV  
 B. Spitzberg, RIV  
 PUBLIC

<b>OFFICE</b>	<b>RII:DNMS</b>	<b>RII:DNMS</b>	<b>RII:DNMS</b>
<b>SIGNATURE</b>	/RA/	/RA/	/RA/
<b>NAME</b>	DAyres	MCrespo	OSmith
<b>DATE</b>	02/07/2002	02/07/2002	02/07/2002
<b>COPY?</b>	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY      DOCUMENT NAME: C:\Program Files\Adobe\Acrobat 4.0\PDF  
 Output\Westinghouse IR 2002-001.wpd

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 70-1151

License No.: SNM-1107

Report No.: 70-1151/2002-001

Licensee: Westinghouse Electric Company

Facility: Commercial Fuel Fabrication Facility  
Columbia, SC 29250

Inspection Conducted: January 7-11, 2002

Inspectors: D. Ayres, Senior Fuel Facility Inspector, RII  
M. Crespo, Fuel Facility Inspector, RII  
O. Smith, Physical Security Inspector, RII

Accompanying  
Personnel: E. McAlpine, Chief, Fuel Facilities Branch, RII  
O. Lopez, Nuclear Safety Intern, RII  
N. Rivera, Nuclear Safety Intern, RII

Approved by: L. Wert, Acting Chief, Fuel Facilities Branch  
Division of Nuclear Materials Safety, RII

Enclosure

## EXECUTIVE SUMMARY

The focus of this routine, announced inspection was the observation and evaluation of the licensee's programs for plant operations, physical security, maintenance/surveillance and training. The report includes inspection efforts of three regional inspectors. The inspectors were accompanied by the Chief, Fuel Facilities Branch, NRC Region II during one day of the inspection. Two inspectors from NRC Headquarters were also on site during the week to inspect the licensee's criticality safety program (see Inspection Report 70-1151/2002-201). The inspection identified the following aspects of the licensee's programs as outlined below:

### **Plant Operations**

- Operations at the facility were being performed according to the licensee's safety analyses.
- The licensee's process safety controls were accurately represented in plant drawings and were consistent with the plant configuration and the safety analysis.
- Housekeeping had improved since the last operations inspection and was adequate to maintain radiological safety and ensure emergency egress pathways were clear of debris.
- The remediation of the 50 gallon spill of uranyl nitrate solution that occurred in the HF spiking station on October 29, 2001 was adequate to restart the system. The development of long-term corrective actions associated with the dike failure will be tracked as Inspection Follow-up Item (IFI) 2002-001-01. The corrective actions for the roof leak in the erbia process area were adequate to resume operations in the erbia blending area.
- The corrective actions to prevent recurrence of Violation (VIO) 01-02-01 and VIO 01-03-01 were in place and were adequate. IFI 01-07-01 was adequately addressed by the licensee. These items were closed.

### **Security**

- The licensee adequately implemented their NRC approved Physical Security Plan and procedures.

### **Maintenance/Surveillance**

- The conduct of maintenance on process safety controls was being adequately performed to ensure their availability and reliability.
- Maintenance planning was performed adequately through the integration of operations and maintenance staff inputs.
- The procedures for maintenance work for the Uranyl Nitrate (UN) bulk tanks system and HF spiking stations were properly approved by licensee management and included adequate instructions to ensure availability and reliability of the equipment.

- The licensee's maintenance training program ensured that maintenance personnel have received adequate training for their position.
- Surveillance testing of the UN bulk tank monitors were adequate to ensure the availability and reliability of the safety controls. Calibrations for electronic controls were being performed in accordance with established frequencies.

### **Training**

- General employee training and testing materials provided proper instruction to operators on required safety topics.
- The licensee's operator training program ensured that operators had a satisfactory knowledge of the procedures and job requirements that were to be performed.

### **Attachment**

Partial List of Persons Contacted

Inspection Procedures Used

List of Items Opened, Closed, and Discussed

Acronyms

## REPORT DETAILS

### **1. Summary of Plant Status**

This report covered a 5 day period. Powder, pellet, and fuel assembly production proceeded at normal rates on three process lines. One process line was shut down during the week due to routine maintenance. Another process line was shut down during portions of the week due to problems with control system software. Initial operations in the Burnable Absorber Expansion System (BAES) were underway. There was one unusual plant operational occurrence (NRC Event Number 38612) that occurred at the facility the day before the inspectors arrived (See section 2.d.).

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

#### a. Conduct of Operations (O3.01)

##### (1) Inspection Scope

Operations in the fuel production and uranium recovery areas were reviewed to verify adherence to safety requirements and conduct of safe practices.

##### (2) Observations and Findings

The inspector observed operations in the fuel processing areas and the uranium recovery areas. The inspectors also observed the outdoor activities supporting the fuel manufacturing process, including the Uranyl Nitrate (UN) bulk tank system. The inspectors observed that specific operations were being performed safely in accordance with approved plant procedures and postings.

During tours of the facility, the inspectors noted radiological signs, postings, and procedures were properly posted or readily available. The inspectors 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.

The inspectors were briefed on a problem with the digital control and data acquisition system on one of the powder production lines. Data acquisition communications between a remote digital controller and the process control room were being slowed due to delays in data transmission. All safety systems associated with the affected controller functioned properly during the problem. The licensee corrected the data routing bottleneck, tested all active engineered safety controls associated with the affected portion of the process line, and restarted the process without incident.

##### (3) Conclusion

Operations at the facility were being performed adequately to ensure safety and in accordance with the licensee's safety analyses. A process control system upset was handled promptly and safely.

b. Facility Modifications and Configuration Controls (O3.02), Implementation of Process Safety Controls (O3.03)

(1) Inspection Scope

The licensee's UN bulk tank storage system was reviewed to ensure that plant drawings were consistent with the plant configuration. The safety controls were also reviewed to verify that they coincided with the safety analysis.

(2) Observations and Findings

The inspectors reviewed the licensee's current Integrated Safety Analysis (ISA) to identify the safety controls for the UN bulk storage tanks. The inspectors then verified the location of the specific safety controls, such as the in-line monitors, with the plant drawings. The inspectors noted no discrepancies. The inspectors then interviewed the operators about the safety controls on the UN bulk tanks. The operators were aware of the critical safety controls for the system is the concentration of uranium in the tank and are constantly motoring it. The inspectors found the safety controls used in the process to coincide with those written in the ISA.

(3) Conclusion

The licensee's process safety controls were accurately represented in plant drawings and were consistent with the plant configuration and the safety analysis.

c. 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 inspector observed housekeeping conditions throughout the facility. The inspectors noted that the organization and general housekeeping of the facility has improved since the last operations inspection. The inspectors noticed no issues where the housekeeping could affect the radiological safety or emergency egress of the facility.

(3) Conclusion

Housekeeping had improved since the last operations inspection and was adequate to maintain radiological safety and ensure emergency egress pathways were clear of debris.

d. Review of Previous Event (O3.07)

(1) Inspection Scope

The inspectors reviewed the work relating to the remediation of the 50 gallon spill of uranyl nitrate solution that occurred in the HF spiking station on October 29, 2001. The inspectors also evaluated the roof leak that occurred in the erbia process area on January 6, 2002 (NRC Event Number 38612, Nuclear Materials Event Database #: 020020).

(2) Observations and Findings

On October 29, 2001, a flange in the HF spiking station began leaking and caused 50 gallons of uranyl nitrate solution to spill into the dike below. The inspectors reviewed the area in which the spill occurred. The spill had seeped through a hole in the dike floor and into the subflooring, thus the dike failed to contain the spill. The licensee had remediated the area by digging up the contaminated subflooring materials and underlying soil. One of the weaknesses in the dike structure that contributed to the failure was that the back wall of the process building was used as one side of the dike. Over time, a hole in the dike developed at the wall/floor interface. This hole was undetected because the spiking station was enclosed in plexiglas that had lost its transparency. Upon completion of the remediation of the area, the licensee rebuilt a new diked area that no longer used the back wall as part of the dike wall. The licensee had also made sure that no other dikes in the facility used a building wall as part of the dike wall. The licensee's root cause evaluation was not completed at the time of this inspection. The development of the licensee's long-term corrective actions associated with this incident will be tracked as Inspection Follow-up Item (IFI) 2002-001-01.

The inspectors observed where the roof had leaked water onto the floor of the erbia process area, which was reported to the NRC as a loss of double contingency. The inspectors discussed the safety significance of this event with the criticality safety inspectors from NRC Headquarters. Due to the location and the small volume of water involved, this event was deemed to be of low safety significance. The inspectors observed the source of the leak and determined that the apparent cause was due to degradation of sealant around a structural beam that protruded through the roof. The licensee's corrective actions involving the resealing of the roof around the structural beam was adequate for resuming operations in the erbia blending area.

(3) Conclusion

The remediation of the 50 gallon spill of uranyl nitrate solution that occurred in the HF spiking station on October 29, 2001 was adequate to restart the system. The development of long-term corrective actions associated with the dike failure will be tracked as IFI 2002-001-01. The corrective actions for the roof leak in the erbia process area were adequate to resume operations in the erbia blending area.

e. 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 inspector reviewed the licensee's corrective actions for Violation (VIO) 01-02-01 and VIO 01-03-01 concerning examples of failure to follow criticality safety postings. For VIO 01-02-01, the licensee had implemented an engineered control for the uranium dissolver elevator to help prevent operators from violating the spacing requirements. For VIO 01-03-01, the licensee had conducted retraining of employees handling special nuclear material and made all employees aware that spacing violations would result in disciplinary actions. The health physics department was also assigned to actively search for spacing violations throughout the plant and report findings to the area's supervisor. Based on these corrective actions, VIO 01-02-01 and VIO 01-03-01 was closed.

The inspectors reviewed the ISA of the new erbia process for IFI 01-07-01, which involved a discrepancy between the licensee's erbia recycle material sampling methods and the corresponding safety analysis. The inspectors reviewed the updated ISA and noted that sampling method mentioned in the ISA now agreed with the operating procedure. The inspectors consulted with the criticality safety inspectors present to determine if the change in the ISA was adequate in addressing the issue and found the change to be satisfactory. Thus, IFI 01-07-01 was closed.

(3) Conclusion

The corrective actions to prevent recurrence of VIO 01-02-01 and VIO 01-03-01 were in place and were adequate. IFI 01-07-01 was adequately addressed by the licensee. These items were closed.

**3. Security (S2) (IP 81000 series)**

a. Management, Staffing, Plan and Procedures, Audit (S2.01), Barriers, Locks, Equipment, Hardware, Maintenance (S2.02), Alarm Stations Functions (S2.03), Access Controls (S2.04), Records, Reports, Event Logs Part 73.71 (S2.07)

(1) Inspection Scope

The inspector reviewed the licensee's physical security program in the areas of material use and storage; surveillance, detection and response; and testing and maintenance. The inspector observed the licensee's facilities, interviewed security personnel, and observed security personnel in the performance of their duties to determine if the security program was implemented in accordance with the physical security plan commitments and regulatory requirements.

(2) Observations and Findings

Special nuclear material was properly used and stored within the control access area (CAA) as required by regulations. The Westinghouse Accountability Tracking and Tracing Systems (WATTS) was available to ensure proper placement and transfer of special nuclear material (SNM). Security personnel performing detection and surveillance functions were cognizant of their responsibilities. Response procedures with off-site local law enforcement were arranged in a Memorandum of Agreement dated May 15, 1997. Vehicle access controls and search procedures were adequate to detect theft of SNM. Random patrols were used to monitor the CAA perimeter fence and provide early detection and assessment of attempted unauthorized accesses. Testing of security systems and devices were logged in the daily security officer desk log.

(3) Conclusion

The licensee adequately implemented their NRC approved physical security plan and procedures.

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

a. Conduct of Maintenance (F1.01), Qualifications of Maintenance Personnel (F1.04)

(1) Inspection Scope

The conduct of maintenance on safety significant equipment and qualification of maintenance personnel were reviewed to verify maintenance was being adequately performed by knowledgeable individuals to ensure the proper operation of the equipment upon completion of the maintenance work.

(2) Observations and Findings

The inspectors reviewed maintenance records for work performed on safety controls associated with the UN bulk tank system. The inspectors noted that required periodic maintenance was being performed at the intervals specified by the licensee's maintenance program. The inspectors also noted that details of the execution of work orders were being promptly recorded. The inspectors verified that functional testing was being performed prior to returning designated components to operational status.

The inspectors observed maintenance work on one of the decanting centrifuges of the ammonium diurate (ADU) system. The inspectors interviewed the maintenance staff performing the work. The inspectors noted their detailed knowledge of the equipment as well as knowledge of the maintenance procedure for the work that was required to be performed.

(3) Conclusion

The conduct of maintenance on the UN bulk tank system safety controls was being adequately performed to ensure their availability and reliability. Maintenance to rebuild the decanting centrifuges was performed by knowledgeable and qualified individuals.

b. Work Control Procedures (F1.02).

(1) Inspection Scope

The work control system for maintenance activities were reviewed to verify that work orders for programmed maintenance were initiated properly.

(2) Observations and Findings

The inspectors reviewed the process in which the licensee planned maintenance. The licensee had a maintenance planning department that produced all the work orders for planned maintenance. The inspectors interviewed members of the department for details on how work orders for safety significant maintenance were produced. The inspectors verified that all work orders were adequately labeled to draw attention to those that were safety significant or fire safety related. The maintenance planning computer system (Mapcon) informed the planners which work orders should be labeled as such. The Mapcon system also informed the planning department of any maintenance work that was overdue. The inspectors reviewed the weekly overdue maintenance list and discussed it with the maintenance planners. The inspectors found no safety significant issues with the list.

The inspectors attended a maintenance planning meeting between the operations supervisors, maintenance staff, and maintenance planners. The meeting demonstrated good communication between the groups. The inspectors also noted that the integration of the operations staff and maintenance staff in the planning of maintenance work helped ensure the work would be done properly and on time.

(3) Conclusion

The maintenance planning system ensured that work orders for programmed maintenance work was performed properly and on time.

c. Work Control Authorizations (F1.03)

(1) Inspection Scope

Work order authorizations for maintenance activities were reviewed to verify that they were properly approved by licensee management and included adequate instructions for performing the maintenance activities.

(2) Observations and Findings

The inspectors noted that the maintenance planning department arranged for all the approvals to be obtained prior to the issuing of a work order. The inspectors also reviewed several procedures for maintenance work on the UN bulk tanks system and the HF spiking stations. The inspectors observed that the procedures included adequate descriptions of the work to be performed. The inspectors also observed that these procedures were approved by the cognizant engineer for each respective area. The inspector reviewed several hot work permits. Each hot work permit had the appropriate signatures needed for approval.

(3) Conclusion

The procedures for maintenance work on the UN bulk tank system and HF spiking stations were properly approved by licensee management and included adequate instructions to ensure the availability and reliability of the equipment.

d. Surveillance Testing (F1.06) and Calibrations of Equipment (F1.07)

(1) Inspection Scope

Surveillance testing and calibration of engineered safety controls were reviewed to verify tests were being performed at the frequency established to ensure availability and reliability of the controls.

(2) Observations and Findings

The inspectors reviewed the records of calibration tests performed on the in-line monitors for the large, unfavorable geometry UN bulk tanks. The inspectors reviewed the procedure for the calibration of the tanks and questioned technicians on how the work was to be performed to ensure that the appropriate alarms would sound in the event of a high concentration of uranium in the tank. The inspectors found that the calibrations were being performed at the designated intervals.

(3) Conclusion

Surveillance testing of the UN bulk tank monitors were adequate to ensure the availability and reliability of the safety controls. Calibrations for electronic controls were being performed in accordance with established frequencies.

**5. Training (F2) (IP 88010)****a. 10 CFR 19.12 Training (F2.01), General Nuclear Criticality Safety Training (F2.02), General Radiological Safety Training (F2.03), and General Emergency Training (F2.04)****(1) Inspection Scope**

General employee training and testing materials were reviewed to verify that proper instruction was being given to operators on required safety topics.

**(2) Observations and Findings**

The inspectors reviewed the general employee interactive training software and portions of the tests given to employees. The inspectors found that the training and testing adequately covered all of the safety topics required by 10 CFR 19.12 and commitments made in the facility license application. The inspectors noted that the computer based training made excellent use of multimedia functions to illustrate sights and sounds found in the facility.

**(3) Conclusion**

General employee training and testing materials provided proper instruction to operators on required safety topics.

**b. Operating Procedure Training (F2.05) and On-the-job Training (F2.06)****(1) Inspection Scope**

Operation procedures and the on-the-job training program was reviewed by the inspectors.

**(2) Observations and Findings**

The inspectors reviewed the operation procedures for the UN bulk tanks and questioned operators on their knowledge of the safety systems for the tanks. The operators demonstrated adequate knowledge of the safety systems of the tanks and how to respond to high concentration alarms.

The inspectors reviewed a sample of exams given to operators that test their knowledge of operational procedures (an 80% or greater is required to pass). The inspectors noted the tests adequately tested the operators knowledge of the procedures with detailed specific questions.

The inspectors interviewed the training manager for the UN bulk tanks area. The training manager briefed the inspector on training requirements, including on-the-job training, for the area by providing samples of the training checklists used to complete the operator's training. For the operator to be fully qualified, the operator must complete the checklist. The inspector noted that the training process was adequate to ensure qualified operators.

The inspectors attended a training presentation on the new HF storage tanks. The training provided thorough detail of the new tanks as well as comparisons to the old tank system. All operators that worked in the area were required to take the course and to document that they had completed the training.

(3) Conclusion

The licensee's operator training program ensured that operators had a satisfactory knowledge of the procedures and job requirements that were to be performed.

**6. Exit Meetings**

The inspection scope and results were summarized with those persons indicated in the Attachment on January 9, for the security inspection areas, and January 10, 2002, for the operations, maintenance, and training inspection areas. 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

- # M. O. Connelly, Criticality Safety
- # B. Ervin, CPE Manager
- \* D. Godberry, Site Security Contract Manager
- # D. Graham, Environment, Health and Safety
- \*# J. Heath, Integrated Safety Manager
- \*# S. McDonald, Environment, Health and Safety Manager
- \* R. Monley, Plant Manager
- # C. Perkins, Maintenance Manager
- # D. Precht, Chemical Operations Manager
- # T. Shannon, Environment, Health and Safety
- \* P. Stroud, Human Resources Security Services
- # C. Snyder, Criticality Safety
- # D. Williams, Criticality Safety

NRC Personnel

- # E. McAlpine, Chief, Fuel Facilities Branch, Region II

\*Attended exit meeting on January 9, 2001  
# Attended exit meeting on January 10, 2001

**INSPECTION PROCEDURES USED**

- |          |   |
|----------|---|
| IP 81431 | Fixed Site Physical Protection of SNM of Low Strategic Significance |
| IP 88010 | Operator Training/Retraining  |
| IP 88020 | Regional Nuclear Criticality Safety Inspection Program              |
| IP 88025 | Maintenance and Surveillance Testing                                |

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

Opened

- |          |     |  |
|----------|-----|--|
| 02-01-01 | IFI | Corrective actions for failure of HF spiking station dike. |
|----------|-----|--|

Closed

- |          |     |  |
|----------|-----|--|
| 01-02-01 | IFI | Two examples of failure to follow criticality safety posting in uranium recovery dissolver elevator. |
| 01-03-01 | IFI | Three examples of failure to follow criticality safety posting in the uranium powder mixing hoods.   |

01-07-01      IFI      Discrepancy between the licensee's erbia recycle material sampling methods and the corresponding safety analyses.

Discussed

None

**ACRONYMS**

ADU	Ammonium Diurante
BAES	Burnable Absorber Expansion System
CAA	Control Access Area
CAAS	Criticality Accident Alarm System
CFR	Code of Federal regulations
ChAMPS	Chemical Area Manufacturing Process System
IFI	Inspector Follow-up Item
IP	Inspection Procedure
IR	Inspection Report
ISA	Integrated Safety Analysis
NRC	Nuclear Regulatory Commission
OCA	Owner Controlled Area
P&IDs	Piping and Instrumentation Drawings
SER	Safety Evaluation Report
SNM	Special Nuclear Material
UN	Uranyl Nitrate