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

April 7, 2017

Mr. Mike Annacone
Vice President, Columbia Fuel Operations and
Manager, Columbia Plant
Westinghouse Electric Company
5801 Bluff Road
Hopkins, SC 29061

SUBJECT: WESTINGHOUSE ELECTRIC COMPANY – NUCLEAR REGULATORY COMMISSION INTEGRATED INSPECTION REPORT NO. 70-1151/2017-002

Dear Mr. Annacone:

The Nuclear Regulatory Commission (NRC) conducted an announced inspection during the second quarter of calendar year 2017 (February 27 – March 2, 2017), at the Westinghouse Columbia Fuel Fabrication Facility in Hopkins, SC. The purpose of the inspection was to determine whether activities authorized under the license were conducted safely and in accordance with NRC requirements. The enclosed report presents the results of the inspection. At the conclusion of this inspection, the results were discussed with you and members of your staff at an exit meeting on March 2, 2017.

The inspection examined activities conducted under your license as they relate to public health and safety, the common defense and security, and to confirm 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, interviews with plant personnel, and plant observations. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel. No violations of NRC requirements were identified.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390 of NRC's "Rules of Practice and Procedure," a copy of this letter and enclosure will be made available electronically for public inspection in the NRC Public Document Room, or from the NRC's Agencywide Documents Access and Management System (ADAMS), which is accessible from the NRC Website at http://www.nrc.gov/reading-rm/adams.html.

If you have any questions, please contact Tom Vukovinsky of my staff at (404) 997-4622.

Sincerely,

/RA/ T. Vukovinsky for

Eric C. Michel, Chief
Projects Branch 2
Division of Fuel Facility Inspection

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

Enclosure:
NRC Inspection Report 70-1151/2017-002
w/Supplemental Information

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SUBJECT: WESTINGHOUSE ELECTRIC COMPANY – NUCLEAR REGULATORY COMMISSION INTEGRATED INSPECTION REPORT NO. 70-1151/2017-002

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U. S. NUCLEAR REGULATORY COMMISSION
REGION II

Docket No.:	70-1151
License No.:	SNM-1107
Report No.:	70-1151/2017-002
Licensee:	Westinghouse Electric Company
Facility:	Columbia Fuel Fabrication Facility
Location:	Hopkins, SC 29061
Dates:	February 27 through April 2, 2017
Inspectors:	N. Peterka, Fuel Facility Inspector (Section A.1) M. Crespo, Senior Fuel Facility Inspector (Section A.2) P. Startz, Fuel Facility Inspector (Section B.1)
Approved by:	E. Michel, Chief Projects Branch 2 Division of Fuel Facility Inspection

Enclosure

EXECUTIVE SUMMARY

Westinghouse Electric Company
Columbia Fuel Fabrication Facility
NRC Integrated Inspection Report 70-1151/2017-002
February 27 through March 2, 2017

The inspection was conducted by Nuclear Regulatory Commission (NRC) regional inspectors during normal shifts in areas of safety operations and facility support. The inspectors performed a selective examination of license activities that were accomplished by direct observation of safety-significant activities and equipment, tours of the facility, interviews and discussions with licensee personnel, and a review of facility records. No violations of NRC requirements were identified.

Operational Safety

- In the area of the Nuclear Criticality Safety (NCS), no violations were identified (Paragraph A.1)

- In the area of items relied on for safety (IROFS), no violations were identified. (Paragraph A.2).

Facility Support

- In the area of Maintenance and Surveillance of Safety Controls, no violations were identified. (Paragraph B.1)

Attachment:
Key Points of Contact
List of Items Opened, Closed, and Discussed
Inspection Procedures Used
Documents Reviewed

REPORT DETAILS

Summary of Plant Status

The Westinghouse Facility converts uranium hexafluoride (UF_6) into uranium dioxide using a wet conversion process, and fabricates fuel assemblies for use in commercial nuclear power reactors. During the inspection period, normal production activities were ongoing.

A. Safety Operations

1. Nuclear Criticality Safety (Inspection Procedure 88015)

a. Inspection Scope and Observations

Criticality Analysis

The inspectors reviewed the selected Criticality Safety Evaluations (CSEs) and associated assumptions and calculations to verify consistency with the commitments in the License Application, including the consideration of the Double Contingency Principle, assurance of subcriticality under normal and credible abnormal conditions with the use of subcritical margin, technical practices and methodologies, and treatment of nuclear criticality safety (NCS) parameters. The inspectors reviewed the selected CSEs to determine whether approved CSEs were available, were of sufficient detail and clarity to permit independent review, and whether calculations were performed within the validated area of applicability and consistent with the validation report. The CSEs were selected based on factors such as risk-significance, if new or revised, the use of unusual control methods, and operating history. The CSEs reviewed included: CSE-14-C, CSE-17-C, and CSE-19-B, which covers various processes within the Integral Fuel Burnable Absorber (IFBA), ERBIA, and final assembly portions of the facility. In addition, the CSEs listed in Section 4 of the supplemental information attachment were also reviewed.

The inspectors reviewed the licensee's generation of accident sequences to determine whether the CSEs systematically identified normal and credible abnormal conditions for the analysis of process upsets in accordance with the commitments and methodologies in the License Application. This effort included the review of accident sequences that the licensee determined to be not credible in order to determine whether the bases for incredibility were consistent with the commitments, definitions, and methodologies in the License Application and were documented in sufficient detail to permit an independent assessment of credibility. This review was conducted for the following: CSE-14-C, CSE-17-C, and CSE-19-B.

Criticality Implementation

The inspectors performed walk-downs of the Ammonium Diuranate (ADU) Vaporization area, Integral Fuel Burnable Absorber (IFBA) Area, and the ERBIA (a fuel additive) Area systems to determine whether existing plant configuration and operations were covered by, and consistent with, the process description and safety basis in the CSEs. The inspectors reviewed process and system descriptions and setpoint analyses to verify that engineered controls established in the CSEs were included. The inspectors reviewed operating procedures and postings to verify that selected administrative

controls established in the CSEs were included. The inspectors interviewed operators and engineers to verify that administrative actions established in the CSEs were understood and implemented properly in the field.

Criticality Operational Oversight

The inspectors reviewed NCS-related training records to determine whether operator training included instruction in criticality hazards and control methods, whether the licensee's established NCS-related operator training was consistent with commitments in the License Application, and whether NCS staff were involved in the development of operator training. The inspectors interviewed operations staff to determine whether they were cognizant of NCS hazards and control methods related to their specific job function. The NCS-related training records reviewed included annual refresher training for the facility and operator specific criticality safety training.

The inspectors accompanied licensee NCS engineers on a general walk-down of the facility to determine whether NCS staff routinely inspected fissile material operations to ascertain that criticality requirements were being satisfied. Additionally, the inspectors interviewed three NCS engineers and reviewed audit records that had been documented since the last NCS inspection.

Criticality Programmatic Oversight

The inspectors reviewed the selected CSEs listed above to verify that they were performed in accordance with NCS program procedures and received appropriate independent review and approval. The inspectors conducted interviews and reviewed the corrective action prevention and learning system (CAPAL) entries to verify that audit findings were being identified, entered, and tracked to resolution of the issue.

Criticality Incident Response and Corrective Action

The inspectors interviewed licensee managers, engineers, and staff responsible for the maintenance and operation of the Criticality Accident Alarm System (CAAS) to verify whether CAAS detector operability was maintained, including, whether all components were functionally tested, whether alarm setpoints were set to promptly actuate upon detecting the minimum accident of concern, and whether access to alarm setpoints was strictly controlled.

The inspectors reviewed selected NCS-related CAPAL and Redbook entries to verify whether anomalous conditions were identified and entered into the CAPAL, whether proposed corrective actions were sufficiently broad, whether they were prioritized on a schedule commensurate with their significance, and whether they were completed as scheduled and addressed the problem identified.

b. Conclusion

No violations of NRC requirements were identified.

2. Operational Safety (Inspection Procedure 88020)

a. Inspection Scope and Observations

The inspectors focused on the operations in and around the (IFBA) area and the Uranyl Nitrate (UN) Bulk storage tanks, including the operation of inline uranium monitors. The inspectors reviewed the licensee's (ISA) and selected several criticality safety accident sequences and various items relied on for safety (IROFS) designed to prevent the accident sequence. The inspectors also reviewed a sample of accident sequences identified in the IFBA ISA. The selected accident sequences are listed in Section 4 of the supplemental information attachment. In addition, the inspectors reviewed the engineering drawings and nuclear criticality safety evaluation related to the contaminated sump used for wastewater discharges from various processes throughout the plant. The inspectors reviewed the implementation of management measures for the selected IROFS to verify that they were being adequately conducted to meet the requirements of 10 CFR 70.62. The review consisted of walk downs of process equipment, review of run sheets for administrative controls, and discussions with engineers in charge of the areas. The inspectors reviewed the list of operators for IFBA to verify that they were trained and in compliance with training requirements of Section 11.3 of the license application.

The inspectors reviewed a sample of condition reports to verify that the licensee was appropriately addressing and correcting safety-significant conditions. The inspectors reviewed the 2016 list of IROFS that either failed on demand or were determined to be inoperable to verify the licensee was in compliance with the recordkeeping requirements of 10 CFR 70.62(a)(3).

The inspectors reviewed the 2017 compliance and Environmental Health and Safety (EH&S) audit schedule to verify that the licensee was on track to meet the requirements of Section 3.6.2 of the license application. The inspectors reviewed the results of the 2016 Fire Safety Program formal audit to verify compliance with Section 3.6.2.2 of the license application.

The inspectors reviewed various operating procedures for the IFBA area and the UN Bulk tank operation to verify that modifications to existing and the generation of new procedures were implemented according to Section 3.4 of the license application. In addition, the inspectors verified that procedures were reviewed at the frequency dictated in Section 3.4.1.3 of the license application. The inspectors reviewed the operations organization to verify that the new plant manager was evaluated in accordance with the qualification requirements of Chapter 2 of the license application.

The inspectors evaluated the housekeeping of the facility to assess if there would be a negative impact on safety.

b. Conclusion

No violations of NRC requirements were identified.

B. Facility Support

1. Maintenance and Surveillance of Safety Controls (IP 88025)

a. Inspection Scope and Observations

The inspectors performed document reviews, and observed maintenance and surveillance field activities for IROFS and other safety controls to ensure they remained reliable and available to perform their safety function when needed as required by paragraph 3.2 of the License Application, Revision (Rev.) 2.0.

The inspectors reviewed the licensee's work control program to determine if it included provisions to ensure pre-job planning and preparation of work orders to support maintenance and surveillance activities to determine compliance with paragraph 3.2.2 of the license application. The inspectors observed a maintenance shift turnover meeting and a pre-job briefing for a large maintenance evolution to determine compliance with the provisions of the work control program. The inspectors reviewed maintenance and surveillance work orders and surveillance test packages for accuracy and to ensure they challenged and verified operability of IROFS and safety controls.

Inspectors concentrated efforts on licensee activities involving an update of the incinerator programmable logic controller components and firmware revision including ongoing testing and verification of the IROFS it manages. The inspectors evaluated the functional verification of IROFS I-027, incinerator interlock INC-414, to evaluate compliance was in accordance with testing procedure MCP203625, Rev. 4, "Verification of Interlock INC-414 (I-027) watchdog timer." Inspectors also reviewed the following related functional verification of other related IROFS to determine compliance with their respective testing procedures as follows: IROFS URRS-17 completed in accordance with MCP-203605, Rev. 5; IROFS I-002 completed in accordance with MCP-203613, Rev. 8; "Verification of interlock INCIN-408 lower burner trip," IROFS I-003 in accordance with MCP-203619, Rev. 5: "Verification of interlock INCIN-409 upper burner trip," IROFS I-001 verified in accordance with MCP-203623, Rev. 8 "Verification of incinerator interlock INCIN-407 (I-001) Master Fuel Trip," IROFS I-090 in accordance with MCP-203628, Rev. 6, "Verification of interlock INCIN-418 (I-090) Light-off Max Timer Exceeded," IROFS URRS-17 "Verification of interlock INCIN-422 (URRS-17) purge complete"; and IROFS I-024 Verification of interlock INCIN-062 (I-024) Load door closed." The inspectors reviewed a total of nine work packages to determine if they were reviewed and evaluated prior to returning equipment to service as required by paragraph 3.2.2.2 of the license application.

The inspectors observed other maintenance work activities on selected systems and processes to determine if work activities were conducted in accordance with paragraph 3.2.2 of the license application and procedure SYP-203, "Isolation of Hazardous Energy." The inspectors reviewed the functional verification of inline monitor of the F-1168 Filtrate Stream to V-1170A or 1170B to determine compliance with work order 744784 and MCP-202221, Rev. 1, Verification of Interlock WCD-129. The inspectors observed ongoing activities associated with work order 749107, Configuration Control Form (CCF) 16665, installation of new air line for V-1030 I/J and the installation of a new pump S-1030 I/J per CCF 17060, installation of a closed system method of emptying the 1030 scrubber overflow tanks V-1030 A-J. The inspectors reviewed the work order to determine if the work was properly controlled and authorized by operations prior to commencement of work, including a review of the lockout/tag-out used to protect

the workers from hazardous energy sources in accordance with 3.4.1.1 of the license application. The inspectors conducted interviews of maintenance staff and supervisors to assess the ability of the licensee to safely conduct the work in accordance with license requirements and procedures as required by paragraph 3.4 of the license application. The inspectors reviewed the work instructions for accuracy, proper level of detail, and inclusion of post maintenance test requirements to verify operability of the equipment prior to return to service as required in paragraph 3.2.2.2 of the license application.

The inspectors interviewed maintenance supervisors regarding the training and qualification program for maintenance technicians that perform maintenance on safety-related equipment including IROFS. The inspectors reviewed the training and qualification records for a sample instrument and controls technicians as required by paragraph 3.4.2 of the license application.

The inspectors also reviewed the licensee corrective action program to verify that performance issues relating to the maintenance and surveillance of IROFS and safety controls were entered into the corrective action program and evaluated the adequacy of corrective actions taken, to determine compliance with paragraph 3.8 of the license application. A total of eleven corrective action reports and red book entries were reviewed.

b. Conclusion

No violations of NRC requirements were identified.

D. Exit Meeting

The inspection scope and results were presented to members of the licensee's staff at various meetings throughout the inspection period and were summarized on March 2, 2017, to M. Annacone and staff. No dissenting comments were received from the licensee. Proprietary information was discussed but not included in the report.

SUPPLEMENTAL INFORMATION

1. KEY POINTS OF CONTACT

Name	Title
A. Batten	Engineering
R. Bates	Maintenance Supervisor
P. Bartman	QA Manager
G. Byrd	Licensing Engineer
R. Byrd	I&C Manager
J. Howell	Environmental, Health and Safety (EH&S) Manager
C. Miller	Acting NCS manager
A. McGehee	Senior NCS Engineer
N. Parr	Licensing Manager
M. Trayers	Maintenance Engineering Manager
J. Vining	Senior NCS Engineer
T. Wells	Manager of Work Management

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

2. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Not Applicable.

3. INSPECTION PROCEDURES USED

IP 88015, Nuclear Criticality Safety
IP 88020, Operational Safety
IP 88025, Maintenance and Surveillance of Safety Controls

4. DOCUMENTS REVIEWED

Records:
CSE-3-A, Autoclave Vaporizers, Rev. 7
CSE-3-G, UF6 Cylinder Vaporization and Condensate System, Rev. 7
CSE-14-C, Miscellaneous Operations in the Integral Fuel Burnable Absorber (IFBA) Area, Rev. 12
CSE-15-C, Waterglass Liquid Waste Revision, Rev. 6
CSE-17-C, Final Assembly Operations, Rev. 21
CSE-19-B, Pellet Transfer Operations in the OV-9100, Rev. 0
CSE-4-H, Process Sintered Pellets Revision 0
Facility Walkthrough Assessments
MCP-202189, Calibration of Activity Monitors RT-1039 C/D: LR230 Offload Activity Monitors, Rev. 1, dated October 15, 2015
MCP-202037, GA-6M Criticality Alarm Calibration and SSC Verification, Rev. 30, dated October 20, 2016
LTR-EHS-17-3, “2017 EH&S Program, Supplier and Formal Compliance Audit Schedule,” dated January 26, 2017

LTR-EHS-10-112, “Contaminated Sump,” dated January 7, 2011
EHS-AUDIT-16-9, “Fire Safety Audit,” dated March 29, 2016
Drawing No. 610F02FS01, Rev. 12
Sketch 836038-1, Revision 98, URRS-Area Safety Significant Controls

Procedures:
COP-871100, “Use and Servicing of the Portable Vacuum Cleaner,” Rev. 12
COP-872060, “Coater Cleaning and Maintenance,” Rev. 33
COP-872071, “IFBA Pellet Coater Operation,” Rev. 12
COP-874040, “Mop Water System,” Rev. 25
COP-874050, “Coated Pellet Acid Stripping & Recovery,” Rev. 28
COP-874074, “Sandblaster Operation,” Rev. 17
COP-874086, “Inspection of Ventilation Ducts,” Rev. 3
MCP-203400, “Verification of Instrumented Safety Function IFBACTR-118,” Rev. 3
MCP-203403, “Maint. of IFBA Coater Hardwired Safety Significant Systems,” Rev. 2
CA-220, Nuclear Safety Qualification Training, Rev. 7, December 29, 2016
COP-836015, Normal Operation of UN Storage Tanks, Rev. 31, dated March 26, 2015
RA-302, Criticality Postings, Rev. 17, dated February 11, 2016
RA-304, Criticality Accident Alarm System, Rev. 16, dated January 19, 2012
RA-313, Criticality Safety Evaluations (CSEs), Rev. 15, dated November 19, 2015
MCP-108000, Preventive Maintenance
MCP-108103, Maintenance Work Order Handling
WM-001, Work Management Process
WM-002, Deficiency Identification and Reporting
SYP-203, Rev. 20, Isolation of Hazardous Energy
COP-835510, Rev. 23, Operation of Assay 3 (Canberra Q2 System), used for S-1030 scrubber telleretts.
RA-108, Rev. 36, Safety Significant Controls
QA-004, Rev. 41, Equipment and Process Qualifications and/or Verifications
MCP-108103, Rev. 34, Maintenance Work Order Handling
MCP-202058, Rev. 3, Limit/Trip/Interlock/Alarm Switches, Generic
MCP-202046, Rev. 7, Pressure and Differential Pressure Transmitters, Generic

Other Documents:
510F43P107, Condensate Receiver T-1404 Filters FL-1404 and Tank V-1402B
510F43P107, Condensate Receiver T-1410 Filters FL-1402 and Tank V-1402B
610F02FS01, Waste Recovery Lagoons and Sumps, Rev. 12
LTR-EHS-10-112, Contaminated Sump, dated January 7, 2011
TRN-004, Floor Storage Training, Rev. 6
TRN-062, Criticality Safety Posting Training, Rev. 5
TR-111, Inadvertent Containers, Rev. 6
DWG 360F11EL15-17060:503, BPCS Rack #6 (CP-1415G) Honeywell Rack 6 Slot 2
DWG 333F02PI03-17060:02 Scrap Recovery/Process Vent Scrubber Sump Overflow Tanks V-1030 A-J, Pumps P-1030 A-B and MI

Redbook Entries:
70357, 70466, 70491, 70538, 70643, 70852, 71124, 71195, 71225, 71238, 71323, 71426, 71445, 71446, 71467, 71472, 71496, 71575, 71697, 71735, 71751, 71809, 71833, 71834, 71838, 71850, 71853, 71856, 71903, 71915, 71950, 71998, 72047, 753110, 72135

Condition Report written as a result of the inspection:
100454698

Records:
Work Order 759210, PSL109P, Conversion Line 1 Calciner
Work Order 729278, LR230 Pump Out Interlocks Verification per COP-836038
Work Order 748982 Poly Cart Transport Cart
Work Order 740467 Annual Verification of Safety Significant Interlocks on Conv. Line #2.
Work Order 754513
Work Order 732566
Work Order MCP-202221, Revision 1, Verification of Interlock WCD-129