August 29, 2013

Mr. David J. Precht, Plant Manager
Westinghouse Electric Co., LLC
Nuclear Fuel Division
5801 Bluff Road
Hopkins, SC 29061-9121

SUBJECT: WESTINGHOUSE ELECTRIC COMPANY- U.S. NUCLEAR REGULATORY COMMISSION INSPECTION REPORT NUMBER 70-1151/2013-202

Dear Mr. Precht:

The U.S. Nuclear Regulatory Commission (NRC) conducted a routine, announced Nuclear Criticality Safety (NCS) inspection at your facility in Columbia, South Carolina, from July 29 to August 1, 2013. The purpose of the inspection was to determine whether activities involving special nuclear material were conducted safely and in accordance with your license and regulatory requirements. Throughout the inspection, observations were discussed with your staff. An exit meeting was held on August 1, 2013, during which inspection observations and findings were discussed with your management and staff.

The inspection, which is described in the enclosure, focused on the most hazardous activities and plant conditions; the most important controls relied on for safety and their analytical basis; and the principal management measures for ensuring controls are available and reliable to perform their functions relied on for safety. The inspection consisted of analytical basis review, selective review of related procedures and records, examinations of relevant NCS-related equipment, interviews with NCS engineers and plant personnel, and facility walk downs to observe plant conditions and activities related to safety basis assumptions and related NCS controls. Based on the inspection, your activities involving nuclear criticality hazards were found to be conducted safely and in accordance with regulatory requirements.

In accordance with Title 10 of the *Code of Federal Regulations* 2.390 of NRC's "Rules of Practice," a copy of this letter and the enclosure will be made publicly available in the public electronic reading room of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html.

If you have any questions concerning this report, please contact Timothy Sippel, of my staff, at (301) 287-9151, or via e-mail to Timothy.Sippel@nrc.gov.

Sincerely,

/RA/

Michael X. Franovich, Chief
Programmatic Oversight
and Regional Support Branch
Division of Fuel Cycle Safety
and Safeguards
Office of Nuclear Material Safety
and Safeguards

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

Enclosure:
NRC Inspection Report No. 70-1151/2013-202
w/Attachment: Supplementary Information

cc w/enclosure:

Wayne Sepitko, Manager
Environment, Health and Safety
Commercial Nuclear Fuel Division

Carl Snyder, Manager
Licensing & Regulatory Programs
Commercial Nuclear Fuel Division

Susan E. Jenkins, Assistant Director
Division of Waste Management
Bureau of Land and Waste Management
Department of Health and Environmental Control

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DATE	8/20/2013	8/26/2013	8/29/2013

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U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS

Docket No:	70-1151
License No:	SNM-1107
Report No:	70-1151/2013-202
Licensee:	Westinghouse Electric Company, Inc.
Location:	Columbia, South Carolina
Inspection Dates:	July 29 – August 1, 2013
Inspector:	Tamara Powell, Criticality Safety Inspector
Approved by:	Michael X. Franovich, Chief Programmatic Oversight and Regional Support Branch Division of Fuel Cycle Safety and Safeguards Office of Nuclear Material Safety and Safeguards

Enclosure

EXECUTIVE SUMMARY

Westinghouse Electric Company, INC.
NRC Inspection Report 70-1151/2013-202

Introduction

Staff of the U.S. Nuclear Regulatory Commission (NRC) performed a routine, announced Nuclear Criticality Safety (NCS) inspection of the Westinghouse Electric Company Inc.(WEC) facility, in Columbia, South Carolina from July 29 – August 1, 2013. The inspection included an onsite review of the licensee's NCS program, NCS evaluations, NCS audits, internal NCS event review and follow-up, the criticality accident alarm system (CAAS), plant operations, and open items follow-up. The inspection focused on risk-significant fissile material processing activities and areas including ammonium diuranate (ADU) conversion, uranium dioxide (UO_2) powder handling and pelletizing, fuel manufacturing including Erbia and integral fuel burnable absorber (IFBA) fuel manufacturing, uranium recovery, the incinerator, uranium hexafluoride (UF_6) cylinder wash, and UF_6 cylinder recertification.

Results

- No safety concerns were identified regarding the licensee's NCS program.
- No safety concerns were identified regarding the licensee's NCS audits.
- No safety concerns were identified during a review of recent licensee investigation of internal events.
- No safety concerns were identified during a review of the licensee's CAAS.
- No safety concerns were identified during walk downs of plant operations.

REPORT DETAILS

1.0 Summary of Plant Status

WEC manufactures light water reactor fuel at its Columbia, South Carolina, facility. During the inspection, the plant operated normally.

2.0 Nuclear Criticality Safety Program (IP 88015 & 88016)

a. Inspection Scope

The inspectors reviewed selected criticality safety evaluations (CSE) generated or revised since the last inspection to determine the adequacy of the analytical basis for facility operations. The inspector reviewed selected aspects of the following documents:

- CN-CRI-09-28, "Warm Caustic Waterglass Cake System Calculations," Revision 2, dated July 2013.
- CN-SB-08-37, "ADU Pelleting Powder Criticality Accident Potential," Revision 1, dated July 2013.
- CN-SB-11-019, "Criticality Accident Potential for Warm Caustic Waterglass Cake Dissolution System," Revision 1, dated July 2013.
- COP-830524, "Operation of F-1168 Warm Caustic Waterglass Cake Dissolution and Filtration," Revision 0, dated July 30, 2013.
- CSE-1-K, "CSE for the ADU Pellet Lines 1-5 Torit Ventilation Systems," Revision 6, dated March 2013.
- CSE-2-A, "CSE for Uranyl Nitrate Bulk Storage and HF Spiking Station," Revision 5, dated May 2013.
- CSE-3-J, "Fitzmill and Product Hoods," Revision 2, dated May 2013.
- CSE-3-O, "ADU Conversion Hydrolysis Column, Nitrate Vessel and Precipitator on Lines Not Covered by CSE-3-D," Revision 5, dated July 2013.
- CSE-8-B, "CSE for the ADU Pelleting Powder Prep and Pressing Operations," Revision 2, dated July 2013.
- CSE-8-D, "CSE for CFFF Pellet Grinder Line," Revision 12, dated June 2013.
- CSE-10-A, "CSE for ADU Rod Area," Revision 4, dated June 2013.
- CSE-13-A, "CSE for the Incinerator System," Revision 8, dated July 2013.
- CSE-15-D, "CSE for Warm Caustic Waterglass Cake Dissolution System," Revision 2, dated July 2013.
- NCS-006, "Including Bounding Assumptions in SSC Sketches," Revision 1, dated November 19, 2008.
- NCS-017, "Guidance for the NCSIP2," Revision 3, dated September 10, 2012.
- RA-104, "Regulatory Review of Configuration Change Authorizations," Revision 25, dated April 26, 2012.
- RA-313, "Criticality Safety Evaluations," Revision 13, dated September 13, 2012.
- RA-314, "Implementation of Criticality Safety Evaluations," Revision 15, dated January 17, 2012.
- TA-500, "Columbia Manufacturing Plant Configuration Control," Revision 27, dated April 9, 2012.

b. Observations and Findings

The inspectors observed that, NCS evaluations were prepared by qualified NCS engineers and that independent reviews of the evaluations were completed by other qualified NCS engineers, and limits on controlled parameters were established and maintained. The inspectors determined that NCS controls for equipment and processes assured the safety of the operations.

c. Conclusions

No safety concerns were identified regarding the licensee's NCS program.

3.0 Nuclear Criticality Safety Inspections, Audits, and Investigations (IP 88015)

a. Inspection Scope

The inspector reviewed the licensee's procedures for NCS inspections, called "Facility Walkthrough Assessments (FWA)," and records of previously completed FWAs to assure that appropriate issues were identified and resolved. The inspector reviewed selected aspects of the following documents:

- RA-316, "NCS Facility FWA," Revision 6, dated March 21, 2012.

- NCS FWA 1st Quarter Assessments Areas
    - Waterglass
    - Conversion Wet Processes
    - UF6 Cylinder Receipt and Handling
    - ADU Pellet Operations
    - Scrubbers
    - Misc LLRW
    - Solvent Extraction
    - ADU Rod Area
    - HEPA Filter House Systems
    - IFBA Fuel Rod Manufacturing
    - Viper/Product Engineering Development Lab
    - ADU Bulk Blending
    - IFBA Processing
    - IFBA/Erbia Chemical Lab

- NCS FWA 2nd Quarter Assessment Areas
    - ADU Bulk Blending
    - ADU Conversion Drying
    - Conversion Decontamination Room
    - Conversion Scrap Cage
    - Torits
    - UF_6 Vaporization
    - Dry and Wet Trash Collection/Assay Systems/Incinerator
    - Safe Geometry Dissolvers/Fluoride Stripping
    - Final Assembly

- Erbia Powder Processing
- Erbia Pelleting
- Cylinder Wash
- ADU Pelleting-Powder Operations
- Conversion Scrap Cage
- Waterglass/ Warm Caustic/Aqueous Waste
- Analytical Services Laboratory

b. Observations and Findings

The inspector observed that the licensee's FWAs were conducted in accordance with written procedures. The inspector noted that FWAs were performed by NCS engineers who reviewed the NCS analysis for the inspected area, reviewed open NCS issues from previous audits; reviewed the adequacy of control implementation; reviewed plant operations for compliance with license requirements, procedures, and postings; examined equipment and operations to determine that past evaluations remained adequate; and interviewed operators to verify understanding of controls. The inspector confirmed that deficiencies identified during the FWA were appropriately captured in the licensee's corrective action program and resolved in a timely manner.

c. Conclusions

No safety concerns were identified regarding the licensee's NCS audits.

4.0 Nuclear Criticality Safety Event Review and Follow-up (IP 88015 & 88016)

a. Inspection Scope

The inspectors reviewed the licensee's response to internally-reported events. The inspectors reviewed the progress of investigations and interviewed the licensee's staff regarding immediate and long-term corrective actions. The inspectors reviewed selected aspects of the following documents:

- RA-107, "Corrective Action Process for Regulatory Events," Revision 22, dated January 5, 2012.
- Redbook Entry 62794, dated February 7, 2013.
- Redbook Entry 63323, dated April 21, 2013.
- Redbook Entry 63591, dated May 28, 2013.
- Redbook Entry 63704, dated June 10, 2013.
- Redbook Entry 63807, dated June 18, 2012.
- Redbook Entry 64070, dated July 24, 2013.

b. Observations and Findings

The inspectors reviewed selected licensee internally-reported events. The inspectors observed that internal events were investigated in accordance with written procedures and appropriate corrective actions were assigned. The inspectors had no safety concerns regarding the licensee's reporting, investigation, and correction of internal NCS related events.

c. Conclusions

No safety concerns were identified regarding the licensee's NCS training and qualification program.

5.0 Criticality Alarm Systems (IP 88017)

a. Inspection Scope

The inspector interviewed engineering and maintenance staff, and performed facility walk downs to determine the adequacy of the licensee criticality alarm system.

b. Observations and Findings

The inspector reviewed the licensee's criticality alarm detector placement to determine that the system remained in accordance with license requirements. The inspector observed the locations of all criticality alarm detectors during plant walk downs. The inspectors discussed the status of the horn replacement project with the licensee staff.

c. Conclusions

No safety concerns were identified during a review of the licensee's CAAS.

6.0 Plant Activities (IP 88015, IP 88016)

a. Inspection Scope

The inspectors walked down portions of the facility to determine whether risk-significant fissile material operations were being conducted safely and in accordance with regulatory requirements including those addressed by newly issued or revised CSEs mentioned under Section 2.0.

b. Observations and Findings

The inspectors performed walk downs of operations in ADU conversion, UO_2 powder handling and pelletizing, fuel manufacturing including Erbia and IFBA fuel manufacturing, uranium recovery, the incinerator, UF_6 cylinder wash, and UF_6 cylinder recertification. The inspectors verified that controls identified in NCS analyses were installed or implemented and were adequate to ensure safety. The cognizant, NCS engineers were knowledgeable and interacted regularly with operators on the process floors. The inspectors verified the adequacy of management measures for assuring the continued availability and reliability of safety-significant controls relied upon by the licensee for controlling criticality risks.

c. Conclusions

No safety concerns were identified during plant walk downs.

7.0 Open Items

IFI 70-1151/2012-203-01
This item tracks the reevaluation and possible redesign of the batch control system and roll hood enclosure. The licensee is tracking this under Redbook Entry 60149, "Powder Lodged in Pellet Line/Prep System." During the previous inspection, the inspectors discussed several proposals to control the batches in the system with the process engineering group. During this inspection, the inspector interviewed licensee staff and determined that the licensee has a long term plan to tie a digital scale into the powder preparation system programmable logic controller so that the programmable logic controller can use the scale to know when the poly pack has reached a target weight. The inspector further determined that all corrective actions associated with this event had been completed. The inspector also reviewed the relevant CSE (CSE-8-B) for the area which had been recently implemented. **This item is closed.**

8.0 Exit Meeting

The inspector presented the inspection scope and results to members of the licensee's management and staff during an exit meeting on August 1, 2013. The licensee acknowledged and understood the findings as presented.

SUPPLEMENTARY INFORMATION

1.0 List of Items Opened, Closed, and Discussed

Items Opened

None

Items Closed

IFI 70-1151/2012-203-01 Tracks the re-evaluation and possible re-design of the batch control system and roll hood enclosure**.**

Items Discussed

IFI 70-1151/2013-201-01 Tracks the completion of NCSIP-II.

2.0 Inspection Procedures Used

IP 88015	Nuclear Criticality Safety Program
IP 88016	Nuclear Criticality Safety Evaluations and Analyses
IP 88017	Criticality Alarm Systems

3.0 Key Points of Contact

Westinghouse Electric Company

D. Precht	Plant Manager
E. Byrd	EH&S
N. Parr	EH&S Manager
C. Snyder	NCS

NRC

Tamara Powell	Criticality Safety Inspector, HQ

All attended the exit meeting on August 1, 2013.

4.0 List of Acronyms and Abbreviations

ADAMS	Agencywide Documents Access and Management System
ADU	ammonium diurante
CAAS	criticality accident alarm system
CSE	criticality safety evaluation
CFFF	Columbia Fuel Fabrication Facility
EH&S	environment, health, and safety
FWA	Facility Walkthrough Assessments
IFBA	integral fuel burnable absorber
IP	inspection procedure
IROFS	item relied on for safety
ISA	integrated safety analysis
NCS	Nuclear Criticality Safety
NRC	U.S. Nuclear Regulatory Commission
SSC	safety-significant control
UF_6	uranium hexafluoride
UO_2	uranium dioxide
URI	unresolved item
URRS	uranium recycle and recovery
WEC	Westinghouse Electric Company (licensee)