



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

November 22, 2019

EA-16-173
EN 54161
EN 54273
EN 54298

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 – U.S. NUCLEAR REGULATORY
COMMISSION INTEGRATED INSPECTION REPORT NUMBER 70-1151/2019-004
AND NOTICE OF VIOLATION**

Dear Mr. Annacone:

This letter refers to the inspections conducted from July 1 through September 30, 2019, at the Westinghouse Columbia Fuel Fabrication Facility in Hopkins, SC. The purpose of these inspections was to determine whether activities authorized under the license were conducted safely and in accordance with U.S. Nuclear Regulatory Commission (NRC) requirements. The enclosed inspection report presents the results of these inspections.

The inspections examined activities conducted under your license as they relate to public health and safety, the common defense and security, and compliance with the Commission's rules and regulations as well as the conditions of your license. Within these areas, the inspectors reviewed selected procedures and representative records, observed activities, and interviewed personnel.

Based on the results of this inspection, the NRC has determined that one Severity Level IV violation of NRC requirements occurred.

The violation was evaluated in accordance with the NRC Enforcement Policy. The current Enforcement Policy is included on the NRC's Web site at (<http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>). The violation is cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding it are described in detail in the subject inspection report.

The violation is being cited in the Notice because this violation was not licensee-identified as would be required for a non-cited violation per the NRC's Enforcement Policy, Section 2.3.2.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. If you have additional information that you believe the NRC should consider, you may provide it in your response to the Notice. The NRC's review of your response to the Notice will also determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390 of the NRC's "Rules of Practice and Procedures," a copy of this letter, its enclosures, and your response, 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), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy or proprietary, information so that it can be made available to the Public without redaction.

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

Sincerely,

/RA/

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

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

Enclosure:
NRC Inspection Report 70-1151/2019-004
w/Supplemental Information

cc:
ListServ

SUBJECT: WESTINGHOUSE ELECTRIC COMPANY – U.S. NUCLEAR REGULATORY COMMISSION INTEGRATED INSPECTION REPORT NUMBER 70-1151/2019-004 AND NOTICE OF VIOLATION dated on November 22, 2019

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ADAMS: Yes ACCESSION NUMBER **ML19326C453** SUNSI REVIEW COMPLETE FORM 665 ATTACHED

OFFICE	RII:DFFI	RII:DFFI	RII:DFFI	RII:DFFI	RII:DFFI
NAME	K. McCurry	T. Vukovinsky	R. Gibson	M. Ruffin	E. Michel
DATE	11/6/2019	11/6/2019	11/6/2019	11/6/2019	11/22/2019
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY

NOTICE OF VIOLATION

Westinghouse Electric Company, LLC
Hopkins, South Carolina

Docket No. 70-1151
License No. SNM-1107
EN No. 54273

During an NRC inspection conducted September 23-26, 2019, one violation of NRC requirements was identified. In accordance with the Enforcement Policy, the violation is described below:

Tile 10 of the *Code of Federal Regulations* (10 CFR) 20.1501(a) states, in part, that "Each licensee shall make or cause to be made, surveys of areas, that may be necessary for the licensee to comply with the regulations in this part and are reasonable under the circumstances to evaluate the magnitude and extent of radiation levels, concentration, and the potential radiological hazards of the radiation levels detected."

Contrary to the above, on September 5 and 10, 2019, the licensee failed to perform surveys of areas to comply with the regulations in this part and were reasonable under the circumstances to evaluate the magnitude and extent of radiation levels, concentration, and the potential radiological hazards of the radiation levels detected, to comply with the requirements of 10 CFR 20.1501(a). Specifically, two cylinders containing UF₆ heels were shipped by the licensee with non-fixed contamination on and near the valve cover that were above NRC requirements in 10 CFR 71.87(i), and Department of Transportation requirements in 49 CFR 173.443(a).

This is a Severity Level IV violation. (Section 2.2.2)

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 70-1151

License No.: SNM-1107

Report No.: 70-1151/2019-004

Licensee: Westinghouse Electric Company

Facility: Columbia Fuel Fabrication Facility

Location: Hopkins, SC 29061

Dates: July 1 through September 30, 2019

Inspectors: R. Gibson, Senior Fuel Facility Inspector, (Paragraph A.2, C.1.i)
K. McCurry, Fuel Facility Inspector, (Paragraph A.1, C.1.ii, C.1.iii, C.2)
M. Ruffin, Fuel Facility Inspector (Paragraph 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
Nuclear Regulatory Commission Integrated Inspection Report 70-1151/2019-004
July 1 through September 30, 2019

The inspection was conducted by Nuclear Regulatory Commission (NRC) regional inspectors during normal shifts in areas of operational safety 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. One Severity Level IV violation was identified during this inspection.

Operational Safety

- In the area of Nuclear Criticality Safety, no violations of more than minor significance were identified. (Paragraph A.1)
- In the area of Operational Safety, no violations of more than minor significance were identified. (Paragraph A.2)

Facility Support

- In the area of Plant Modifications, no violations of more than minor significance were identified. (Paragraph B.1)

Other Areas

- (OPENED) One Severity Level IV, self-revealing, cited violation was identified for failure to perform adequate surveys on outgoing shipments of 30B cylinders, VIO 70-1151/2019-004-01 (Paragraph C.1.i)
- (OPENED/CLOSED) EN 54161, Waste Drum Damaged Due to Over Pressurization (Paragraph C.1.ii)
- (OPENED) EN 54298, Procedural Noncompliance with Administrative Item Relied on for Safety (Paragraph C.1.iii)
- (CLOSED) Confirmatory Order Section V, Item 5, Implementation of Additional Methods to Monitor System Parameters for Early Indication of an Abnormal Accumulation in the S-1030 Scrubber (Paragraph C.2)

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 (UF₆) 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

Criticality Analysis

The inspectors evaluated selected aspects of the licensee's Nuclear Criticality Safety program to verify compliance with selected portions of 10 CFR Part 70, including Subpart H and Appendix A; Chapter 6, "Nuclear Criticality Safety (NCS) Program," of the facility's license application; the licensee's NCS manual; and applicable procedures.

The inspectors reviewed selected criticality safety evaluations (CSEs) and associated assumptions and calculations related to an incident onsite to verify they were consistent with the commitments in the license application, including the Double Contingency Principle and assurance of subcriticality under normal and credible abnormal conditions. Specifically, the NRC was given a courtesy notification after water condensed in the instrument air system due to an instrument air dryer failing, revealing an analyzed moderation source that could enter the Torit dust collector systems in the conversion and pellet lines. The inspectors reviewed the accident scenarios outlined in the affected CSEs to determine whether a moderation upset analyzed in the CSE bounded the event and remained highly unlikely with the items relied on for safety (IROFS) already in place. The inspectors also reviewed the protection and prevention scores assigned to the initiating events, passive IROFS, and administrative controls documented for these sequences in the Integrated Safety Analysis (ISA) Summary to verify the licensee used the approved methodology outlined in their license application and applicable procedures. In addition, the inspectors reviewed the calculations that the licensee completed to determine (1) how much water would be needed for an upset condition to occur if a sufficient mass of special nuclear material (SNM) was present and (2) how long it would take for the instrument air system to accumulate that quantity of water in the Torit hoppers. The inspectors conducted these reviews to verify that the licensee made conservative assumptions, that the initiating event had not occurred, and that the analysis supported the licensee's decision to restart operations.

The inspectors also reviewed accident scenarios involving water intrusion from the instrument air system that were determined to be not credible to determine whether the bases for incredibility were consistent with the commitments, definitions, and methodologies in the license application and NCS manual, specifically NCS-017, "Categorizing Potential Criticality Scenarios and Criticality Safety Significant Controls."

In addition, the inspectors reviewed CSEs related to the storage and processing of SNM in the bulk blending area to determine whether the licensee's generation of accident sequences systematically identified normal and credible abnormal conditions in accordance with the commitments and methodologies in the license application for the analysis of process upsets. The inspectors reviewed the scores assigned to credible accident sequences to determine whether they were appropriately supported, consistent with procedural guidance, and resulted in the scenario being highly unlikely. The inspectors also reviewed assumptions made for upset conditions to verify they were clearly described, appropriately conservative, and consistent across the CSEs, calculation notes, and ISA Summary.

The CSEs reviewed are listed in section 4 of the attachment. Additionally, the inspectors verified no changes were made to the validation report since the last NCS inspection.

Criticality Implementation

The inspectors performed walk-downs of the conversion and pellet lines and the bulk blending area to determine whether existing plant configuration and operations were covered by, and consistent with, the process description and safety basis in the selected CSEs. The inspectors reviewed process and system descriptions, specifications, drawings, and vendor manuals to verify that engineered controls established in the CSEs were included and being implemented as specified. The engineered controls in place to control mass, geometry, spacing, and moderation included material level sensors in the hoppers, favorable geometry polypaks, glovebox drains, storage carts designed to prevent interaction, and piping and equipment integrity and dimensions. The inspectors reviewed operating procedures and postings to verify that selected administrative controls established in the CSEs were also included. The administrative controls reviewed included instructions for what material, moderation content, and container type could be used in the selected processes, as well as trained operator actions to respond to alarms. The inspectors interviewed operators and engineers to verify that administrative actions established in the CSEs were understood and implemented as specified.

Criticality Operational Oversight

The inspectors accompanied a licensee NCS engineer while performing an NCS facility walkthrough assessment of the bulk blending area to determine whether NCS staff routinely assessed field compliance with established NCS controls, interacted with operators, and promptly entered issues identified during the walkdown into the licensee's corrective action program (CAP). Additionally, the inspectors interviewed NCS management and reviewed procedures and schedules to verify that the qualified NCS engineers adequately prepared for and performed these walkthroughs such that the complete set of fissile material processing areas were assessed quarterly for higher risk areas and semiannually for lower risk areas in accordance with procedure RA-316, NCS Facility Walkthrough Assessments, and the associated checklist.

The inspectors reviewed the applied management measures for selected NCS IROFS to determine whether the management measures were sufficient to ensure the availability and reliability of those controls.

The management measures and IROFS reviewed were selected from the CSEs listed above and included procedures, training, preventive maintenance surveillances, inspection, calibration, and functional testing records, as applicable.

Criticality Programmatic Oversight

The inspectors reviewed new and/or revised NCS program procedures to determine whether the licensee implemented license requirements and whether the NCS program was enacted in accordance with them. The only revised NCS program procedure was RA-316, NCS Facility Walkthrough Assessments, Revision (Rev.) 11, and the associated checklist RAF-316-1, Nuclear Criticality Safety Checklist for NCS Facility Walkthrough Assessments, Rev. 2. The inspectors reviewed and witnessed implementation of the changes, as noted above, to verify the NCS engineers were knowledgeable and the program still met the commitments identified in the license and Chapter 6 of the application.

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 from a technical reviewer and the NCS engineering manager as well as the associated process engineer and area manager.

Criticality Incident Response and Corrective Action

The inspectors reviewed the licensee's response to the instrument air system issue, including immediate corrective actions, to verify the licensee followed procedures CA-134, "Columbia Plant Significant Event Response Guidelines," and RA-107, "Corrective Action Process for Regulatory Events." Specifically, the inspectors reviewed the licensee's actions to shut down the process through Stop Work Order SWO-00026, implement interim compensatory measures, review potentially impacted CSEs, conduct conservative engineering evaluations, measure the moisture content in potentially affected polypaks, review and walkdown over five hundred active safety-significant controls (SSCs) identified in their ISA Summary, and ensure that systems containing special nuclear material (SNM) were safe prior to starting back up. The inspectors also reviewed the licensee's reportability evaluation to determine whether the limiting scenario remained highly unlikely and assurance of subcriticality could be demonstrated to meet the performance requirements of 10 CFR 70.61.

The inspectors reviewed selected NCS-related corrective action program (CAP) entries to verify that anomalous conditions were promptly identified and entered into the CAP, that they received the required level of investigation, and that they were closed out consistent with license commitments and procedures. The inspectors reviewed the associated corrective actions to verify they were sufficiently broad, prioritized on a schedule commensurate with their significance, completed as scheduled, and appropriate to correct the condition, when required, consistent with program procedures. Specifically, the inspectors targeted issue reports and Redbook entries that were associated with the Torit dust collector system, polypak storage, and the bulk blending area to verify issues identified in the field were being promptly entered and corrected through the licensee's corrective action program in accordance with licensee procedures.

Additionally, the inspectors reviewed the selected CAP entries to assess whether extent of conditions were performed for the appropriate significance levels in accordance with procedure CA-007, "Corrective and Preventive Action," and whether

performance requirements were still met for degraded and failed IROFS making the plant condition not reportable to the NRC under Appendix A of 10 CFR Part 70. The CAP entries reviewed are listed in section 4 of the attachment.

b. Conclusion

No violations of more than minor significance were identified.

2. Operational Safety (Inspection Procedure 88020)

a. Inspection Scope

The inspectors evaluated the operational safety of the facility to verify the licensee operates the plant safely and in accordance with 10 CFR Part 70, their license, and their License Application. The inspectors interviewed the 1st Shift Manager, Uranium Recovery & Recycling Services (URRS) operators, an operations engineer, a mechanical integrity engineer, and a SOLX operator, and reviewed records associated with the URRS SOLX system. The inspectors selected a sample of SSCs, including IROFS, for accident sequences applicable to the SOLX system as described in the ISA Summary to verify the SSCs were implemented and maintained in accordance with the applicable regulatory requirements and licensing basis of the facility.

The inspectors reviewed management measures, specifically procedures, training, and maintenance for IROFS in the SOLX system, including flange guards, backflow prevention devices, vent overflows, and structural integrity of the piping and tanks to confirm they were available and reliable of performing their intended safety functions as required by NRC regulations and Chapter 3 of the License Application. The inspectors performed a walk-down of the IROFS in SOLX to determine whether the IROFS were installed and being operated and maintained as described in the ISA Summary, Licensee Application, and applicable design documentation.

The inspectors interviewed operators in the URRS control room to verify whether operators and technicians were knowledgeable of the implementation of the reviewed IROFS. The inspectors conducted interviews and reviewed records to verify whether the licensee conducted periodic surveillances as required by the ISA Summary for the IROFS listed above. The inspectors reviewed the surveillance procedures to verify the established periodic functional test, when applicable, confirmed the IROFS safety function.

The inspectors reviewed the licensee's corrective action program entries, including the Redbook system, related to the SOLX area over the past twelve months to verify if deviations from procedures and unforeseen process changes affecting nuclear criticality, chemical, radiological, or fire safety were adequately identified, captured, and corrected.

The inspectors reviewed operator training qualifications required to be completed for the URRS SOLX system to verify whether operators in the area were maintaining qualifications in accordance with licensee procedures and requirements.

The inspectors interviewed licensee staff and reviewed documentation to verify if any changes to procedures in URRS SOLX, the organization, and program audits/self-assessments performed since the last NRC inspection were implemented in accordance with the license requirements.

b. Conclusion

No violations of more than minor significance were identified.

B. Facility Support

1. Plant Modifications (Inspection Procedure 88070)

a. Inspection Scope

The inspectors reviewed the licensee's configuration management program to verify whether the licensee established an effective program capable of evaluating, implementing, and tracking modifications to facility processes in accordance with 10 CFR 72 and License Application Chapter 3.1, "Configuration Management." The inspectors reviewed configuration management procedures and interviewed licensee managers, supervisors, and project engineers to verify the configuration management program was being implemented in accordance with the previously stated requirements.

The inspectors reviewed the licensee's configuration management program and observed a Risk Assessment Board (RAB) meeting to verify the licensee addressed pre-job planning and preparation of plant modification design packages in accordance with TA-500, "Columbia Manufacturing Plant Configuration Control." The inspectors also reviewed the program to verify it had adequate provisions in place to prevent plant modifications from degrading performance capabilities of IROFS and other safety controls that were part of the safety design basis.

The inspectors reviewed a sample of plant configuration control forms (CCFs) that were implemented since the last plant modification inspection and interviewed licensee staff to verify CCFs were prepared, reviewed, and completed by the licensee in accordance with TA-500. Specifically, the inspectors reviewed the design packages to determine whether they contained the following: the technical basis for the change, the impact of the change on safety and health as well as the control of licensed material, the necessary training prior to operations, the authorization requirements for the change, and the impacts of the change to the ISA or other safety program information developed in accordance with 10 CFR 70.62. Inspectors reviewed CCF 18124, CCF 17073, and CCF 18308 to verify the licensee identified applicable post-maintenance installation and testing requirements and performed them prior to finalizing the plant modifications. The inspectors also evaluated the packages to verify completed modifications were adequately reviewed prior to implementation and the responsible evaluators of the packages were qualified.

The inspectors evaluated the change packages to determine whether the licensee addressed the baseline design criteria and defense-in-depth stipulated in 10 CFR 70.64 for any new facilities or processes.

A sample of 10 CFR 70.72 evaluations were reviewed by inspectors to verify whether the licensee adequately evaluated the need for NRC pre-approval of select facility modifications. Inspectors also reviewed the training records of licensee personnel conducting the 10 CFR 70.72 evaluations to verify they were qualified to perform the evaluations in accordance with TA-500.

The inspectors performed walk-downs of conversion and pelleting to verify the reviewed modifications in those areas were installed in accordance with the approved design documents, including drawings and technical reports. The inspectors also reviewed related on-site documentation to verify it was updated promptly as required by 10 CFR 70.72(e).

The inspectors reviewed training records to verify project engineers initiating plant modifications were trained and qualified to implement plant modifications. Inspectors also reviewed the licensee's document retention policy to determine whether records of facility modifications were maintained in accordance with 10 CFR 70.72(f).

The inspectors reviewed the most recent audit and assessment of the licensee's configuration management program to verify the licensee identified issues at an adequate threshold and entered them into their CAP in accordance with Chapter 3.6, "Audits and Assessments" of the license application. The inspectors also reviewed the licensee's CAP to verify that issues related to the preparation and installation of plant modifications were entered and properly addressed by the licensee with appropriate corrective actions in accordance with CA-007, "Corrective and Preventive Action."

b. Conclusion

No violations of more than minor significance were identified

C. Other Areas

1. Event Follow-up (Inspection Procedure 88075)

i. Contaminated 30B Cylinder (Event Notice (EN) 54273 – Framatome)

a. Inspection Scope

The inspectors followed-up on an event, EN 54273, where heeled 30B UF₆ cylinders shipped by the licensee were found to have loose surface contamination levels on and around the valve cover that were above those allowed by U.S. Department of Transportation (DOT) for alpha and beta/gamma contamination. From interviews with licensee staff including the cylinder wash operator, and review of documents, the inspectors determined that the cylinder wash operator did not document survey results of all five zones (e.g., zone 1 is the area around the cylinder valve and name plate, zone 2 is the rest of the dome area of the cylinder and also the inside of the top skirt of the cylinder, zone 3 is an area of 27" toward the front section of the body, zone 4 is an area

of 27" along the middle of the cylinder body, and zone 5 is an area of 27" toward the back end of the cylinder body). There was no documentation of the valve cover being surveyed or inspected in accordance with the licensee procedure ROP-02-014, "Cylinder Cleaning and Monitoring," Revision 10. The procedure defines a release survey as, "A documented contamination survey of targeted areas of the cylinder surface after cleaning and visual inspection of the cylinder and valve cover." The cylinder wash operator indicated that he only documented high level results on the survey form from the cylinders and not all zones.

EN 54273 was opened and closed in Framatome's integrated inspection report 70-1257/2019-004, dated October 25, 2019 (ML19301A076).

b. Conclusion

One Severity Level IV violation of NRC requirements was identified and is described below.

Failure to Perform Adequate Surveys on Outgoing Shipments of 30B Cylinders

Introduction

The inspectors identified a self-revealing cited Severity Level IV (SL IV) violation of 10 CFR 20.1501(a) for the licensee's failure to make or cause to be made surveys of areas that may be necessary for the licensee to comply with the regulations in this part and are reasonable under the circumstances to evaluate the magnitude and extent of radiation levels, concentration, and the potential radiological hazards of the radiation levels detected.

Description

On August 27, 2019, the licensee began the process of moving and washing cylinder LU0348 to be release for shipment. On September 5, cylinder LU0704 was washed and moved for shipment. On September 10, 2019 both cylinders, along with 28 others, were loaded onto a flatbed trailer to be shipped to Framatome. On September 12, 2019, the 30B UF₆ cylinders were received by Framatome. Upon arrival, the cylinders were inspected and surveyed by Framatome employees and found to have loose surface contamination levels on and around the valve cover that were above those allowed by DOT for alpha and beta/gamma contamination. Specifically, cylinder LU0704 contained 250 dpm/cm² alpha and 2,500 dpm/cm² beta/gamma, and cylinder LU0348 contained 40 dpm/cm² alpha and 2,000 dpm/cm² beta/gamma. Framatome decontaminated the top of the cylinders, removed and bagged the contaminated valve covers. Framatome immediately notified the carrier and the NRC operations center as required by 10 CFR 20.1906(d).

The licensee conducted an Apparent Cause Analysis (ACE) (IR 2019-13869) of the event and completed its investigation on October 10, 2019. The inspectors reviewed the licensee's ACE and determined that the findings identified by the licensee were contributing factors of the licensee's failure to perform adequate surveys on outgoing shipments of two 30B cylinders containing licensed material.

Analysis

The licensee failed to make or cause to be made surveys of areas that may be necessary for the licensee to comply with the regulations of 10 CFR 20.1501(a) and are reasonable under the circumstances to evaluate the magnitude and extent of radiation levels, concentration, and the potential radiological hazards of the radiation levels detected. This failure is a violation of 10 CFR 20.1501(a).

The inspectors determined that the violation was more than minor based on screening question 17 of Inspection Manual Chapter 0616, Appendix B-6, Radiological Protection, Example d which states, in part, "An item... was inadequately surveyed and subsequently released from the radiological control area (RCA) of the facility". The potential existed for the contaminated item to be released offsite beyond the owner-controlled area." Specifically, the violation resulted in the licensee shipping two 30B cylinders beyond the owner-controlled area with non-fixed contamination on the surfaces that were above the removable surface contamination limits in DOT 49 CFR 173 and NRC 10 CFR Part 71.

In accordance with the NRC Enforcement Policy section 2.2.2(d), violations that are less serious, but are of more than minor concern and resulted in no or relatively inappreciable potential safety consequences, are characterized as Severity Level IV violations.

Enforcement

10 CFR 20.1501(a) states, in part, that "Each licensee shall make or cause to be made, surveys of areas, that may be necessary for the licensee to comply with the regulations in this part and are reasonable under the circumstances to evaluate the magnitude and extent of radiation levels, concentration, and the potential radiological hazards of the radiation levels detected."

Contrary to the above, on September 5, and again on September 10, 2019, the licensee failed to make or cause to be made surveys of areas that may be necessary for the licensee to comply with the regulations in this part and are reasonable under the circumstances to evaluate the magnitude and extent of radiation levels, concentration, and the potential radiological hazards of the radiation levels detected, to comply with the requirements of 10 CFR 20.1501(a). Specifically, surveys conducted failed to detect loose surface contamination which resulted in two cylinders being shipped with non-fixed contamination on and near the valve cover that were above the limits established in 10 CFR 71.87(i), and DOT requirements in 49 CFR 173.443(a).

In response to the event, the licensee initiated immediate corrective actions by (1) suspending all outgoing shipments of cylinders; (2) re-initiating cylinder shipment with the use of overpacks or sealands to prevent exceedance of regulatory limits; (3) health physics performing resurvey of cylinder valve covers not installed on cylinders for contamination; and (4) revising procedures to include at a minimum: requirements to survey valve covers for contamination and including storage instructions, establishing limits for fixed and non-fixed contamination on cylinders for on-site release, and implementing time constraint for time allowed between release surveys and shipment. In addition, the licensee included some preliminary and long-term extent of condition reviews: (1) to survey all cylinder valve covers not installed on cylinders for

contamination and decontaminate covers that are contaminated; and (2) revise the survey form used to record survey results after cylinder wash to include results for all survey locations (zones), instrument information, approval signatures and make the form a control form, this ensures the survey results are documented adequately to meet regulatory requirements and to document review by supervision.

This violation will be opened as VIO 70-1151/2019-004-01, "Failure to Perform Adequate Surveys on Outgoing Shipments of 30B Cylinders." This is a violation of 10 CFR 20.1501(a). A Notice of Violation is attached.

ii. WER 70-1151/2019-001-00: Over-Pressurization of Wet Drum (EN 54161)

a. Inspection Scope

On July 12, 2019, the licensee reported the discovery of an unplanned fire or explosion damaging a container containing licensed material in accordance with 10 CFR 70.50(b)(4), as EN 54161, Waste Drum Damaged Due to Over Pressurization. Specifically, operations personnel in the URRS area packaged contaminated wet recoverable material (e.g., mop heads, filters, rags, and laboratory waste) into a closed drum at the designated drum loading station, performed the required assay survey, and placed the drum into storage. Shortly afterward, the drum pressurized forcing the lid off and a small portion of its contents to disperse into the immediate vicinity. Dry paper in the drum created a small fire, which was promptly extinguished without the use of a water hose or fire extinguisher. The drum was then separated from other stored material and assayed to reveal a U-235 content of 71.45 grams, which met the reporting threshold.

The health physics department monitored the area and found no airborne results approaching radiological limits, and the incident had no impact on the health and safety of the employees, the public, or the environment. The licensee entered this event into their CAP under issue report IR-2019-11027 and suspended loading operations of wet recoverable material until further evaluation was complete. Operating personnel also checked the other drums in the area with heat monitoring equipment, and no additional heat generation issues were identified.

On August 8, 2019, the licensee submitted their 30-day written report in response to this event, LTR-RAC-19-63, to meet the requirements of 10 CFR 70.50(c)(2). The inspectors reviewed the licensee's written report to verify it included the probable cause of the event, corrective actions taken or planned to prevent reoccurrence, and whether the event was identified and evaluated in the ISA. The inspectors also reviewed the issue report generated for this event to determine whether the cause statement and basis, extent of conditions, and actions required and taken reflected the information submitted in the written report and were adequate to correct the issue and prevent similar events from occurring. To verify proper implementation of corrective actions, the inspectors reviewed procedural changes to COP-841000, "Low Level Radioactive Scrap Handling," that added instructions and warnings for URRS personnel to (1) provide oversight of materials being properly segregated into the drums, (2) ensure items being placed in the wet combustible trash do not have free liquid present, (3) remove the lid gasket from the drum lids before sealing to provide a vent path to prevent pressurization,

and (4) measure and document drum temperatures during the first hour after generation to detect if an exothermic reaction is occurring.

In addition, the licensee administered operating experience on this event, developed training related to the procedural changes, and conducted an audit to determine the effectiveness of their corrective actions. The inspectors reviewed the licensee's assessment, and conducted independent observations and interviews of URRS operators, to determine whether the facility was effective in reducing the likelihood of event reoccurrence.

This item is considered closed.

b. Conclusion

No violations of more than minor significance were identified.

iii. WER 70-1151/2019-002-00: Fire Admin IROFS Degradation (EN 54298)

a. Inspection Scope

On September 27, 2019, the licensee reported the discovery of a degradation of an IROFS that resulted in a failure to meet the performance requirements of 70.61(b) in accordance with Appendix A to Part 70, as EN 54298, Procedural Noncompliance with Administrative Item Relied on for Safety. Specifically, IROFS UF6FIRE-901 requires that fuel trucks maintain a distance of 60 feet from Uranium Hexafluoride (UF6) cylinders to provide separation in the case of a fire. However, on September 26, a fuel oil delivery truck, escorted by plant employees, drove along the road adjacent to the UF6 cylinder storage area approximately 20 to 30 feet away from the cylinders for a few minutes, violating the procedure and degrading the IROFS. The other IROFS in this accident sequence remained reliable and available as required, however the sequence did not remain highly unlikely with this IROFS degraded.

This was a non-emergency event notification, and there was no release of hazardous or radiological materials. There were no health or safety consequences to the public, the employees, or the environment from this procedure non-compliance. The licensee entered this event into their CAP and implemented immediate corrective actions to ensure that designated escorts understand the proper delivery route specified in the procedure prior to any fuel trucks being escorted inside the facility fence.

This item was discussed and remains open.

b. Conclusion

No violations of more than minor significance were identified.

2. Review of Confirmatory Order Action Item V.5 (Inspection Procedures 92703)

a. Inspection Scope

The inspectors reviewed the licensee's actions regarding Confirmatory Order (CO) Section V, Item 5 (ML17221A122), which required the licensee to develop and implement additional methods to monitor system parameters that would provide early indication of an abnormal accumulation in the S-1030 scrubber from a process upset

that could challenge the accumulation rate and/or criticality safety mass limits. The methods are supposed to provide timely indications to enable the operators to take appropriate actions in accordance with approved procedures.

Specifically, the licensee performed an evaluation to identify and recommend controls for parameters that if left unchecked or uncontrolled could lead to an unexpected uranium accumulation in the S-1030 scrubber. The licensee evaluated all 53 inputs to the S-1030 scrubber and concluded that, with the current procedures and processes in place, there were no inputs that have the capability of producing an acute accumulation that could challenge the associated assumptions and conclusions in the CSE due to the general system design, system upgrades, added inspections, and procedure improvements that have been implemented since the 2016 scrubber event. Specifically, with respect to monitoring the S-1030 scrubber for detection of a change in buildup rate, the licensee implemented process improvements to (1) add weekly camera inspections of the scrubber inlet duct, inlet transition, and baskets, (2) collect biweekly samples of scrubber solution to determine uranium concentration, and (3) record the bag filter differential pressures for the recirculating water every four hours, change the filter when that pressure reaches 10 psig, and evaluate the scrubber if filters are being changed more frequently which is indicative of a change in the system. The licensee also installed a new S-1030 scrubber body with enhanced viewing windows to improve inspection capabilities, new instrumentation on the recirculation piping to improve flow indication, and a new level probe to provide an alarm on high level.

The inspectors reviewed the licensee's evaluation, the associated CSE, and the process improvements and system modifications that were made. Specifically, the inspectors observed the modifications in the plant, reviewed the procedural and maintenance changes, requested the recent biweekly S-1030 uranium concentration samples, and reviewed the associated controls defined in the CSE and ISA Summary to verify the modifications and practices put in place would provide early indication of an abnormal accumulation in the scrubber.

b. Conclusion

The licensee has developed and implemented additional methods to monitor system parameters that would provide early indication of an abnormal accumulation in the S-1030 scrubber from a process upset. Based on the review above, the NRC has concluded that Westinghouse met the requirements stated in CO Section V, Item 5. This item is now considered closed.

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 September 26, 2019, to A. Pope and staff and again in a telephone exit on October 24, 2019. Proprietary information was discussed but not included in this report.

SUPPLEMENTAL INFORMATION

1. KEY POINTS OF CONTACT

<u>Name</u>	<u>Title</u>
B. Bedford	Manager, EFIN – Engineering Fix-it-Now
G. Couture	Manager, Licensing
T. Gregg	Manager, Uranium Recovery & Recycling Services
L. Johnson	Sr. Engineer, NCS
K. Lundy	Manager, Plant Modifications
C. Miller	Manager, NCS
N. Parr	Manager, Environmental
A. Pearson	Manager, EH&S Operations
A. Pope	Director, Organizational Effectiveness
R. Ruiz	Manager, 1 st Shift URRS
R. Schoonover	Project Engineer
T. Scott	Sr. Engineer, NCS
E. Wills	Manager, Environmental, Health & Safety
P. Young	Manager, Technical Services

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

2. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

VIO 70-1151/2019-004-01	VIO	Failure to Perform Adequate Surveys on Outgoing Shipments of 30B Cylinders (Paragraph C.1.i)
EN 54298	EN	Procedural Noncompliance with Administrative Item Relied on for Safety (Paragraph C.1.iii)

Opened/Closed

EN 54161	EN	Waste Drum Damaged Due to Over Pressurization (Paragraph C.1.ii)
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Closed

CO Section V, Item 5	CO	Implementation of Additional Methods to Monitor System Parameters for Early Indication of an Abnormal Accumulation in the S-1030 Scrubber (Paragraph C.2)
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3. INSPECTION PROCEDURES (IP) USED

IP 88015	Nuclear Criticality Safety
IP 88020	Operational Safety
IP 88070	Plant Modifications
IP 88075	Event Follow-up
IP 92703	Follow-up of Confirmatory Action Letters or Orders

4. **DOCUMENTS REVIEWED**

Criticality Safety Evaluations and Calc Notes

CN-CRI-06-002, Determination of Single Parameter Limits for Homogeneous UO₂ Systems, Rev. 0
CN-CRI-08-23, Pelleting Donaldson 3DF24 Super Torit, Rev. 1
CN-SB-08-08, ADU Conversion Lines 1-5 Torit Ventilation Systems Criticality Accident Potential (CSE-1-M R4), Rev. 6
CN-SB-08-09, ADU Pellet Lines 1-5 Torits and Discharge End Torit Criticality Accident Potential (CSE-1-K R7), Rev. 6
CN-SB-10-15, Criticality Accident Potential for Polypak Storage Carts, Rev. 2
CSE-1-E, Criticality Safety Evaluation for S-1030 Scrubber System, Rev. 19
CSE-1-K, Criticality Safety Evaluation (CSE) for the ADU Pellet Lines 1-5 Torit Ventilation Systems, Rev. 8
CSE-1-M, Criticality Safety Evaluation (CSE) for ADU Conversion Line Torits, Rev. 5
CSE-1-Q, Criticality Safety Evaluation for ADU Bulk Blending Room Torits, Rev. 5
CSE-5-A, Criticality Safety Evaluation for Ammonium Diuranate (ADU) Bulk Blending System, Rev. 2
CSE-13-E, Criticality Safety Evaluation (CSE) for URRS Trash and Assay Operations, Rev. 2
CSE-16-B, Criticality Safety Evaluation (CSE) for Storage of Uranium Bearing Materials System [Polypak Storage Carts], Rev. 7

Records:

Apparent Cause Analysis, 2019-13869, Revision 8
CCF 17073
CCF 17282
CCF 18074
CCF 18124
CCF 18124 Verification
CCF 18229
CCF 18229 email
CCF 18308
CF-81-037
CF-81-037, dated July 27, 2018
DWG No. 510F21PI01, Plant Utilities/Instrument Air Compressor Room #2, Rev. 19
Form CF-20-030, Backflow Device Test Report Form, Revision 2
Form CF-81-002, UF6 Cylinder Record, Revision 60
Formal Compliance Audit (EHS-AUDIT-18-2, Revision 1)
IROFS inspected (OPS): SOLX-901, SOLX-110, SOLX-111, SOLX-115, SOLX-117, SOLX-503, and SOLX-903
Lab Report No. 2019106917, MISC_Powder Analytical Report, dated September 12, 2019
LTR-EHS-19-72, Ingress of Condensate from the Compressed Air System into Fissile Material Systems, Rev. 0
OM81230
OM82000, 52 Week Functional Verification of Safety Significant Controls – Pellet Line(s), dated 6/13/2019

PM 85057, PM 85054, PM 85053, PM 85052, PM 85056, PM 85047, PM 85048, OM 85252
PSEDoc-0006160, FL-2200 Bounding Water Generation from Instrument Air, Rev. 0
PSEDoc-0006161, Evaluation of Impact of Water in Air Lines on SSCs, Rev. 0
Red Book No. 75338 – NRC walkdown noticed flange guard missing from flange dirty dissolver
Staff Qualification Records - URRS
SWO-00026, Stop Work Order, dated September 13, 2019
WEC-17-165 Report, Rev. 0, dated June 1, 2017
Why Tree, 2019-13869, Revision 4
Work Order 795799
Work Order 796302
Work Order 799770
Work Order 802043
Work Order 805661
Work Order 808521

Procedures:

CA-007, Corrective and Preventive Action, Rev. 43
CA-134, Columbia Plant Significant Event Response Guidelines, Rev. 2
COP-810096, Cold Pressure Checking of UF6 Cylinder, Revision 17
COP-810097, UF6 Bay Handling of UF6 Cylinders, Revision 27
COP-810098, UF6 Cylinder Installation and Removal, Revision 53
COP-829013, Functional Verification of Safety Significant Controls Pellet Area, Rev. 67, dated 7/11/19
COP-830110, SOLX and Product Concentrator System 1 – Startup and Operation, Revision 42
COP-835101, Monitoring the Chemical Area Cooling Tower, Revision 12
COP-836051, Activity Monitors on Chemical Area Cooling Tower Operation, Revision 1
MCP-108135, Olympus Model MG 45
MCP-108202, Model 2Gd1, Ultrasonic Thickness Gage Instructions for Inspection
MCP-108241, Backflow Preventers – Inspection and Testing Procedure, Revision 0
MCP-202046, Pressure and Differential Pressure Transmitters (Generic), Revision 7
MCP-20225, Chemical Cooling Tower 8351 A/B Gamma Activity Monitor Calibration and Cool-100 Alarm Verification, Revision 3
MG2DL, Ultrasonic Thickness Gage use and Calibration
NCS-007, Homogeneous UO₂ Single Parameter Limits, Rev. 4
NCS-017, Categorizing Potential Criticality Scenarios and Criticality Safety Significant Controls, Rev. 4
RA-104, Regulatory Review of Configuration Change Authorization, Rev. 31, dated October 28, 2018
RA-106, Regulatory Component Audits at The Columbia Fuel Fabrication Facility, Rev. 38, dated June 13, 2019
RA-107, Corrective Action Process for Regulatory Events, Rev. 27
RA-316, NCS Facility Walkthrough Assessments, Rev. 11
RAF-104-02, EH&S Change Authorization Action Item Summary, Rev. 19, dated November 26, 2013
RAF-104-03, Nuclear Criticality Safety Review Guidelines for Configuration Control Change Packages, Rev. 11, dated October 25, 2018

RAF-104-04, Radiation Protection Guidelines & Checklist, Rev. 3, dated August 22, 2019
RAF-104-05, Environmental Protection Guidelines & Checklist, Rev. 8, dated November 26, 2013
RAF-104-06, Industrial Safety Protection Guidelines & Checklist, Rev. 6, dated April 25, 2018
RAF-104-07, Installation Verification Checklist, Rev. 3, dated November 26, 2013
RAF-104-08, Nuclear Material Safeguards Guidelines and Checklist, Rev. 4, dated August 22, 2019
RAF-104-09, Environmental Health & Safety 10 CFR 70.72 Guidelines and Checklist, Rev. 0, dated November 26, 2013
RAF-104-10, Nuclear Criticality Safety Configuration Change Preliminary Safety Basis Review, Rev. 1, dated October 25, 2018
RAF-316-1, Nuclear Criticality Safety Checklist for NCS Facility Walkthrough Assessments, Rev. 2
ROP-02-008, Surveys of Incoming and Outgoing Shipments of Radioactive Materials
ROP-02-014, Cylinder Cleaning and Monitoring
SOI-C-0719, Interim Compensatory Measures for Instrument Aire Event, Rev. 0
TA-500, Columbia Manufacturing Plant Configuration Control, Rev. 37, dated October 25, 2018
TA-500-06, Configuration Change Control Guidelines for Shop Tooling and Tooling Drawings, Rev. 2, dated January 25, 2018
TA-500-09, Electronic Configuration Change Life Cycles, Rev. 2, dated July 26, 2018
TA-500-10, Configuration Management Risk Assessment Board Meeting, Rev. 2, dated July 12, 2018
TAF-500-01, Columbia Plant Configuration Change Control Form, Rev. 23, dated January 4, 2018
TAF-500-04, Configuration Control Documentation Checklist, Rev. 1, dated January 25, 2018
TAF-500-05, Configuration Control Pre-Review Checklist, Rev. 1, dated January 25, 2018
TAF-500-06, Configuration Control Pre-Startup Checklist, Rev. 1, dated January 25, 2018
TAF-500-07, Configuration Control Closeout Checklist, Rev. 1, dated January 25, 2018
TAF-500-08, Subsequent Non-SSC Substitution Equivalency Review, Rev. 1, dated January 25, 2018
TAF-500-09, Subsequent SSC Substitution Equivalency Review, Rev. 1, dated January 25, 2018
TAF-500-10, Risk Assessment Board Collaborative Review, Rev. 2, dated July 12, 2018
TAF-500-11, 10CFR70.72 Engineering Pre-Screening Checklist, Rev. 0, dated July 12, 2018
W2-5.1-101.W05, Medium Level CAP Issue Work Instruction, Rev. 0

Issue Reports and Redbooks Written as a Result of the Inspection:

IR-2019-13869, Documented Comments Identified by NRC during IP 88075 inspection, September 26, 2019
IR-2019-14165, Documented Comments Identified by NRC during IP 88075 inspection, September 19, 2019

IR-2019-14447, Documented Comments Identified by NRC during IP 88075 inspection,
September 26, 2019
IR-2019-14493, Documented Comments Identified by NRC during IP 88015 inspection,
September 26, 2019
IR-2019-14557, Documented Comments Identified by NRC during IP 88015 inspection,
September 26, 2019

Issue Reports and Redbooks Reviewed:

IR-2018-12504
IR-2018-12987
IR-2018-14943
IR-2018-15515
IR-2018-17486
IR-2018-20250
IR-2018-20413
IR-2018-8744
IR-2018-9428
IR-2019-1083
IR-2019-10890
IR-2019-13866
IR-2019-13922
IR-2019-3125
RB 74772
RB 75157
RB 75169
RB 75304

Other Documents:

321F02P102, Rev. 6, sheet 1, dated December 19, 2018
335F05P102, Rev. C1, sheet 1, dated July 31, 2018
335F05P102, Rev. C1, sheet 3, dated July 31, 2018
335F05PP02, Rev. C1, sheet 1, dated July 31, 2018
335F05PP02, Rev. C1, sheet 4, dated August 1, 2018
335F05PP02, Rev. C1, sheet 5, dated July 31, 2018
335F05PP02, Rev. C1, sheet 6, dated August 1, 2018
335F05PP02, Rev. C1, sheet 7, dated August 1, 2018
335F05PP02, Rev. C1, sheet 8, dated August 1, 2018
337F05P102, Rev. C3, sheet 1, dated July 25, 2018
337F05P102, Rev. C3, sheet 3, dated July 25, 2018
337F05PP01, Rev. C2, sheet 10, dated July 25, 2018
337F05PP01, Rev. C2, sheet 11, dated July 25, 2018
337F05PP01, Rev. C2, sheet 7, dated July 25, 2018
337F05PP01, Rev. C2, sheet 8, dated July 25, 2018
337F05PP01, Rev. C2, sheet 9, dated July 25, 2018
337F05PP01, Rev. C3, sheet 1, dated July 25, 2018
810097-1, UF6 Cylinder Surface Cleaning Zones, Revision 0
836038-1, Safety Significant Controls – URRS, Revision 118
Columbia Fuel Operations Organization Chart, dated September 2019
Slab Tank Picture

EN 54161 Event Follow-up:

EHS-AUDIT-19-5, Audit for the Low Level Radioactive Scrap Handling Regarding Drum Over Pressurization, dated September 18, 2019

COP-841000, Low Level Radioactive Scrap Handling, Rev. 28

IR-2019-11027

IR-2018-5138

IR-2018-7845

IR-2018-9921

Level 2 Response Report Template, Wet Trash Drum Pressurization, dated July 12, 2019

LTR-RAC-19-63, Westinghouse Reported Event# EN54161 Follow-Up Report, dated August 8, 2019

RB 73252

RB 73561

RB 73835

RB 74903

RB 75152

CO Action Item V.5:

850781, SI-Safety, S1030 Uranium Concentration Samples – 2 Week OM, dated 7/23/2019

853293, SI-Safety, S1030 Uranium Concentration Samples – 2 Week OM, dated 8/7/2019

854895, SI-Safety, S1030 Uranium Concentration Samples – 2 Week OM, dated 8/19/2019

855654, SI-Safety, S1030 Uranium Concentration Samples – 2 Week OM, dated 9/3/2019

858029, SI-Safety, S1030 Uranium Concentration Samples – 2 Week OM, dated 9/16/2019

COP-811101, Calciner Off-Gas Scrubber, Rev. 83

COP-815010, Conversion Blu-M Oxidation, Rev. 33

COP-815020, Scrap Recovery Scrubber S-1030, Rev. 25

PSEDoc-0005377, Confirmatory Order (CO) No., EA-16-173, Upset Condition Monitoring, Rev. 0