



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

April 25, 2018

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 NUMBER 70-1151/2018-002  
AND NOTICE OF VIOLATION**

Dear Mr. Annacone:

This letter refers to an inspection conducted from January 1 through March 31, 2018, 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 U.S. Nuclear Regulatory Commission (NRC) requirements. The enclosed inspection report presents the results of this inspection. At the conclusion of this inspection, the inspectors discussed the findings with you and members of your staff at an exit meeting held on March 15, 2018.

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, orders, and regulations and with the conditions of your license. Within these areas, the inspection consisted of a selected examination of procedures and representative records, observations of activities, and interviews with 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 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 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

Enclosures:

1. Notice of Violation
2. NRC Inspection Report 70-1151/2018-002  
w/Supplemental Information

cc: (See page 3)

cc:

John Howell  
Manager  
Environment, Health and Safety  
Electronic Mail Distribution

Nancy Parr  
Manager  
Licensing  
Electronic Mail Distribution

Christine Kneece  
Manager  
Industrial Safety  
Electronic Mail Distribution

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

SUBJECT: WESTINGHOUSE ELECTRIC COMPANY – NUCLEAR REGULATORY  
 COMMISSION INTEGRATED INSPECTION REPORT NUMBER 70-1151/2018-002  
 AND NOTICE OF VIOLATION

DISTRIBUTION:

E. Michel, RII  
 T. Vukovinsky, RII  
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 C. Ryder, NMSS  
 M. Baker, NMSS  
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 ADAMS:  Yes      ACCESSION NUMBER: ML18115A127  
 A023       SUNSI REVIEW COMPLETE       FORM 665 ATTACHED

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SIGNATURE	Per feeder	Per feeder	Per feeder	Per Feeder			
NAME	TVukovinsky	JMunson	CRivera	MRuffin			
DATE	4/25/2018	4/25/2018	4/25/2018	4/25/2018			
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

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## NOTICE OF VIOLATION

Westinghouse Electric Company  
Hopkins, SC

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

During a Nuclear Regulatory Commission (NRC) inspection conducted March 12 through 15, 2018, one violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

As stated by Title 10 of the *Code of Federal Regulations* (10 CFR) 70.61(a) requires, in part, that the licensee shall evaluate, in the integrated safety analysis performed in accordance with 10 CFR 70.62, its compliance with the performance requirements in paragraphs (b), (c), and (d) of this section.

10 CFR 70.61(d) states, in part, that the risk of nuclear criticality accidents must be limited by assuring that under normal and credible abnormal conditions, all nuclear processes are subcritical.

Contrary to this requirement, on or before March 15, 2018, the licensee failed to assure that under normal and credible abnormal conditions, all nuclear processes were subcritical. Specifically, the licensee failed to assure that, under the credible abnormal condition of a fissile-bearing solution leak from process vessels or piping in the solvent extraction or cylinder wash areas, movement and replacement activities for 55-gallon drums used for processing in the uranium recycle and recovery services (URRS) area would remain subcritical. This resulted in a failure to include a credible accident sequence in the licensee's integrated safety analysis.

This is a Severity Level IV violation (Section 6.2.d.1 of the Enforcement Policy).

Pursuant to the provisions of 10 CFR 2.201, Westinghouse Electric Company is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, Region II, within 30 days of the date of the letter transmitting this Notice. This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

Your response will be made available electronically for public inspection in the NRC Public Document Room or in 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, proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

In accordance with 10 CFR 19.11, you may be required to post this NOV within two working days.

Dated this 25<sup>th</sup> day of April, 2018

U. S. NUCLEAR REGULATORY COMMISSION  
REGION II

Docket No.: 70-1151

License No.: SNM-1107

Report No.: 70-1151/2018-002

Licensee: Westinghouse Electric Company

Facility: Columbia Fuel Fabrication Facility

Location: Hopkins, SC 29061

Dates: January 1 through March 31, 2018

Inspectors: J. Munson, Nuclear Process Engineer  
C. Rivera, Fuel Facility Inspector  
M. Ruffin, Fuel Facility Inspector  
K. McCurry, Fuel Facility Inspector Trainee

Approved by: E. Michel, Chief  
Projects Branch 2  
Division of Fuel Facility Inspection

## **EXECUTIVE SUMMARY**

Westinghouse Electric Company  
Columbia Fuel Fabrication Facility  
Nuclear Regulatory Commission Integrated Inspection Report 70-1151/2018-002  
January 1 through March 31, 2018

The inspection was conducted by Nuclear Regulatory Commission (NRC) regional inspectors during normal shifts in the 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. One violation of NRC requirements was identified.

### **Operational Safety**

- One cited Severity Level (SL) IV violation was identified for the failure to assure that, under the credible abnormal condition of a fissile-bearing solution leak from solvent extraction or cylinder wash process components, handling of 55-gallon drums used for processing in the uranium recycle and recovery services (URRS) area would remain subcritical as required by 10 CFR 70.61(d). (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 Maintenance and Surveillance of Safety Controls, no violations of more than minor significance were identified. (Paragraph B.1)

### **Attachments:**

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<sub>6</sub>) 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. Criticality Safety (Inspection Procedure 88015)

###### a. Inspection Scope

###### *Criticality Analysis*

The inspectors reviewed selected criticality safety evaluations (CSEs) to determine whether properly reviewed and approved CSEs were in place prior to conduct of new or changed operations and were of sufficient detail and clarity to permit independent review. The inspectors reviewed the selected CSEs to determine whether calculations were performed within their validated area of applicability and consistent with the validation report. The inspectors reviewed the selected CSEs to verify they were consistent with the commitments in the License Application (LA) regarding double contingency and assurance of subcriticality under normal and credible abnormal conditions with the use of subcritical margin. The inspectors also reviewed associated assumptions and calculations to verify they were consistent with the technical practices and methodologies of applied Nuclear Criticality Safety (NCS) parameters as committed to in the LA. The CSEs were selected based on factors such as risk-significance, whether or not they were new and/or revised, and operating history. The CSE review focused on CSE-3-I, "ADU Conversion Calciner," CSE-4-E, "URRS 706 Hood," and CSE-7-A, "Solvent Extraction System."

The inspectors reviewed the licensee's generation of accident sequences in the above CSEs to determine whether normal and credible abnormal conditions were systematically identified in accordance with the commitments and methodologies in the LA for the analysis of process upsets. This included the review of accident sequences that the licensee determined to be not credible to verify 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. Additionally, the inspectors reviewed selected accident sequences designated as not credible to determine whether the bases for incredibility relied on any items which should be identified as items relied on for safety (IROFS). This review was conducted for the uranium recycle and recovery services (URRS) 706 hood, solvent extraction process, and ammonium diuranate (ADU) conversion calciner.

###### *Criticality Implementation*

The inspectors performed walk-downs focusing on the URRS 706 hood, solvent extraction process, and ADU conversion calciner to determine whether existing plant configuration and operations were covered by, and consistent with, the process description and safety basis in the CSE. The inspectors performed reviews to verify that

the requirements of administrative controls were properly reflected in procedures. The inspectors performed interviews with area operators to verify that administrative controls were understood and implemented as required by the safety bases.

The inspectors reviewed the Integrated Safety Analysis (ISA) Summary and supporting ISA documentation to determine whether the controls identified in the ISA were supported by technical bases in the CSEs.

#### *Criticality Programmatic Oversight*

The inspectors reviewed recently revised NCS program procedures to determine whether the licensee implemented license requirements and whether the NCS program was enacted in accordance with them. The revised NCS program procedures included RA-106, RA-121, and RA-310. The inspectors conducted interviews and reviewed records to determine whether NCS staff reviewed new and/or revised fissile material operations and procedures, including maintenance plans, consistent with program procedures and at a level commensurate with their significance.

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 inspector reviewed the NCS program audits to verify that they were conducted at a frequency consistent with license requirements and with appropriate thoroughness.

The inspectors reviewed NCS staff qualification records to verify that NCS engineers and senior NCS engineers have the necessary education and experience and were qualified in accordance with license requirements.

#### b. Conclusion

One cited Severity Level (SL) IV violation was identified for the failure to assure that, under the credible abnormal condition of a fissile-bearing solution leak from solvent extraction or cylinder wash process components, handling of 55-gallon drums used for processing in the URRS area would remain subcritical as required by 10 CFR 70.61(d).

#### Introduction

The NRC inspectors identified a cited SL IV violation of 10 CFR 70.61(d) for the licensee's failure to assure that under normal and credible abnormal conditions, all nuclear processes were subcritical. Specifically, the licensee failed to assure that, under the credible abnormal condition of a fissile-bearing solution leak from process vessels or piping, handling of 55-gallon drums used for processing in the URRS would remain subcritical.

#### Description

On March 15, 2018, NRC inspectors identified a credible accident sequence that was not properly analyzed in the licensee's CSEs and ISA. This sequence involved the collection of uranyl nitrate solution from the solvent extraction system in a non-favorable geometry 55-gallon drum used for processing at the nearby URRS 706 hood.

The URRS 706 hood is used to transfer dried residue material to a 55-gallon waste drum for eventual disposal. The 55-gallon drum is routinely replaced and relocated to another area of the facility for further processing. Located in close proximity to the 706 hood is solvent extraction, which poses a criticality concern for non-favorable geometry containers (such as a 55-gallon drum) due to the potential of a uranyl nitrate solution leak from process vessels or piping. The inspectors reviewed the CSEs for the URRS 706 hood, solvent extraction system, and inadvertent containers to determine whether the licensee's analyses considered all credible abnormal conditions during drum movement and replacement activities.

The inspectors determined that the licensee's analyses did not adequately bound the potential collection of uranyl nitrate solution in the 55-gallon drum due to a leak from the solvent extraction system during its movement and replacement activities. The licensee's CSE for the 706 hood, CSE-4-E, considered potential criticality in the 55-gallon drum while in place at its approved processing location connected to the hood, but did not consider or bound its replacement and movement activities once disconnected from the hood as such activities were considered bound by the licensee's CSE for inadvertent containers, CSE-99-G. No controls were established to restrict the movement of the drum such that it was not relocated to the solvent extraction area, and no controls were established to ensure that the drum could not collect solution. Likewise, the licensee's CSE for the solvent extraction system, CSE-7-A, considered potential criticality due to a significant leak of uranyl nitrate solution from process vessels or piping. However, the CSE did not consider the presence of non-favorable geometry containers as this type of accident sequence was also considered to be bound by the licensee's CSE for inadvertent containers, CSE-99-G. CSE-99-G considered potential criticality due to the collection of moderated fissile material (including uranyl nitrate solution) in unauthorized non-favorable geometry containers, but did not consider the presence of the authorized 55-gallon drum (the 55-gallon drum is authorized to be in the URRS as it is used for normal operations at the 706 hood). As such, the inspectors determined the licensee failed to assure subcriticality of 55-gallon drum movement and replacement activities under the credible abnormal condition of a process leak from the solvent extraction system.

The licensee immediately shut down the affected processes and performed an extent of condition evaluation, which identified a similar scenario with the wet combustible trash process also located in the URRS area. The wet combustible trash process uses non-favorable geometry containers, and the nearby cylinder wash operation presents a source of moderated fissile-bearing solution under credible abnormal conditions. The inspectors determined that the licensee also failed to assure subcriticality of 55-gallon drum movement and replacement activities under the credible abnormal condition of a process leak from the cylinder wash operation. Due to their extent of condition, the licensee also immediately shut down cylinder wash operations to eliminate that source of fissile-bearing solution.

### Analysis

The licensee failed to assure that under normal and credible abnormal conditions, all nuclear processes were subcritical as required by 10 CFR 70.61(d). Specifically, the licensee failed to assure that, under the credible abnormal condition of a fissile-bearing solution leak from process vessels or piping, handling of 55-gallon drums used for processing in the URRS area would remain subcritical.

No safety-related events occurred, and there was no actual safety consequence to the workers or public. Therefore, the actual safety significance was low. The inspectors determined that at least two unlikely, independent, and concurrent changes in process conditions would have been required in order for a criticality accident to occur. Although the accident sequence was not properly analyzed in the licensee's CSEs and ISA, there were existing safety significant controls (SSCs) and other procedural barriers in place which served to limit the likelihood of an inadvertent criticality. Therefore, the potential safety significance was also low.

The failure to assure that under normal and credible abnormal conditions all nuclear processes are subcritical as required by 10 CFR 70.61(d) was determined to be more-than-minor as it aligns with NRC Inspection Manual Chapter (IMC) 0616, "Fuel Cycle Safety and Safeguards Inspection Reports," Appendix B screening question number 11, "Does the violation result in the failure to ensure that all nuclear processes are subcritical with an approved margin of sub-criticality for all normal and credible abnormal conditions as required by 10 CFR 70.61(d)?" The violation was characterized as SL IV in accordance with Example 6.2.d.1 of the NRC Enforcement Policy, which states "Under 10 CFR Part 70, Subpart H, a licensee fails to meet the requirements of 10 CFR 70.61, 'Performance Requirements,' or Appendix A, 'Reportable Safety Events,' to 10 CFR Part 70, and the failure does not result in a SL I, II, or III violation." Because the likelihood of criticality remained highly unlikely, the violation did not result in a SL I, II, or III violation as an appropriate state of risk was maintained.

### Enforcement

10 CFR 70.61(d) requires, in part, that the risk of nuclear criticality accidents be limited by assuring that under normal and credible abnormal conditions, all nuclear processes are subcritical.

Contrary to this requirement, on or before March 15, 2018, the licensee failed to assure that under normal and credible abnormal conditions, all nuclear processes were subcritical. Specifically, the licensee failed to assure that, under the credible abnormal condition of a fissile-bearing solution leak from process vessels or piping, handling of 55-gallon drums used for processing in the URRS area would remain subcritical. This resulted in a failure to include a credible accident sequence in the licensee's ISA.

As previously stated, the licensee immediately shutdown the affected process areas and performed an extent of condition (Reference No. LTR-EHS-18-21). These issues were entered into the licensee's corrective action program (CAP) under IR-2018-7348 and IR-2018-7421. The licensee also initiated a 24 hour event notification (Report No. 53266) based on 10 CFR Part 70 Appendix A(b)(1), which requires, in part, any event or condition that results in the facility being in a state that was not analyzed, was improperly analyzed, or is different from that analyzed in the ISA, and which results in failure to meet the performance requirements of 10 CFR 70.61 be reported to the NRC Operations Center within 24 hours of discovery.

This violation of 10 CFR 70.61(d) is identified as NOV 70-1151/2018-002-001, "Failure to assure the subcriticality of 55-gallon drums in the URRS area." A Notice of Violation is enclosed.

## 2. Operational Safety (Inspection Procedure 88020)

### a. Inspection Scope

The inspectors interviewed the operations manager, one operations engineer and reviewed records associated with the calciner system in the conversion area to validate the correct implementation of IROFS and their safety functions, as described by the following accident sequences listed in the ISA summary:

- Ammonium Diuranate (ADU ) Calciner System- ADU Powder Released
- ADU Conversion Calciner System- Explosion/Fire at Startup
- ADU Conversion Calciner System- Explosion/Fire during Operation
- Criticality Safety Evaluation (CSE)-3-I Scenario #1: What if Furnace Tube Burn-Through Occurs?

The inspectors reviewed the analysis and calculations conducted by the licensee to verify that IROFS were not needed for the accident sequences “ADU Calciner System-ADU Powder Released” and “ADU Conversion Calciner System- Explosion/Fire during Operation and Startup,” as they did not exceed the 10 CFR Part 70 thresholds for High and Intermediate Consequence events. The inspectors reviewed IROFS ADUCAL-906, ADUCAL-902 and ADUCAL-914 associated with scenario #1 in the Criticality Safety Evaluation, CSE-3-I, “What if Furnace Tube Burn-Through Occurs,” to verify they IROFS were implemented as described in the ISA.

The inspectors reviewed the management measures associated with IROFS ADUCAL-906, ADUCAL-902 and ADUCAL-914 to verify that the IROFS were available and reliable to function when needed as described in the ISA summary. The inspectors conducted walk downs of the process area to verify the physical presence of active engineered safety controls. The inspectors reviewed procedure ROP-06-002, “Effluent Air Sampling and Counting,” to verify that required actions for ADUCAL-914, an administrative control, as identified in the ISA Summary were transcribed into written operating procedures. The inspectors evaluated the operating limits and operator responses for upset conditions documented in the procedure to verify that limits needed to assure safety were properly described.

The inspectors interviewed operators in the control room to verify that operators and technicians were knowledgeable of the implementation of the reviewed IROFS. The inspectors conducted interviews and document reviews to verify that the licensee conducted periodic surveillances as required by the ISA Summary for ADUCAL-902 and ADUCAL-906. The inspectors reviewed the surveillance procedures to verify the established periodic functional test was being conducted for the IROFS safety function.

The inspectors reviewed the licensee’s CAP entries related to the calciner system for the past 12 months to verify that deviations from procedures and unforeseen process changes affecting nuclear criticality, chemical, radiological, or fire safety were documented and investigated promptly.

The inspectors reviewed training qualifications required to be completed by operators in the conversion area to verify that the operators in the conversion area were maintaining qualifications in accordance with licensee procedures and requirements.

b. Conclusion

No violations of more than minor significance were identified.

B. Facility Support

1. Maintenance and Surveillance of Safety Controls (Inspection Procedure 88025)

a. Inspection Scope

The inspectors interviewed two senior managers, one manager, two maintenance personnel, and one system engineer to verify maintenance and surveillance program activities were performed in accordance with section 3.2 of the LA, "Maintenance." The inspectors performed document reviews, interviewed maintenance staff, and observed maintenance and surveillance activities for a sample of IROFS and other safety controls. The evaluations were conducted to determine if the safety controls remained available and reliable to perform their safety function when needed, in accordance with licensee procedures and requirements. The following IROFS were inspected: VENT-INCINT-901, PELPREP-914, and VENT-903. The inspectors reviewed a total of thirteen work packages to determine if they were reviewed prior to returning equipment to service.

The inspectors reviewed samples of the licensee's work control program to verify provisions were in place to ensure pre-job planning and preparation of work orders supporting maintenance and surveillance activities were conducted in accordance with licensee procedures and requirements. The inspectors reviewed samples of maintenance and surveillance work orders and post-maintenance testing records for accuracy and to determine if the functionality of IROFS and safety controls were verified operational in accordance with maintenance procedures and ISA accident sequences. The inspectors observed several maintenance shift turnover meetings and two pre-job briefings for maintenance activities to verify compliance with the work control program requirements.

The inspector observed maintenance work activities on selected systems and processes to verify work activities were conducted in accordance with licensee requirements and approved procedures. Specifically, the inspectors observed inspection of the HEPA filter housing of the incinerator system IROFS (VENT-INCINT-901), the cleanout of the S-4220 scrubber, and the laser welder of the wet filtration unit (SSC GRIDSCRUB-908). The inspectors reviewed work orders prior to the commencement of work to verify the work was properly controlled and authorized. The inspectors interviewed maintenance staff and supervisors to assess the licensee's ability to safely conduct the work in accordance with license requirements and approved maintenance procedures. Work instructions were reviewed to verify they were accurate, contained the proper level of detail, and that post-maintenance testing and calibrations, as specified by the license requirements, were performed prior to restoring the equipment to operational status.

The inspectors interviewed one maintenance supervisor regarding the training and qualification program for maintenance personnel performing work on safety-related equipment, including IROFS. The inspectors reviewed the training and

qualification records of two maintenance mechanics, two maintenance electricians and one instrumentation and controls technician to verify the individuals were qualified to perform their assigned maintenance activities.

The inspectors reviewed the Environmental Health and Safety formal compliance audit to evaluate if it met license requirements in regards to maintenance activities. The inspectors evaluated whether audit findings were properly entered into the licensee's corrective action program.

The inspector reviewed the licensee's CAP to evaluate if programmatic functions complied with procedural requirements. The review included whether performance issues relating to the maintenance and surveillance of IROFS and safety controls were entered into the CAP and whether corrective actions had been implemented.

b. Conclusion

No violations of more than minor significance 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 15, 2018, 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**

<u>Name</u>	<u>Title</u>
M. Annacone	VP, Columbia Fuel Operations and Manager, CFFF
A. Boone	Maintenance Planner/Manager
G. Byrd	Licensing Engineer
J. Couture	Licensing Engineer
J. Howell	Environmental, Health and Safety (EH&S) Manager
C. Hudson	Operations Engineer
K. Faulkenberry	Maintenance Mechanics 2nd Shift Manager
W. Macecevic III	Site Maintenance Manager
C. Miller	NCS manager
J. Nimmo	Operations Engineer
N. Parr	Licensing Manager
J. Reid	Mechanical Maintenance 1st Shift Manager

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

### **2. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**

#### Opened

70-1151/2018-002-01      VIO      Failure to Assure the Subcriticality of 55-Gallon Drums in the URRS Area.

### **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:

CN-CRI-16-004, "CN-CRI-07-21, ADU Conversion Calciner," Revision (Rev.) 0  
CN-SB-12-015, "Criticality Accident Potential for ADU Conversion Calciner (CSE-3-I Rev 6)," Rev. 3  
CN-SB-12-016, "Criticality Accident Potential for Solvent Extraction Process (CSE-7-A R8)," Rev. 1  
CSE-3-I, "Columbia Fuel Fabrication Facility ADU Conversion Calciner," Rev. 6  
CSE-4-E, "URRS 706 Hood," Rev. 8  
CSE-7-A, "Solvent Extraction System," Rev. 9  
CSE-99-G, "Inadvertent Containers," Rev. 2  
Form No: RAF-125-5, "Environment, Health and Safety Nuclear Criticality Safety Engineer Training Checklist," Revs. 5 and 6  
ISA 03, "ADU Conversion System Summary," Rev. 13.1

CF-81-932, Conversion Line 1: Safety Significant interlocks, Alarms and Passive Engineered Controls Functionality Verification Form, Rev. 65, dated August 24, 2015  
 CF-81-933, Conversion Line 2: Safety Significant interlocks, Alarms and Passive Engineered Controls Functionality Verification Form, Rev. 67, dated August 10, 2015  
 CF-81-934, Conversion Line 3: Safety Significant interlocks, Alarms and Passive Engineered Controls Functionality Verification Form, Rev. 67, dated July 27, 2015  
 CF-81-940, Conversion Line 4: Safety Significant interlocks, Alarms and Passive Engineered Controls Functionality Verification Form, Rev. 67, dated January 11, 2016  
 CF-81-941, Conversion Line 5: Safety Significant interlocks, Alarms and Passive Engineered Controls Functionality Verification Form, Rev. 58, dated January 1, 2016  
 OM81201, OM81202, OM81203, OM81204, OM81205, PM20235  
 Conversion Training Matrix as of February 15, 2018 WOs: 724314, 758202, 740467, 739147, 773854, 737910, 772461, 727992, 762041, 798435, 790862, 79C849, 790301, 790062, 790861, 782388, 788685, 759055, 795678, 795679, 796392, 796504, 790062, 788509

Procedures;

COP-836028, "Uranium Recycling & Recovery Area," Rev. 24  
 RA-106, "EH&S Audits at the Columbia Fuel Fabrication Facility," Rev. 5  
 RA-121, "Redbook Internal Reporting System," Rev. 14  
 RA-310, "Nuclear Criticality Safety Independent Technical Reviews," Rev. 3  
 RA-313, "Criticality Safety Evaluations (CSEs)," Rev. 15  
 RAF-316-1, "Nuclear Criticality Safety Checklist for NCS Facility Walkthrough Assessments," Rev. 1  
 NCS-017, "Categorizing Potential Criticality Scenarios and Criticality Safety Significant Controls," Rev. 4  
 CSE-3-I, Criticality Safety Evaluation (CSE) for the Columbia Fuel Fabrication Facility-ADU Conversion Calciner, Rev. 6, dated May 17, 2016  
 MCP-203312, Verification of Interlock ADUCAL-906, Calciner OT Trip, Rev. 13, dated October 1, 2015  
 MCP-203329, Verification of Interlock ADUCAL-902, Rev. 18, dated November 6, 2017  
 MCP-203379, Leak Test Calciner Hydrogen BPCS Block Valves and Hydrogen SIS Block Valves for Conversion Lines 2, 3, 4, and 5, Rev. 5, dated November 6, 2017  
 MCP-203349, Leak Test Calciner Hydrogen Shutoff Valves, Rev. 3, dated November 23, 2017  
 ROP-06-002, Roof Effluent Air Sampling and Counting, Rev. 24, dated March 19, 2015  
 CA-006, Columbia Plant Training Delivery System (TDS), Rev. 30, dated August 17, 2017  
 CA-220, Safety Basis Qualification Training, Rev. 9, dated November 17, 2017.  
 WM-001, Work Management Process, Rev. 0, dated January 9, 2014  
 WM-002, Deficiency Identification and Reporting, Rev. 4, dated December 12, 2013  
 WM-003, Work Request/Work Order Prioritization, Rev. 1, dated August 13, 2015  
 WM-007, Work Management Scheduling, Rev. 3, dated October 23, 2014  
 WM-008, Work Management Planning, Rev. 2, dated May 30, 2013  
 WM-011, Work Management Functional Equipment Groups (FEGs), Rev. 0, dated June 12, 2008  
 MCP-108000, Preventative Maintenance, Rev. 19, dated September 7, 2017  
 MCP-108103, Maintenance Work Order Handling, Rev. 40, dated February 26, 2018  
 MCP-108233, Limits and Requirements of Maintenance Troubleshooting, Rev. 3, dated July 20, 2017

MCP-202002, Industrial Instrument Calibration, Rev. 35, dated August 9, 2016  
CA-220, Safety Basis Qualification Training, Rev. 9, dated November 17, 2017

Condition Reports Written as a Result of the Inspection:

CAPAL 73518, 73519, IR-2018-7278, CR-2018-7346, IR-2018-7348, IR-2018-7421, IR-2018-7470

Other Documents:

Drawing No. 313F01PI02, "Process Ventilation Flow Diagram from URRS to Scrubbers S-2A & S-2B, Rev. 14

LTR-EHS-18-21, "Extent of Condition for NRGs in proximity to solution processing," dated March 16, 2018

SYP-306, "CFFF Fire/Criticality System Impairment," Rev. 16

STF-306-5, "Fire Protection Impairment Form," Rev. 1

DWG No.: 334F05P101, ADU Line #1/Calcination, Rev. 34.

DWG No.: 335F05P101, ADU Line #2/Calcination, Rev. 34.

EHS-AUDIT-17-2, Formal Compliance Audit, dated April 26, 2017