



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
245 PEACHTREE CENTER AVENUE N.E., SUITE 1200
ATLANTA, GEORGIA 30303-1200

October 25, 2021

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

SUBJECT: COLUMBIA FUEL FABRICATION FACILITY – INTEGRATED INSPECTION
REPORT 07001151/2021003

Dear Mr. Annacone:

On July 29, 2021, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Columbia Fuel Fabrication Facility. On July 29, 2021, the NRC inspectors discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

No violations of more than minor significance were identified during this inspection.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

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

Docket No. 07001151
License No. SNM-1107

Enclosure:
As stated

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SUBJECT: COLUMBIA FUEL FABRICATION FACILITY – INTEGRATED INSPECTION
 REPORT 07001151/2021003 – DATED October 25, 2021

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OFFICE	RII/DFFI	RII/DFFI	RII/DFFI		
NAME	P. Startz	T. Sippel	E. Michel		
DATE	10/15/21	10/15/21	10/25/2021		

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**U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report**

Docket Number: 07001151

License Number: SNM-1107

Report Number: 07001151/2021003

Enterprise Identifier: I-2021-003-0117

Licensee: Westinghouse Electric Company

Facility: Columbia Fuel Fabrication Facility

Location: Hopkins, SC

Inspection Dates: July 26, 2021 to July 29, 2021

Inspectors: T. Sippel, Fuel Facility Inspector
P. Startz, Fuel Facilities Inspector

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

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting an integrated inspection at Columbia Fuel Fabrication Facility, in accordance with the fuel cycle facility inspection program. This is the NRC's program for overseeing the safe operation of licensed fuel cycle facilities. Refer to <https://www.nrc.gov/materials/fuel-cycle-fac.html> for more information.

List of Violations

No violations of more than minor significance were identified.

Additional Tracking Items

None.

PLANT STATUS

The Westinghouse Facility converts uranium hexafluoride (UF₆) into uranium dioxide using a wet conversion process and fabricated fuel assemblies for use in commercial nuclear power reactors. During the inspection period, normal production activities were ongoing.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Inspections were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2600, "Fuel Cycle Facility Operational Safety and Safeguards Inspection Program." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

SAFETY OPERATIONS

88015 - Nuclear Criticality Safety

The inspectors evaluated selected aspects of the licensee's Nuclear Criticality Safety program to verify compliance with selected portions of 10 CFR 70, including 70.61, and 70.62, Chapter 6.0, "Nuclear Criticality Safety (NCS) Program," of the facility's license application, and applicable licensee procedures.

Criticality Analysis (IP Section 02.01)

The inspectors interviewed licensee staff and reviewed nuclear criticality safety evaluations (CSEs), and associated calculations, to verify compliance with 10 CFR 70 and applicable sections of the license application, including 6.1.1, 6.1.3, 6.1.4, 6.1.5.2, and 6.1.6. Specifically, the inspectors interviewed licensee staff and reviewed CSEs for scrubbers as described below:

- CSE-1-G, "Criticality Safety Evaluation (CSE) for Acid Scrubber S-2A/2B," Rev. 13, including the review of what-if analysis, normal, credible abnormal, and non-credible accident sequences. The inspectors walked down the S2A2B scrubber and other scrubbers that may be exposed to enriched uranium with licensee NCS engineers. The requirements and technical basis for IROFS that were established to prevent criticality accidents.
- CN-CRI-09-11, "S-2A/2B System (With Concrete Walls Near Sump Tanks)," Rev. 2, which was reviewed because it contained a variety of calculations and information supporting the licensee's evaluation of criticality accident sequences and IROFS in CSE-1-G.
- The inspectors interviewed licensee NCS engineers and the NCS manager about the review, approval, and implementation of CSEs and other NCS documentation. The inspectors interviewed licensee NCS staff about validation and the use of computer codes in the licensee's criticality safety program.

Criticality Implementation (IP Section 02.02)

The inspectors selected engineered and administrative controls from the licensee's integrated safety analysis (ISA) summary to verify proper implementation through a review of process and system descriptions, drawings, plant walkdowns, and operator interviews to verify compliance with 10 CFR 70 and applicable sections of the license application, including, 6.1.2, 6.1.3. Specifically, the inspectors interviewed licensee staff and reviewed the following controls, and their management measures, associated with the CSE listed above:

- IROFS VENT-S2A2B-103, -106, and -122 which are passive IROFS preventing solutions from overflowing/backflowing into unfavorable geometries. The inspectors walked down these controls in the field to verify their presence and condition, and reviewed drawings and maintenance records.
- IROFS VENT-S2A2B-116, -117, and -118 which are passive IROFS controlling the credited geometry, absorption, and reflection properties of the scrubber sump. The inspectors walked down these control in the field to verify their presence and condition and reviewed maintenance records.
- IROFS ADUSCRA-147 and VENT-S2A2B-131 which are credited as active and passive IROFS to prevent backflow. The inspectors walked down these controls in the field, reviewed drawings and maintenance records.
- IROFS VENT-S2A2B-107 and -108 which are administrative IROFS to prevent foreign objects from causing blockages in the scrubber. The inspectors walked down portions of these controls and reviewed procedures and maintenance records.
- IROFS VENT-S2A2B-109 which is an administrative IROFS to perform a routine inspection and cleanout. The inspectors reviewed maintenance records and condition reports.
- IROFS VENT-S2A2B-110 and -124 which are administrative IROFS controlling concentration in the scrubber sump through routine sampling, the inspectors walked down the lab that processes the samples, interviewed lab personnel, and reviewed procedures and sample results.
- IROFS VENT-901 which is an administrative IROFS that limits mass accumulations through routine gamma surveys of selected ductwork; the inspectors also interviewed licensee staff and reviewed applicable procedures, survey records, and related drawings.

Criticality Operational Oversight (IP Section 02.03)

The inspectors assessed the NCS staff's oversight of plant operators, procedures, and operations of systems involving special nuclear material to verify compliance with 10 CFR 70 and applicable sections of the license application. Specifically, the inspectors performed the following activities:

- Reviewed TRN-001-2, "Rad Protection Criticality Safety SSCs Safeguards," which is NCS training that covers types of controls, IROFS, postings, the double contingency principle, the consequences of a criticality and other NCS topics.

- Reviewed Criticality & Radiation Safety NSQT, dated September 30, 2020, which is NCS training that covers criticality control parameters, past accidents and other NCS topics.
- Observed a licensee NCS engineer conduct a weekly Facility Walkthrough Assessment (FWA) in the Scrap Cage area and reviewed the FWA schedule and FWA records for 2021.

Criticality Programmatic Oversight (IP Section 02.04)

The inspectors reviewed NCS program procedures, and NCS staff qualification records to verify compliance with 10 CFR 70 and applicable sections of the license application, including 6.1.3.3, and 6.1.10. Specifically, the inspectors interviewed licensee NCS staff, reviewed the following documents, and conducted a walkdown as described below:

- COP-815023, "S-2A and S-2B Inspection and Clean Out," Rev. 4, which provides instructions for the periodic inspection and cleanout of the inside of scrubber system components and includes the implementation of IROFS VENT-S2A2B-108, -109, -111.
- Various WOs related to the surveying, inspecting, and cleaning ductwork and scrubber systems (e.g., WO 874993).
- COP-814325, "Scrubbers 2A & 2B," Rev. 31, which includes instructions for taking the IROFS VENT-S2A2B-110 and -124 concentration samples of the scrubber sump water.
- RAF-125-5, "Nuclear Criticality Safety Engineer Training Checklist," dated March 30, 2021, which documented the training and qualification of a recently qualified licensee NCS engineer.
- Licensee NCS program procedures, RA-303, RA-305, RA-313, and RA-315 which the licensee recently revised.
- The inspectors also walked down the laboratory where the scrubber sump samples are analyzed for uranium concentration and interviewed lab personnel.

Criticality Incident Response and Corrective Action (IP Section 02.05)

The inspectors reviewed the licensee's criticality accident alarm system (CAAS) and corrective action program (CAP) to verify compliance with 10 CFR 70 and applicable sections of the license application, including 6.1.8. Specifically, the inspectors reviewed documents, and/or interviewed licensee staff concerning the following:

- NCS-related corrective action records, including IR-2021-2474, IR-2021-3870, IR-2021-4738, IR-2021-4957, and IR-2021-5048
- the evaluation and use of portable criticality detection devices

RADIOLOGICAL CONTROLS

86740 - Inspection of Transportation Activities

The inspectors evaluated select aspects of the licensee's Transportation Activities program to determine whether the licensee has established and is maintaining an effective, management-

controlled program; to ensure radiological and nuclear safety in the receipt, packaging, delivery to a carrier and, as applicable, the private carriage of licensed radioactive materials; and to determine whether transportation activities are in compliance with the applicable Nuclear Regulatory Commission 10 CFR Parts 20 and 71 regulations and Department of Transportation (DOT) (49 CFR Parts 171-178) transport regulations.

The inspectors examined the licensee's procedures and shipment records and observed actual package preparations and operations to verify compliance with the regulations above. Specifically, the inspectors reviewed or observed the following:

- receipt contamination surveys, physical inspections, and off-loading of full 30B cylinders from their UX-30s (overpacks) and placement into a UF6 storage yard
- inspection/removal of tamper indicating devices (seals) from UX-30 overpacks
- removal of the UX-30 overpack lids
- receipt, inspections, and off-loading of incoming LR-230 uranyl nitrate hexahydrate (UNH) contents
- shipment of three truckloads of fuel assembly traveller shipping packages

Preparation of Packages for Shipment (IP Section 02.01)

The inspectors examined the licensee's procedures and package preparations to verify compliance with the Chapter 3 of the License Application. Specifically, the inspectors reviewed, verified, and observed the following:

- traveller package refurbishment bay including spare parts, procedures, and calibrated tooling
- ongoing preparations of a traveller package
- Nuclear Material Transaction form 741 for Manifest 52-2140933
- Nuclear Material Transaction form 741 for Manifest WS-53455-0-149
- TR-501 Shipment of Liquid Low Enriched Uranium, Rev. 7

Delivery of Completed Packages to Carriers (IP Section 02.02)

The inspectors examined the licensee's procedures and shipment records and observed actual transport activities to determine that the licensee met package delivery regulations and Chapter 3 of the License Application. Specifically, the inspectors reviewed or observed the following:

- Shipping Manifest WS-53457-0-001, shipment of LSA-1 waste materials
- Shipping Manifest ISEU (000001-219 through 000023-221), shipment of LSA-1 waste materials
- Shipping Manifest ISEU (000012-229 through 000039-232), shipment of LSA-1 waste materials

Receipt of Packages (IP Section 02.03)

The inspectors examined the licensee's procedures to verify compliance with 10 CFR 20.1906 and Chapter 3 of the License Application. Specifically, the inspectors reviewed the following:

- COP-836047, "Uranium Nitrate Offloading from LR-230 Containers"
- CF-83-239, "LR-230 Offload Checklist"
- TR-300, "Unload UF6 Cylinders"

Records and Reports (IP Section 02.04)

The inspectors examined the licensee's recordkeeping and reports to verify compliance with the regulations above. Specifically, the inspectors reviewed the following:

- Certificate of Disposal, Receipt LSA-1 waste for disposal, dated March 3, 2021
- Certificate of Disposal, Receipt LSA-1 waste for disposal, dated March 14, 2021

General License Requirements (IP Section 02.05)

The inspectors reviewed licensee package certifications utilized for shipment of radioactive material packages to verify compliance with 10 CFR 71, Subpart C, and Chapter 3 of the License Application. Specifically, the inspectors reviewed:

- Certificate of Compliance No. 9291 for the LR-230 container
- Model UX-30 Certification Type B (U) F Fissile Package Design Certificate USA/9196/B (U) F-96, Rev. 34
- Model 30B Certification Type AF Fissile Package Design Certificate USA/0411/AF-96, Rev. 12

Management Controls (IP Section 02.06)

The inspectors reviewed management controls for transportation activities to verify compliance with Chapter 3 of the License Application. Specifically, the inspectors reviewed:

- COLUMN MC&A Software Guide, Form 741, Domestic UF6 Gas Receipts
- LCTP-20-06, "Management Assessment of the LR-230 Packaging," Rev. 0, dated December 21, 2020
- LCPT-21-02, "Management Assessment of the Traveller Packaging," Rev. 0, dated March 30, 21
- LCTP-21-04, "Management assessment of UF6 incident during transport," Rev. 0, dated June 2, 2021

Indoctrination and Training Program (IP Section 02.07)

The inspectors conducted interviews, reviewed training, and indoctrination documentation, and observed activities for shipping container engineering staff involved in transport

activities to verify compliance with Chapter 3 of the License Application. Specifically, the inspectors:

- reviewed ESH-015 DOT Radioactive Materials training records, classroom training required every three years, for employees 4889 and 30696

Quality Assurance Program (IP Section 02.08)

The inspectors reviewed the quality assurance documents to verify compliance with 10 CFR 71.137 and Chapter 3 of the License Application. Specifically, the inspectors reviewed:

- COP-831010, "Shipping Low Level Radioactive Waste," Rev. 33, dated May 14, 2020
- LCPT-21-02, "Nuclear Fuel Transport assessment"
- LCPT-20-06, "Management assessment of the LR-230 packaging"

Audit Program (IP Section 02.09)

The inspectors reviewed the assessment reports to verify compliance with 10 CFR 71.137 and Chapter 11 of the license. Specifically, the inspectors reviewed:

- LCPT- 21-04, Management assessment of UF6 incident during transport
- Incident Report 2020-4142
- Incident Report 2020-11489

Procurement and Selection of Packagings (IP Section 02.10)

The inspectors examined the licensee's recent purchase of new Traveller packages to verify compliance with the federal regulations above. Specifically, for packaging that is used by the licensee to transport or to deliver licensed material to a carrier for transport, the inspectors reviewed the following:

- Drawing 10043E83, sheet 1, "Traveller STD Upgrade General Assembly," Rev. 8, dated November 5, 2019
- Sketch 938603-22, "Traveller Shipping Container," Rev. 11, issued August 10, 2017

Preparation of Packages for Shipment (IP Section 02.11)

The inspectors examined the licensee's package markings and documentation to verify compliance with applicable parts of the federal regulations above. Specifically, the inspectors reviewed:

- MOP-500153, "Pack and Unpack Fuel Assembly – traveler package," Rev. 3, dated July 30, 2020
- MOP-730753, "Pack Fuel Assembly – traveler package," Rev. 54, dated May 13, 2021

Periodic Maintenance of Packagings (IP Section 02.12)

The inspectors examined the licensee's procedures and ongoing refurbishment activities to verify compliance with applicable parts of the federal regulations above. Specifically, the inspectors reviewed the following:

- Drawing 10043E83, sheet 1, "Traveller STD Upgrade General Assembly," Rev. 8, dated November 5, 2019
- Traveller Refurbishment Verification Checklist, Package Serial Number TX-200, completed June 12, 2021
- TR-229, "Traveller Recertification," Rev. 2, dated June 21, 2021

Records, Reports, and Notifications (IP Section 02.13)

The inspectors reviewed the licensee's records and procedures for recordkeeping and reports to verify that a system is in place to verify compliance with the federal regulations above. Specifically, the inspectors reviewed the following:

- 938603-22, "Traveller Shipping Container Checklist"
- Licensee Investigation Report 2020-13034, "LR-230 discovered package defect," dated November 12, 2020
- Licensee Investigation Report 2020-4142, "LR-230 tamper seal discovered to be improperly applied," dated March 26, 2020
- Licensee Investigation Report 2021-1944, "MCC container discovered cracked during preparation for loading," dated February 16, 2021

INSPECTION RESULTS

No issues were identified.

EXIT MEETINGS AND DEBRIEFS

The inspectors verified no proprietary information was retained or documented in this report.

- On July 29, 2021, the inspectors presented the integrated inspection results to Mike Annacone and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date	
86740	Drawings	Drawing 10043E83, sheet 1 of 3	Traveller STD Upgrade General Assembly	Rev. 8	
	Miscellaneous	ESH-015	DOT Radioactive Materials (classroom training), three years, completions for #30696 and 4889 on 11/9/2020	11/9/2020	
	Procedures	Form 741	COLUMN MC&A Software Guide for Form 741, Domestic UF6 Gas Receipts		
		CF-83-239	Offload Checklist		Rev. 5
		COP-831010	Shipping Low Level Radioactive Waste		Rev. 33
		COP-836047	Uranyl Nitrate Offloading from LR-230 Containers		Rev. 22
		MOP-730753	Pack Fuel Assembly – traveler package		Rev. 54
		NOP-500153	Pack and Unpack Fuel Assembly – traveler package		Rev. 3
		Sketch 938603-22	Traveller Shipping Container Inspection Checklist Assessment, Management assessment of the LR-230 packaging, performed 12/21/2020		Rev. 11
		TR-224	Refurbish Traveller Shipping Package		Rev. 23
		TR-229	Traveller Recertification		Rev. 2
		Traveller Refurbishment Verification Checklist	Package Serial Number TX-200, completed 6/12/2021		6/12/2021
88015	Corrective Action Documents	IR-2021-2474, IR-2021-3870, IR-2021-4738, IR-2021-4739, IR-2021-4957, IR-2021-5048, IR-2021-5141, IR-2021-5481, IR-2021-7327	A sample of various NCS related corrective action records.		
	Drawings	313F01HV07 Sheet 01	Process Ventilation System Scrubbers S-2A/2B Isometric	Rev. 9	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		313F01PI01 Sheet 01	Piping Flow Diagram - Scrubbers S-2A & S-2B	Rev. 18
		313F01PI02 Sheet 03	Process Ventilation Flow Diagram Scrubbers S-2A & S-2B	Rev. 25
		313F01PI02 Sheet 04	Process Ventilation Filters 1A and 1B P&ID	Rev. 18
	Engineering Evaluations	NSA-TR-08-27	Using Electronic Dosimeters as Alarming Personal Criticality Detectors at Westinghouse Facilities	12/2/08
	Miscellaneous		2021 FWA Schedule	
			Criticality & Radiation Safety NSQT	9/30/20
		PSEDoc-0004972	Results from startup testing for FN-962 for CCF 17-493	Rev. 0
		PSEDoc-0005351	Results from startup testing of FN-961 for CCF 17-531	Rev. 0
		TRN-001-2	Rad Protection Criticality Safety SSCs Safeguards	
	Procedures	CA-220	Safety Basis Qualification Training	Rev. 12
		CAP-815023	S-2A and S-2B Inspection and Clean Out	Rev. 4
		CN-CRI-003	NCS Manual	Rev. 3
		COCL-M14	Use of Agilent 7800 for TMI and PPM U Analysis	Rev. 4
		COP-814325	Scrubbers 2A & 2B	Rev. 31
		RA-303	Controls of Moderating Materials for Nuclear Criticality Safety	Rev. 19
		RA-305	Nuclear Criticality Safety Computer Code Validation	Rev. 11
		RA-313	Criticality Safety Evaluations (CSEs)	Rev. 16
		RA-314	Implementation of Criticality Safety Evaluations	Rev. 20
	Radiation Surveys	ROF-05-062-7, ROF-05-062-7, ROF-05-062-8, ROF-05-062-8, ROF-05-062-11	Ventilations Systems Equipment Radiation Survey Monthly - S-1030 Survey, Ventilations Systems Equipment Radiation Survey Monthly - S-1030 Survey, Ventilations Systems Equipment Radiation Survey Monthly - S-2A/2B Survey, Ventilations Systems Equipment Radiation Survey Monthly - S-2A/2B Survey, Ventilations Systems Equipment Radiation Survey Quarterly - S-958 Survey	6/21/21, 7/23/21, 6/21/21, 7/23/21, 6/6/21
	Self-Assessments	RAF-316-1	Various Nuclear Criticality Safety Checklist for NCS Facility Walkthrough Assessments for various areas in the first and	Various Dates

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			second quarter of 2021	
	Work Orders	38975	52 Week OM81233 SI-Safety, S2A/2B Vacuum Breaks and Overflow Piping	Completed 4/30/21
		38976	52 Weeks OM818809 SI-Safety, S2A and S2B Scrubbers Cleaning and Inspection	Completed 4/20/21
		39160	52 Weeks PM81151 SI-Safety, Spring to Close Air Blowdown Valve Replacement on S2A2B Bag Filters	Completed 4/19/21
		4507	52 Weeks PM81155 SI-Safety, S2A2B Bag Filter Blowdown Back Flow Preventer Ball Valve Leak Check	Completed 9/25/20
		47230	13 Weeks OM91115 SI-Safety - Gamma Surveys of Ventilation Systems	Completed 6/19/21
		47341	13 Weeks OM81262 SI-Safety, S2A/2B Filter Instrument Air Spring Return Valves	Completed 6/23/21
		49609	4 Weeks (Monthly) OM81806 SI-Safety, S2A and S2B Uranium Concentration Samples	Completed 7/2/21
		54052	4 Weeks (Monthly) OM91009 SI-Safety, HP Ventilation Survey	Completed 7/23/21
		WO 874988	OM81233 SI-Safety, S2A/2B Vacuum Breaks and Overflow Piping - 52 Weeks OM	Completed 4/27/20
		WO 874992	OM 818809 SI-Safety, S2A and S2B Scrubbers Cleaning and Inspection - 52 Week OM	Completed 4/27/20
		WO 891490	SI-Safety, Instrument Air Shut-Off Valve for Air to S2A2B Bag Filter Blowdowns - 52 Week OM	