



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

January 30, 2022

Mr. Doug Nay
Facility Manager
Global Nuclear Fuel - Americas, L.L.C
P.O. Box 780, Mail Code J20
Wilmington, NC 28402

**SUBJECT: GLOBAL NUCLEAR FUEL - AMERICAS, L.L.C – INTEGRATED INSPECTION
REPORT 07001113/2021004 AND NOTICE OF VIOLATION**

Dear Mr. Nay:

On December 31, 2021, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Global Nuclear Fuel - Americas, L.L.C. On November 18, 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.

The enclosed report discusses a Severity Level IV violation. The NRC evaluated this violation in accordance Section 2.3.2 of the NRC Enforcement Policy, which can be found at <http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>. We determined that this violation did not meet the criteria to be treated as a non-cited violation because NRC staff identified the violation, therefore, licensee credit for self-identification was not warranted. The NRC has determined that the reason for the violation, the corrective actions taken and planned to correct the violation and prevent recurrence, and the date when full compliance was achieved for this violation is adequately addressed and captured on the docket in this inspection report. Therefore, you are not required to respond to this letter unless the record does not accurately reflect your corrective actions or your position. In that case, or if you choose to provide additional information, you should follow the instructions specified in the enclosed Notice.

If you contest the violation or the significance or severity of the violation documented in this inspection report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; and the Director, Office of Enforcement.

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/

Robert E. Williams, Jr., Chief
Projects Branch 1
Division of Fuel Facility Inspection

Docket No. 07001113
License No. SNM-1097

Enclosure:
Enclosure 1: Notice of Violation
Enclosure 2: INTEGRATED INSPECTION REPORT 07001113/2021004

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SUBJECT: GLOBAL NUCLEAR FUEL - AMERICAS, L.L.C – INTEGRATED INSPECTION REPORT 07001113/2021004 AND NOTICE OF VIOLATION

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NOTICE OF VIOLATION

Global Nuclear Fuel - Americas, L.L.C

Docket No.: 07001113

07001113 - Global Nuclear Fuel- Americas

License No.: SNM-1097

Consistent with the NRC Enforcement Policy and Title 10 of the Code of Federal Regulations (CFR) Part 2.201, the following violation identified in inspection report 2021004 is being cited:

GNFA's Material License Safety Condition S-1 states in part, "Authorized use: For use in accordance with statements, representations, and conditions of application dated and supplements dated..."

License Application (LA) Section 11.1.1, "Reasonable Assurance" states, in part, "GNF-A commits to apply Management Measures on a continuing basis to IROFS for the purpose of providing reasonable assurance that the IROFS are available and able to perform their function when needed."

LA Section 11.3, "Maintenance" states, in part, "The purpose of planned and scheduled maintenance of safety controls is to assure that systems are kept in a condition of readiness to perform the planned and designed functions when required."

10 CFR 70.62, "Safety program and integrated safety analysis," Section a(3), states in part, "Each licensee or applicant shall maintain records of failures readily retrievable and available for NRC inspection, documenting each discovery that an item relied on for safety or management measure has failed to perform its function upon..."

Contrary to the above, on or about January 29, 2021, it was determined that IROFS 203-12 did not perform its required safety function of closing the main UF6 flow valve (XV#2905) and a secondary set of UF6 flow valves (XV#1902/903 & XV#1922/923) in the vaporization room when the actual flow rate was considerably lower than the trip setpoint. On August 31, 2018, the licensee failed to apply management measures for the purpose of providing reasonable assurance that IROFS 203-12 would be available and able to perform its function when needed. Specifically, the licensee's "maintenance" management measure failed to assure that IROFS 203-12 was kept in a condition of readiness to perform its design function when required. Additionally, on January 29, 2021, the licensee failed to characterize the as-found condition of IROFS 203-12 as a failed IROFS and maintain records of that failure in accordance with 10 CFR 70.62."

This cited SLIV violation will be tracked as 07001113/2021-004-01 and will be closed to corrective actions that have been instituted by the licensee and inspected by NRC staff as part of this inspection.

This violation is associated with a Severity Level IV finding.

Consistent with 10 CFR 19.11, you are required to post this Notice of Violation within two working days of receipt.

Enclosure 1

Replying to Notice of Violation

The NRC has concluded that information regarding the reason for the violation, the corrective actions taken and planned to correct the violation and prevent recurrence, and the date when full compliance was achieved is already adequately addressed on the docket in Inspection Report No. 07001113/2021004. However, you are required to submit a written statement or explanation under 10 CFR 2.201 if the description on the docket does not accurately reflect your corrective actions or your position. In that case, or if you choose to respond, please mark your reply "Reply to a Notice of Violation; VIO-07001113/2021-004-01" and send it to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001 with a copy to the Regional Administrator, Region 2, within 30 days of the date of the issuance of this Notice of Violation.

If you choose to respond, your response 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 consistent with 10 CFR 2.390. Therefore, to the extent possible, the 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).

Dated this 27th day of January 2022

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

Docket Number: 07001113

License Number: SNM-1097

Report Number: 07001113/2021004

Enterprise Identifier: I-2021-004-0132

Licensee: Global Nuclear Fuel - Americas, L.L.C

Facility: Global Nuclear Fuel - Americas, L.L.C

Location: Wilmington, NC

Inspection Dates: November 15, 2021 to November 19, 2021

Inspectors: M. Ruffin, Fuel Facility Inspector
P. Startz, Fuel Facilities Inspector
T. Vukovinsky, Sr. Fuel Facility Project Inspector

Approved By: Robert E. Williams, Jr., Chief
Projects Branch 1
Division of Fuel Facility Inspection

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting an integrated inspection at Global Nuclear Fuel - Americas, L.L.C, 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

IROFS 203-12 Failed Management Measure	
Significance	Report Section
Severity Level IV NOV 07001113/2021004-01 Closed	88020
The NRC identified a Severity Level (SL) IV cited violation of a failure to apply management measures for the purpose of providing reasonable assurance that item relied on for safety (IROFS) 203-12 was available and reliable to perform its intended function. The licensee identified the issue in January 2021, however, the NRC identified that the failure was not properly characterized in Condition Report 36100.	

Additional Tracking Items

None.

PLANT STATUS

Global Nuclear Fuel - Americas (GNF-A), LLC manufactures uranium dioxide (UO₂) powder, pellets, and light water reactor fuel bundles at its Wilmington, NC facility. The facility converts uranium hexafluoride (UF₆) to UO₂ using a Dry Conversion Process (DCP) and performs fuel fabrication operations. During the inspection period, normal production activities at the facility 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

88020 - Operational Safety

The inspectors evaluated selected aspects of the licensee's operational safety program to verify compliance with selected portions of Title 10 of the U.S. Code of Federal Regulations (10 CFR) Section 70, including 70.24, 70.61, 70.62; Chapter 11, "Management Measures," of the facility's License Application (LA); and applicable licensee procedures.

Identification of Safety Controls and Related Programs (IP Section 02.01)

The inspectors selected specific process areas for inspection based on the safety basis information of the facility, the risk/safety significance of the process areas, the description of plant changes submitted to the NRC, and past plant performance documentation. For the process areas of interest, the inspectors selected a sample of accident sequences in nuclear criticality safety, radiation safety, fire safety, and/or chemical safety based on the information provided in the integrated safety analysis (ISA) summary. The inspectors conducted a general plant tour of each major plant operating area. The process areas selected for review are listed below:

- Node 203 - DCP Hydrogen Fluoride (HF) Recovery
- Node 206 - Blend, Pre-compaction, Granulation (BPG), and Tumbling

Review of Safety Controls and Related Programs (IP Section 02.02)

The inspectors reviewed information related to active, administrative, engineered, and passive IROFS for accident sequences within the node groups selected in IP Section 02.01 above, including the identification of the licensee's assumptions and bounding cases as they apply to each of the selected accident sequences or IROFS. This review was performed

to verify the IROFS were available and reliable to perform their intended safety functions and the design basis assumptions were reflected in the actual conditions in the field. The specific safety controls selected for review are listed below:

Node 203 IROFS:

- 202-20, Pyro-Hydrolysis Steam Flow, active engineering control (AEC)
- 203-12, Hydrolysis Steam Flow, AEC
- 203-13, HF Common Pipe Detector and Polluted HF Tank, AEC
- 203-14, HF Condenser and Vapor/Liquid Separator- Safe Geometry, passive engineering control (PEC)
- 203-15, Monel Safety Filters, PEC
- 203-16, HF Non-Condensable Separation, Augmented Administrative Control (AAC)
- 203-21, Reactor Monel Filters, PEC

Node 206 IROFS

- 206-01, Blender External Oil Volume, Administrative Control (AC)
- 206-02, Blender Lid Design, PEC
- 206-03, FRS/LIMS Blend Plan Verifies Moderator Content, AAC
- 206-04, FBS-BPG/AMM Verification of Moderator Fraction, AEC
- 206-05, Blender Additive Bottle Design, PEC
- 206-06, PLC Detects Blender Arm Rotation, AEC
- 206-08, Routine Inspections of Press Base, AC
- 206-09, Free Draining Press Sump and Oil Catch Pan, PEC
- 206-10, Process Equipment Barrier - BPG Process, PEC
- 206-11, Tumbler Additive Bottle Design, PEC
- 206-12, FBS-DTM, AAC

Implementation of Safety Controls (IP Section 02.03)

For the selected safety controls listed in IP Section 02.02 above, the inspectors reviewed management measures to verify proper implementation in accordance with 10 CFR 70, Chapter 3, "Integrated Safety Analysis," and Chapter 10, "Management Measures" of the LA. This review was performed to verify the IROFS were present, available, and reliable to perform their safety function and that the design basis assumptions were reflected in the actual conditions in the field. The inspectors conducted the following activities to verify the implementation of selected safety controls:

- conducted walk-downs of Node 203 and Node 206 to verify implementation of safety controls and selected IROFS
- interviewed and observed operators within Node 203 and Node 206 to verify knowledge of the associated IROFS and verify the documented implementation methods matched those within the field
- reviewed and discussed with licensee staff the following operating procedures (OPs):
 - OP 203.00.100, HF Treatment – General Information, Revision (Rev.) 4
 - OP 203.00.209, HF Treatment – Abnormal Conditions, Rev. 2
 - OP 203.00.300, HF Treatment – Process Information, Rev. 1
 - OP 206.00.100, DCP BPG - General Information, Rev. 2

- OP 206.00.101, DCP BPG - MC&A, Rev. 0
- OP 206.00.201, DCP BPG - Loading Powder and Additives, Rev. 9
- OP 206.00.206, DCP BPG - Abnormal Operations, Rev. 11
- OP 206.00.208, DCP BPG - Basic Operator Maintenance, Rev. 4
- WI-16-106-02, Configuration Management Program – Nuclear Manufacturing Operations, Rev. 15
- reviewed the following IROFS Requirement Specification (IRS) documents:
 - IRS 203-12, IROFS 203-12 Hydrolysis Steam Flow, Rev. 1
 - IRS 203-13, IROFS 203-13 Common Pipe Detector and Polluted HF Tank, Rev. 4
 - IRS 202-20, IROFS 202-20 Pyro-hydrolysis Steam Flow, Rev. 1
 - IRS 203-16, IROFS 203-16, HF Non-Condensable Separation, Rev. 3
- reviewed the following Quantitative Risk Assessments (QRA)
 - QRA 202, DCP – Conversion, Rev. 23
 - QRA-203, DCP – HF Recovery, Rev. 12
 - QRA-206A, BPG-Tumble, Rev. 9
- reviewed the following Criticality Safety Analyses (CSAs):
 - CSA 203.00.100, CSA HF Recovery, Rev. 3
 - CSA 206.00.100, CSA DCP BPG and Tumble, Rev. 1

Safety Control Support Programs (IP Section 02.04)

The inspectors assessed additional management measures that support the availability and reliability of the selected safety controls to verify these were implemented in accordance with 10 CFR 70 and Chapter 10 of the LA. Specifically, the inspectors conducted the following activities:

- observed an operational shift turn over meeting
- reviewed failure records for IROFS during the previous calendar year
- reviewed the following calibration documents:
 - F8S12218, Annual Calibration Verification for Current Trip Hydrolysis Steam Flow, May 1, 2021
 - F8S12219, Annual Calibration Verification for Current Trip Pyro-Hydrolysis Steam Flow, May 1, 2021
 - FT12218, Hydrolysis Steam Flow Calibration, August 31, 2021
 - FT12219, Pyro-Hydrolysis Steam Flow Calibration, August 31, 2021
- reviewed the following Functional Test Instructions (FTI):
 - FTI 202-20, Pyro-Hydrolysis Steam Flow FT#2219
 - FTI-202-20B, Pyro-Hydrolysis Steam Flow FCV#2219
 - FTI 203-12, Hydrolysis Steam Flow FT#2218
 - FTI 203-12B, Hydrolysis Steam Flow FCV#2218
 - FTI 203-16, HF Non-Condensable Separation
 - FTI 201-00, Common IROFS Devices – Vaporization
 - FTI 202-00, Common IROFS Devices – Conversion
 - FTI 206-04A, Blender FBS AEC IROFS controls
 - FTI 206-04B, Tumbler FBS AEC IROFS controls
 - FTI 206-06, Detection of Blender Arm Rotation
 - LIMS-FRS-F1
 - LIMS-FRS-F2
- reviewed the following surveillance records:
 - IROFS Surveillance 206-01: Weekly Homogenizer and Blender External

- Oil Reservoir Checks, January 5, 2021
- IROFS Surveillance 206-02, 206-10: Annual Homogenizer and Blender Equipment Barriers, February 22, 2021
- IROFS Surveillance 206-05, 206-11: Annual Additive Bottle Designs, January 11, 2021
- IROFS Surveillance 206-09: Annual Free Draining Press Base and Catch Pan, January 19, 2021
- reviewed the following corrective action program (CAP) records:
 - Condition Reports: 14311, 26801, 35688, 36100, 36101, 37291, 38127, and 38317
 - Safety Assessment for Condition Reports 36100 and 37291
- reviewed training documents for select operators associated with Nodes 203 and 206

FACILITY SUPPORT

88070 - Permanent Plant Modifications

The inspectors conducted a review to verify the licensee had established and implemented a configuration management system to evaluate, implement, and track changes to the facility in accordance with the applicable requirements in 10 CFR Section 70.72 and Chapter 11, "Management Measures," of the LA. The inspectors reviewed and verified the licensee had established management measures for changes to the facility in accordance with 10 CFR 70, Subpart H and the LA, and that modifications to processes met the requirements in 10 CFR 70.64.

Sample Selection (IP Section 02.01)

The inspectors reviewed licensing documents, changes the licensee determined did not require pre-NRC approval under 10 CFR 70.72, and changes that affected the ISA to select changes/modifications to review. To assess whether the licensee conducted evaluations according to their established configuration management system, the inspectors selected the following plant modifications, identified as Change Requests (CRs) to review:

- CR-28523, "Set Up Update for Press"
- CR-28888, "Update Powder Outlet Handling of Moisture Analysis"
- CR-28946, "Implement OP Changes Assoc with CR28888 in UO2 Press Area", updating procedures OP-1020.12.100, OP-1020.12.201, and OP-1020.63.100; supporting CR-28888 changes.
- CR-28948, "Implement OP Changes Assoc with CR28888 in Powder Pack", updating procedures OP-1339.01.100, OP-1339.01.101, OP-1339.01.201, OP-1339.02.100, OP-1339.02.101, and OP-1339.02.201; supporting CR-28888 changes
- CR-28950, "Implement OP Changes Assoc with CR28888 in Powder Area," updating procedures OP-2200.00.101 and OP-2210.00.10; supporting CR-28888 changes.
- CR-29347, "Alternate Powder Outlet Moisture Detection System Rotameter"

Facility Change/Modification Process (IP Section 02.02)

The inspectors reviewed the selected modifications listed in IP Section 02.01 above to verify the licensee established a configuration management system in accordance with 10 CFR 70.72 and the conditions of the license. Specifically, the inspectors conducted the inspections activities listed below:

- reviewed the following procedures to verify the configuration management system was documented in written procedures in accordance with 10 CFR 70.72(a):
 - WI-16-106-02, "Configuration Management Program Nuclear Manufacturing Operations," Rev. 15
 - WI-16-106-08-G01, "FMO Configuration Management Guide", Rev. 8
 - WI-27-104-07, "Nuclear Safety Release Requirements", Rev. 2.1
- interviewed licensee staff and performed walk-downs of CR-28888 and CR-29347 projects,
- reviewed the following configuration management packages and supporting documents to verify the licensee's evaluation of changes provided valid technical bases to determine whether an amendment to the license was required based on the criteria in 10 CFR 70.72(c)
 - CR-28888, "Update Powder Outlet Handling of Moisture Analysis," ISA Reviewer Change Evaluation Form
 - CR-29347, "Alternate Powder Outlet Moisture Detection System Rotameter"
 - Moisture Trip and Sampling 28Apr20_2
- reviewed SPM 21-003 M21000, "GNF-A Revised samples of the ISA Summary per 10CFR70.72(d)," dated January 29, 2021, to verify the applicable submissions were updated in accordance with 10 CFR 70.72(e), including that "SPM 21-003 M210009 Attachment 1" had a summary of 2020 changes to the ISA, and "SPM 21-003 M210009 Attachment 2" had Rev. 24 of the ISA Summary
- interviewed licensee staff, walked-down CR-28888, reviewed CSA 204.00.100, "Criticality Safety Analysis DCP Powder Outlet", Rev. 2, May 2020, and reviewed samples of the change management packages to verify the licensee was in compliance with 10 CFR 70.34 and 10 CFR 70.65 for applicable facility changes
- reviewed a sample of configuration management system records to verify the licensee submitted a summary with facility changes and revised ISA Summary pages to the NRC in accordance with 10 CFR 70.72(d)
- reviewed procedure WI-15-100-02, "GNF-A Nonconformance Material Control", Rev. 0.5 to evaluate conformance with configuration management requirements

Management Measures (IP Section 02.03)

For the selected modifications, the inspectors reviewed the management measures established for affected IROFS (or credited safety controls) to verify the management measures ensured the IROFS (or credited safety controls) were available and reliable to perform their intended function as required by 10 CFR 70.61 and the license. Specifically, the inspectors conducted the inspection activities listed below:

- interviewed licensee staff and reviewed change management procedures to verify the licensee implemented the aspects described in configuration management system procedures and in accordance with Chapter 11.2 of the LA
- reviewed a sample ISA Team Change Report for CR-28888, "Update Powder Handling of Moisture Analysis," dated May 12, 2020
- reviewed temporary facility change TFC # 29347, "Alternate Powder Moisture Detection System Rotameter," dated September 28, 2020 through December 18, 2020, to evaluate compliance of temporary production changes to the requirements
- interviewed licensee staff about functional testing of IROFS in the uranium powder operations area
- reviewed samples of post-modification testing procedures and observed how post-modification tests were conducted to verify the licensee ensured adequate implementation of the design and functionality of the following safety systems:
 - DCP - Powder Operations
 - IRS 204-01 "Kiln Hatch Nitrogen Purge Alarm"
 - IRS 204-02 "Cooling Hopper Moisture Detection System"
- reviewed the following maintenance and surveillance records of selected modifications to verify the licensee established and performed periodic maintenance and surveillance testing in accordance with the license:
 - FTI 1020.14.F1, "Mass Control at the Feed Tube on 7B Rotary Press using Detector," completed on July 16, 2020
 - FTI 1020.14.F3, "Failsafe Switch on 7B Rotary Press Shuts Down if the Press Operator Leaves the Press," completed on July 15, 2020
 - FTI 1020.14.F4, "Mass Control at the 7B Rotary Press Due to Open Hopper," completed on July 16, 2020
 - FTI 1020.14.F5, "Mass Control at Mass Photo Sensor for 7B Rotary Press Can Dump Station," completed on July 22, 2020
 - FTI 1020.14.F7, "7B Dump Station Interlock Door Sensor," completed on July 22, 2020
- interviewed licensee staff and reviewed training records of licensee staff associated with selected modifications to verify staff involved in facility changes were qualified in accordance with the license and plant procedures, including CP-20-107 "GNF-A Manufacturing Training and Qualifications Program," Rev. 7
- interviewed licensee training staff and reviewed samples of training records to verify the licensee conducted plant modification training in accordance with Chapter 11 of the LA and plant procedures
- reviewed condition reports to determine whether the licensee identified configuration management, post-modification testing, and/or plant modification issues and corrected the condition in accordance with approved CAP procedures and the license
- reviewed a recent audit and assessments of the configuration management system and interviewed licensee staff to verify the scope and frequency of audits were being conducted in accordance with the LA and facility procedures
- reviewed engineering analyses "Moisture Trip and Sampling 28 AUG 20,"

detailed discussion for reconfiguring the Mark VIe Distributed Control System (DCS) system to accommodate elimination of powder sampling and laboratory moisture analysis results

- reviewed CR-29125 "ISA Reviewer Change Evaluation Form," dated July 6, 2020

License Application Changes (IP Section 02.04)

For the selected modifications, the inspectors interviewed licensee staff and reviewed samples of applicable sections of the LA to verify the licensee evaluated LA changes and conducted NRC pre-approval screenings in accordance with the license requirements. Specifically, the inspectors conducted the inspection activities listed below:

- reviewed procedure WI-16-106-02, "Configuration Management Program," Rev. 15 used to determine whether NRC pre-approval of LA changes is required to verify the licensee correctly evaluated LA changes
- reviewed the following ISA Summary changes regarding project CR-28888 to verify the licensee followed their approved change process, determined an adequate conclusion, maintained records of the evaluations, and provided the bases for determining the change did not require prior NRC approval:
 - ISA Summary for NRC License SNM-1097, Chapter 5, Section 8.3.1.2, Revision 23.2: regarding the deletion of "Moderated Material Feed to Container Fill [Event]," that makes the initiating event feeding Powder Pack node 2070 highly unlikely based upon CR-28888 changes

New Processes at Existing Facilities (IP Section 02.05)

At the time of inspection, the licensee had not implemented any new facility processes since the previous NRC inspection in the area of permanent plant modifications. Therefore, the inspectors' review did not include an evaluation of whether the licensee addressed the baseline design criteria and defense-in-depth as stipulated in 10 CFR 70.64.

Records Retention (IP Section 02.06)

The inspectors reviewed the following documents impacted by the selected modifications to verify the licensee maintained records of facility changes in accordance with the license requirements and 10 CFR 70.72:

- operating procedures:
 - OP-204.00.100 "DCP Powder Outlet – General Information," Rev. 2
 - OP-204.00.201 "DCP Powder Outlet – Startup," Rev. 2
 - OP-204.00.202 "DCP Powder Outlet – Normal Operations," Rev. 2
 - OP-204.00.203 "DCP Powder Outlet – Powder Sampling," Rev. 1
 - OP-204.00.205 "DCP Powder Outlet – Abnormal Operations," Rev. 2
 - OP-1338.00.100 "DCP Material Handling - General Information," Rev. 10
 - OP-1338.00.300 "DCP Material Handling - Process Information," Rev. 2
- training records of individuals involved in facility changes
- program/facility changes:
 - CR-28523, "Set Up Update for Press"
 - CR-28888, "Update Powder Outlet Handling of Moisture Analysis"

- CR-28946, "Implement OP Changes Associated with CR28888 in UO2 Press Area," updating procedures OP-1020.12.100, OP-1020.12.201, and OP-1020.63.100; supporting CR-28888 changes
- CR-28948, "Implement OP Changes Associated with CR28888 in Powder Pack," updating procedures OP-1339.01.100, OP-1339.01.101, OP-1339.01.201, OP-1339.02.100, OP-1339.02.101, and OP-1339.02.201; supporting CR-28888 changes
- CR-28950, "Implement OP Changes Associated with CR28888 in Powder Area," updating procedures OP-2200.00.101 and OP-2210.00.10; supporting CR-28888 changes
- CR-29347, "Alternate Powder Outlet Moisture Detection System Rotameter"
- ISA Summary:
 - Chapter 5, Section 8.3.1.2, Revision 23.2: regarding the deletion of "Moderated Material Feed to Container Fill [Event]," that makes the initiating event feeding Powder Pack node 2070 highly unlikely based upon CR-28888 changes.

INSPECTION RESULTS

IROFS 203-12 Failed Management Measure	
Severity	Report Section
Severity Level IV NOV 07001113/2021004-01 Closed	88020
<p>The NRC identified a Severity Level (SL) IV cited violation of a failure to apply management measures for the purpose of providing reasonable assurance that IROFS 203-12 was available and reliable to perform its intended function. The licensee identified the issue in January 2021, however, the NRC identified that the failure was not properly characterized in Condition Report 36100.</p>	
<p><u>Description:</u> The safety function of IROFS 203-12 is to stop UF6 flow to the reactor upon indication of the hydrolysis steam flow rate dropping below its setpoint. The purpose of this low flow control is to prevent unreacted UF6 from carrying over into the HF off-gas stream to HF Recovery, which could otherwise result in a criticality downstream in unfavorable geometry process vessels within the HF Recovery System. At the low flow setpoint, there remains an excess of steam flow stoichiometrically to react with the UF6 at the nominal UF6 flow rate and prevent UF6 carryover.</p> <p>On August 31, 2018, the licensee performed maintenance on the Line 3 Hydrolysis steam flowrate (commonly called "bucket testing") as part of annual maintenance for IROFS 203-12. During this testing, it was determined that the instrument span would be required to be changed from 0-31.4 to 0-61.42. This is approximately a 100% span change which was considerably greater than normal required adjustments (less than 10%). This large change was questioned by site management, but the flow data supported the change and therefore plant staff proceeded to make the change.</p> <p>On January 29, 2021, during restart activities associated with Line 3, operational issues with hydrolysis steam prevented the operation of Line 3 from being restored. As part of troubleshooting, the hydrolysis steam flow rate instrumentation was found to be measuring inaccurately. When tested directly (bucket testing), the actual flow rate was 2.3 times below</p>	

the indicated flow rate and was well below the intended setpoint of IROFS 203-12 by approximately 40%. No other instrumentation changes had occurred between August 2018 and January 2021. It was determined that the new span change to correct the flow rate required an approximate 100% change in the previous direction and was in line with the former value prior to the August 2018 change. Additionally, the scheduled bucket testing for 2019 and 2020 were not conducted for various reasons, which would have potentially identified the discrepancy at an earlier date.

IROFS Requirement Specification document IRS 203-12, "IROFS 203-12 Hydrolysis Steam Flow," Rev.1, Section 6.0, "Success / Failure Criteria," states in part, "...Failure of this IROFS requires that the UF6 block valves remain open when the flow of the steam to the Hydrolysis super-heater is below its set point." Condition Report 36100 was initiated to document this issue. During the investigation into the event, licensee staff declared that IROFS 203-12 was in a degraded condition versus a failed condition as defined in IRS 203-12. Since the IROFS was documented as degraded instead of failed, the failure of the IROFS was not being tracked by licensee staff as a failed IROFS in accordance with 10 CFR 70.62a(3). NRC inspectors identified that the failed IROFS was not being properly tracked by licensee staff.

Corrective Actions: The licensee entered the issue into their CAP as Condition Report 36100. Line 3 was shutdown as a result of the seal box leak and was not restored until after updating the span of the instrument and completing several confirmatory bucket tests. During the investigation, 20 to 30 bucket tests were performed to validate the as found/as left conditions. The licensee evaluated the failure of IROFS 203-12 in the three accident sequences it is credited for mitigative control in the ISA, and performance requirements of 70.61 continued to be met.

The licensee performed an extent of condition and determined the condition was limited to only this Line 3 Hydrolysis steam flow meter, which was spanned differently than the other conversion line steam flow meters. The other meters on Line 1 and Line 3 (Line 2 uses a different type of flow system) were checked to have typical span values and were more recently verified to have the indicated and observed flows match.

Corrective actions included creating a FTI for each of the six conversion steam flows. This includes instructions for performing the flow tests, verifying if a span change is needed, and includes both the flow data and relative control valve position as part of the data set. The FTIs created are interlocked with vaporization/conversion to prevent operation if the FTIs are not complete within the time period required for annual FTIs. Additionally, performance equations were also added in the process historian to monitor steam flow control valve position relative to flow to detect changes in conditions that could warrant an on-demand flow test. Off-normal conditions are reported to licensee management to initiate an investigation in the instance of an abnormal occurrence.

NRC inspectors reviewed these new FTIs and their implementation and the following references:

Corrective Action References: Condition Report 36100
Safety Assessment for Condition Report 36100
CR 29833, FTI-203-12B, Hydrolysis Steam Flow and FTI-202-20B, Pyro-Hydrolysis Steam Flow
CR 29834 associated with updates to log sheet 202.08 and OP202.00.209

Analysis: This violation was considered to be more-than-minor based on Manual Chapter

0616, "Fuel Cycle Safety and Safeguards Inspection Reports," general screening question #8, "Does the violation adversely affect the ability of an IROFS or safety related component to perform its intended safety function?" This question was answered YES based on the safety function of IROFS 203-12 not actuating when the required steam flow setpoint was reached, the length of time the IROFS was inoperable, and the missed opportunities to correct the deficiency. The inspectors determined that the violation was of SL IV significance because the violation aligned with Example 6.2.d.1 of the 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." Additionally, in accordance with Section 2.2.2 of the NRC Enforcement Policy, violations that are less serious but are of more than minor concern and result in no or relatively inappreciable potential safety consequences are characterized as SL IV violations. Although the licensee identified the issue and entered the issue into their CAP, they did not track the item as a failed IROFS to be available for NRC inspectors to review, if required. Based on IRS 203-12, NRC staff determined that the failure of IROFS 203-12 met the definition of a failed IROFS, therefore, licensee credit for self-identification was not warranted.

There was no actual safety consequence since any unreacted UF6 gas present due to the low hydrolysis steam flow was reacted by the Pyro-Hydrolysis steam flow. In addition, no indications were present during the timeframe in question of UF6 carryover into the HF Recovery System. A potential safety significance existed due to the long timeframe that IROFS 203-12 was failed since an additional failure of Pyro-Hydrolysis steam during this time could have potentially led to unreacted UF6 gas passing into the HF Recovery System and making its way to unfavorable geometry tanks.

Enforcement:

Severity: The inspectors determined that the violation was of SL IV significance because the violation aligned with Example 6.2.d.1 of the 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." Additionally, in accordance with Section 2.2.2 of the NRC Enforcement Policy, violations that are less serious but are of more than minor concern and result in no or relatively inappreciable potential safety consequences are characterized as SL IV violations.

Violation: GNFA's Material License Safety Condition S-1 states in part, "Authorized use: For use in accordance with statements, representations, and conditions of application dated and supplements dated..."

LA Section 11.1.1, "Reasonable Assurance" states, in part, "GNF-A commits to apply Management Measures on a continuing basis to IROFS for the purpose of providing reasonable assurance that the IROFS are available and able to perform their function when needed."

LA Section 11.3, "Maintenance" states, in part, "The purpose of planned and scheduled maintenance of safety controls is to assure that systems are kept in a condition of readiness to perform the planned and designed functions when required."

10 CFR 70.62, "Safety program and integrated safety analysis," Section a(3), states in part, "Each licensee or applicant shall maintain records of failures readily retrievable and available

for NRC inspection, documenting each discovery that an item relied on for safety or management measure has failed to perform its function upon...”

Contrary to the above, on or about January 29, 2021, it was determined that IROFS 203-12 did not perform its required safety function of closing the main UF6 flow valve (XV#2905) and a secondary set of UF6 flow valves (XV#1902/903 & XV#1922/923) in the vaporization room when the actual flow rate was considerably lower than the trip setpoint. On August 31, 2018, the licensee failed to apply management measures for the purpose of providing reasonable assurance that IROFS 203-12 would be available and able to perform its function when needed. Specifically, the licensee’s “maintenance” management measure failed to assure that IROFS 203-12 was kept in a condition of readiness to perform its design function when required. Additionally, on January 29, 2021, the licensee failed to characterize the as-found condition of IROFS 203-12 as a failed IROFS and maintain records of that failure in accordance with 10 CFR 70.62.”

This cited SLIV violation will be tracked as 07001113/2021-004-01 and will be closed to corrective actions that have been instituted by the licensee and inspected by NRC staff as part of this inspection.

Enforcement Action: This violation is being cited because the licensee does not have an NRC-approved Corrective Action Program and did not identify the violation, consistent with Section 2.3.2 of the Enforcement Policy.

EXIT MEETINGS AND DEBRIEFS

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

- On November 18, 2021, the inspectors presented the operational safety and permanent plant modification inspection results to Doug Nay and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
88020	Calibration Records	F8S12218	Annual Calibration Verification for Current Trip Hydrolysis Steam Flow	05/01/2021
		F8S12219	Annual Calibration Verification for Current Trip Pyro-Hydrolysis Steam Flow	05/01/2021
		FT12218	Hydrolysis Steam Flow Calibration	08/31/2021
		FT12219	Pyro-Hydrolysis Steam Flow Calibration	08/31/2021
	Corrective Action Documents	CR 36100	Safety Assessment for CR 36100	January 2021
		CR 37291	Safety Assessment for CR 37291	June 2021
		CR14311	Line 3 Steam Bucket Tests	October 2015
		CR26801	IROFS Modification Assessment Form	09/04/2018
		CRs 14311, 26801, 35688, 36100, 36101, 37291, 38127, 38317,	Corrective Action Documents	Various
	Corrective Action Documents Resulting from Inspection	38383	Notice of Violation corrective action	11/18/2021
	Miscellaneous	FTI 201-00	Common IROFS Devices - Vaporization	Various
		FTI 202-00	Common IROFS Devices - Conversion	Various
		FTI 202-20B	Pyro-Hydrolysis Steam Flow FT#2219	Various
		FTI 203-12	Hydrolysis Steam Flow #2218	Various
		FTI 203-12B	Hydrolysis Steam Flow #2218	Various
		FTI 203-16	HF Non-Condensable Separation	Various
		FTI-206-04A	FBS-BPG/AMM Check of Moderation Maintained Below Criticality Safety Limits	09/30/2020
		FTI-206-04A	FBS-BPG/AMM Check of Moderation Maintained Below Criticality Safety Limits	09/29/2021
FTI-206-04B		FBS Check of Moderation Maintained Below Criticality Safety	November	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Limits at Tumbler	2020
		FTI-206-04B	FBS Check of Moderation Maintained Below Criticality Safety Limits at Tumbler	08/17/2021
		FTI-206-06	Detection of Blender Arm Rotation	10/01/2021
		IROFS Surveillance 205-02, 206-01	Weekly Homogenizer and Blender External Oil Reservoir Checks	01/05/2021
		IROFS Surveillance 205-03, 205-08, 206-02, 206-10	Annual Homogenizer and Blender Equipment Barriers Surveillance	02/22/2021
		IROFS Surveillance 206-05, 206-11	Annual Additive Bottle Design Surveillance	01/11/2021
		IROFS Surveillance 206-09	Annual Free Draining Press Base and Catch Pan Surveillance	001/19/2021
		LIMS-FRS FTI F2	Annual Verification that the LIMS/FRS Moisture Controls Prevent a Blend with Too Much Moisture	06/30/2021
		LIMS-FRS-F1	Verification that the LIMS/FRS controls on moisture prevent excess powder from being used in the DCP process	09/08/2021
		PHA-204-205-206	ISA Reference Report for the DCP Powder Node Group	Rev. 12
		QRA-206A	Dry Conversion Process: Blend, Pre-Compact, Granulate & Tumble	Rev. 09
		TR 202-00	Technical Report - Dry Conversion Process	Rev. 0
	Procedures	CSA-203.00.100	Criticality Safety Analysis HF Recovery	Rev. 3
		IRS 202-20	IROFS 202-20 Pyro-Hydrolysis Steam Flow	Rev. 1
		IRS 203-12	IROFS 203-12 Hydrolysis Steam Flow	Rev. 1
		IRS 203-13	IROFS 203-13 Common Pipe Detector and Polluted HF Tank	Rev. 4
		IRS 203-16	IROFS 203-16, HF Non-Condensable Separation	Rev. 3
		OP 2006.00.203	DCP Blend Pre-Compact Granulate - BPG Discharge & Cleanout	Rev. 8
		OP 203.00.100	HF Treatment - General Information	Rev. 4
		OP 203.00.209	HF Treatment - Abnormal Conditions	Rev. 2

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		OP 203.00.300	HF Treatment - Process Information	Rev. 1
		OP 206.00.100	DCP Blend Pre-Compact Granulate - General Information	Rev. 2
		OP 206.00.101	DCP Blend Pre-Compact Granulate - MC&A	Rev. 0
		OP 206.00.201	DCP Blend Pre-Compact Granulate - Loading Powder & Additives	Rev. 9
		OP 206.00.202	DCP Blend Pre-Compact Granulate - Press & Granulator Startup	Rev. 8
		OP 206.00.203	DCP Blend Pre-Compact Granulate - BPG Discharge & Cleanout	Rev. 8
		OP 206.00.204	DCP Blend Pre-Compact Granulate - Blend Only Discharge & Cleanout	Rev. 3
		OP 206.00.205	DCP Blend Pre-Compact Granulate - End of Cleanout: Scrap Processing	Rev. 1
		OP 206.00.206	DCP Blend Pre-Compact Granulate - Abnormal Operations	Rev. 11
		OP 206.00.207	DCP Blend Pre-Compact Granulate - Alarm Response & emergency Operations	Rev. 1
		OP 206.00.208	DCP Blend Pre-Compact Granulate - Basic Operator Maintenance	Rev. 4
		OP 206.00.300	DCP Blend Pre-Compact Granulate - Process Information	Rev. 1
		QRA-202	DCP – Conversion	Rev. 23
		QRA-203	HF Recovery	Rev. 12
WI-16-106-02	Configuration Management Program - Nuclear Manufacturing Operations	Rev. 15		
88070	Engineering Changes	CR-28523	"Set Up Update for Press"	1/21/2020
		CR-28888	"Update Powder Outlet Handling of Moisture Analysis"	5/1/2020
		CR-28946	"Implement OP Changes Assoc with CR28888 in UO2 Press Area"	5/15/2020
		CR-28948	"Implement OP Changes Assoc with CR28888 in Powder Pack"	5/15/2020
		CR-28950	"Implement OP Changes Assoc with CR28888 in Powder Area"	5/15/2020
		CR-29347	"Alternate Powder Outlet Moisture Detection System Rotameter"	9/28/2020
		ISA Summary for	Chapter 5, Section 8.3.1.2, Deletion of "Moderated Material	Rev. 23.2

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		NRC License SNM-1097	Feed to Container Fill [Event]," that makes the initiating event feeding Powder Pack node 2070 highly unlikely based upon CR-28888 changes	
		TFC # 29347	"Alternate Powder Moisture Detection System Rotameter"	12/18/2020
	Engineering Evaluations	CR-29125	"ISA Reviewer Change Evaluation Form to implement moderation limits CSA and remove radiological accident for powder pack"	07/06/2020
		CSA 204.00.100	"Criticality Safety Analysis DCP Powder Outlet"	Rev. 2
		ISA Team Change Report for CR-28888	"Update Powder Handling of Moisture Analysis"	05/12/2020
		Moisture Trip and Sampling 28 AUG 20	"Engineering evaluation for reconfiguring the Mark VIe DCS system to accommodate elimination of powder sampling and laboratory moisture analysis results"	09/28/2020
		Moisture Trip and Sampling 28Apr20_2	"Engineering detailed description outlining CR-28888 operational logic: Proposed changes and actions to support operation of powder outlet WITHOUT ongoing laboratory support for moisture and analysis."	04/28/2020
		Quantitative Risk Assessment (QRA) 204A	QRA for DCP Powder Outlet Node Number 2040	Rev. 4
		Miscellaneous	SPM 21-003 M210009	"GNF-A Revised samples of the ISA Summary, and Attachment 1 that included a summary of 2020 changes to the ISA records, and Attachment 2 that included Revision 24 of the ISA Summary"
	Operability Evaluations	Functional Test Instruction 1020.14.F1	"Mass Control at the Feed Tube on 7B Rotary Press using Detector"	7/16/2020
		Functional Test Instruction 1020.14.F3	"Failsafe Switch on 7B Rotary Press Shuts Down if the Press Operator Leaves the Press"	7/15/2020
		Functional Test Instruction 1020.14.F4	"Mass Control at the 7B Rotary Press Due to Open Hopper,"	7/16/2020

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		Functional Test Instruction 1020.14.F5	"Mass Control at Mass Photo Sensor for 7B Rotary Press Can Dump Station"	7/22/2020
		Functional Test Instruction 1020.14.F7	"7B Dump Station Interlock Door Sensor"	7/22/2020
	Procedures	CP-20-107	"GNF-A Manufacturing Training and Qualifications Program"	Rev. 7
		IROFS 204-02 IRS 204-02	"Cooling Hopper Moisture Detection System"	Rev. 2
		IRS 204-01	"IROFS 204-01 Kiln Hatch Nitrogen Purge Alarm"	Rev. 1
		OP 1070.35.201	"Gad Shop Rotary Press - Startup, revisions incorporating changes described in CR-28523 "	Rev. 0 and 1
		OP-1338.00.100	"DCP Material Handling - General Information"	Rev. 10
		OP-1338.00.300	"DCP Material Handling - Process Information"	Rev. 2
		OP-204.00.100	"DCP Powder Outlet – General Information"	Rev. 2
		OP-204.00.201	"DCP Powder Outlet – Startup"	Rev. 2
		OP-204.00.202	"Powder Outlet – Normal Operations"	Rev. 2
		OP-204.00.203	"DCP Powder Outlet – Powder Sampling"	Rev. 1
		OP-204.00.205	"DCP Powder Outlet – Abnormal Operations"	Rev. 2
		WI-15-100-02	"GNF-A Nonconformance Material Control"	Rev. 0.5
		WI-16-106-02	"Configuration Management Program"	Rev. 15
		WI-16-106-08-G01	"FMO Configuration Management Guide"	Rev. 8
WI-27-104-07	"Nuclear Safety Release Requirements"	Rev. 2.1		