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

July 25, 2017

EA-17-90
EN 52251

Mr. Adam Hilton
FMO Facility Manager
Global Nuclear Fuel-Americas, L.L.C.
P.O. Box 708, Mail Code J20
Wilmington, NC 28402

SUBJECT: GLOBAL NUCLEAR FUEL – AMERICAS, L.L.C – NUCLEAR REGULATORY COMMISSION INTEGRATED INSPECTION REPORT 70-1113/2017-003

Dear Mr. Hilton:

This letter refers to the inspections conducted during the second quarter of calendar year 2017 (April 1 – June 30, 2017), at the Global Nuclear Fuel – Americas, L.L.C facility in Wilmington, NC. The purpose of the inspections was to determine whether activities authorized under the license and implementation of programs and procedures in the areas of Plant Operations, Nuclear Criticality Safety, and Maintenance and Surveillance were conducted safely and in accordance with Nuclear Regulatory Commission (NRC) requirements. Additionally, the inspectors reviewed the circumstances associated with the transportation of contaminated scrap metal that occurred on September 16, 2016 and Event Notice 52251, "Inoperable Uranium Hexafluoride scrubber exhaust system in the Fuel Manufacturing Operations (FMO) building," which occurred on September 19, 2016. The enclosed report presents the results of these inspections. At the conclusion of the inspections, the inspectors discussed the findings with you and members of your staff during an exit meeting on April 27, 2017, and a subsequent exit telephonically on June 29, 2017.

These inspections examined activities conducted under your license as they relate to public health and safety and compliance with the Commission's rules and regulations and with the conditions in your license. Within the areas mentioned above, the inspection consisted of an examination of selected procedures and representative records, observations of activities, facility walk-downs, and interviews with personnel. Throughout the inspections, observations were discussed with your managers and staff.

Based on the results of these inspections, five apparent violations (AVs) were identified. Three of these are being considered for escalated enforcement action 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 first AV, considered for escalated enforcement, involved a failure to make or cause to be made surveys of scrap metal piping prior to its release and transportation as required by 10 CFR 20.1501(a). This AV is discussed in Section C.1.a.i of this inspection report. The second AV, considered for escalated enforcement, involved the failure to comply with applicable Department of Transportation (DOT) regulations appropriate to the mode of transport of contaminated materials as required per 10 CFR 71.5(a). This AV is discussed in Section C.1.a.ii of this inspection report. The third AV, considered for escalated enforcement, involved the failure to notify the NRC as required by 10 CFR 20.1906(d)(1) when removable radioactive surface contamination exceeds the limits of 10 CFR 71.87(i). This violation is discussed in Section C.1.a.iii of this inspection report. The fourth AV involved the failure to perform the monitoring of a package as required by 10 CFR 20.1906(c). This AV is discussed in Section C.1.a.iv of this inspection report. The fifth AV involved the failure to maintain records of surveys as required by 10 CFR 20.2103(a). This AV is discussed in Section C.1.a.v of this inspection report. The circumstances surrounding these AVs and the significance of the issues were discussed with members of your staff on June 29, 2017.

Before the NRC makes its enforcement decision, we are providing you an opportunity to: (1) respond to the AVs addressed in this inspection report within 30 days of the date of this letter, (2) request a Pre-decisional Enforcement Conference (PEC), or (3) request Alternative Dispute Resolution (ADR). If a PEC is held, it will be open for public observation and the NRC will issue a press release to announce the time and date of the conference. If you decide to participate in a PEC or pursue ADR, please contact Eric Michel at 404-997-4555 within 10 days of the date of this letter. A PEC should be held within 30 days and an ADR session within 45 days of the date of this letter.

If you choose to provide a written response, it should be clearly marked as a “Response to Apparent Violations in NRC Inspection Report 70-1113/2017-003” and should include for each AV: (1) the reason for the AV or, if contested, the basis for disputing the AV; (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 previously docketed correspondence, if the correspondence adequately addresses the required response. Additionally, your response should be sent to the NRC’s Document Control Center, with a copy mailed to Mark Lesser, U.S. Nuclear Regulatory Commission Region II-Marquis One Tower, 245 Peachtree Center Avenue North East, Suite 1200, Atlanta, GA 30303-1257, within 30 days of the date of this letter. If an adequate response is not received within the time specified or an extension of time has not been granted by the NRC, the NRC will proceed with its enforcement decision or schedule a PEC.

If you choose to request a PEC, the conference will afford you the opportunity to provide your perspective on these matters and any other information that you believe the NRC should take into consideration before making an enforcement decision. The decision to hold a PEC does not mean that the NRC has determined that a violation has occurred or that enforcement action will be taken. This conference would be conducted to obtain information to assist the NRC in making an enforcement decision. The topics discussed during the conference may include information to determine whether a violation occurred, information to determine the significance of a violation, information related to the identification of a violation, and information related to any corrective actions taken or planned. In presenting your corrective action, you should be aware that the promptness and comprehensiveness of your actions will be considered in assessing any civil penalty for the apparent violations. The guidance in NRC Information Notice 96-28, "Suggested Guidance Relating to Development and Implementation of Corrective Action," may be helpful.

In lieu of a PEC, you may also request ADR with the NRC in an attempt to resolve this issue. ADR is a general term encompassing various techniques for resolving conflicts using a third party neutral. The technique that the NRC has decided to employ is mediation. Mediation is a voluntary, informal process in which a trained neutral (the "mediator") works with parties to help them reach resolution. If the parties agree to use ADR, they select a mutually agreeable neutral mediator who has no stake in the outcome and no power to make decisions. Mediation gives parties an opportunity to discuss issues, clear up misunderstandings, be creative, find areas of agreement, and reach a final resolution of the issues. Additional information concerning the NRC's program can be obtained at http://www.nrc.gov/about-nrc/regulatory/enforcement/adr.html. The Institute on Conflict Resolution (ICR) at Cornell University has agreed to facilitate the NRC's program as a neutral third party. Please contact ICR at 877-733-9415 within 10 days of the date of this letter if you are interested in pursuing resolution of this issue through ADR.

In addition, please be advised that the number and characterization of apparent violations described in the enclosed inspection report may change as a result of further NRC review. You will be advised by separate correspondence of the results of our deliberations on this matter.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, if you choose to provide one, 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, proprietary, or safeguards information so that it can be made available to the Public without redaction.

If you have any questions concerning this matter, please contact Eric Michel of my staff at 404-997-4555.

Sincerely,

/RA/

Mark S. Lesser, Director
Division of Fuel Facility Inspection

Docket No. 70-1113
License No. SNM-1092

Enclosure:
NRC Inspection Report 70-1113/2017-003
w/ Supplementary Information

cc: (See page 4)

cc:
Scott Murray, Manager
Facility Licensing
Global Nuclear Fuels – Americas, L.L.C.
Electronic Mail Distribution

W. Lee Cox, III, Chief
North Carolina Department of Health and Human Services
Division of Health Service Regulation
Radiation Protection Section
Electronic Mail Distribution

SUBJECT: GLOBAL NUCLEAR FUEL – AMERICAS, L.L.C – NUCLEAR REGULATORY COMMISSION INTEGRATED INSPECTION REPORT 70-1113/2017-003

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ADAMS: ☒ Yes ACCESSION NUMBER:ML17206A233 ☒ SUNSI REVIEW COMPLETE ☒ FORM 665 ATTACHED

OFFICE	RII:DFFI	RII:DFFI	RII:DFFI	RII:DFFI	RII:DFFI	RII:DFFI	RII:DFFI
SIGNATURE	Via feeder	Via feeder	Via feeder	Via feeder	Via feeder	Via feeder	/RA/
NAME	TVukovinsky	RGibson	JMunson	RWomack	PStartz	MRuffin	EMichel
DATE	7/19/2017	7/19/2017	7/19/2017	7/19/2017	7/19/2017	7/19/2017	7/21/2017
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OFFICE	RII:EICS						
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U. S. NUCLEAR REGULATORY COMMISSION
REGION II

Docket No.:	70-1113
License No.:	SNM-1097
Report No.:	70-1113/2017-003
Licensee:	Global Nuclear Fuel - Americas, LLC
Location:	Wilmington, North Carolina 28402
Dates:	April 1, 2017 to June 30, 2017
Inspectors:	J. Munson, Fuel Facility Inspector (Section A.2) P. Starz, Fuel Facility Inspector (Section A.1) R. Womack, Fuel Facility Inspector (Section B.1, C.1) R. Gibson, Senior Fuel Facility Inspector (Section C.1) M. Ruffin, Fuel Facility Inspector in Training (Section B.1)
Approved by:	M. Lesser, Director Division of Fuel Facility Inspection

Enclosure

EXECUTIVE SUMMARY

Global Nuclear Fuel - Americas, LLC
NRC Integrated Inspection Report 70-1113/2017-003
April 1 – June 30, 2017

Nuclear Regulatory Commission (NRC) regional inspectors conducted inspections during normal shifts in the areas of Plant Operations, Nuclear Criticality Safety, Maintenance and Surveillance, and event follow-up. During the inspection period, normal production activities were ongoing. These announced, routine inspections consisted of a selective examination of licensee activities accomplished by direct observation of safety-significant activities and equipment, walk-downs of the facility including items relied on for safety (IROFS), interviews and discussions with licensee personnel, and a review of facility records and procedures. Five apparent violations (AVs) were identified during this inspection.

Safety Operations

- In the area of Plant Operations, no violations of more than minor significance were identified. (Section A.1)

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

Facility Support

- In the area of Maintenance and Surveillance, no violations of more than minor significance were identified. (Section B.1)

Other Areas

Five AVs were identified during this inspection from a transportation event where radioactive scrap metal containing licensed material was shipped from GNF-A to a local recycling facility.

1. An AV was identified for failure to make or cause to be made surveys, as required by Title 10 of the Code of Federal Regulations (10 CFR) 20.1501(a). (Paragraph C.1.a.i)

2. An AV was identified for failure to comply with applicable Department of Transportation (DOT) requirements for transporting licensed material outside the site usage on public highways, as required by 10 CFR 71.5(a). (Paragraph C.1.a.ii)

3. An AV was identified for failure to notify the NRC Operations Center when removable radioactive surface contamination exceeds the limits, as required by 10 CFR 20.1906(d)(1). (Paragraph C.1.a.iii)

4. An AV was identified for failure to perform monitoring as practical after receipt of package, but not later than three hours, as required by 10 CFR 20.1906(c). (Paragraph C.1.a.iv)

5. An AV was identified for failure to maintain records of surveys, as required by 10 CFR 20.2103(a). (Paragraph C.1.a.v)

Attachment
Key Points of Contact
List of Items Opened, Closed, and Discussed
Inspection Procedures Used
Documents Reviewed

REPORT DETAILS

Summary of Plant Status

Global Nuclear Fuel - Americas (GNF-A), LLC manufactures uranium dioxide (UO_2) powder, pellets, and light water reactor fuel bundles at its Wilmington, NC facility. The facility converts uranium hexafluoride (UF_6) to UO_2 using a Dry Conversion Process (DCP) and performs UO_2, gadolinium pellet and fuel fabrication operations. During the inspection period, normal production activities at the facility were ongoing.

A. Safety Operations

1. Plant Operations (Inspection Procedure 88020)

a. Inspection Scope

The inspectors evaluated production equipment, interviewed staff, and reviewed records associated with the following production areas: gadolinium dry scrap recovery (GDSR) furnace operations, gadolinium uranium powder processes, sintering furnace processes and support equipment, and other related production activities. The inspectors focused on the evaluation of items relied on for safety (IROFS) to determine if they were being implemented as described in the Integrated Safety Analysis (ISA), Revision (Rev.) 19, dated January 29, 2016, and as described in the associated ISA Quantitative Risk Assessments (QRA's), and if the licensee was operating the facility in compliance with 10 CFR 70.61 as described in paragraph 3.4 of the License Application, dated March 30, 2007 and November 28, 2008.

The inspectors performed physical equipment inspections, evaluated the physical presence of selected passive and active engineered safety controls, evaluated the safety controls to determine their capability and operability, and assessed if controls credited with limiting the risk of potential accident scenarios were capable of preventing or mitigating the scenarios, in compliance with paragraph 3.4 of the License Application.

The following IROFS were selected as samples for the inspection:

- IROFS 404-01, Vertical Breaker Storage Rack, Safe Geometry
- IROFS 405-04, Pellet Boat Transfer Cart, Safe Geometry
- IROFS 405-05, Conveyor Mechanical Stops, Safe Geometry
- IROFS 405-06, Sintering Furnace, Safe Geometry
- IROFS 405-12, Fire Retardant Hydraulic Fluid, Sintering Furnaces
- IROFS 502-06, Feed Hood Optical Sensor, Safe Geometry
- IROFS 502-07, Slugger/Granulator Hood Optical Sensor, Safe Geometry
- IROFS 503-07, Press Hood Optical Sensors, Safe Geometry
- IROFS 504-05, Conveyor Mechanical Stops, Safe Geometry
- IROFS 507-01, GDSR Furnace Feed FBS/PLC Interlock, Prevent Introduction of Safe Geometry of Potentially Moderated Material
- IROFS 507-04, GDSR Furnace Pushover Overcurrent Interlock, Furnace Muffle Favorable Geometry
- IROFS 507-06, GDSR Furnace Low Temperature Interlock, Prevent Discharge of Moderated Material

The inspectors reviewed samples of applicable procedures and records to determine if required actions as identified in the ISA Summary were correctly transcribed into written operating procedures, as required in paragraph 11.5 of the License Application. The inspectors evaluated the contents of operating procedures with respect to operating limits and operator responses for upset conditions to assess if limits and actions needed to assure safety were described in the procedures.

The inspectors interviewed a sample of operators and supervisors to assess if personnel were implementing safety controls in accordance with paragraph 11.4 of the License Application. The inspectors observed the operators performing routine production tasks to evaluate compliance with procedures OP 1030.20.100, "UO2 Sintering Furnace/General Information," Rev. 4, and OP 1030.20.203, "UO2 Sintering Furnace/Normal Operations," Rev. 4. The inspectors reviewed selected postings and operator aids applicable to the tasks being observed and verified that the postings and operator aids were current and representative of safety controls describe in the above procedures.

The inspectors evaluated samples of the safety controls listed above to determine if they were adequately tested in accordance with paragraphs 11.3.4 and 11.8 of the license application. The inspectors reviewed the licensee's corrective action program (CAP) entries for the past twelve months to assess if any deviations from procedures and unforeseen process changes affecting nuclear criticality, chemical, radiological, or fire safety were documented and investigated in accordance with paragraph 11.6.3 and 11.7 of the License Application. Also, the inspectors evaluated the corrective actions associated with selected condition reports to evaluate if the completed corrective actions were in accordance with paragraph 11.9 of the License Application.

b. Conclusion

No violations of more than minor significance were identified.

2. Nuclear Criticality Safety (Inspection Procedure 88015)

a. Inspection Scope

The inspectors reviewed selected Criticality Safety Analyses (CSAs), listed in the documents reviewed of the supplemental information, to determine whether properly reviewed and approved CSAs were in place and were of sufficient detail and clarity to permit independent review. The inspectors reviewed the selected CSAs to determine whether calculations were performed within the validated area of applicability and consistent with the validation report. The inspectors reviewed the selected CSAs and associated assumptions and calculations to verify consistency with the commitments in the License Application, including the consideration of the Double Contingency Principle, assurance of subcriticality under normal and credible abnormal conditions with the use of subcritical margin, technical practices and methodologies, and treatment of nuclear criticality safety (NCS) parameters. The CSAs were selected based on factors such as risk-significance, if they were new or revised, the use of unusual control methods, and operating history. The CSAs reviewed included the CSAs for the Incinerator Building (CSA-704.00.100), Outside Storage Pads (CSA-706.00.100), Moderation Limits (CSA-900.01.100), and Criticality Warning System DAM 20 (CSA-703.00.100).

The inspectors reviewed the licensee's generation of accident sequences to verify whether the CSAs systematically identified normal and credible abnormal conditions for the analysis of process upsets in accordance with the commitments and methodologies in the License Application. This effort included the review of accident sequences that the licensee determined to be not credible in order to determine whether 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.

The inspectors reviewed changes to the SCALE6.1/KENO-VI validation report, including a change to area of applicability (AOA) 5, [Low Enriched Uranium] LEU Heterogeneous Compound Systems with Boron. Additionally, the licensee removed any multi-group cross-section validation for this AOA, using only continuous energy for future applications. The inspectors verified that no changes had been made to the GEMER Monte Carlo Code validation report since the last NCS inspection.

The inspectors performed walk-downs of the DCP, DSR, Incinerator Building, and Outside Storage Pads to determine whether existing plant configuration and operations were covered by, and consistent with, the process description and safety basis in the CSA. The inspectors interviewed operators and engineers to verify that administrative actions established in the CSAs were understood and implemented properly in the field. The inspectors reviewed the ISA Summary and supporting ISA documentation to determine whether the controls identified in the ISA were supported by technical basis in the CSAs.

The inspectors accompanied a licensee NCS engineer on a general walk-down of the DCP and DSR to determine whether NCS staff routinely inspected fissile material operations to ascertain that criticality requirements were being satisfied.

The inspectors reviewed the selected CSAs listed above to verify that they were performed in accordance with NCS program procedures and received appropriate independent review and approval. The inspectors conducted interviews and reviewed CAP entries to verify that audit findings were being identified, entered, and tracked resolution of the issue.

The inspectors reviewed selected NCS-related CAP entries to verify whether anomalous conditions were identified and entered into the CAP, whether proposed corrective actions were sufficiently broad, whether they were prioritized on a schedule commensurate with their significance, and whether they were completed as scheduled and addressed the problem identified.

The inspectors reviewed the Triennial Criticality Safety Audit of the GNF-A facility, which was conducted by external reviewers.

b. Conclusion

No violations of more than minor significance were identified.

B. Facility Support

1. Maintenance and Surveillance (Inspection Procedure 88025)

a. Inspection Scope

The inspectors interviewed supervisors, managers, engineers, operators, and technicians to evaluate maintenance and surveillance program activities for compliance with the license application. Specifically, the inspectors reviewed records and procedures, including the most recently completed Functional Test Instruction (FTI) records for IROFS 201-01, 201-07, 201-24, 201-25, 201-05, and 301-12 to verify the licensee staff performed testing, maintenance, and surveillance activities as required to ensure IROFS remained available and reliable to perform their intended safety function. The inspectors also reviewed records to verify safety equipment testing occurred at the required frequencies and that required data was properly documented. The inspectors focused on the DCP UF_6 Vaporization, DCP Hydrofluoric Acid (HF) Recovery, DCP Powder Outlet, and the DSR furnace systems to verify the selected IROFS were being properly maintained.

The inspectors observed maintenance planning and turn over meetings, and conducted interviews to verify that the licensee's program to maintain safety controls had provisions to ensure adequate pre-job planning and preparation of work orders to support maintenance and surveillance activities. The inspectors reviewed maintenance and surveillance work orders for accuracy and to verify that test packages challenged and verified operability of the IROFS listed above. The inspectors also observed the operators and area engineer perform the functional testing of the powder outlet cooling hoppers.

The inspectors also reviewed maintenance staff's training and qualification records to verify technicians were adequately trained and qualified to perform their activities as outlined in section 11.4, Training, of the License Application. The inspectors also interviewed a maintenance technician in training about the training they receive to become a maintenance technician to verify it was in accordance with approved training procedures as outlined in CP-20-107 "GSC Manufacturing Training and Qualification."

The inspectors determined work activities on the selected systems and processes were conducted in accordance with licensee requirements and approved procedures as outlined in CP-24-100, "Wilmington Maintenance Administration." The inspectors verified that post-maintenance testing and calibrations were performed in accordance with licensee procedures and conducted prior to restoring equipment to operational status.

The inspectors reviewed the licensee's CAP to verify performance issues relating to the maintenance and surveillance of IROFS and safety controls were being entered into the CAP and adequate corrective actions were assigned, implemented, and tracked in accordance with approved procedures. The inspectors interviewed maintenance technicians, maintenance planners, area engineer, and the maintenance manager regarding the use of the corrective action system to verify that licensee staff was familiar with the licensee's CAP procedures and the usage of the CAP.

b. Conclusion

No violations of more than minor significance were identified.

C. Other Areas

1. Event Follow-Up (Inspection Procedure 88075)

a. The inspection included a follow-up inspection on a transportation event where radioactive scrap metal containing licensed material was shipped from GNF-A to a local recycling facility.

i. Failure to Make or Cause to be Made Surveys

Introduction: The inspectors identified through an event an Apparent Violation (AV) of Title 10 of the Code of Federal Regulations (10 CFR) 20.1501(a) for the licensee's failure to make appropriate surveys to evaluate the potential radiological hazards of work performed on scrap metal piping at their waste treatment facility.

Description: In January of 2016, the licensee began the process of implementing a Facility Change Request (21891) to remove and discard abandoned piping as well as other electrical work within the Fuel Manufacturing Operation (FMO) waste treatment facility. A walk down of the area was performed by several managers, subject matter experts for the area, the Radiological Safety Engineer, and the responsible Radiation Protection Monitor (RPM/Radiation Technician) to assess the potential hazards and discuss the scope of the work. In early August 2016, as part of the pre-job activities, the RPM walked down the area and took surveys, smears and direct frisks of the piping for alpha radiation contamination prior to the pipes being cut. Once the pipes were cut (sections of 4" diameter by 8' long), the RPM took additional smears on the cut ends of the piping and found no contamination. The piping was then placed in a dumpster and prepared for offsite release. Through interviews, the inspectors learned that the RPM only surveyed the pipes with an alpha radiation detecting instrument because the scrap piping could not fit inside of a Small Article Monitor (SAM). SAM has the capability to also detect beta radiation. The scrap piping had inaccessible areas where potential for contamination existed. The utilized alpha radiation detecting instrument cannot detect internal (to piping) contamination due to shielding from the metal piping and calcium fluoride (CaF_2) residue in the piping.

The inaccessible areas were not adequately surveyed by the RPM as required by approved procedures. Section 4.5.2 of procedure WI-27-105-05, Rev. 3, states, in part, "Items with inaccessible surfaces and volumetric materials, shall not be unconditionally released except as allowed by an Approved Survey Method or as directed by the Radiation Protection Supervisor or facility Radiation Protection Program Manager." Section 4.5.4.5 of the same procedure, states "Ensure Approved Survey Methods for items with inaccessible surfaces provide confidence that the item is not contaminated by applying one or more of the following techniques, considering how the item(s) have been used: (1) use swabs to gain access into small orifices; (2) scan the item with a sodium iodine (NaI) detector; (3) completely or partially disassemble the item to survey enough surface to conclude the item is not contaminated; and (4) if disassembly or special survey techniques are impractical, then prescribe survey locations and required sensitivities as needed to support an

evaluation to determine if internal surfaces are potentially contaminated." In addition, Section 4.5.4.6, states "Ensure Approved Survey Methods for volumetric materials have the capability to detect licensed radioactive material at or below the analysis requirements for similar media (e.g., soil or water) as required by the facility environmental surveillance program."

The RPM released the scrap metal piping as scrap metal for unconditional release with inaccessible areas that were not surveyed, without the use of an Approved Survey Method, and without the approval of the Radiation Protection Supervisor or facility Radiation Protection Program Manager, as required by the procedure.

On September 29, 2016, after Southern Industrial Contractors (SIC) received clearance from GNF-A maintenance to ship the material, SIC arranged to have the scrap metal recycling facility pick up the dumpster of scrap metal piping. The dumpster was loaded onto a truck and transported to the scrap metal recycling facility, located approximately 15 minutes from GNF-A. Prior to entering the facility, all shipments are checked by a radiation portal monitor alarm. The dumpster of scrap metal piping from GNF-A caused the portal monitor to alarm. The shipment was not allowed to enter the scrap metal facility. The scrap metal recycling facility contacted SIC, who instructed the facility to return the dumpster back to the GNF-A site.

GNF-A assessed the returned material in accordance with Section 1.3.2, "Authorized Guidelines for Contamination-Free Articles" of their license application. GNF-A determined from the initial surveys of the material that it did not meet the reporting requirements of 10 CFR 20.2203(a)(3)(ii) regarding the discovery of contaminated material in an unrestricted area with concentrations of radioactive material greater than 10 times the limit in their license.

Subsequently, on February 2, 2017, based on additional survey results and volumetric determinations, GNF-A determined that the uranium concentration in the scrap metal piping exceeded 10 times the volumetric license release limit of 30 pCi/gram authorized for the disposal of industrial waste treatment products in Section 1.3.6.1 of their NRC license application.

GNF-A determined that samples previously analyzed from the scrap metal piping contained uranium concentrations ranging between 1,456 pCi/gram up to 9,076 pCi/gram for uranium-234, 53 pCi/gram up to 325 pCi/gram for uranium-235, and 257 pCi/gram up to 1,193 pCi/gram for uranium-238. These levels were greater than 10 times the release limit of 30 pCi/gram.

In letter to the NRC dated March 20, 2017 (ML17079A518), GNF-A submitted a written report that stated, "In accordance with 10 CFR 2203(a)(3)(ii), GNF-A facility in Wilmington, N.C. hereby submits a written report for the discovery of contaminated material in an unrestricted area greater than 10 times the limit in their license requirement."

In assessing the material, the licensee did not perform the required survey for arrival packages when the dumpster was returned from the recycle facility on September 29, 2016, as required by approved procedures. Section 4.4.1 of procedure WI-27-105-20, Rev. 5 requires the licensee to survey each package for dose rates on contact and at 1 meter. Section 4.4.2 of the same procedure requires a removable

contamination smear survey of the exterior of each package using the instructions in Section 4.1.2, which requires to smear the exterior of each package. Timely monitoring of the package by the licensee would have identified radiation dose and contamination levels of the package, and would have allowed the licensee to take appropriate corrective actions including surveying workers for contamination.

From August 22, through September 23, 2016, the licensee contractor, SIC, removed and discarded the scrap metal piping into a dumpster for transport. The Radiation Work Permit (RWP) posted by the RPM did not address personal protective equipment to be used by the SIC workers during the removal of the piping. Because of the inadequate survey by the RPM, the licensee failed to identify contamination of the piping and there was a significant potential for personnel contamination and uptake. The workers were not monitored for personnel contamination after the completion of the work and prior to exiting the GNF-A site. In addition, lung counts were not performed on the workers until five months after the removal of the piping. The licensee's additional failure to conduct surveys on September 29, resulted in continued failure to monitor workers for contamination and exposure. The licensee's procedure for personnel monitoring, Nuclear Safety Release/Requirements, NSR/R #: 13.11.04, Section 1, states, in part, "A personal survey for possible contamination on clothing and body is required of all personnel when leaving a Contaminated Area, using Whole Body Monitors or Hand and Foot Monitors. Hair and skin surfaces should be dry when surveyed. Contamination monitoring instruments are located at authorized exit points and should be used." The SIC workers were working in a contaminated area, and were not monitored in accordance with the licensee's procedure for personnel monitoring.

The licensee's failure to make or cause to be made surveys of areas, that are reasonable under the circumstances, to evaluate the magnitude and extent of radiation levels, concentrations or quantities of residual radioactivity, and the potential radiological hazards of the radiation levels and residual radioactivity detected is considered a violation of 10 CFR 20.1501(a). Specifically, a dumpster of stainless steel pipes containing low enriched uranium was not adequately surveyed and subsequently released for unrestricted use to a local metal recycling center with uranium concentration levels greater than the release limit of 30 pCi/gram as described in Section 1.3.6.1 of the License Application. Further, upon arrival of the dumpster after being rejected by the scrap metal site, the licensee did not perform the required timely survey for package receipt, and did not monitor the workers who performed the work in the contaminated area.

Analysis: The inspectors determined that the noncompliance is more than minor based on screening question 19 of Inspection Manual Chapter (IMC) 0616, Appendix B, which asks, "Does the noncompliance result in a spill or release of radioactive material on the licensee's site or to the offsite environment?" Specifically, the noncompliance adversely affected the spread of contamination beyond the designated controlled areas.

The actual safety consequences were a release of licensed material that exceeded concentration limits established in the license application. The licensee conducted a dose assessment for the workers involved in the cutting and handling of the material and determined that a low dose potential existed for a worker throughout the process. The exposure time to the public was significantly less than that of a worker, and, thus,

the potential radiation exposure to a member of the public was low. However, the NRC determined that there was a substantial potential for exceeding the 10 mg per week uranium intake limit of 10 CFR 20.1201(e) due to exposure resulting from potential grinding, cutting, handling of the contaminated piping, or a potential traffic accident and fire. The NRC estimated that approximately 8 kg of the 580 kg total CaF_2 was uranium.

This noncompliance is being considered for escalated enforcement as it closely aligns with an escalated violation example in the Enforcement Policy based on the potential release of radioactive material to an unrestricted area in excess of the requirements specified in 10 CFR 20.1301(f), in that an actual release to an unrestricted area occurred and was substantially greater than the limit in Section 1.3.6.1 of the License Application, and there was a substantial potential to exceed the uranium intake limit of 10 CFR 20.1201(e).

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

Contrary to the above, on and prior to September 29, 2016, the licensee on three occasions failed to make or cause to be made surveys of areas that may be necessary for the licensee to comply with the regulations in this part and are reasonable under the circumstances to evaluate the magnitude and extent of radiation levels, concentrations or quantities of residual radioactivity, and the potential radiological hazards of the radiation levels and residual radioactivity detected. Specifically: (1) a dumpster of stainless steel pipes containing low enriched uranium was not adequately surveyed and subsequently released for unrestricted use to a local metal recycling center with uranium concentration levels greater than ten times the release limit of 30 pCi/gram in Section 1.3.6.1 of the License Application; (2) the licensee did not perform the required timely survey for arrival packages as required by approved procedures; and (3) the licensee did not monitor the workers who performed work in a contaminated area as required by the licensee's monitoring procedure NSR/R#: 13.11.04.

The licensee has taken the following corrective actions: (1) improved training for the RPMs in survey practices and the need to select the proper survey instrument for the type of contamination expected, (2) revised procedures to clarify survey requirements for the release of radioactive material from the different facilities, (3) revised procedures to provide clear instructions on the contamination surveys required in the different areas of the facility, and (4) training on historical knowledge of facility operations was provided to the licensee's RPMs, to ensure adequate material release surveys are performed.

This AV will be tracked as 70-1113/2017-003-01, "Failure to make or cause to be made surveys."

ii. Failure to Comply with Applicable DOT Requirements for Transporting Licensed Material Outside the Site Usage on Public Highways

Introduction: The inspectors determined an NRC-identified AV of 10 CFR 71.5(a) occurred for the licensee's failure to comply with DOT requirements when contaminated metal piping was transported to the scrap metal facility and returned to the GNF-A site.

Description: As described previously, on the morning of September 29, 2016, a dumpster containing stainless steel metal piping from the waste treatment facility at GNF-A was shipped using a contractor, SIC, to a local scrap metal facility in which the contents were not properly surveyed by the licensee. The dumpster of scrap metal piping from GNF-A caused the portal monitor to alarm at the scrap metal facility. Southern Metal (scrap metal facility) immediately contacted SIC, who instructed the driver to return the shipment back to GNF-A. The shipment of radioactive stainless steel piping was returned to GNF-A that same morning without any shipping papers, marking and labeling, placarding or proper packaging.

On the morning of September 29, 2016, when the dumpster containing the contaminated metal piping was determined to be radioactive at the scrap metal facility, GNF-A had an additional opportunity to properly survey the material and apply the correct packaging, labeling, placarding, and provide shipping papers in accordance with 49 CFR. The licensee's failure to comply with DOT requirements constitutes a violation of 10 CFR 71.5(a), which states, in part, "Each licensee who transports licensed material outside the site of usage, where transport is on public highways shall comply with the applicable requirements of the DOT regulations in 49 CFR parts 107, 171 through 180, and 390 through 397, appropriate to the mode of transport." The licensee failed to comply with DOT requirements when the scrap metal piping was transported to the scrap metal facility and returned to the GNF-A site.

Analysis: The inspectors determined that the noncompliance is more than minor based on screening question 27 of IMC 0616, Appendix B, which asks, "Does the noncompliance involve a failure to properly characterize, classify, label, track, or dispose of radioactive waste and does it result in (1) the failure to meet a disposal facility's waste acceptance criteria, or (2) unplanned personnel exposure or contamination?" When the dumpster containing the contaminated metal piping was determined to be radioactive at the scrap metal facility, GNF-A had an opportunity to properly package, mark and label, placard, package and provide shipping papers applicable to DOT requirements in 49 CFR.

The actual safety consequences include uncontained and unlabeled shipment of radioactive material on public roads. The potential safety consequences of an improperly packaged, marked, labeled, and placarded shipment without shipping papers includes the potential for exposure to the public.

This noncompliance is being considered for escalated enforcement as it aligns with an escalated violation example of the Enforcement Policy for Transportation based on the exceedance of contamination above regulatory limits.

Enforcement: 10 CFR 71.5(a) states, in part, "Each licensee who transports licensed material outside the site of usage, as specified in the NRC license or where transport is on public highways shall comply with the applicable requirements of the DOT regulations in 49 CFR parts 107, 171 through 180, and 390 through 397, appropriate to the mode of transport."

Contrary to the above, on September 29, 2016, the licensee failed to comply with applicable DOT requirements in 49 CFR parts 107, 171 through 180, and 390 through 397 for transporting licensed material outside the site of usage, where transport is on public highways. Specifically, a dumpster containing stainless steel pipes of low enriched uranium from the waste treatment facility was not properly packaged, marked and labeled, placarded and shipping papers generated when shipment of unidentified type, quantity, and form of radioactive material left the licensee's site and was subsequently returned.

The licensee has taken the following corrective actions: (1) the shipment of stainless steel scrap metal was returned to the controlled access area of the facility, (2) stop work notice issued for the release of potentially contaminated material without explicit management approval, and (3) revised the radioactive material control procedure to clarify the process for unconditional material release from the site.

This AV will be tracked as 70-1113/2017-003-02, "Failure to comply with applicable DOT requirements for transporting licensed material outside the site usage on public highways."

iii. Failure to Notify the NRC Operations Center When Removable Radioactive Surface Contamination Exceeds the Limits

Introduction: The inspectors determined an NRC-identified AV of 10 CFR 20.1906(d)(1) occurred for the licensee's failure to immediately notify the final delivery carrier and the NRC Operations Center by telephone, when removable radioactive surface contamination exceeds the limits of 10 CFR 71.87(i).

Description: On September 29, 2016, GNF-A shipped a dumpster of contaminated open-ended stainless steel metal piping containing low enriched uranium. The open ends of the scrap piping released uranium in CaF_2 to the external surfaces of the piping and dumpster. The surfaces of the piping and the dumpster were not surveyed adequately for removable contamination prior to being transported to the scrap metal facility. When the dumpster of scrap metal piping from GNF-A arrived at the scrap metal facility, it caused the portal monitor to alarm, and the shipment was not allowed to enter. The dumpster was transported back to GNF-A where removable contamination surveys revealed two areas of alpha emission values of 320 dpm/cm^2 and three areas of beta emission values of 416 dpm/cm^2, which exceeded the non-fixed external radioactive contamination limit of 240 dpm/cm^2 for beta, gamma, and low toxicity alpha emitters stated in 49 CFR 173.443.

The inspectors determined from interviews with licensee staff and review of records that GNF-A failed to immediately notify the NRC Operations Center when they determined that removable radioactive contamination on the surfaces of the scrap metal piping transported from the scrap metal facility to GNF-A site was not as low as

reasonably achievable (ALARA) as required by 10 CFR 71.87(i), and exceeded the limits of 49 CFR 173.443 for non-fixed contamination as required by 10 CFR 20.1906(d).

Analysis: The inspectors determined that the noncompliance is more than minor based on screening question 22 of IMC 0616, Appendix B, which asks, "Does the noncompliance result in exceeding radiation levels or the removable surface contamination limits for a transportation package as defined in 49 CFR 173 or 10 CFR Part 71?" Specifically, the licensee failed to notify the NRC when they determined that removable radioactive contamination was on the surface of the scrap metal piping and the dumpster exceed the limits of 49 CFR.

The actual impact included the reduced ability of the NRC to evaluate an unprotected shipment of radioactive material on a public road. The potential impact of an improperly packaged, marked, labeled, and placarded shipment without shipping papers included the potential for exposure to the public.

This noncompliance is being considered for escalated enforcement as it aligns with an escalated violation example of the Enforcement Policy for Transportation involving a failure to make a required notification.

Enforcement: 10 CFR 20.1906(d)(1) states, in part, "The licensee shall immediately notify the final delivery carrier and the NRC Operations Center when removable radioactive surface contamination exceeds the limits of 10 CFR 71.87(i) of this chapter." 10 CFR 71.87(i) states "The level of non-fixed (removable) radioactive contamination on the external surfaces of each package offered for shipment is as low as reasonably achievable, and within the limits specified in DOT regulations in 49 CFR 173.443." 49 CFR 173.443 defines the non-fixed external radioactive contamination limits as 240 dpm/cm^2 for beta, gamma, and low toxicity alpha emitters.

Contrary to the above, on September 29, 2016, the licensee failed to immediately notify the NRC Operations Center of removable radioactive surface contamination exceeding the limits of NRC and DOT requirements. Specifically, the licensee shipped numerous sections of open end metal piping containing radioactive material in an unpackaged, open-top transport that did not keep levels of contamination as low as reasonably achievable and was later determined to exceed regulatory limits. Survey results from the piping determined two areas of alpha emission values of 320 dpm/cm^2 and three areas of beta emission values of 416 dpm/cm^2.

At the time of the inspection, the licensee has not taken or proposed any corrective actions to address this AV.

This AV will be tracked as AV 70-1113/2017-003-03, "Failure to notify the NRC Operation Center when removable radioactive surface contamination exceeds the limits."

iv. Failure to Perform Monitoring as Practical After Receipt of Package, but not Later Than 3 Hours

Introduction: The inspectors determined an NRC-identified AV of 10 CFR 20.1906(c) occurred for the licensee's failure to monitor a package within 3 hours of receipt at their facility.

Description: On the morning of September 29, 2016, a shipment of radioactive scrap metal piping was received by GNF-A from a local scrap metal facility. The scrap metal shipment had set off the gamma portal monitor alarm at the entrance of the scrap metal facility and had been subsequently returned to GNF-A. The package was received by the licensee at approximately 10:16 am on September 29, 2016. The receipt survey was not completed until approximately 5:49 pm on the same day, a period greater than 3 hours.

The inspectors determined from interviews with licensee staff and review of procedures that the licensee did not perform the required survey following arrival of packages in a timely manner in accordance with 10 CFR 20.1906(c). Neither external dose rate nor removable contamination surveys were performed within three hours, as required by 10 CFR 20.1906(c).

Analysis: The inspectors determined that the noncompliance is more than minor based on screening question 1 of IMC 0616, Appendix B, which asks, "Could the noncompliance reasonably be viewed as a precursor to a significant event?" Specifically, the noncompliance adversely affected the need to timely characterize a shipment of unidentified type, quantity, and form of radioactive material that was transported from the licensee's site to a scrap metal facility and then returned to the licensee's site.

This noncompliance had no actual safety consequence. The potential safety consequence was a delay in the licensee's ability to evaluate the receipt of a contaminated radioactive shipment.

Enforcement: 10 CFR 20.1906(c) states, in part, "The licensee shall perform the monitoring required by paragraph (b) of this section as soon as practical after receipt of the package, but not later than three hours after the package is received at the licensee's facility if it is received during the licensee's normal working hours, or not later than three hours from the beginning of the next working day if it is received after working hours."

Contrary to the above, on September 29, 2016, a package was received during normal working hours and the licensee failed to monitor a package within three hours of its receipt. Specifically, a dumpster containing scrap metal piping of unidentified type, quantity, and form of radioactive material was transported from a scrap metal facility to the GNF-A site. The package was returned from a scrap metal recycle facility after setting off the radiation portal monitors.

The licensee has taken the corrective action by revising procedures to provide clear instructions on the contamination surveys required in the different areas of the facility.

This AV will be tracked as AV 70-1113/2017-003-04, "Failure to perform monitoring as practical after receipt of package, but not later than 3 hours."

v. Failure to Maintain Records of Surveys

Introduction: The inspectors determined an NRC-identified AV of 10 CFR 20.2103(a) occurred for the licensee's failure to provide survey records from the results of surveys of the scrap metal piping and dumpster.

Description: From interview with licensee's staff and review of records, the inspectors learned that the RPM walked down the area for piping removal and took surveys, smears and direct frisks of the piping for alpha radiation contamination prior to the pipes being cut and removed as scrap metal beginning on August 22, 2016, and completing on September 23, 2016. The RPM surveyed the dumpster for unconditional release after the completion of the work on September 23, 2016 and prior to the shipment on September 29, 2016. The licensee was not able to provide survey records for review by the inspectors for both surveys of the scrap metal piping and the dumpster in accordance with 10 CFR 20.2103(a). 10 CFR 20.2103(a) requires each licensee shall maintain records showing the results of surveys and calibration required by Parts 20.1501 and 20.1906(b). The licensee failure to maintain records of surveys as required in 10 CFR 20.2103(a) is considered a violation.

Analysis: The inspectors determined the noncompliance is more than minor based on screening question 4 of IMC 0616, Appendix B, which asks, "Does the noncompliance represent more than a paperwork issue (e.g., resulted in a physical impact on the plant) that adversely impacted personnel or nuclear safety?" Specifically, the licensee failed to provide record of surveys taken by the RPM during piping removal and prior to the release for unconditional use.

The actual impact of this violation was a reduced ability for both the licensee and the NRC to perform evaluation and follow-up to a radiological contamination event.

Enforcement: 10 CFR 20.2103(a) states, "Each licensee shall maintain records showing the results of surveys and calibrations required by Parts 20.1501 and 20.1906(b). The licensee shall retain these records for three years after the record is made."

Contrary to the above, on or before August 22, 2016, and before September 29, 2016, the licensee did not maintain records showing the results of surveys of the scrap metal facility change request performed during those periods.

This AV will be tracked as AV 70-1113/2017-003-05, "Failure to maintain records of surveys."

b. (Closed) Licensee Event Report (LER) 2016-002, "EN 52251, Inoperable UF_6 scrubber exhaust system in FMO."

On September 19, 2016, the licensee notified the NRC of Event Number 52251, "UF_6 Scrubber Exhaust System Not Operating as Required." Specifically, at approximately 1930 on September 18, 2016, an exhaust fan motor within the boundary of IROFS 804-

01, FMO Exhaust Scrubber System, failed. The associated DCP Control Room indicator, designated per QRA-803/804, Rev. 7, to indicate failure and thus limit failure duration and protect the assumed reliability of the IROFS did not indicate that a failure had occurred. The motor failure was discovered by HVAC personnel while performing a required walk down of the system. Through a review of the ISA and operating data, the failure of the exhaust fan motor was determined to have occurred within its assumed frequency, and compliance with the performance requirements of 10 CFR 70.61 was maintained. However, the DCP Control Room indicators designated for limiting failure duration did not function when needed. The inspectors determined that the DCP Control Room indicators were not being functionally tested as a part of the licensee's maintenance program. 10 CFR 70.62(d) requires, in part, that licensees establish management measures to ensure that IROFS are designed, implemented, and maintained, as necessary, to ensure they are available and reliable to perform their function when needed. Contrary to this requirement, on or before September 18, 2016, the licensee failed to establish adequate management measures to ensure IROFS 804-01 was maintained, as necessary, to ensure it was available and reliable to perform its function when needed. Specifically, the licensee failed to functionally test the DCP Control Room indicators, a component relied on to protect IROFS 804-01 assumed reliability by providing early warning of a failed scrubber exhaust fan. This violation is minor because the non-compliance did not meet the more than minor screening criteria as described in NRC IMC 0616, Appendix B, and the non-compliance neither contributed to nor caused the IROFS failure, and compliance with the performance requirements of 10 CFR 70.61 was maintained. Compliance of 10 CFR 70.62(d) was restored by reanalyzing the QRA to apply credit for key component monitoring, duration of control unavailability, and plant historical data on failure probability of the scrubber and system. The Licensee Event Report 2016-002, "EN 52251, Inoperable UF_6 scrubber exhaust system in FMO" is closed.

c. Conclusion

Five AVs of NRC requirements 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 April 27 and June 29, 2017, to A. Hilton and staff. No dissenting comments were received from the licensee. Proprietary information was discussed but not included in the report.

SUPPLEMENTARY INFORMATION

1. KEY POINTS OF CONTACT

Licensee personnel

Name	Title
J. Berger	Manager, Powder Production and Support Shop
D. Bardwell	Maintenance Technician
J. Dixon	C&IS/Instrument Technician
M. Dodds	Senior NCS Engineer
V. Eakins	C&IS/Instrument Technician
D. Eghbali	Senior NCS Engineer
A. Hilton	FMO Facility Manager
A. Humphry	Training Manager
M. Martin	Process Engineer
K. McGowan	Training Lead FMO
B. Muncy	FMO Control Room Operator
S. Murray	Manager, Facility Licensing
D. Nay	FMO Manufacturing Engineering Manager
P. Ollis	Facility Licensing
K. Parrett	Maintenance Technician
L. Paulson	Senior NCS Engineer
J. Reeves	Manager, Integrated Safety Analysis
J. Rohner	NCS Program Manager
E. Saito	Environmental Health and Safety Manager & Nuclear Safety Manager
L. Sampson	FMO Control Room Operator
K. Smith	DCP Area Engineer
T. Tindle	Manufacturing Engineer

2. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

70-1113/2017-003-01	AV	Failure to make or cause to be made surveys.
70-1113/2017-003-02	AV	Failure to comply with applicable DOT requirements for transporting licensed material outside the site usage on public highways.
70-1113/2017-003-03	AV	Failure to notify the NRC Operation Center when removable radioactive surface contamination exceeds the limits.
70-1113/2017-003-04	AV	Failure to perform monitoring as practical after receipt of package, but not later than three hours.
70-1113/2017-003-05	AV	Failure to maintain records of surveys.

Opened & Closed

None

Closed

70-1113/2016-002	LER	Event Notification 52251, Inoperable UF6 Scrubber Exhaust System (Paragraph C.1.b)

Discussed

None

3. INSPECTION PROCEDURES USED

88015	Nuclear Criticality Safety
88020	Operational Safety
88025	Maintenance and Surveillance of Safety Controls
88075	Event Follow-up

4. DOCUMENTS REVIEWED

CSAs:
CSA-704.00.100, Incinerator Building, Rev. 1
CSA-706.00.100, Outside Storage Pads, Rev. 1
CSA-900.01.100, Moderation Limits, Rev. 1
CSA-703.00.100, CAAS Needs Evaluation: Criticality Warning System DAM 20, Rev. 0

Audit:
Triennial Criticality Safety Audit of the Global Nuclear Fuel – Americas, LLC Fuel Fabrication Facility Wilmington, NC, November 2016

Validation Reports:
SCALE6.1/KENO-VI Monte Carlo Code Validation Report, Rev. 2
GEMER Monte Carlo Code Validation Report, Rev. 5.2

Records
Functional Test Instruction Powder Outlet, Rev. 4, dated April 27, 2017
TD 201-24 Cold Trap Weight Interlock A
TD 301-03 Furnace- Safe Geometry
TD 301-05 Furnace Screener- Safe Geometry
TD 401-05 Routine Inspections of Press Base
Training Records, Revised DRS Operator System Review, completed October 28, 2016
Training Records, DCP CRO HF Recovery Qualification, completed April 12, 2017
Training Records, SOP HF Treatment – Operation of the Washing Column, use of the new Mark 6 DCS, OP 203.00.203
Dose Estimate from CaF_2 piping handling and sectioning, dated February 15, 2017.
Unconditional release survey form, Roll-off container, rigging and a ladder, dated October 7, 2016
Unconditional release survey form, Backhoe, Bobcat, and shovels used to dig out drainage ditches at WTF
Survey records of smears on spread sheet by EHS Manager attached to email dated September 29, 2016
Apex-InVivo analysis report for SIC workers dated February 7, 2017

Survey records of smears on spread sheet by EHS Manager attached to email dated February 2, 2017
Special Survey CaF2 Pipes prior to Lab Analysis, dated January 30, 2017
Radiation Survey Report, dated January 25, 2017
Functional Test Instruction Test No. 201-25, Rev. 1, dated April 25, 2017
Functional Test Instruction Test No. 201-24, Rev. 1, dated April 26, 2017
TD 201-03 Pigtail Leak Check
TD 301-12 Oversize Can Process Scale Interlock
TD 804-02 Scrubber Sump-Safe Geometry
Gensuite Compliance Calendar Task: IROFS Verification: IROFS 804-02 Scrubber Sump - Safe Geometry (PEC), dated November 30, 2017
Gensuite Compliance Calendar Task: SD 05.06.02 Area 421 Whse FMO Scrubber Sump Annual Inspection, dated April 15. 2017
TD 401-08 Process Equipment Barrier- Pellet Press
TD 201-01 Vaporization Cylinder Temperature and Pressure Control System
Calibration Work Order # 417650, dated January 3, 2017
Functional Test Instruction (FTI) Approved Per CR#: 15668, Rev 0.1, dated April 14, 2016
Functional Test Instruction (FTI) Approved Per CR#: 15668, Rev 0.1, dated April 15, 2016
Functional Test Instruction (FTI) Approved Per CR#: 15668, Rev 0.1, dated June 15, 2016
Functional Test Instruction (FTI) Approved Per CR#: 20697, Rev 0, dated January 25, 2017
Functional Test Instruction (FTI) Approved Per CR#: 21504, Rev 0.2, dated June 15, 2017
Functional Test Instruction (FTI) Approved Per CR#: 15669, Rev 0.1, dated April 14, 2016
FMO Maintenance Organizational Chart, dated April 17, 2017

Procedures:
CP-20-107, GSC Manufacturing Training and Qualification, Rev. 6, dated March 22, 2017
CP-24-100, Wilmington Maintenance Administration
CP-12-102
CP-06-216
WI-16-106-02
WI-20-107-07
OP 1030.20.100, UO2 Sintering Furnace #2 General Information, Rev. 4
OP 1030.20.203, UO2 Sintering Furnace #2 Normal Operations, Rev. 4
OP 1081.01.202, Incinerator – Normal Operations, Rev. 0
OP 1081.01.205, Incinerator – Emergency Operations, Rev. 0
OP 1081.01.300, Incinerator – Process Operations
OP 1081.01.100, Incinerator – General Information, Rev. 0
OP 1341.00.300, DCP Second Floor Additive Make up Process Information
OP 1341.00.203, DCP Second Floor Additive Make up Basic Operator Maintenance
OP 1341.00.201, DCP Second Floor Additive Make up Normal Operation
OP 1030.20.100, UO2 Sintering Furnace #2 – General Information, Rev. 4
OP 1030.20.203, UO2 Sintering Furnace #2 – Normal Operations, Rev. 4
OP 1810.00.100, GDSR Furnace & Screener - General Information, Rev. 1
OP 1810.00.101, GDSR Furnace & Screener – MC&A, Rev. 0
OP 1810.00.201, GDSR Furnace & Screener – Normal Operations, Rev. 1
WI-27-105-13, “Radiation Work Permits”, Rev. 4, dated March 13, 2017
CP-24-100, “Wilmington Maintenance Administration”, Rev. 1, dated April 22, 2015
WI-27-105-05, “Control of Radioactive Material”, Rev. 4, dated February 13, 2017
WI-27-105-08, “Contamination Measurement and Control, Rev. 2, dated August 17, 2015
CP-20-305, “Radiation Protection Training Program”, Rev. 0, dated July 9, 2013
C-04, “Line Breaking, Rev. 8, dated October 1, 2015

WI-27-105-13, “Radiation Work Permits”, Rev. 3, dated January 30, 2015
WI-27-105-20, “Radioactive Shipment Surveys”, Rev. 5 dated March 28, 2017

Condition Reports:
CR 8623
CR 11072
CR 15669
CR 19237
CR 20714
CR 21504
CR 23574
CR 15669
CR 21891
CR 18130
CR 21618

Other:
CP-15-07, Stop Work Notice, Rev. 5.2
Routine Work Order #WO445349, dated April 6, 2017
Minor Work Order #WO411345, dated January 6, 2017
Minor Work Order # WO393753, dated October 21, 2016
Minor Work Order # WO341616, dated September 2, 2016
Calibration Work Order # 444588, dated March 28, 2017
Calibration Work Order 417637, dated January 8, 2017
Calibration Work Order 417639, dated January 8, 2017
Minor Work Order # WO369736, dated September 23, 2017
Minor Work Order #WO369718, dated September 22, 2017
Routine Work Order # WO225422R1, dated April 8, 2016
Preventative Work Order #436128, dated February 27, 2017
Minor Work Order #WO447228, dated March 29, 2017
WO 433801, dated March 10, 2017
WI-27-104-01, Nuclear Safety and Security Event Communication and Notification, Rev. 9.0
Change Request 21891
Letter dated March 20, 2017, GNF-A Written Report
Radiation Work Permit 5558
Radiation Work Permit 5572