



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

November 6, 2014

EA-14-141
NRC Event No. 49969

Mr. Amir Vexler
FMO 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. – NUCLEAR REGULATORY
COMMISSION INSPECTION REPORT 70-1113/2014-008

Dear Mr. Vexler:

This letter refers to the special inspection conducted April 14 -17, 2014, at the Global Nuclear Fuel – Americas (GNF-A) facility in Wilmington, North Carolina, and a subsequent in-office inspection completed on May 22. The purpose of the special inspection was to review the facts surrounding the failure to maintain items relied on for safety (IROFS) available and reliable as required by Title 10 of the Code of Federal Regulations (10 CFR) Part 70; assess GNF-A's response to the failure of IROFS; and evaluate the immediate and planned long term corrective actions to prevent recurrence. The results of the inspection were discussed with GNF-A management representatives and documented in NRC Inspection Report No. 70-1113/2014-006 (ML14184B141).

On October 1, a pre-decisional enforcement conference was held in the NRC Region II office with you and members of your staff to discuss the significance and root causes of the two apparent violations (AVs) identified as a result of the special inspection and your corrective actions, documented in NRC Inspection Report No. 70-1113/2014-007 (ML14234A051). The AVs involved: 1) the failure to meet the performance requirements of 10 CFR 70.61(b) and 2) the failure to effectively implement management measures.

During the conference, GNF-A acknowledged the violations and presented the details of its investigation, root cause analysis, and corrective actions. Based on your review, GNF-A concluded that the conditions found during the dry conversion process recycling event had no actual safety consequence, the risk of criticality remained highly unlikely, and double contingency was maintained.

Based on the information developed during the inspection and the information provided during the conference, the NRC has determined that only one violation occurred involving the failure to implement management measures. We based our conclusions on the following NRC analysis.

The Global Nuclear Fuel – Americans (GNF-A) integrated safety analysis (ISA) summary detailed the applicable accident sequence as consisting of three factors:

1. An initiating event (loss of nitrogen pressure allowing reverse steam flow) probability of 1,
2. The failure probability for IROFS 202-08 (Dew Point Sensor) as 1.0×10^{-2} , and
3. The failure probability for IROFS 202-09 (Hatch Valve Pressure Indication) as 1.0×10^{-2} .

All three factors combined results in an overall likelihood for the accident sequence of 1.0×10^{-4} events/year, which is equivalent to highly unlikely and therefore meets regulations. Based on the licensee's ISA Summary, the Special Inspection Team determined that the estimated likelihood of this potential criticality accident sequence increased from "highly unlikely" to "not unlikely." This change in risk indicated a failure to meet regulations (the performance requirements of 10 CFR 70.61). Therefore, based on the event as reported, the license was operating with a likelihood of 1.0 event/year (not unlikely).

During the October 1 PEC, GNF-A provided three key facts regarding the circumstances of the event and the processes and equipment involved. The first fact was that the estimated probability of the initiating event for the accident sequence in the ISA Summary was conservatively set at 1. GNF-A provided information indicating that the estimate should be reduced to a frequency of 1.0×10^{-1} events/year (or less) based on the fact that the powder must form a void space that provides a pathway for steam to enter the unicorn in an amount of concern. The NRC evaluated this information and found no issues. Therefore, the NRC's analysis incorporated the required powder formation with the failure of the nitrogen purge to result in a sufficiently conservative 1.0×10^{-1} events/year frequency (or less).

The second key fact involved the hatch valves operation described as part of the Hatch Valve Pressure Indication IROFS 202-09. The hatch valves were interlocked such that they cannot be opened at the same time. GNF indicated that the protection factor assigned to IROFS 202-09 did not take the valve operation into consideration, and therefore additional credit can be assigned.

The NRC's evaluation of the entire scenario for the hatch valves system concluded that the overall hatch valve system offers significant protection from uncontrolled steam intrusion. Also of note, the hatch valve system did not fail as part of this event. However, the licensee designated the IROFS to be the pressure indication system to ensure that the hatch valve system remains operational and does not degrade. This IROFS acted as a management measure to ensure the overall operability of the hatch valve system. To compensate for the failure of this management measure, GNF-A provided additional data to demonstrate that the hatch valve system was thoroughly tested with functional test instructions. GNF-A also noted that operators were well aware of the hatch valves' function and purpose even though the system was not designated as an IROFS. Based on these observations, the NRC concluded that sufficient management measures were present for the hatch valve system to reach the same pedigree of reliability and availability as a designated IROFS. And since the hatch valve system remained reliable and available during the operation in question, the NRC concluded that the probability of failure of this control system can be credited at a conservative 1.0×10^{-2} (or less) even though the nitrogen pressure indication (essentially a management measure on the hatch valve control) was unreliable.

The third key fact involved the nitrogen purge for the lower feed screw. While not listed as a feature in the ISA summary, the nitrogen purge for the lower feed screw is described in the criticality safety analysis and operators are required to log the pressure once per shift. During

the PEC, GNF-A suggested that this control is equivalent to an administrative IROFS with a failure probability of 1.0×10^{-1} (or less). However, GNF-A did not provide sufficient testing, calibration, or training data to demonstrate the reliability and availability for this control. The lack of robust management measures indicated that the control did not meet all the requirements and pedigree of an IROFS as defined in the ISA Summary. Therefore, the NRC concluded that no protection factor would be applied based on this control.

In summary, the NRC's overall likelihood evaluation of the accident sequence using the revised initiating event frequency and crediting the Hatch Valve system was no more than 1.0×10^{-3} events/year (unlikely) using the most conservative values presented by GNF-A. In light of these conservative values, the NRC concluded that the accident sequence can be assigned a 1.0×10^{-4} events/year (highly unlikely) to account for the conditions and controls available during operation. The NRC determined that assessing the accident sequence to be "unlikely," while conservative, does not accurately reflect the process controls, enabling conditions, and the available and reliable controls in place that were still functioning.

Using the methodology in Inspection Manual Chapter (IMC) 2606, the NRC staff concluded that GNF-A used sufficient conservatism in their analysis and ISA such that crediting the actual conditions and controls in place (based on the discussion above) resulted in the licensee's recycle operations having sufficient controls to meet the performance requirements. Therefore, apparent violation regarding the failure to performance requirements is no longer valid.

However, multiple failures of management measures were identified that required corrective actions and a revision of the ISA is warranted to better reflect the controls and management measures in place (which GNF-A has stated is in progress). Per guidance in IMC 0616, the failures of management measures were more than minor as they constitute more than administrative performance deficiencies and resulted in a Severity Level IV (SLIV) violation of NRC requirements. Therefore, prior to March 31, 2014, GNF-A failed to establish management measures to ensure that IROFS were designed, implemented, and maintained as necessary to ensure they are available and reliable to perform their function when needed, contrary to 10 CFR 70.62(d) and License Application Chapter 11, Management Measures. Specifically, the licensee failed to establish adequate management measures involving the design of IROFS 202-08 and the configuration control of IROFS 202-09. In accordance with Section 2.3.2 of the NRC's Enforcement Policy, this licensee identified and corrected SLIV violation is being treated as a Non-Cited Violation (NCV).

The NRC has concluded that information regarding: (1) the reason for the violation; (2) the corrective actions that have been taken and the results achieved; and (3) the date when full compliance will be achieved is already adequately addressed on the docket in Inspection Report No. 70-1113/2014-006 and material presented at the October 1 PEC. Therefore, you are not required to respond to this letter unless the description herein 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 below.

If you contest the violation or the significance of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001, with copies to: (1) the Regional Administrator, Region II; (2) the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

For administrative purposes, AVs 70-1113/2014-007-01, 70-1113/2014-007-02, and Licensee Event Report 70-1113/2014-002, Event Number 49969 are closed.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the NRC document system (ADAMS). ADAMS is accessible from the NRC website at <http://www.nrc.gov/reading-rm/adams.html>.

Should you have any questions concerning this letter, please contact me at (404) 997-4629.

Sincerely,
/RA/

Marvin D. Sykes, Chief
Projects Branch 2
Division of Fuel Facility Inspection

Docket No. 70-1113
License No. SNM-1097

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North Carolina Department of Health and Human Services
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Radiation Protection Section
Electronic Mail Distribution

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