



Global Nuclear Fuel

A Joint Venture of GE, Toshiba, & Hitachi

Global Nuclear Fuel

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SPM 11-034

August 12, 2011

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

Attn: Document Control Desk

Subject: 30-day Report of Event – Criticality Accident Alarm System Degradation

References: 1) NRC License SNM-1097, Docket 70-1113
2) GNF-A Event Reports 47047, 47061, 47066, 7/13/11, 7/15/11, 7/17/11

Dear Sir or Madam:

In accordance with 10CFR70.50(c)(2), Global Nuclear Fuel – Americas L.L.C. (GNF-A) hereby submits the required written report for the events regarding a criticality accident alarm system (CAAS) degradation. These events were reported within 24 hours by telephone to the NRC Operations Center in accordance with 10 CFR 70.50(b)(2).

The applicable information required by 10 CFR 70.50(c)(1) was submitted by facsimile following each report on July 13, 2011, July 15, 2011, and July 17, 2011. These reports are included as Attachment 1.

Additional information is provided as follows:

Event Details and Safety Significance

At approximately 1730 on 7/12/2011 during a regularly scheduled test of the inside Criticality Accident Alarm System (CAAS) covering the Fuel Manufacturing Operation (FMO), it was discovered that the evacuation signal in a ChemMet lab sample prep room was inaudible. Immediate and effective measures were taken to ensure the evacuation signal was audible in the sample prep room, although these measures were inconsistent with the nuclear safety horn test instruction. The evacuation signal was audible in all other areas inside the CAAS. The inaudible horn condition was reported within 24 hours at 1712 on 7/13/2011.

During the performance of a follow-up CAAS audibility test in FMO, it was discovered at ~1655 on 07/14/2011 that the system failed to immediately activate the horn evacuation signal as required. System detectors responded as expected; however, activation of the associated warning horns was delayed approximately 3 minutes. This response time to activate horns did not meet the system design requirement to immediately activate. Additionally, a review determined an approximately 3-minute horn signal delay was noted in the previous test on 7/12/11. The delay in horn activation caused the CAAS to be unable to perform its intended function to mitigate the effects of an inadvertent criticality event and this condition was reported within 24 hours at 1615 on 7/15/2011.

As a part of the corrective actions for the CAAS events reported on 7/13/2011 and 7/15/2011, GNF-A performed an investigation into the cause of the delayed audible alarm activation. The investigation determined a hardware failure caused a horn activation delay that existed at the time of the May and June 2011 functional tests and was not adequately identified and reported. This discovery was also reported within 24 hours at 1826 on 7/17/2011.

On 7/15/2011 an independent Root Cause Team was formed to initiate an investigation.

Probable Cause of Event

An investigation team conducted a review and determined the probable causes of the events included:

- A failed horn was identified as the direct cause of the inaudible horn in the lab area
- A component hardware failure in the horn activation system was identified as the direct cause of the horn activation delay
- The CAAS is maintained through routine response checks and scheduled functional tests conducted in accordance with internal procedures. However, these routine system verification tests were inadequate to identify the component failure in the horn activation system and insufficient questioning attitude contributed to the delayed identification of the condition.

Immediate Corrective Actions Taken

On 7/13/2011, an additional horn was installed in the ChemMet laboratory area and the horn was retested to ensure the evacuation signal was audible in the lab areas.

On 7/14/2011, in response to the horn activation system delay, the FMO operations were suspended, an immediate orderly shutdown of fuel production operations occurred, and all controlled access area (CAA) personnel were evacuated. In addition, the emergency organization was activated and only essential personnel, escorted by radiation protection personnel with a survey meter, were allowed into the CAA to perform periodic security and system checks. A formal EHS Stop Work Notice (SWN) was issued on 7/15/11.

Near-term Corrective Actions Taken

A component failure in the horn activation system control panel was identified and the control panel was repaired. Completed July 16, 2011

A CAAS comprehensive system test and horn audibility plan was developed and conducted to ensure system readiness and demonstrate it provided adequate warning capability in all areas. Completed July 24, 2011

Upon verification of the CAAS functionality, limited personnel were allowed by the Emergency Director to enter the CAA to perform authorized activities such as security patrols, radiation protection surveillance and limited fuel moves as necessary to maintain safe shutdown conditions. Completed July 26, 2011

The CAAS underwent extensive requalification tests to verify the system met regulatory and design requirements. The CAAS procedure to operate, maintain, and functionally test the integrity of the CAAS was revised to augment system verification requirements including response checks, signal activation response time, and horn audibility testing. A weekly verification test was implemented to assure the system successfully signals the Autocall horn signal activation system. Full personnel access to the CAA was approved. Completed July 31, 2011

August 12, 2011

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Upon completion of an operational self assessment and readiness review per an approved plan, the SWN was lifted and fuel manufacturing operations were authorized to resume. Completed August 5, 2011

In addition to the above corrective actions, during the operations shutdown period, designated Fuel Manufacturing personnel received additional training addressing human performance and safety conscious work environment.

Longer-term Preventive Actions

Complete and issue the final root cause analysis report and associated corrective/preventive actions. The report is scheduled to be completed by August 31, 2011.

If you have any questions regarding this matter, please contact me at (910) 819-5950.

Sincerely,


Scott Murray, Manager
Licensing & Liabilities

Commitments: None

Attachment 1: Event Descriptions

cc:

M. N. (Nick) Baker, NRC NMSS, Washington, DC
Mary Thomas, NRC RII Atlanta

Attachment 1

INAUDIBLE CRITICALITY WARNING SIREN (EN 47047)

"At approximately 1730 on 7/12/2011, a regularly scheduled test of the inside Criticality Warning System (CWS) covering the Fuel Manufacturing Operation (FMO) was conducted. It was discovered that a CWS warning horn in the ChemMet lab was determined to be inaudible. Compensatory measures were immediately implemented. All other horns of the inside CWS in all other areas were functional and clearly audible. The affected area will remain shut down pending an investigation and implementation of additional corrective actions. The event is being reported within 24 hours pursuant to 10CFR70.50(b)(2) as a safety equipment failure. A CWS warning horn in the ChemMet lab was determined to be inaudible. All other CWS warning horns operating correctly. Investigation results pending. Affected area access was restricted. The faulty CWS horn has been replaced and tested."

Phillip Ollis, Acting Manager,
Licensing and Liabilities
1712 7/13/11

INOPERABLE CRITICALITY ACCIDENT ALARM SYSTEM WARNING HORNS (EN 47061)

"As part of the corrective actions for the event reported on 7/13/11 [EN #47047], GNF-A performed a Criticality Accident Alarm System (CAAS) audibility test covering the Controlled Access Area (CAA) at approximately 1655 on 7/14/11. The subsequent test revealed that the installed CAAS system failed to immediately activate the horn signal generators as expected. Activation of the associated warning horns was delayed approximately 3 minutes. This response time to activate horns did not meet the design requirement. Additionally, a review determined an approximately 3 minute horn signal delay was noted in a previous test on 7/12/11. An investigation into these matters is ongoing.

"The FMO [Fuel Manufacturing Operations] complex fissile material process operations were suspended on 7/14/11 and personnel evacuated. The emergency organization was activated and efforts to troubleshoot the root cause in the horn signal activation circuit delay initiated. All production activities involving Special Nuclear Material are shut down.

"The installed CAAS is a safety-significant system and is maintained through routine response checks and scheduled functional tests conducted in accordance with internal procedures. These events are being reported pursuant to the requirements of 10CFR70.50(b)(2)."

Phillip Ollis, Acting Manager,
Licensing and Liabilities
1615 7/15/11

* * * UPDATE ON 7/17/11 AT 1826 EDT FROM OLLIS TO HUFFMAN * * *

The cause of the inoperable Criticality Accident Alarm System (CAAS) has been identified as a hardware failure - specifically a capacitor on a circuit board. The CAAS has been repaired and a comprehensive testing plan is under development. Continuing to withhold personnel from the Controlled Access Area and all production activities remain shut down. A root cause analysis and recovery plan is underway.

Attachment 1 (Continued)

PREVIOUS INOPERABILITY OF CRITICALITY ACCIDENT ALARM SYSTEM WARNING CIRCUIT NOT IDENTIFIED (EN 47066)

"As part of the corrective actions for the Criticality Accident Alarm System (CAAS) events reported on 7/13/11 (EN #47047) and 7/15/11 (EN #47061), GNF-A is performing an investigation into the cause of the delayed audible alarm actuation. The investigation has determined that this delay existed at the time of the May and June 2011 functional tests and was not adequately identified and thus not reported. The response time to activate the horns did not meet the design requirement for CAAS. These events are being reported pursuant to the requirements of 10CFR70.50 (b)(2)."

Phillip Ollis, Acting Manager,
Licensing and Liabilities
1826 7/17/11