



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION II  
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November 5, 2010

Mr. David B. Amerine  
President  
Nuclear Fuel Services, Inc.  
P. O. Box 337, MS 123  
Erwin, TN 37650

**SUBJECT: LICENSEE PERFORMANCE REVIEW PERIOD ADJUSTMENT**

Dear Mr. Amerine:

This letter is to notify Nuclear Fuel Services of the NRC staff's decision to adjust the current Licensee Performance Review (LPR) period. Originally, the LPR was to consider Nuclear Fuel Services' performance with regard to the safe conduct of licensed activities during the period of April 6, 2009 through April 5, 2010. The revised LPR period has been modified to the period beginning January 7, 2010, to December 31, 2010. The logic for this transition is described below.

The LPR process is described in NRC Inspection Manual Chapter 2604, "Licensee Performance Review," and defines the process used by the NRC staff to review a fuel cycle licensee's performance in maintaining adequate protection of public health and safety, the environment, and common defense and security. The results of such a review are intended to:

- provide an overview of licensee performance and identify programmatic areas that require improvement to NRC management using a systematic retrospective assessment of a licensee's performance regarding its ability to use licensed materials in a safe and secure fashion;
- inform licensees and the public of the results of the NRC's assessment; and,
- provide the NRC staff with a basis for adjusting the fuel cycle facility inspection program, including such areas as focus, frequency, and resources.

In 2009, Nuclear Fuel Services experienced a number of significant operational events, most notably the October 13, 2009, process upset in a bowl cleaning station in the uranium aluminum process in the Blended Low-Enriched Uranium preparation facility and the November 14, 2009, glove box fire in the Commercial Development Line. In response to these events and other concerns regarding plant safety performance, the NRC conducted additional inspections to review the underlying conditions that contributed to these events and performance concerns.

In response to the NRC staff's performance insights, the staff elected to perform an Interim Performance Review in December 2009. During this review, the staff concluded that Nuclear Fuel Services' performance warranted additional regulatory action to provide reasonable assurance that licensed operations were conducted in a manner that protected public health and safety and the environment. A redacted copy of the Interim Performance Review is enclosed. The resulting regulatory actions included the issuance of a Confirmatory Action Letter on January 7, 2010, (ML100070118) to document commitments that Nuclear Fuel Services made to improve plant safety. These commitments included shutting down production processes and not returning those processes to operation until additional NRC inspections had been completed. By way of Restart Readiness Assessments, the NRC verified that those commitments had been satisfied and several process lines were allowed to resume operation.

As a result of the NRC's concerns with operational safety performance at Nuclear Fuel Services, the NRC significantly increased the level of inspection and oversight of the facility. Between October 13, 2009 and November 5, 2010, the NRC has expended approximately 2,100 hours of additional inspection effort to ensure public health and safety. Each of the Restart Readiness Assessments included a public exit meeting to apprise the public of the results. The combined processes of the Interim Performance Review and the public exit meetings discussed above satisfy the fundamental assessment and communication objectives of the LPR program.

In order to determine the appropriate level of regulatory oversight needed at Nuclear Fuel Services based on current plant operational performance, the staff will adjust the LPR period so that it will consider licensee performance between January 7, 2010, and December 31, 2010. After the close of the adjusted LPR period, the staff will assess Nuclear Fuel Services' safety performance in accordance with the process described in Inspection Manual Chapter 2604. In addition, the NRC staff will use the findings of the most recent Safety Culture Board of Advisors report to inform its decisions on how to focus the emphasis of planned inspections and other near-term regulatory actions that are necessary to ensure that Nuclear Fuel Services takes the steps needed to establish and sustain a strong safety culture.

As before, the results of that assessment will be publicly released and the staff will present the assessment results to you in a public meeting. The time and location of that meeting will be provided to you and the public at a later date, within approximately 90 days after the close of the assessment period.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at [http://www.nrc.gov/reading\\_rm/adams.html](http://www.nrc.gov/reading_rm/adams.html) (the Public Electronic Reading Room).

D. Amerine

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If you have any questions, please contact Mr. Steven J. Vias, Chief, Fuel Facilities Inspection Branch 1 at 404-997-4560 or via e-mail at [steven.vias@nrc.gov](mailto:steven.vias@nrc.gov).

Sincerely,

**/RA/**

Anthony T. Gody, Director  
Division of Fuel Facility Inspection

Enclosure: As stated

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Distribution w/encl: (See page 4)

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ADAMS: X Yes    ACCESSION NUMBER: \_\_\_\_\_                      X SUNSI REVIEW COMPLETE

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**Nuclear Fuel Services Interim Performance Review  
Senior Management Summary  
December 2009**

**Introduction:**

An Augmented Inspection Team (AIT) is currently reviewing the circumstances associated with an unexpected exothermic reaction that occurred within the Uranium Aluminum processing portion of the Blended Low Enriched Uranium (BLEU) Prep Facility (BPF) at NFS on October 13, 2009. The preliminary insights from the AIT, combined with a review of recent operations and performance, have led the staff to conclude that additional regulatory action is needed to provide reasonable assurance that the facility can be operated safely. The staff recommends that additional regulatory action be taken prior to restart of NFS process lines. The specific recommended regulatory actions that should be considered for implementation prior to restart of the NFS process lines (all of which are currently shutdown for an annual scheduled holiday shutdown) are discussed below and in Attachment 1.

**Background and Recent Experience:**

**Confirmatory Order Issued February 21, 2007:**

In late 2006 and early 2007, the NRC considered escalated enforcement action against NFS to address a number of apparent violations. The issues under review at the time included six apparent willful and non-willful violations of safety and security requirements. The NRC participated in the Alternate Dispute Resolution process with NFS on the apparent violations and, as a result, concluded the following:

- (1) Past disposition of violations via the enforcement policy had not resulted in NFS' development of corrective actions capable of preventing recurrence of violations;
- (2) A deficient safety culture at NFS appeared to be a contributor to the recurrence of violations; and
- (3) A comprehensive, third party review and assessment of the safety culture at NFS represented the best approach for the identification and development of focused, relevant and lasting corrective actions.

To resolve the pending escalated enforcement cases, the NRC and NFS agreed to the issuance of a Confirmatory Order in which NFS committed to a number of actions, including: (a) conducting a baseline assessment of safety culture by an independent assessment party; (b) establishment and implementation of a safety culture improvement plan; (c) a follow-up independent assessment of safety culture; and (d) submittal of a license amendment request to address requirements for configuration management.

**Overall NFS Performance Since Issuance of the Confirmatory Order**

**Licensee Performance Reviews – February 2007 through August 2009**

Since issuance of the Confirmatory Order in February 2007, NRC has completed four Licensee Performance Reviews at NFS. In these performance assessments, the staff noted that NFS continued to implement its safety culture improvement plan and identified opportunities for improvement in several functional areas. In the most recent LPR, issued in August 2009, the staff identified multiple facets of NFS' correct action program (CAP) that warrant improvement.

**Problem Identification and Resolution Inspection – June 2009**

The specific elements of NFS' CAP that warrant improvement were identified during inspections conducted throughout the period, including a Problem Identification and Resolution (PI&R) inspection conducted between April and May 2009. The PI&R team identified (a) inconsistent use of extent of condition reviews; (b) weakness in determining and implementing corrective actions based on the number of recurring issues identified; (c) corrective actions that focus narrowly on repairing broken equipment without broadening the scope of corrective actions to address reasons why equipment failed initially; (d) weakness in documentation of apparent cause investigations; and (e) inconsistent implementation of corrective action effectiveness reviews.

**Enforcement History (2007-2009)**

The staff reviewed enforcement actions between 2007 and 2009 (i.e., since the issuance of the Confirmatory Order). NFS has been the subject of a number of enforcement actions with regard to process safety controls that provide insight as to the effectiveness of their safety culture improvement initiative and configuration management process, including:

- (1) Failure to ensure effectiveness of the combustible control program inspections that were identified as an IRCFS (procedural controls were not adequate to prevent repeated occurrences of excessive combustible loading);
- (2) Failure to adequately demonstrated subcritical margin under for all normal conditions associated with the BPF bowl cleaning station;
- (3) Failure to identify the impairment of the sprinkler system (an IROFS) during roof replacement activities due to an inadequate implementation of the safety review and change control program; and,
- (4) Failure to implement the "toll-gate" (configuration management tool) process that required documentation of design goals and meetings to determine the requirements for engineering projects.

The staff noted that although escalated enforcement action has been taken since 2007, the violations involved legacy issues whose contributing causes preceded the issuance of the confirmatory order and, therefore, did not reflect current safety performance.

**Commercial Development Line (CDL) – Recent History**

NFS commenced operation of the Commercial Development Line in the summer of 2009. The line processes excess UF6 under a contract with the Department of Energy (DOE) and downblends it for shipment in various forms to DOE or commercial fuel fabricators.

**Operational Readiness Review:** The staff conducted an operational readiness review of the CDL in June 2009. The staff identified one significant design inadequacy with regard to accident scenarios for certain process columns. The staff also identified that NFS had to be prompted to conduct a root cause analysis and identify long term corrective actions.

**CD Line Glove Box Fire – November 2009:** The CDL experienced a process upset in November 2009. In that event, the licensee experienced an unexpected fire which damaged portions of a glove box containing a cylinder of UF6. The staff is currently inspecting the circumstances of the event. In addition, the staff is currently inspecting a potential precursor event that occurred several days prior to the event and was less than thoroughly evaluated by the licensee. It should be noted that the CDL event (and potential precursor) occurred during the time that the NRC AIT was underway.

**Inaccurate Response to Notice of Violation**

In a letter dated November 13, 2009, NFS informed the NRC that a response to a Notice of Violation previously submitted in October 2008 was not accurate. [REDACTED]

**Augmented Inspection Team (AIT) (Ongoing; October 2009 – present)**

On October 13, 2009, NFS experienced an unanticipated exothermic reaction within the Uranium-Aluminum portion of the BLEU Prep Facility. The NRC dispatched a Special Inspection team and subsequently elevated its response to an Augmented Inspection Team when the licensee evaluated the event as having potentially been a high consequence event under certain circumstances.

**Preliminary AIT Conclusions (As of December 17) – Partial List**

- (1) The change management process was not adequately implemented because of perceived production pressure, poor communication, a lack of questioning attitude, and a lack of management oversight. The AIT assessed that adequate change management processes were in place prior to the October 13 event, if used as written and intended, could have prevented the event.
- (2) NFS' initial decision to initiate system recovery actions on October 13 lacked a detailed evaluation, with an adequate technical basis, and appropriate management review until NRC questioned the basis for the planned actions.
- (3) NFS' decision to restart the U-Aluminum process on November 30 lacked a rigorous technical basis and appropriate management review.
- (4) NFS' Integrated Safety Analysis (ISA) was not adequate to meet the performance requirements in 10 CFR 70.61, in that, a high consequence accident scenario (NO<sub>x</sub> generation in the U-Aluminum process) did not have a sufficient number of IROFS identified and implemented. In addition, NFS did not identify IROFS for several accident scenarios in fuel manufacturing, U-oxide, U-aluminum, and the CD line processes involving NO<sub>x</sub> generation that required IROFS to meet the performance criteria.

**SUMMARY OF KEY ISSUES:**

Based on the staff's interim performance review, including the preliminary conclusions of the AIT, Region II has concluded that the licensee should, as a minimum:

- (1) Complete a functionality assessment of IROFS BUA-43 (sodium nitrate flow switch) prior to restart of U-Aluminum;
- (2) Complete their causal analysis of the organizational causal factors that contributed to the October 13 process upset event;
- (3) Complete the extent of condition review for the U-oxide process area;
- (4) Complete an extent of cause review for each of the identified causal factors;
- (5) Identify appropriate near and long-term corrective actions to address each of the causal factors;
- (6) Evaluate the cause(s) and implement specific corrective actions for the failure to complete comprehensive root cause, extent of condition and extent of cause analyses without significant prompting by the NRC;



- (7) Evaluate the cause(s) and implement appropriate corrective actions for the failure to identify and implement appropriate corrective actions to address the causal factors for the event prior to making the decision to restart potentially affected processes;
- (8) Identify and implement IROFS for NO<sub>x</sub> generation accident scenarios in fuel manufacturing, U-oxide, U-aluminum, and the CD line processes.

**Conclusions and Recommendation**

In view of the events, inspections and assessment described above, the staff has concluded that additional regulatory action is required to provide reasonable assurance that NFS can be operated in a manner that protects the public health and safety and the environment. Region II recommends that the NRC develop and issue a letter to confirm, as a minimum, NFS' commitment to the actions described in Attachment 1. NRC should:

- (1) Request that NFS submit a letter to the NRC with commitments to take specific actions to address the causal factors for the October 13, 2009, process upset event in the bowl cleaning station of the Blended Low Enriched Uranium Process Facility.
- (2) Evaluate the adequacy of NFS' written commitments.
- (3) Develop and execute a Communications Plan to support issuance of the Confirmatory Action Letter (CAL)
- (4) Issue a CAL confirming the agreed upon commitments.
- (5) Conduct inspections to verify the adequacy of completed NFS commitments.

**Desired NFS Commitments Prior to Restart**

No.	Commitments	U-AI	U-Oxide	CD Line	Fuel Manufacturing
1	NFS institutionalize that granular, metallic “fines” material will not be processed in the U-AI process line	X			
2	NFS institutionalize identified, necessary improvements to the change control process, which are currently delineated in a temporary procedure that expires in mid-January, and train staff and management on the changes	X	X	X	X
3	NFS complete their causal analysis for the October 13 process upset event (Note: NFS informed the NRC that they completed this on December 14, but it has not been inspected by the AIT)	X	X	X	X
4	NFS identify and implement specific near-term corrective actions to address each of the identified causal factors that contributed to the event	X <sup>1</sup>	X <sup>1</sup>	X <sup>1</sup>	X <sup>1</sup>
5	NFS complete an extent of condition review for the October 13 process upset event in U-Oxide (Note: NFS already completed a review of the appropriate areas in U-AI, CD line and fuel manufacturing, which were reviewed by the AIT)		X		
6	NFS complete an extent of cause analysis for each of the causal factors identified by the licensee, and identify and implement specific interim corrective actions	X <sup>1</sup>	X <sup>1</sup>	X <sup>1</sup>	X <sup>1</sup>
7	NFS evaluate each accident scenario involving NOx generation to verify that appropriate IROFS are identified and implemented, and that management measures for those IROFS are sufficient to ensure that each IROFS is available and reliable to perform its intended function when needed.	X <sup>1</sup>	X <sup>1</sup>	X <sup>1</sup>	X <sup>1</sup>
8	NFS will subject each of these commitments to an independent implementation and effectiveness review prior to providing them for NRC inspection	X <sup>2</sup>	X <sup>2</sup>	X <sup>2</sup>	X <sup>2</sup>
9	NFS will allow sufficient time for the NRC to inspect NFS’ implementation of these commitments prior to restarting any process	X <sup>3</sup>	X <sup>3</sup>	X <sup>3</sup>	X <sup>3</sup>

**Desired NFS Commitments Not Tied to Restart**

<b>No.</b>	<b>Commitments</b>
10	NFS evaluate the cause(s) and implement specific corrective actions for the failure to complete comprehensive root cause, extent of condition, and extent of cause analyses without significant prompting by the NRC
11	NFS evaluate the cause(s) and implement appropriate corrective actions for the failure to identify and implement appropriate corrective actions to address the causal factors for the event prior to making the decision to restart potentially affected processes
12	NFS identify and implement specific long-term corrective actions to address each of the identified causal factors that contributed to the October 13 process upset event

Notes:

1. NFS could conceivably prioritize and complete actions necessary to restart any one process while continuing to work on the others.
2. In this context, appropriately qualified individuals in the areas that are being assessed who have not been responsible for conduct or oversight of activities at NFS would satisfy the meaning of independent. Therefore, in addition to qualified individuals who do not work for B&W, individuals who work for B&W, but have not been responsible for conduct or oversight of activities at NFS could be considered independent. It is anticipated that B&W would use a mix of both external and B&W qualified individuals to meet the independent commitment.
3. NFS should plan to allow at least two weeks from notification of their readiness to completion of the necessary inspections.