

Reviewed:

70-143/2005-010-07 IFI Criticality Alarm unit failed with no detection

IFI involved RMS-3 criticality monitors resetting to their default configuration. The investigation into the issue was reviewed by the inspector and was determined to be adequate. The root cause was determined to be incompatibility between the RMS-3 units and an accompanying software package called RADNET, and the licensee had discontinued use of this software. This item will remain open to track the licensee's long term resolution.

03/09/06

NRC Inspection Report 70-143/2006-006 and Notice of Violations, Mar. 13 through Mar. 17, 2006. March 6, 2006, Accidental Spill of 37 liters (9 gallons) of high-enriched uranium

Failure to notify the NRC in accordance with 10 CFR 70, Appendix A, (a)(4)(ii) reporting requirements (Paragraph 2)

Failure to verify proper installation of the tray dissolver filter enclosure drains prior to use of the system with fissile material (Paragraph 4)

Failure to meet the performance requirements of 10 CFR 70.61 (d) for accident sequences related to handling fissile material in the tray dissolver system (Paragraph 4).

Failure to meet the performance requirements of 10 CFR 70.61 (d) for accident sequences related to fissile solution accumulation on the solvent extraction room floor (Paragraph 4).

Failure to assume that fissile solution could be misdirected from the solvent extraction feed transfer line in NCS analysis for the tray dissolver system (Paragraph 4).

Failure to ensure that process systems not approved for use were isolated from active SNM-bearing systems and failure to implement facility change process requirements of 10 CFR 70,72 (Paragraph 5).

Failure to use a valid procedure to conduct licensed activities (Paragraph 5).

Failure to report the events concerning the yellow solution in the 2M05 enclosure in accordance with the requirements of Section 5.1 of NFS-GH-65 (Paragraph 5).

03/18/06

Confirmatory Action Letter. Spill of 37 liters (9 gallons) of High Enriched uranyl nitrate, **ML073060169.** **Note: This document was not available to the public in 2006.**

03/28/06

License Performance Review, Jan. 23, 2005 and ending Feb. 4, 2006, **ML072490009**. NRC found areas needing improvement in four of the five performance areas, including problems identified in the previous LPR period associated with implementing the criticality safety analytical process, implementing the safeguards program, and management oversight of operations. To date, your efforts have not resulted in consistent conduct of licensed activities in accordance with regulatory requirements.

PERFORMANCE AREA: SAFETY OPERATIONS (Chemical safety, nuclear criticality safety (NCS), plant operations, and fire safety):

a. NCS analyses that adequately reflect license requirements and identify appropriate scenarios and control:

- 70-143/2005-205-05 VIO Failure to prohibit use of a positive bias in calculating upper safety limits (USLs); the method approved in the license assumes any positive values of bias to be equated to zero**
- 70-143/2005-208-01 VIO Failure to discuss the actual safety limit based on a neutron multiplication factor of 0.98, where the license limited the neutron multiplication factor in such cases to 0.95**
- 70-143/2005-203-01 VIO Failure to implement/establish a criticality safety control identified in the safety analysis for the uranium-aluminum (U-A1) hydrogen dilution ventilations system.**
- 70-143/2005-208-03 VIO Failure to establish an appropriate concentration safety limit for a non-uniform aqueous solution in the waste water treatment facility (WWTF).**

NRC identified a poorly controlled modification of a process enclosure drain. These enclosure drains may have been identified as credited safety features in the process analysis (Inspection Report (IR) 2005-008).

NRC identified various inconsistencies and deficiencies found in validation reports and analyses involving verification of normality of benchmarks, definition of the area of applicability, and calculation of the upper safety limits (USLs) (IR 2005-205).

b. Management oversight of operations and operational changes

- 70-143/2005-001-01 VIO Failure to conduct down-blending operations in accordance with an approved temporary**

procedure due to the lack of awareness of disabled safety system.

- 70-143/2005-002-01 VIO Failure to remove danger isolation tags prior to system operation of testing on the high-enriched uranium (HEU) storage columns in the 333 building.
- 70-143/2005-003-01 NCV Failure to store special nuclear material (SNM) in its authorized location due to confusion over identical storage racks.
- 70-143/2005-003-02 NCV Failure to rework U-Al process caustic waste solution according to procedure led to a transfer to the ventilation system (Event Number (EN) 41651)
- 70-143/2005-004-01 URI Licensee employee transferred raffinate solvent extraction waste into a solvent extraction boil-down condensate storage area using a temporary hose, which was not covered by approved, written procedures.
- 70-143/2005-008-02 VIO Failure to place the lock and tag on the single energy isolation point, prior to performing work on the equipment was a violation of procedures.
- 70-143/2005-010-03 NCV Failure to have personnel present in the building during the operation of the Uranium-Metal (U-M) dissolvers for approximately one hour, contrary to procedural requirements.
- 70-143/2005-010-04 NCV Failure to comply with criticality safety postings, which restricted the number of drums stored in the QC vault.
- 70-143/2005-011-01 NCV Failure to leak-test the Area 800 components when required by the operating procedure.
- 70-143/2005-011-03 NCV Failure to close an open container when it was left unattended.
- 70-143/2006-001-01 NCV Failure to comply with criticality safety instructions.

PERFORMANCE AREA: RADIOLOGICAL CONTROLS (Radiation protection (RP) environmental protection, waste management, and transportation)

c. Formality and discipline in implementing the RP program:

- 70-143/2005-002-04 VIO Failure to control work in contaminated areas within the Blended Low Enriched Uranium (BLEU) Preparation Facility (BPF) with written procedures.**
- 70-143/2005-007-01 VIO Failures (two examples) to properly control and release radiation work permit (RWP) areas, involving missing boundary tape in controlling an area and no final surveys before releasing an area.**
- 70-143/2005-007-02 VIO Failure to ensure an employee's urine sample was collected within the required time frame and, accordingly, to deny that employee access to the BLEU protected area.**
- 70-143/2005-007-03 VIO Failure of plant staff to don full-face respirators or evacuate according to procedure.**
- 70-143/2005-010-06 VIO Failures (four) to comply with RWP instructions involving inadequate RWPs, incorrect personal protective equipment (PPE), improper posting of an area, and poor final close out surveys.**
- 70-143/2005-011-02 NCV Failure to post the RWP at the job site.**
- 70-143/2006-001-03 VIO Failures (four) to follow RSP requirements involving the failing to wear PPE.**

No radiation controls were established for excavation work adjacent to the WWTF, which had been controlled as a Radiologically Controlled Area when previously excavated and filled with fresh gravel. The area was subsequently released under NFS-GH-15, Covering Plant Surfaces (IR 2006-001)

d. Quality assurance (QA) of packaging components important to safety; specifically, the conduct of quality assurance audits and the control and effectiveness of the procurement control program.

- IR 71-0249/2005-201 VIO Failure to perform audits of the Transportation QA program during the last three years addressing all applicable criteria of Subpart H of**

10 CFR Part 71, using appropriately trained personnel not having direct responsibilities in the areas audited (Severity Level IV Violation).

IR 71-0249/2005-201 VIO NFS issued PO0412052298 on 12/6/04 without prior QA approval of the requisition and without including the mandatory quality requirement for nonconformance disposition (Severity Level IV Violation).

IR 71-0249/2005-201 VIO PO0412052298 issued by NFS on 12/6/04, failed to specify that the provisions of Part 21 applied to the procurement (Severity Level IV Violation).

IR 71-0249/2005-201 VIO Failure to adequately evaluate and qualify Century Industries for design, testing and fabrication activities performed under PO0303038655 (Severity Level IV Violation).

PERFORMANCE AREA: FACILITY SUPPORT (Maintenance and surveillance, training, emergency preparedness, and management controls.

e. Utilization of the problem identification and corrective action program.

70-143/2005-009-02 AV Ineffective corrective actions, highlighted by a shallow root cause investigation, and failure to follow through on recommended evaluations and corrective actions (part of Apparent Violation (AV), Enforcement Action (EA) 2005-180, Severity Level (SL)-III, Civil Penalty (CP).

Operational experience from similar past events not utilized:

a. No verification that the discard block and bleed valve were locked shut prior to performing a transfer operation between banks. (Associated with VIO 2005-002-02), (Similar to events documented in IRs 2002-205 and 2004-001).

b. No signature verification that the discard valve was shut and locked as required, and no verification that the valve lineup was correct prior to initiating recirculation of the system. (Associated with VIO 2005-010-05).

NRC- and licensee-identified issues were not entered into the corrective action program until requested by inspectors. The inspectors noted several issues, which had been identified by NRC inspectors and discussed with licensee management which were not entered into PIRCS until inspectors made repeated inquiries. On

each separate issue, inspectors had to either make repeated requests for information or point out to senior management that no entry was yet made in PIRCS (IR 2005-007).

Two corrective action program entries related to radiation protection issues were not made until requested by the inspectors. One entry resolved a RP violation by incorrectly documenting that no violation occurred - corrected after the inspectors reviewed the item (IR 2006- 001).

f. Engineering design, verification, and configuration control, predominantly in BPF:

- 70-143/2005-010-02 AV **The design basis of the U-AI enclosure drain safety system was inadequate, in that enclosure vacuum was not considered (EA 2006-018).**
- 70-143/2005-001-03 VIO **Failure of the safety related equipment program logic controller to be capable of performing the criticality safety purpose for which it was specified.**
- 70-143/2005-008-01 NCV **Failure to analyze required environmental effluent samples in the BLEU complex sewer.**
- 70-143/2005-008-01 VIO **Failure to maintain configuration control due to lack of use of engineering change notices.**
- 70-143/2006-001-02 NCV **Failure to correctly set the 333 Building solvent extraction condensate inline monitor to a non-conservative value.**

The licensee discovered a criticality safety concern, in that the wet off gas line for the raffinate column in the uranium recovery area was not adequately sized to prevent pressurization of the system (IR 2005-008, EN 41197).

A weakness was identified in that only out-of-date configuration drawings were available in the BPF (IR 2005-010).

The licensee identified a **failure** mode for an IROFS that was not recognized in the design process when the in-line monitor failed but the process continued to run (IR 2005-011).

The NRC identified a **failure** to recognize a potential NCS precursor during review of an internal event (IR 2005-207). An investigation identified potential NCS control **failures** resulting in fissile solution accumulation in the BLEU U-AI dissolution process off-gas system (IR 2005-207).

g. Reliability of the Criticality Alarm System:

The large number of trouble alarms and false high radiation alarms due to electrical problems (IR 2005-003).

70-143/2005-010-07 IFI New radiation monitors reset themselves to factory defaults and rendered one detector pair inoperable with no indication of system trouble or fault.

Criticality alarm system inoperable in the NDA/Loading dock area due to detector failure (Retracted EN 42047).

NRC EN 42226 involved a relay failure for a criticality detector in the Oxide Conversion Building, which rendered the detector pair inoperable. A 10 CFR Part 21 report was submitted (IR 2006-001).

PERFORMANCE AREA: SAFEGUARDS (Material control and accounting (MC&A), physical protection, and classified material/information security).

i. Control of Strategic Special Nuclear Material (SSNM) through procedural adherence:

70-143/2005-202-01 AV Failure to properly control an SSNM item (EA 2005-093, SL-III/CP).

70-143/2005-012-03 VIO Failure to properly control SSNM.

70-143/2005-009-01 VIO Failure to properly control SSNM.

70-143/2005-009-02 AV Failure to properly control SSNM (EA 2005-180).

70-143/2005-013-04 URI Two examples in which the licensee failed to properly control SSNM.

04/18/06 NRC Inspection Report 70-143/2006-002 and Notice of Violation, **Two (2) Severity Level IV, Feb. 5, 2006 through Mar. 18, 2006, ML081490350 (corrected copy).**

Note:

Original report dated April 17, 2006 (ML081490105) stated on Page 1 of Letter "Violation B is being cited because **licensee investigations were not completed**

and corrective actions were not identified as of the time of the date of the exit meeting for this report.”

Corrected copy states “Violation B is being cited because **specific** corrective actions **to prevent recurrence of the event** were not identified as of the date of the exit meeting for this report.”

Several other changes and additions are contained in the corrected copy.

Open:

70-143/2006-002-01 VIO Failure to comply with configuration control

On Jan. 3, 2006, the licensee **failed** to comply with the **change control process** during modifications to the (R) detection system, in that:

1. Licensee **failed** to ensure that changes to the as-built condition did not impact the safety of the SSC, in that a fail-safe feature of the system was defeated by a change in system components.
2. Licensee **failed** to verify that an active engineered control identified as SRE was properly installed upon completion of maintenance, in that the functional test did not identify the non-availability of a system fail-safe feature.
3. Licensee **failed** to obtain work acceptance approval and **failed** to obtain review and approval for changes, for work completed under a Minor 2 work request prior to use of equipment.

70-143/2006-002-03 VIO Failure to comply with (R) requirements from a controlled area

On Feb. 13, 2006, visiting personnel and licensee escorts failed to remove shoe covers and step across the line/barrier as required, in that they removed anti-contamination clothing inside the controlled area of the Blue Preparation Facility with no step-off barrier established.

70-143/2006-002-02 URI Electrical Schematic Configuration Control

70-143/2006-002-04 URI Review of Contaminated Scaffolding

Closed:

70-143/2003-010-01 VIO Failure to comply with storage requirements and maintain station limit postings

70-143/2005-002-04 VIO Failure to control work by an operating or

Radiation Work Permit (RWP) procedure in a posted contaminated area (R)

70-143/2005-007-02 VIO Failure to submit bioassay

70-143/2005-007-03 VIO Failure of individuals to utilize respirator (R) when process ventilation was lost

04/21/06

Notice of Severity Level III Violation and Proposed Imposition of Civil Penalties in the amount of \$32,500, was issued to Nuclear Fuel Services, Inc. (NFS) NRC: Escalated Enforcement Actions Issued to Materials Licensees, <http://www.nrc.gov/reading-rm/doc-collections/enforcement/actions>

This action is based on a Severity Level III problem associated with **two violations**. The **first** violation involved the failure develop and implement a design for **the uranium-aluminum enclosure overflow system** which provided that Items Relied on for Safety (IROFS) would be reliable and available to perform their function when needed. The **second** violation involved the failure to report a condition that resulted in the facility being in a state that was not analyzed, and which resulted in failure to meet the performance requirements or 10 CFR 70.61.

04/21/06

NRC Inspection Report 70-143/2005-010, Oct. 2, 2005 through Nov. 12, 2005, Notice of Violation (NOV), **Severity Level III Problem**, and Proposed Imposition of **Civil Penalty - \$32,500**, (EA-06-018), Event Report 42133, **ML081500190**. Severity Level III Problem and \$32,500 Civil Penalty was issued on October 24, 2005 (EA-05-093). **Licensee has been subject of escalated enforcement action within the last 2 years.**

Failure to provide adequate assurance that items relied on for safety (IROFS) would be reliable and available to meet **nuclear criticality safety** performance criteria.

Prior to Sep. 9, 2005, the licensee **failed** to develop and implement a design for the **(R) (uranium-aluminum)** enclosure overflow system, which provided adequate assurance that IROFS would be reliable and available to perform their function when needed. Specifically, the design of the enclosures for the **(R)** system (designated as an IROFS) was such that it may not have functioned properly during normal and credible abnormal conditions.

From Oct. 22, 2005 through Nov. 10, 2005, the licensee **failed** to report a condition that resulted in the facility being in a state that was not analyzed, and which resulted in failure to meet the performance requirements of 10 CFR 70.61. In this case, the condition involved the design of the enclosures for the Blended Low Enriched Uranium Preparation Facility overflow system, which may not have functional properly during normal and credible abnormal conditions.

The NRC has concluded that **criticality** is **NOT** highly unlikely under the expected and bounding process conditions that existed in the **(R)** enclosure, due to the failure to install the enclosure drains at the correct height. The **NRC considers the potential consequences of this event to be significant**. The NRC further notes these enclosures are present throughout the NFS facility and their **drains** are the only protection against the accumulation in them **(R)**. (See 10/21/05)

05/01/06

NRC Inspection Report 70-143/2006-203, Criticality Inspection, April 3 though 7, 2006, ML081490351. (**Note**: Inspection Report addressed to **Kerry Schutt, President and General Manager**)

Discussed:

70-143/2005-208-01 VIO Failure to discuss the actual safety limit relied on in wastewater treatment tanks to demonstrate subcriticality for normal and credible abnormal conditions

The licensee provided an approved criticality analysis for the wastewater process which uses defined and justified limits to establish mass controls for the wastewater tanks. **The inspectors noted that some licensee NCS and production staff were not yet aware that the control basis for the wastewater tanks had been changed to mass**. This items will remain open pending complete implementation of the **newly-defined mass limits**.

70-143/2005-205-01 IFI Tracks the licensee's revision of the (R) NCSE to clearly articulate the technical basis.

Licensee indicated that the NCSE is **expected to be revised by the end of 2006** at which time these change will be incorporated. This items remains open.

70-143/2005-208-02 IFI Tracks licensee actions to amend Safety Condition S-9 of the license to eliminate references to ANSI/ANS series standards and clarify the meaning of "published experimental data."

The licensee **has not initiated actions to resolve this item**.

Closed:

70-143/2005-208-03 VIO Failure to establish an appropriate concentration safety limit for non-uniform aqueous solution in Waste Water Treatment Facility (WWTF) tanks.

The licensee had been relying on a single-parameter critical limit, which was intended for use with uniform aqueous solutions when the solution being controlled was known to settle while in storage. The licensee provided an approved criticality analysis for the wastewater process which uses defined and justified limits to establish mass controls for the wastewater tanks and which does not reference the previous single-parameter limit. Inspectors determined that the licensee analysis adequately resolved the issue.

05/04/06 NRC Inspection Report 70-143/2006-07, April 3 through 7, 2006,
ML073060347.

Purpose of inspection was to independently assess and verify the information you provided and actions taken in the letter dated March 24, 2006 in response to the NRC's Confirmatory Action Letter No. 02-06-003 (dated March 18, 2006), **regarding the justification for continued operation of Naval Fuel Operations (NFO)**

70-143/2006-07-01 IFI Licensee's actions to address post-maintenance deficiency when safety control effects more than one system

An approved work request was noted to have a deficiency. Inspectors noted a planned work request that involved the modification of the carbon dioxide fire suppression system wiring to prevent shutdowns of (R). The work request stated that the interlock wiring for the carbon dioxide system would need to be modified. However, the work request was categorized as a Minor 2, which does not require a significant safety review, **even though significant safety systems were being affected**. When this issue was brought to the attention of the licensee, safety management indicated that this type of work should not be allowed on a Minor 2 work request.

Inspectors noted that the planned post-maintenance setting would not test the carbon dioxide system's interlocks, only those for (R). Thus, this work request affected the safety controls for two systems, however, the licensee did not recognize the need to functionally test one of them. When this was brought to the licensee's attention, the licensee agreed that there was a deficiency in the identification of all the applicable systems affected by this safety control. An Inspector Follow-up Item was opened to track the licensee's actions to correct this issue.

Other observations:

NFO Configuration Review:

Inspectors determined that the licensee did not place electrical schematics of

active engineered controls (AECs) under configuration control. Therefore, the licensee did not perform independent verifications or auditing of these configurations. The licensee essentially depended on the adequacy of post-maintenance testing to determine if AECs have been properly wired to respond to safety conditions. The inspectors found this to be a potentially **significant weakness in the licensee's configuration control program** due to the potential to have active engineered safety controls adversely affected. This issue was **identified in a previous NRC inspection report (70-143/2006-002)** and is being tracked as an unresolved issue.

Design Guidance Review:

Inspectors reviewed the licensee's available design guidance for engineers. The inspector found the guidance to be vague or non-existent in many areas. The bulk of the guidance simply gave reference to pertinent standards that should be consulted for material of construction and piping dimensions. **No guidance was found on how to properly design a system to prevent backflow into a process vessel. Also no guidance was found on how to properly account for process upset conditions.** The licensee had no specific requirements for design guidance to the engineering function, however the inspectors communicated this observed weakness to the licensee.

Licensee Audit and Corrective Action Program Review:

Minor issues found were simply passed along to the area owners and assumed to be addressed if the resources were available. Also, the inspectors noted that while the audits were independent, they were not implemented with a formal procedure. The inspectors attempted to verify the licensee's "reassessment of the safety controls" as stated in their response to the Confirmatory Action Letter No. 02-06-003, March 18, 2006. The inspectors discovered that a communication error had occurred and the statement actually referred to the Blended Low Enriched Uranium Preparation Facility instead of NFO.

Inspectors noted a lack of adequate response to certain events. Specifically, the inspectors noted an adverse trend regarding the blockage of the (R) resulting in the routine actuation of an IROFS (automatic shutdown due to high pressure). The licensee had identified the adverse trend; however, effective actions had not yet been taken to address it. Although not an immediate safety issue, the inspectors concluded that the licensee's acceptance of a routing challenging of an IROFS to be a poor operational practice.

Inspectors reviewed the licensee's actions leading up to a reportable event in (R) on (R). The event was reviewed to verify if opportunities for identification were missed. Based on interviews and documentation reviewed, the licensee did not miss an early indication of a potential event. (Event report not available)

(Inspectors: M. Crespo, D. Hartland, O. Lopez, T. Powell, N. Rivera; approved by D. Ayres, Chief, Fuel Facility Inspection Branch 1)

05/23/06

NRC Inspection Report 70-143/2006-003 and Notice of Violation, **Severity Level IV**, Mar. 19, 2006 through Apr. 29, 2006, **ML073060269**. (**Note:** Inspector reviewed **changes in senior management roles**, responsibilities and functions that will become **effective on May 1, 2008**. The Chief Executive Officer assumed the responsibilities of the president and plant manager with the former president being named as Executive Vice President for Site Services).

Note: The blended low-enriched uranium (BLEU) oxide conversion operations continued while the **BLEU Preparation Facility (BPF) operations were shutdown following the March 6, 2006 spill.**

Open:

70-143/2006-003-01 VIO Failure to follow criticality safety procedures

During a tour of the solvent extraction room on April 11, 2006, the resident inspector found a two-liter bottle setting under the stairs leading to the second story of the building (Bldg 333). The bottle contained what appeared to be cheesecloth and did not have a cap as required by procedure for unattended containers. **Failure** to ensure that an unattended container was properly sealed/closed, in accordance with procedure NFS-HS-CL-26, was cited as a violation of NRC requirements.

70-143/2006-003-02 VIO Violation A was a failure to develop and implement a design for the uranium-aluminum enclosure overflow system which would be reliable and available to perform their function when needed.

Violation B was a failure to report a condition that resulted in the facility not being able to meet the requirements of 10 CFR 70.61. This item is being opened as a mechanism to track closure of a previously identified and closed Apparent Violation (EA-06-018)

Closed:

70-143/2005-010-02 AV Violation A was a failure to properly design the enclosure overflow system. **Violation B** was a failure to report this design deficiency condition (EA-06-018).

NRC communicated to the licensee by letter dated April 21, 2006, that AV 70-143-2005-010-02 (involving improperly designed uranium aluminum process overflows, Event No. 42133) was a **Severity Level III violation**. Therefore, **AV 70-143/2005-010-02** is now considered closed and **VIO 70-143/2006-003-02** is opened for additional NRC followup and corrective action review (EA-06-018).

Inspectors reviewed Event 42131 concerning the **failure** of an Administrative IROFS in the Environmental Safety Program. **On Nov. 8, 2005, in the Building 330 Waste Water Treatment Facility (WWTF), a caustic solution transfer was made from tank 13 to 11, and the mass limit was exceeded for uranium.** The event was reported in the licensee's Problem Identification, Resolution and Corrective System (PIRCS). Licensee's initial corrective actions were to reinforce the importance of strict compliance with procedural guidance and review applicable IROFS. In addition, **new IROFS limits were revised** and implemented to establish consistent limits.

Inspectors reviewed Event 42089 concerning the **failure** of an Administrative IROFS (October 28, 2005) where following the transfer of the H caustic discard bank, the block and bleed valves were left open and not locked as required by procedure. As a result, approximately 270 liters of unsampled caustic discard solution from the H bank was transferred to the caustic discard tank immediately following a transfer of sampled solution from the G bank. Transfer of caustic solutions now must be made with the approval of the facility manager, operator and supervisor, each of whom must sign and date that the block and bleed valves are closed prior to transfer and again after a transfer.

05/31/06 NRC Inspection Report 70-0143/2005-004 and Office of Investigation Report 2-2005-029, **ML081500430**. Being considered for escalated enforcement.

On June 22, 2005, a Production Supervisor and a Maintenance Mechanic entered an RWP area to perform maintenance and repairs (R) without wearing a full-face respirator as required by RWP 05-04-032. NRC concluded that the actions of the two individuals were willful in that the individuals (1) had received RWP procedural training; (2) were familiar with the procedure which requires that all personnel read, comply with, and sign all RWPs; and (3) had received annual refresher training related to the RWP procedure and (4) stated that they observed the posted RWP and the yellow tape surrounding the RWP area.

06/09/06 NRC Inspection Report 70-143/2006-006, March 13-17, 2006. Special Inspection Team (SIT) Inspection, **ML072630328**. Purpose of the SIT was to review the causes and circumstances surrounding the inadvertent transfer on March 6, 2006.

The SIT determined that the event's immediate safety consequences were very significant in that operators were unaware that their actions could result in transfer of high-enriched uranium (HEU) to the filter enclosure. In addition, identification after the event of an **unsafe accumulation point (elevator**

pit) in the BLEU Preparation Facility (BPF) floor, raised significant safety concerns because solution leaks are a credible abnormal condition in the BPF, and the BPF floor is identified as an item relied on for safety to maintain solution leaks in a safe slab configuration. There were no controls in place to prevent a solution leak from entering the elevator pit. The SIT specifically noted that the Problem Identification and Resolution Correction System, Configuration Management, and Change Control Programs failed to prevent the event. **These issues are indicative of inadequate internal processes and ineffective management oversight.**

Opened:

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|--------------------------|------------|---|
| 70-143/2006-06-01 | APV | Failure to notify the NRC in accordance with 10 CFR 70, Appendix A, (a)(4)(ii) reporting requirements |
| 70-143/2006-06-02 | APV | Failure to verify proper installation of the tray dissolver filter enclosure drains prior to use of the system with fissile material. |
| 70-143/2006-06-03 | APV | Failure to meet the performance requirements of 10 CFR 70.61(d) for accident sequences related to handling fissile material in the tray dissolver system |
| 70-143/2006-06-04 | APV | Failure to meet the performance requirements of 10 CFR 70.61(d) for accident sequences related to fissile solution accumulation on the solvent extraction room floor. |
| 70-143/2006-06-05 | APV | Failure to assume that fissile solution could be misdirected from the solvent extraction transfer line in NCS analysis for the tray dissolver system. |
| 70-143/2006-06-06 | APV | Failure to ensure that process systems not approved for use were isolated from active SNM-bearing systems and failure to implement facility change process requirements of 10 CFR 70.72. |
| 70-143/2006-06-07 | APV | Failure to use a valid procedure to conduct licensed activities. |
| 70-143/2006-06-08 | APV | Failure to report the events concerning the yellow solution in the 2M05 enclosure in |

accordance with the requirements of Section 5.1
of NFS-GH-65.

07/07/06 NRC Inspection Report 70-143/2006-004, April 30, 2006 through June 10, 2006, ML073060562.

Most operations were halted prior to the **Union strike that began May 15, 2006. (350 hourly workers out of a total of 700 employees were affected by the strike). Limited fuel manufacturing** and scrap recover processes were operated throughout the reporting period to meet inventory requirements. Blended low-enriched uranium (BLEU) oxide conversion activities were stopped due to a loss of the criticality alarm system from a lightning strike. BLEU preparation facility (BPF) operations remained shutdown following the March 6, 2006 spill event. Decommissioning stopped due to the strike.

07/21/06 NRC Inspection Report 70-143/2006-205 and Notice of Violation, **Severity Level IV**, June 19 through 23, 2006, ML081490352

Opened:

70-143/2006-205-01 VIO Failure to have dual CAAS detector coverage at the WWTF

The monitoring system shall be capable of detecting a criticality that produces an absorbed dose in soft tissue of 20 rads of combined neutron and gamma radiation at an unshielded distance of 2 meters from the reacting material within one minute. Coverage of all areas shall be provided by two detectors. (10 CFR 70.24(a)(1)).

Contrary to above, on and before June 23, 2006, the criticality accident alarm system for (R) which cover (R) of the Waste Water Treatment Facility (WWTF) only had one detector in service.

The inspectors noted that (R) WWTF Victoreen criticality detectors started to alarm after a recent electrical storm and could not be reset. The licensee initiated a work request to repair the detector, but the licensee was unable to get the detector to function properly, and the inoperable detector was placed in an alarm status.

No further corrective actions were taken to replace or fix the detector. The licensee stated that this was because it did not have the parts to fix the detector, an old model that is no longer being manufactured. The inspectors examined the (R), which showed that the (R) was the (R) covering (R).

The inspectors noted that the inoperable detector had been in an alarm state since May 31, 2006. In addition, the inspectors noted that no compensatory measures

were taken during the time period in which there was only one functioning alarm in the area. Failure to have dual CAAS detector coverage is a Violation.

70-143/2006-205-02 IFI Tracks licensee review of its lightning protection system

Inspectors also noted that during the same electrical storm that disabled one of the WWTF Victoreen detectors, the audible alarm system for the BLEU complex CAAS was also disabled. This CAAS failure was not noted because the lightning strike had disabled both the alarm and the diagnostic panel that should have indicated alarm failure. Because the licensee was preoccupied with other effects of the lightning storm, the alarm failure was not noticed for several days. The licensee has since instituted a new requirements to perform a "lamp test" on the diagnostic panel every shift to ensure that it is still working properly.

Inspectors determined that the BLEU complex has lightning protection, but that the installed lightning protection failed to protect the CAAS equipment in this instance. Licensee will review design to see what enhancements can be made to the minimal features needed to meet the applicable codes.

70-143/2006-205-03 URI Splitting a downblending accident sequence into additional sequences

Closed:

70-143/2005-205-07 IFI Tracks commitment to maintain the current prohibition on the use of positive bias in procedure NFS-HS-A-63, and to clarify license commitments regarding calculation of k_{eff} and the use of positive bias.

Discussed:

70-143/2005-205-02 IFI Tracks determination of appropriate experimental uncertainties and the reason for the observed spread in k_{eff} (BLEU validations 54T-03-0054 and 54T-03-0009)

70-143/2005-205-03 IFI Tracks the impact of non-normality of (R) experiments on the 0.97 limit for LEU operations (BLEU validations 54T-03-0054 and 54T-03-0009 and failure to consider normality of data in other validations (HEU operation validations 54T-04-0043 and WRS-97-001)

70-143/2005-205-04 IFI Tracks specification of which materials cover

which portions of the area of applicability (AOA) in the BLEU validation reports (BLEU validations 54T-03-0054 and 54T-03-0009)

- 70-143/2005-205-05 IFI Failure to prohibit use of positive bias in calculating upper safety limit (USL) values for HEU operations**
- 70-143/2005-205-06 IFI Tracks commitment to revise the validation reports to correctly calculate the USL (BLEU validations 54T-03-0054 and 54T-03-0009, and any others affected)**
- 70-143/2005-205-08 IFI Tracks the licensee's determination of the appropriate bounds of the defined AOA in the validation reports covering HEU operations (HEU operation validations 54T-04-0043) and WRS-97-001)**
- 70-143/2005-205-09 IFI Tracks the licensee's resolution of inconsistencies between the validation reports and the procedure, and correcting the methods used to verify adequacy of the margin (HEU operation validations 54T-04-0043 and WRS-97-001)**
- IFIs 02 thru 09 (above) With the exception of 2005-205-07, licensee did not have any documentation that it had completed work on these IFIs**

08/14/06 NRC Inspection Report 70-143/2006-009, June 11, 2006 through July 22, 2006, ML073060398

Open:

- 70-143/2006-009-1 AV Failure to utilize required respiratory protection, (ref: EA-06-129)**

Closed:

- 70-143-2005-004-2 URI Failure to utilize required respiratory protection, (ref: EA-06-129)**

The inspector reviewed the licensee's **use of uranium hexafluoride (UF6) cylinders on site**. The use of UF6 cylinders was limited to small sample size cylinders (less than 7 kilograms of material) for research purposes. The UF6 cylinders present in the facility are kept in storage and once used, are disposed of. Therefore, the application of the information notices regarding UF6 cylinders did

not apply. Also, the use of the cylinders (in which the most recent case was several years ago) was noted to be adequate.

08/28/06 NRC Inspection Report 70-143/2006-011, June 5-9, June 19-23 and July 10-17, 2006, ML073060416

Two discrepancies which involved misplaced Safety Related Equipment (SRE) tags and equipment incorrectly labeled with “0” (zero) rather than the letter “O” were identified and corrected.

Rainwater was observed leaking through the roof and into the operating area in the BLEU Preparation Facility (BPF). Licensee management indicated roof leak repair attempts had been unsuccessful in the past, but that an engineering plan was under development to correct the problem. (**Note: This leaky roof was still being discussed in the NFS Safety Culture update to the NRC in March 2009 in Atlanta**).

An integrated SRE test plan had not been developed prior to NRC review.

Procedure Discrepancies:

Two locked valves were not identified as locked on P&ID 333-F0553-D.

An inlet line to Column 4A01 was not captured on the P&ID

In SOP 409, Section 16, step 6.5.5 (e) was missing the Process Logic controller (PLC) action. Also, there was no operator action to complete a step prior to recording a level reading.

P&ID 333-F0551 showed two instruments on the P&ID in the wrong location.

09/11/06 NRC Inspection Report 70-143/2006-012, July 24 through 28, 2006, ML073060434

SOP 409, Section 8, covered two different processes, which used the same equipment and had similar steps. The procedure had three sections (Steps 4, 5, and 6) and those sections were divided into “A” steps for U-metal and “B” steps for U-oxide. Also, there were steps in the SOP that referenced other steps. The inspectors concluded the steps and multiple references could easily confuse an operator. The issue was discussed with the SOP owner who planned to revise the procedure.

09/11/06 NRC Safety Inspection Report and Compliance Inspection, **71-0249/2006-201**, Notice of Violation, **Severity Level IV**, Sep. 11-13, 2006, ML062710015.

Purpose of inspection was to verify that NFS had taken appropriate corrective action for the concerns identified during the previous NRC inspection March 2005 (ML05116008) that resulted in the issuance of a NOV with four (4) non-compliances.

Based on the current inspection, the team determined that overall, NFS took adequate actions to address the March 2005 inspection issues. However, the team did identify a concern regarding document control that resulted in the citation of a Level IV Notice of Violation as documented in the attached Inspector Notes.

The team identified a concern with regard to corrective actions associated with Commitment ID 2220, one of the eight corrective actions associated with PR 5164. The corrective action completion status was shown as 100%. The associated corrective action was to make changes in several steps of procedure NFS-PUR-A-054 and to then issue the changes in Revision 3 to the document. **The team identified that Revision 3 was never issued even though the corrective action indicated 100% completion.** In actuality, a new procurement procedure had been issued that addressed the issues that would have been contained in Revision 3 to NFS-PUR-A-054.

However, the commitment report was never updated to reflect what had actually occurred. The team reviewed NFS-6H-922, "The NFS Problem Identification, Resolution and Correction System (PIRCS)," and assessed that it does not provide guidance on how corrective action commitments, once assigned, should be closed out. Specifically, it contains no guidance on whether required actions related to commitments must be implemented before commitment closure or if they can be closed based on the intent to implement an action. This observation was discussed with NFS management. The team learned that in the following week, NRC Region II inspection personnel would be at the site performing an inspection that included NFS's corrective action program. The team discussed their observation, with regard to corrective action closure, with the Region II team leader for that inspection and it was agreed that Region II would incorporate this information into their inspection.

Document Control

During the inspection, the team was provided a controlled hard copy of procedure NFS-GH-49, "Implementing Procedure for Transportation Quality Assurance Program," Revision 3. While reviewing document controls for Part 71-related procedures, the team noted that Revision 4 of NFS-GH-49 had been implemented September 8, 2005, and questioned why a controlled copy book still contained the superceded Revision 3. The team determined that when Revision 4 was issued, no distribution sheet had been prepared and no controlled hard copies had been distributed.

Further, the team determined that the NFS individual responsible for initiating the distribution sheet made a decision not to initiate the sheet because Revision 4 to procedure NFS-GH-49 was in the electronic procedure system. NFS initiated PR 8287, dated September 13, 2006, to document this condition. Also, on September 13, 2006, NFS notified all holders of the controlled copies of Revision 3 to NFS-GH-49 that Revision 3 should be replaced by Revision 4.

Procedure NFS-RM-008, "Document Control Procedure," Revision 6, Section 6.b, states, in part, that a distribution sheet is prepared and maintained identifying the document being distributed, number of copies made, to whom issued, and date of issuance. Section 6.c states, in part, that the copy number is written in red ink on the front of each copy. Section 6.e states, in part, that a master file of the current original document and the distribution sheet is maintained for each controlled document in the controlling department, and that these documents may be entered into the vital record systems for microfilming as instructed by the area manager/director.

10 CFR 71.111 states, in part, that a certificate holder shall prescribe activities affecting quality by documented procedures and shall require that these procedures be followed. The NRC identified on September 12, 2006, that, contrary to this requirement, the above requirements from NFS-RM-008 were not implemented by NFS, a certificate holder, when Revision 4 to NFS-GH-49, "Implementing Procedure for Transportation QA Program," was issued. NFS's **failure to perform the required actions of NFS-RM-008 when issuing Revision 4 to NFS-GH-49 is considered a Violation of NRC requirements.**

Other Issues:

The team reviewed facility postings to assess NFS compliance with the requirements of 10 CFR Part 21.6, and noted that Section 206 of the Energy Reorganization Act of 1974 was not posted as required. The team determined that Section 206 had been previously posted. However, due to recent construction activities affecting the bulletin board where the notice had been posted, Section 206 had been taken down but not replaced subsequent to completion of the activities. This issue was discussed with NFS management who stated the issue would be addressed and corrected. This issue constitutes **a violation of minor significance** that is not subject to enforcement action in accordance with Section IV of the Enforcement Policy.

10/02/06

NRC Inspection Report 70-143/2006-010, July 23-2006 through Sept. 2, 2006, **ML073040515.**

Open:

70/143/2006-02-01 URI Failure of the Bldg 306 diesel generator

Inspectors observed Building 306 diesel generator and uninterruptible power supply (UPS) testing on August 4, 2006. This testing resulted in a failure of the diesel generator to assume the electrical load from the UPS following a loss of offsite power. Removal of an electrical jumper from a control circuit board located within the UPS corrected the deficiency and the diesel generator was returned to service on August 9.

Inspectors also evaluated the licensee's semi-annual testing of the UPS and diesel generator performed on August 26. Although the diesel generator had successfully passed all its associated weekly and monthly testing since the new Building 306 UPS had been placed in service on January 14, based on discussions with the licensee, some tests did indicate difficulty in the diesel generator loading sequence. This **anomaly** was never identified in the Problem Identification, Resolution, and Correction System (PIRCS). **License Condition 6.3 requires emergency power for the criticality alarm system. Further, the emergency generators shall be tested for operability on a weekly basis.** Since the operability of the diesel generator could have been affected by the installed jumper for a period in excess of six months, this issue will be tracked as an Unresolved Item.

70-143/2006-10-02 IFI Spill in Building 302

Inspectors monitored the licensee's actions as a result of a spill in Building 302 on August 31. Inspectors monitored the cleanup efforts as well as the activities associated with the event response team. The licensee plans on completing a root cause report to address this issue and potential corrective actions. Pending further evaluation of this issue and assessment of the root case, this issue will be tracked for further NRC review as Inspector Followup Item (IFI)

Closed:

70-143/2006-02-01 VIO Failure to comply with configuration control requirements

Inspectors reviewed the corrective actions stated by the licensee in their response to violation, which involved modifications to the SRE Control program and Programmable Controller Configuration Control procedures. Inspectors reviewed the modifications to the procedures and found them to be adequate to prevent reoccurrence. As part of modifications, the IROFS and/or SRE function have to be part of the SRE test presentation when seeking test approval from the SSRC. Also, the Functional Requirement Definitions (FRDs) will be developed for any electrical logic design impacting SRE items. Inspectors verified that an FDR was developed for the combustible gas detection system. Item closed.

70-143/2006-11-04 URI Investigate overweight thorium shipment and implement corrective actions

Ten kilograms (approx 22 pounds) of natural thorium was shipped to LR International, Inc. on Nov. 11, 2005, under the provisions of 10 CFR 40.22. 10 CFR 40.22(a) limits domestic shipments of source material to a maximum of 15 pounds at a time (and up to 150 pounds a year). Package should have been offered under provisions of 10 CFR 110.22 since it was an international shipment to Holland. 10 CFR 110.22 authorizes international shipments of up to 10 kilograms of source material. Licensee determined that shipping personnel were in a hurry and interchanged the appropriate regulating reference, the correlating weight, and the proper weight units. Licensee re-instructed shipping personnel on 10 CFR 40.22 and 10 CFR 110.22 requirements and occasions for use. Item is closed.

11/07/06 Response to Notice of Violation 70-143/2006-205-01, (ML081490354)

This letter refers to your correspondence dated August 14, 2006, in reply to our July 21, 2006, Inspection Report and Notice of Violation (Notice). The violation in the Notice concerned failure to have dual criticality accident alarm system (CAAS) coverage of an area in accordance with 10 CFR 70.24(a)(1). Specifically the Notice was issued because Nuclear Fuel Services, Inc. (NFS), CAAS for which covers of the Waste Water Treatment Facility, had only one operable detector in service for the period May 31, 2006, to July 15, 2006.

You denied that a violation occurred, and your rationale for denial is based on your view that: (1) the two-detector coverage requirement in 10 CFR 70.24(a)(1) is to minimize false evacuation alarms in the event one detector fails and to ensure that detector coverage is maintained in the event one detector fails; (2) the regulation only requires two detectors for initial installation in each area of the facility; and (3) a violation does not occur any time a detector fails.

The U.S. Nuclear Regulatory Commission's (NRC's) position that follows addresses each of your reasons for denial of the violation as discussed above. Two-detector coverage minimizes false evacuation alarms in the event one detector fails and ensures that detector coverage is maintained in the event one detector fails: 10 CFR 70.24(a)(1) requires that coverage of all areas shall be provided by two detectors. The intent of the regulation is to minimize false evacuation alarms and provide for continued coverage in the event of single detector failure. Placing a detector in alarm status for an extended period of time increases the risk of loss of coverage over the area due to failure of the remaining operable detector. One operable detector covering an area for an extended period of time does not meet the intent of the regulation to ensure that reliable detector coverage for that area is maintained.

Two detectors are required only for initial installation in each area of the facility: This is an incorrect interpretation of 10 CFR 70.24(a)(1). The regulation states that areas that contain quantities of special nuclear material exceeding the values

stated require at least dual detector coverage and does not differentiate between initial installation and continued facility operation. By placing a detector in an "alarm" state for continued operation over an extended period of time does not meet the intent of the regulation to maintain two-detector coverage of the area.

A violation does not occur any time a detector fails: This statement is not fully reflective of what constitutes a violation of 10 CFR 70.24(a)(1). A violation occurs when one of the two detectors fails without timely implementation of compensatory measures.

The basis for the Notice is your decision to place a detector in an "alarm" state for continued operation over an extended period of time without taking compensatory measures or replacing the inoperable detector. As specified in Section 3.2.4.3 of your license (SNM-124), "Criticality Detection and Evacuation Alarm System," the evacuation alarm system will meet the guidance established in ANSI/ANS 8.3-1986, "Criticality Accident Alarm System." Section 6.5, "Corrective Action," of the standard states that when tests reveal inadequate performance, corrective action shall be taken without unnecessary delay. **Placing the detector in alarm status on May 31, 2006, after resetting it without success and not completing repairs on the detector until July 15, 2006, without implementing compensatory measures, neither met the requirement of 10 CFR 70.24(a)(1) nor your commitment to the ANSI/ANS standard.**

Upon reconsideration and consultation with the Office of Enforcement, we have determined that the **cited violation is valid and requires corrective action to prevent recurrence.** You must take the necessary corrective measures to resolve this violation in accordance with applicable regulatory requirements. You are also required to respond to this letter within 30 days and should follow the instructions specified in our July 21, 2006, Inspection Report and Notice of Violation when preparing your response. In particular, you should include the reason for the violation and the corrective steps you have taken to avoid future violations. After reviewing your response to the Notice, the NRC will determine whether further enforcement action is necessary to ensure compliance with the regulatory requirements.

11/13/06 NRC Inspection Report No. 70-143/2006-013, Sep. 3, 2006 through Oct. 14, 2006, **ML073250382** and duplicate **ML073050079**.

Inspector Findings:

Inspectors noted a malfunctioning fire door in the entrance to BPF.

An SRE in the in line monitor at the BLEU Complex would not properly perform its intended safety function as designed.

Several instances where issues were not being properly identified in the PIRCS program. Deficiency was brought to attention of management.

Follow-up of Previously Identified Issues:

Reviewed:

70-143/2006-007-01 IFI Inspector reviewed the licensee's actions in response to post maintenance deficiency that could occur when safety control affect more than one system.

ISA manager detailed the plans and schedule that had been created to address the issue. Licensee target completions date was June 2007 to properly incorporate all the interrelating SRE tests/controlled in to the database. Items will be left open to review progress at a date closer to completion.

Closed:

70-143/2004-011-01 IFI Evaluation of Portable HEPA filters

70-143/2005-007-01 VIO Failure to review and follow RWP procedures; three examples

70-243/2005-008-02 VIO Failure to implement the LOTO (Lock-out/Tag-out) procedure

70-143/2006-010-02 IFI Spill in Building 302

70-143/2005-010-05 VIO Failure to verify SNM concentration in waste

70-143/2005-010-06 VIO Failure to comply with RWP procedures

70-143/2005-010-07 IFI RMS-3 Criticality Alarm unit failure

70-143/2006-001-03 VIO Failure to follow radiological protection clothing requirements

70-143/2006-003-01 VIO Failure to implement criticality safety procedures

70-143/2006-003-0 VIO Violation A was failure to develop and implement a design for the uranium aluminum enclosure overflow system that would be reliable and available to perform their function when needed. Violation B was a failure to report a condition that resulted in the facility not being able to meet the requirements of 10 CFR 70-61. This item was opened as a tracking mechanism for closure of a

previously identified and closed Apparent Violation (EA-06-018)

70-143/2006-010-02 IFI Spill in Building 302

11/16/06

NRC Inspection Report 70-143/2006-207, Oct. 23 through 27, 2006, **ML081490355**. (**Note:** BLEU Preparation Facility (BPF) was starting to operate for the first time since March 2006, when operations were shut down due to an event in the BPF (R) process).

Observations and Findings:

After discussions, **licensee recognized the weakness in not having all the corrective actions from NCS audits being placed into PIRCS**. Inspectors determined that the items entered into PIRCS since the last inspection were associated with incorrectly putting laboratory samples on a shelf between operations and the laboratory.

Open:

70-143/2006-207-01 IFI Tracks the licensee's revision to the safety audit procedure to require that all recommended corrective actions be entered into PIRCS, along with an appropriate reference to work orders or other documentation for corrective actions completed during the audit.

Discussed:

70-143/2005-205-02 IFI Tracks determination of appropriate experimental uncertainties and the reason for the observed spread in keff (BLEU validations 54T-03-0053 and 54T-03-0009).

70-143/2005-205-03 IFI Tracks the impact of non-normality of (R) experiments on the 0.97 limit for LEU operations (BLEU validations 54T-03-0054 and 54T-03-0009) and failure to consider normality of data in other validations (HEU operation validations 54T-04-0043 and WRS-97-001).

70-143/2005-205-04 IFI Tracks specification of which materials cover which portions of the AOA in BLEU validation reports (BLEU validations 54T-03-0054 and 54T-03-0009).

70-143/2005-205-05 VIO Tracks failure to prohibit use of positive bias in

calculating USL values for HEU operations.

- 70-143/2005-205-06 IFI Tracks commitment to revise the validation report to correctly calculate the USL (BLEU 54T-03-0054, 54T-03-0009, and any others affected).
- 70-143/2005-205-08 IFI Tracks the licensee's determination of the appropriate bounds of the defined AOA in the validation reports covering HEU operations (HEU operation validations 54T-04-0043 and WRS-97-001).
- 70-143/2005-205-09 IFI Tracks the licensee's resolution of inconsistencies between the validation reports and the procedure, and correcting the methods used to verify adequacy of the margin (HEU operation validations 54T-04-0043 and WRS-97-001).
- 70-143/2005-208-02 IFI Tracks licensee actions to amend Safety Condition S-9 of the license to eliminate references to ANSI/ANS series standards and clarify the meaning of "published experimental data."
- 70-143/2006-205-02 IFI Tracks licensee review of its lightning protection system.

Closed:

- 70-143/2005-205-01 IFI Tracks the licensee's revision of the (R) NCSE to clearly articulate the technical basis.
- 70-143/2005-208-01 VIO Failure to discuss in the NCSE the actual safety limit relied on in wastewater treatment tanks to demonstrate subcriticality for normal and credible abnormal conditions

11/29/06 NRC Inspection Report 70-143/2006-019, October 9-13 and October 15-16, ML073250411.

Inspection verified that the recent short term corrective actions to the **configuration management program** that were made as a result of a March 6, BPF spill event were adequately implemented. However, development and implementation of longer-term solutions to the programmatic deficiencies previously identified as contributing to the event were still needed.

Configuration Management and Control

Licensee had a **diffuse configuration management program** that relied on several procedures and organizations to meet overall regulatory requirements. The program can be expected to adequately identify and evaluate permanent plant modifications to prevent degradation of the facility safety basis. **Inspectors noted that diffuse nature of the configuration management program contributed to the BPF event.**

A **minor violation** was identified for failure to fully establish in written procedures the **configuration management program requirements as specified in 10 CFR 70-72 (a)**

A weakness in the configuration management program was identified when electrical drawings involving safety related equipment had not been reviewed, verified and maintained in the configuration management system and representative of the facility's configuration. Licensee indicated to the NRC through discussion and presentation that electrical SRE were designed to "fail safe" upon a loss of electrical power. However, a total of 33 SREs required a special test.

A weakness in the integrated safety analysis program used to evaluate the effectiveness of items relied on for safety was identified when it was determined that a loss of power "fail safe" condition evaluation had not been specifically required. Contributing to the weakness was the lack of written guidance to assist in the identification of credible upset conditions (e.g. loss of power) when performing process hazard analyses.

The licensee's Corrective Action Program (CAP), **when completely developed and fully implemented**, should enhance assurances that nuclear safety issues will be promptly identified, evaluated and addressed. There were no CAP or problem identification, resolution and corrective system (PIRCS) issues identified that were significant enough to delay the re-introduction of special nuclear material into the Blended Low-Enriched Uranium (BLEU) Preparation Facility.

NFS' investigation of the March 6, 2006 BPF spill event revealed that a less than adequate PIRCS process was one of the root causes for the event.

12/01/06

License Performance Review, 2/5/2006 - 10/13/2006, ML071930522. Given the number, significance, and repetitiveness of these issues, the **confidence normally provided through a robust safety program is not evident. These issues are also indicative that further action to improve your safety culture is warranted.** NRC will continue heightened oversight of your licensed operation through inspections beyond those specified by the NRC's core inspection program.

PERFORMANCE AREA: SAFETY OPERATIONS (Chemical safety, nuclear criticality safety (NCS), plant operations, and fire safety).

a. Verification and implementation of equipment and controls identified in NCS analyses:

Failure to verify the proper installation of the tray dissolver filter enclosure drains prior to use of the system with fissile material (apparent violation (APV) 2006-006-02).

Failure to establish management measures for the tray dissolver drains which constituted a failure to meet the performance requirements of 10 CFR 70.61(d) for accident sequences related to handling fissile material (APV 2006-006-03).

Failure to have the solvent extraction room floor meet the performance requirements of 10 CFR 70.61(d) for accident sequences related to fissile solution accumulation (APV 2006-006-04).

Failure to assume in the NCS analysis for the tray dissolver system that fissile solution could be misdirected from the solvent extraction feed transfer line (APV 2006-006-05).

PERFORMANCE AREA: FACILITY SUPPORT (Maintenance and surveillance, training, emergency preparedness, and management controls).

a. Utilization of the problem identification and corrective action program:

Failure to capture unusual conditions associated with yellow solutions in the enclosure in the corrective action program (APV 2006-006-08)

The licensee's corrective action system demonstrated adequate trending and input of items, but the trends also indicated inadequate response to certain recurring issues (inspection report (IR) 2006-007).

Failure of NFS management to make an NRC notification in accordance with timeliness requirements of 10 CFR 70, Appendix A (APV 2006-006-01).

Failure to maintain dual Criticality Accident Alarm System (CAAS) detector coverage at the waste water treatment facility (violation (VIO) 2006-205-01).

b. Engineering design, verification, and configuration control:

The use of a **less-than-adequate configuration management system** that **failed** to ensure that the safety impact of the partially installed and unisolated change

was addressed per requirements of 10 CFR 70.72 is identified as an apparent violation (APV 2006-006-06).

Failure to provide adequate procedures for the operation of the enclosure components (APV 2006-006-07).

Failure to correctly implement the configuration control program during modification of an active engineered control, in that a failsafe feature of the explosive gas detection system was defeated. (VIO 2006-002-01).

The electrical schematics of active engineered controls were not typically placed under configuration control and relied solely on post-maintenance testing to verify the proper configuration (unresolved item (URI) 2006-02-02).

Weaknesses were identified in the licensee configuration management program (IR 2006-203).

PERFORMANCE AREA: SAFEGUARDS (Material control and accounting (MC&A), physical protection, and classified material/information security). (Redacted)

12/21/ 06

NRC Inspection Report, 70-143/2006-014 and **Notice of Violation, Severity Level IV, Oct. 15, 2006 through Nov. 25, 2006, ML073050171. (Note: “Newly installed” area LA), and (BLEU Preparation Facility (BPF) resumed operations on October 23, 2006, following an extended shutdown as a result of the March 6, 2006 spill event; From Oct. 23, 2006 to Oct. 27, 2006, inspectors performed a round-the-clock inspection of the BPF restart process).**

Open:

70-143/2006-014-01 VIO Failure to follow Lockout/Tagout Procedure

On Oct. 25, 06, inspectors noted a violation of the lockout/tagout process. Specifically, following a bowl change out on the IE01 centrifuge in the U-AL system. Inspectors noted system locks, personnel locks and the tags had been removed from the breaker on the 1E01 centrifuge. Inspectors also noted the shaft guard had not been reinstalled or extended to cover the shaft. Inspectors brought this to the attention of license management.

Follow up investigation by licensee revealed operations personnel removed all locks following the shift change over and then immediately rehung them. Following work completion, locks were finally removed without reinstalling the shaft guard. Although centrifuge was never running with the guard in the retracted position, the potential existed to start the centrifuge without appropriate personnel protection from rotating equipment.

Failure of plant staff to follow plant procedures, NFS-GS-36, "Lockout/Tagout" Rev. 5. Violation of NRC Requirements tracked as Violation 70-143/2006-014-01 for failure of plant staff to properly implement lockout/tagout program during U-AL operations in the BPF.

Closed:

70-143/2005-010-08 URI Physical Security and Handling of Material

Inspectors reviewed the issue that involved the failure to properly secure material prior to leaving it unattended. Event occurred on Nov. 6, 2005 was determined to be of minor significance and therefore will not be subject to enforcement.

However, the event of Nov. 9, 2005 was determined to be an apparent (AV 2006-008-01) in a separate inspection report.

Licensee continues to perform loss of power testing on various electrical safety related (SRE) in the Naval Fuel Production area, BLEU Complex, BLEU Preparation Facility (BPF). **Issue was identified by special NRC inspection team.**

Inspectors noted weakness in Operational Readiness Review process where a newly installed component in the process area was placed in operation prior to verifying lead tightness.

Inspectors reviewed the compensatory measures associated with the "recently upgraded" area LA. LOA-1988L-004 was developed to provide compensatory fire protection measures for this area since all required fire protection features had not been completed prior to startup of this area.

Inspectors evaluated the activities associated with the Operational Readiness Review process for the newly installed LA process area. Licensee noted a problem during initial operations and generated PIRCS #8644. Problem report addressed a leak that developed at a flanged connection located within a glovebox. **Leak can be attributed to inadequate verification of construction activities or startup testing. Inspectors communicated to licensee the importance of verifying that equipment is operable prior to placing in service.**

There were several instances where issues were not being properly identified in the PIRCS program, which the licensee has been made aware of by the NRC. The inspectors will continue to monitor this issue to ensure that no further examples of documenting issues are identified.

A weakness was noted with the licensee's configuration control of the local criticality alarm panel

2007

01/26/07 NRC Inspection Report 70-143/2006-022, Nov. 26, 2006 through Dec. 31, 2006,
ML073060497

Open:

70-143/2006-022-01 URI Operability of the SAS (Secondary Alarm Station)

Inspectors noted several weaknesses/deficiencies in the operation and maintenance of the SAS Halon system.

On Dec. 15, 2006, a small electrical fire started in a heat trace line associated with the de-ionized water supply line leading to Building 105 (analytical lab). The fire location was outside, near the penetration to the building. The Secondary Alarm Station (SAS) was contacted via emergency telephone and announced the fire over the plant paging system. Fire brigade was dispatched and the fire was extinguished.

Subsequent to the extinguishing of the fire, the plant supervisor directed the SAS operator to activate the manual fire pull station at the SAS panel since the fire protection procedure directed that the sounding of the plant fire alarm would be made for any fires. SAS was requested to perform this action even though there were pull stations located near the scene and there was no manual actuation station at the SAS watch station.

Inadequate communication between the on-scene personnel and the SAS operator resulted in the manual actuation for the Halon system within the SAS building being actuated instead of the fire alarm pull station. Supervision then responded to SAS to address the Halon system discharge. During an attempt to reset the Halon system and place the alternate tank in service, the backup tank discharged.

The impairment required the addition of a manual portable fire extinguishing agent. The expectation being that the SAS operator would use the extinguisher to address a fire in lieu of the Halon system. **The inspectors reviewed the impairment form and noted that some SAS operators had not received the required portable extinguisher training.**

The licensee replaced a non-functioning fire damper and its associated ductwork with a newer design during the holiday shutdown. **The ventilation ductwork between areas 302 and the tube room had been in a non-operational condition for over a year.** During the holiday shutdown, the licensee issued work documents to modify the ventilation system, which would correct the **repeated failures of the installed fire damper.**

01/28/07

NRC Inspection Report 70-143/2007-009 and Notice of Violation, Dec. 3 through Dec. 31, 2007. **Two (2) Severity Level IV Violations and One (1) Non-cited Violation (NCV), ML080290105.**

Open:

70-143/2007-009-01 NCV Failure to follow plant procedures

On Dec. 3, 2007, an operations supervisor directed the discharge of waste material from Area 800 to the waste treatment tanks that did not meet certain discharge criteria. Plant procedure required waste to be directed to certain types of containers for further sampling if the waste did not meet certain criteria. After discussions with operations personnel, the supervisor recognized his error and entered issue into the corrective action system as PIRCS #11823. The non-repetitive, licensee identified and corrected violation for failure to follow procedure is being treated as a non-cited violation (NCV).

70-143/2007-009-02 VIO Failure to follow radiological procedures

During a routine tour of the facility on Dec. 19, 2007, inspectors noted that a normally closed door was open and walked over to the area to investigate. Inspectors found a person on the other side of the door. While discussing the reason for the door being open, the inspectors noticed brown paper on the floor. When they asked why the paper was on the floor, licensee personnel stated that it was clean area to allow for the transition of visitors from the low enriched uranium (LEU) side to the high enriched uranium (HEU) side and back.

The inspectors questioned how the area was radiologically controlled since there was nothing, which identified the area as a clean area. The licensee personnel stated that normally the radiation technician would stay in the area and prevent anyone from entering the area, however, in this case he had to perform some additional duties in another part of the facility. Inspectors determined this practice did not meet the requirements detailed in NFS-GH-42, which requires that the establishment of entrances to controlled areas be properly posted. Licensee's failure to follow plant operating procedures was identified as a violation of NRC requirements.

70-143/2007-009-03 VIO Failure to Implement the Tollgate Process for the BPF U-Metal Project

Inspectors reviewed and discussed with the licensee the implementation of the Tollgate process for the BPF U-Metal Project. The Tollgate process was designed to improve communication with customers and stakeholders, improve formal design peer review, reduce redesign/rework, clear the transition through the

different project execution phases, and integrate the different safety disciplines into the design process.

During the review, the inspectors noted that the licensee did not complete an Engineering-Project Tollgate Approval Form at each tollgate meeting and did not file the forms in the engineering design file for the BPF U-Metal Project. Failure to complete and file the forms resulted in poor implementation of the Tollgate process, and lead to design deficiencies that impacted the process operation. This issue was identified as a violation of NRC requirements.

02/06/07 Status of the U.S. Nuclear Regulatory Commission's Action on Nuclear Fuel Services, Inc.'s Compliance with the **July 8, 2003 Confirmatory Order ML081500562**

02/21/07 On February 21, 2007, a Confirmatory Order (effective immediately) was issued to Nuclear Fuel Services, Inc. (NFS) to confirm commitments made as a result of Alternative Dispute Resolution (ADR) mediation sessions held on September 28 and November 30, 2006. **Originally, this Confirmatory Order was designated as "Official Use Only" and not available for public review.** Upon further evaluation by the NRC, this Confirmatory Order was released publicly, in its entirety, on **July 18, 2009, ML081440079.**

At issue were a number of violations of NRC requirements, some of which were characterized as willful. Specifically, these violations included: 1) a licensee supervisor's willful failure to wear a full face respirator as required by license safety conditions, 2) **a failure of the licensee to meet the performance requirements of a July 2000, Confirmatory Order Modifying License involving its safeguards contingency plan,** 3) a licensee building manager's willful transfer of solvent extraction raffinate without approval as required by license safety conditions, 4) a licensee failure to attend special nuclear material as required by the licensee's Physical Protection Plan, 5) an inadvertent transfer of high enriched uranyl nitrate into an enclosure that was not approved for operation, and 6) a willful failure of two security officers to conduct vehicle searches.

NFS agreed to: 1) provide the NRC written documentation of the reasons for the violations, the corrective actions taken and planned and the completion dates for each corrective action within 60 days of the date of the Order, 2) within 60 days of the date of the order, submit a request to amend the license to revise the configuration management program, and 3) conduct an **independent safety culture assessment** via a third-party, implement a plan to address the findings and recommendations that result from the third-party assessment, and within 24 months following the completion of the initial assessment, provide for an additional third-party assessment of the implemented plan. In recognition of these actions, the NRC agreed to exercise Enforcement Discretion and refrain from proposing a civil penalty and issuing a Notice of Violation or other enforcement action.

Confirmatory Order Effective Immediately For Program Improvements.

“The enclosed Confirmatory Order is being issued to Nuclear Fuel Services, Inc., as a follow-up to the Alternative Dispute Resolution (ADR) mediation sessions with the NRC Commissioner of September 28 and November 30, 2006.”

“We note that, pursuant to Section 223 of the Atomic Energy Act of 1954, as amended, any person who willfully violates, attempts to violate, or conspires to violate, any provision of this Confirmatory Order shall be subject to criminal prosecution as set forth in that section. **Violation of this Order may also subject NFS to civil monetary penalty.**” (Next 3 lines **Redacted**) Letter from /RA/ Victor M. McCree for William D. Travers, Regional Administrator, Region II, NRC, to Dwight B. Ferguson, Jr., President and CEO, NFS, Erwin, TN, 2/21/07, (ML081410191)

Confirmatory Order reflected an agreement between the NRC and NFS that “NFS will conduct via a third party, an independent safety culture assessment which shall include the 13 safety culture components discussed in the NRC Regulatory Issue Summary (RIS) 2006-13, dated July 31, 2006 and the commitments NFS made at the management meeting with the NRC on Sept. 18, 2006.” Modifications to NFS Erwin 2007 Independent Safety Culture Assessment Plan and Schedule, 7/31/06, ML072820542

03/12/07

NRC Inspection Report 70-143/2007-001 and Notice of Violation, **Severity Level IV**, Jan. 1, 2007 through Feb. 10, 2007, **ML081500186**.

Open:

70-143/2007-001-01 VIO Inadvertent Halon Discharge (see Jan. 26, 2007)

A minor fire was located outside on a heat trace line near the laboratory, the licensee failed to follow and develop the required procedures as described in the following instances:

NFS-HS-E-04, "Fire Reporting and Response," Revision 29, Section 5.3, requires the (R) operator to activate a manual fire pull station in the event that a fire notification is received via an emergency call.

On December 15, 2006, an (R) operator failed to activate a manual fire pull station upon receiving a call reporting a fire, **since a pull station did not exist** (R). Procedure NFS-HS-E-04 had not been adequately maintained or revised to reflect the absence of a fire alarm pull station

On December 15, 2006, while attempting to reset the Halon system, the system was actuated a second time and dumped the backup tank. **This activity was performed without adequate fire protection procedures or instructions as required by the license.**

70-143/2007-001-02 IFI Failure to keep (R) Level

The licensee's handling of (R) level inspection was questioned by the inspectors. Reviewed procedures revealed a requirement that the tank level shall be kept at (R) or more. Review of records for **the last 16 months indicated that for a period of time these values had decreased below this limit.** Interviews with the licensee demonstrated the possibility that this limit was very conservative and since the level never fell below (R) the system still could perform its function.

Following request of the set point calculations, the licensee could not find the document during the week of the inspection. The licensee was requested to communicate with the contractor that provides support for the licensee's System.

During the inspection the inspector verified the tank levels were above the limit. Until the set point calculations are provided, this issue is going to be followed as Inspector Follow-up.

70-143/2007-001-03 IFI Discrepancy with License Reference Document

Review of the license requirements revealed the licensee had referenced an old document as the basis for developing and maintaining their fire protection program. Currently, the licensee is basing their program on the Integrated Safety Analysis (ISA) documents. The inspectors brought this minor discrepancy to the licensee which agreed on investigating further as to whether that reference should be removed from the license conditions. The safety concern is minor due to the fact that the ISA is in compliance with the regulations. However, the referenced document contains valuable information not found specifically in the current program that could enhance the safe operation of the facility. This issue is going to be followed as IFI 70-143/2007-001-03 until the licensee makes a decision regarding the fire protection manual.

Reviewed:

70-143/2006-002-03 VIO Unauthorized BPF Exit Points for Visitors

The issue related to a violation involving visiting personnel and licensee escorts' failure to remove shoe covers and step across the line/barrier as required by the licensee internal procedures. The inspectors reviewed the licensee's response dated May 23, 2006, and verified on site, if corrective actions had been taken. In the response, the licensee stated the following: (1) Access to the emergency exit locations for visitors had been discontinued; (2) Identification of better locations for accommodating visitors; (3) Incorporation of lessons learned into annual radiation worker refresher training; and (4) Development of a formal procedure to address how to accommodate facility tours into the protective area. All corrective actions were verified except for the formal procedure communicating instructions

on how to plan facility tours. A draft procedure had been developed but not formalized. This item will remain open until the procedure has been formalized and implemented.

Closed:

70-143/2006-001-04 URI Lack of Radiological Controls for Excavation

The issue was related to work that was performed without radiation controls during excavation work adjacent to the Waste Water Treatment Facility (WWTF). In the past when previously excavated, this area had been controlled as a Radiologically Controlled Area and filled with fresh gravel. The area was subsequently released under NFS-GH-15, "Covering Plant Surfaces." On January 5, 2006, a contractor was observed excavating in the same area that had been previously controlled as a radiologically controlled area without notifying the health and safety staff. **The licensee performed an internal investigation that showed poor planning and communications had occurred between the contractor and the licensee's Health and Safety staff.** In addition, a breakdown of internal communication had occurred between the project coordinator and the health and safety staff regarding the status of the project. After a review of survey records, the inspectors determined that the contractor had not re-excavated down to the contaminated area. The licensee corrective actions included revising an internal procedure, NFS SOP 392, "Work Request Procedure, Rev. 15." The changes included better instruction concerning communications and planning between contractors providing services on site and the licensee's Health and Safety staff. This item is closed.

70-143/2006-002-04 URI Contaminated Contractor Equipment

The issue was related to work involving contractor's scaffolding that became contaminated on site. The equipment was involved in repair work to (R) located at the (R) WWTF. The inspectors reviewed the documentation from the internal investigation and determined from records and discussions with licensee's representatives that the contamination originated on site due to poor health physics practices of the contractors. The inspectors reviewed the survey documentation and no problems were identified. As a part of the corrective actions, **the licensee decided to purchased the scaffolding from the contractor because of fixed contamination levels.**

70-143/2006-022-01 URI Inadvertent Halon Discharge

The licensee failed to follow plant fire protection procedure, NFS-HS-E-04, by not activating a plant fire alarm when required and inadvertently actuating the halon system (R). The licensee did not accurately maintain fire protection procedure, NFS-HS-E-04, to reflect the current plant configuration, and **did not develop a fire protection procedure for performing a potentially hazardous**

evolution in resetting the halon system following an actuation. Failure to follow fire protection procedures was a violation of NRC requirements (VIO 70-143/2007-001-01). This violation will close unresolved item (URI) 70-143/2006-022-01, "Inadvertent Halon Discharge

04/23/07

NRC Inspection Report 70-143/2007-002, Feb. 11 through Mar. 24, 2007, **ML073060098. (Note: Confirmatory Action Letter No. 02-06-003, dated March 18, 2006 is now considered closed).**

Open:

70-143/2007-002-01 URI Evaluate deficiencies identified during 302 equipment and 306 diesel generator/UPS/ABT maintenance activities for enforcement.

The inspectors discussed these issues with licensee management the following week and noted that a **PIRCS items for the apparent deficiencies was not generated until four days later**, after prompting by the inspectors.

70-143/2007-002-02 IFI Upgrade calibration of UAl flow indicators

Inspectors performed the final follow up of BPF operations. The inspection involved a review of recent safety-related equipment (SRE) testing. As part of the review, the inspectors observed the testing of the nitrogen trickle flow system for uranium aluminum (UAl). The inspectors noted that the flow indicators for the trickle flow were not on a routine calibration frequency. Calibration category required only an initial calibration prior to installation.

Inspectors noted that the only verification of accuracy following installation was during the SRE testing, which required the verification of consistent indicator values between identical units in series. When this was brought to the licensee's attention, the licensee agreed that the **management measures regarding this interlock were less than adequate and committed to improving them** by upgrading the indicators to a routine calibration frequency. Track upgrade of SRE calibration.

On Mar. 1, 2007, an operational upset resulted in an excessive amount of fissile material to accumulate in a portion of a glove box located in Area 800. The material was suspected to be in excess of the value described in the nuclear criticality safety evaluation. Although applicable management measures were followed to preclude this event, the unusual amount of material found in an unexpected portion of the process was still considered a potential failure of an items relied on for safety (IROFS), and a 24-hour notification (Event #43204) was made to the NRC per Appendix A of 10 CFR 70.

On Mar. 16, 2007, a caustic transfer was made from the high enriched (HEU) uranium to the low enriched uranium (LEU) side of the BPF facility with an elevated uranium (U) content. The concentration of this caustic batch was greater than the normal limit, 0.05 grams of U per liter. Subsequent transfer was authorized by Letter of Authorization (LOA)-18771-205.

LOA authorized a one-time transfer and raised the set point for the associated in-line (radiation) monitor from 0.566 grams U per liter to 0.13 grams U per liter.

04/27/07

NRC Inspection Report 70-143/2007-202, March 26-30, 2007, Criticality Inspection, **ML081500187**

Open:

70-143/2007-202-01 URI Tracks the adequacy of the licensee's management measures applied to the new module installed in the ILMS (In-line Monitor Station) to ensure that the system is able to perform its safety function when needed.

During the routine 6-month calibration of the ILMS, the licensee observed that the calibration could not be completed and that the spectrum appeared to have wide, short peaks which were not normal. In response, the licensee shut down the condensate discard system, entered a report into its PIRCS, and notified the NRC. The in-line monitor is identified as an active engineered IROFS in the ISA, and the failure of this IROFS left only one IROFS in place. The probable cause of the event was a partial failure of the voltage supply on the multi-channel analyzer (MCA) board. The licensee replaced the MCA board and re-tested and re-calibrated the system.

The inspectors noted that the licensee contacted the manufacturer of the ILMS, which indicated that a failure of this type was not anticipated for the ILMS. The licensee's corrective actions included adding a module that would alarm if the system voltage was not within its operating range.

The inspectors noted that SRE testing of the ILMS did not include testing of the new module. The licensee indicated that the module was tested to be operable prior to installation, but there were no plans in place to test the module further. Appropriate management measures are required to be applied to all IROFS. Functional testing of the new module appears to be an appropriate management measure to ensure continued operability. The review of the licensee's management measures applied to the new module of the ILMS to ensure that the ILMS is able to perform its safety function when needed.

70-143/2007-202-02 IFI Tracks commitment to clarify license

commitments regarding calculation of k_{eff} and the use of positive bias.

Discussed:

70-143/2005-205-02 IFI Tracks determination of appropriate experimental uncertainties and the reason for the observed spread in k_{eff} (BLEU validations 54T-03-0053 and 54T-03-0009)

During this inspection, the licensee acknowledged that little work had been done to close the item, but the **work is expected be completed by 12/31/07**. This item remains open.

70-143/2005-205-04 IFI Tracks specification of which materials cover which portions of the AOA (area of applicability) in BLEU validation reports (BLEU validations 54T-03-0054 and 54T-03-0009)

During this inspection, the licensee acknowledged that little work had been done to close the item, but the **work is expected be completed by 12/31/07**. This item remains open.

Closed:

70-143/2005-205-03 IFI Tracks the impact of non-normality of (R) experiments on the 0.97 limit for LEU operations (BLEU validations 54T-03-0054 and 54T-03-0009) and failure to consider normality of data in other validations (HEU operation validations 54T-04-0043 and WRS-97-001)

During this inspection, the inspectors reviewed 21T-06-2025 and 21-06-2004, which deal with "Evaluation of Non-Normality (R) and "Evaluation of Normality (Validation. Data)." The inspectors determined that there is no impact on non-normality of (R) experiments on the 0.97 limit for (R) operations. Additionally, the licensee performed a normality test on the (R) validation data. The inspectors determined that there is no impact on the Upper Safety Limit (USL) calculation associated with the (R) validation report. This item is closed.

70-143/2005-205-05 VIO Tracks failure to prohibit use of positive bias in calculating USL (Upper Safety Limit) values for HEU Operations

During a previous inspection, the inspectors determined that the licensee violated its validation procedure by using positive bias in calculating the USL, which resulted in a USL greater than the maximum allowed k_{eff} . During this inspection, the inspectors reviewed the licensee's corrective actions which included updating the validation reports and revising procedure NFS-HS-A-63, "Verification and Validation of Nuclear Criticality Safety Analysis Codes." The procedure was revised to clarify that positive bias values are assumed to be zero when determining the USL. The inspectors verified that the corrective actions were complete. This item is closed.

70-143/2005-205-06 IFI Tracks commitment to revise the validation report to correctly calculate the USL (BLEU 54T-03-0054, 54T-03-0009, and any others affected).

During a previous inspection, the inspectors determined that the licensee was using a 95/99.9, confidence criterion in implementing the single-sided lower tolerance method instead of the 95/95 single-sided lower tolerance method as stated in License Condition S-10. During this inspection, the inspectors verified that the validation reports correctly calculated the USL without crediting positive bias. The inspectors also verified that an assessment had been done to confirm that other validation reports were not affected. This item is closed.

70-143/2006-205-01 VIO Failure to have dual CAAS detector coverage at the WWTF as required by 10 CFR 70.24

This item concerned the licensee's failure to have dual criticality accident alarm system (CAAS) detector coverage at the Waste Water Treatment Facility (WWTF) as required by 10 CFR 70.24. During a previous inspection, the inspectors observed that the CAAS (R), which covers (R) of the (R), only had one detector in service. During this inspection, the inspectors reviewed the licensee's revision to procedure NFS-HS-A-21. The inspectors determined that the licensee adequately completed the necessary corrective actions to both address the violation and prevent recurrence. This item is closed.

70-143/2006-207-01 IFI Tracks licensee's revision to the safety audit procedure to required that all recommended corrective actions be entered into PIRCS, along with an appropriate reference to work orders or other documentation for corrective actions completed during the audit.

During this inspection, the inspectors noted that the licensee's procedure for safety audits and inspections, NFS-HS-A-16, had been revised to include guidance on the entry of all recommended corrective actions into PIRCS. The inspectors also noted that in recently completed audits the guidance was being followed. This item is closed.

70-143/2005-205-07 IFI Tracks the licensee's commitment to maintain the current prohibition on the use of positive bias in procedure NFS-HS-A-63, and to clarify license commitments regarding calculation of keff and the use of bias.

This item was closed in Inspection Report 70-143/2006-205; however, the **second part** of the IFI relating to clarifying license commitments had not been completed and will be tracked as Inspector Follow up Item (IFI) **70-143/2007-202-02**.

70-143/2005-205-08 IFI Tracks the licensee's determination of the appropriate bounds of the defined AOA in the validation reports covering HEU operations (HEU operation validations 54T-04-0043 and WRS-97-001).

During this inspection, the licensee acknowledged that little work had been done to close the item, but the work is **expected to be completed by 12/31/07**. This item remains open.

70-143/2005-205-09 IFI Tracks the licensee's resolution of inconsistencies between the validation reports and the procedure NFS-HS-A-63, and correcting the methods used to verify adequacy of the margin (HEU operation validations 54T-04-0043 and WRS-97-001).

During this inspection, the licensee provided supporting documentation; however, the **inspectors were unable to complete their review of this information**. This item remains open.

70-143/2005-208-02 IFI Tracks licensee actions to amend Safety Condition S-9 of the license to eliminate references to ANSI/ANS series standards and clarify the meaning of "published experimental data."

During this inspection, the licensee acknowledged that little work had been done to close the item, but the work is **expected to be completed by 8/1/07**. This item remains open.

70-143/2006-205-02 IFI Tracks the licensee's management measures to ensure that the new module installed in the ILMS is able to perform its safety function when needed.

During a previous inspection, inspectors investigated an event, which had taken place at the facility involving an electrical storm. The inspectors noted that the electrical storm had disabled one of two Victoreen detectors and the audible alarm system for the BLEU complex criticality accident alarm system. During this

inspection, the licensee communicated to the inspectors that the design review of its lightning protection system is ongoing. The design review includes: collection of all licensee drawings on lightning protection, conformation of field installation to conformance to drawings, and review of alternate lightning protection. The design review of the lightning protection system is **expected to be completed by June 2007**. This item remains open.

70-143/2006-205-03 URI Tracks splitting a downblending accident sequence into additional sequences.

During a previous inspection, the inspectors questioned whether the creation of additional sequences should have resulted in an amendment under 10 CFR 70.72. During this inspection, the licensee provided documentation clarifying its position. The inspectors reviewed the licensee's position and determined that this **item should remain open pending guidance from NRC on 10 CFR 70.72**.

05/21/07

NRC Inspection Report 70-143/2007-203, May 7-11, 2007, Criticality Safety Inspection, **ML081500188**

Open Item Follow up:

70-143/2007-202-01 URI This item tracks the adequacy of the licensee's management measures applied to the new module installed in the in-line monitor system (ILMS) to ensure that the system is able to perform its safety function when needed.

During the routine 6-month calibration of the (R) ILMS, the licensee observed that the ILMS spectrum appeared to have wide, short peaks, which were not normal, and which prevented completion of the calibration. The probable cause of the event was a partial failure of the voltage supply on the system multi-channel analyzer (MCA) board. The licensee replaced the MCA board and re-tested and re-calibrated the system. The manufacturer of the ILMS indicated that a failure of this type was not anticipated for the ILMS. The licensee's corrective actions included adding a module that would monitor the MCA voltage supply and alarm if the system voltage was not within its operating range.

During a previous inspection, the inspector noted that safety-related equipment (SRE) testing of the ILMS did not include testing of the new module. During this inspection the licensee indicated that the voltage monitoring module was tested prior to installation and was sent a signal throughout operation which was constantly monitored so that failure of the module would be immediately detected and cause the ILMS to shutdown. The licensee indicated that specific testing of the module did not justify additional SRE tests which would necessarily involve powering down the ILMS and risking damage to the module. The inspector

determined that SRE testing of the ILMS was adequate to ensure it's safety function to interrupt discharge. This item is closed.

70-143/2006-209-01 IFI The inspector reviewed licensee handling of an event at the OCB/EPB facility involving the failure to take mass samples as directed by the NCSE and corresponding operating procedure.

The inspector noted that the license had entered the event into the Problem Identification, Resolution and Correction System (PIRCS) and defined corrective actions. **During a safety audit, the licensee determined that sampling was not being performed as described in the process criticality analysis or operating procedure.**

The inspector reviewed this IFI which tracked revision of the EPB NCSE to provide a more detailed description of the sampling process. The licensee previously reported an event involving failure to take mass samples as directed by the NCSE and the corresponding operating procedures (R). The EPB NCSE required monthly samples to be taken on the inlet and outlet of the EPB system. The requirement is to perform a proportional sample of the waste stream. As part of the licensee corrective actions, the **NCSE will be revised** to provide a more detailed description of the sampling process.

During this inspection, the inspector determined that the **licensee had revised the NCSE and operating procedure to change the sampling requirement to every (R) rather than every month.** This is based on the requirement to perform a proportional sample which cannot be done every month if the volume in a month is substantially less than (R) of waste water. Criticality safety of the EPB relies on prevention of (R) accumulation in the tanks and is accomplished by in-line monitoring, visual inspection, survey, and sampling. The inspector had no safety concerns regarding the NCSE and procedure revisions. Open item IFI **70-143/2006-209-01** is closed.

70-143/2006-205-02 IFI The inspector determined that the licensee had installed and maintained a system of criticality detectors that was capable of monitoring (R) material operations at the facility.

The inspector noted that the licensee had recently experienced damage to the criticality alarm system at the OCB facility due to a lightening related electrical surge. The licensee has completed reviewed of electrical surge-related issues and is implementing corrective actions.

The inspector reviewed open item. This item tracked the licensee's review of its lightning protection system. During a previous inspection, the inspector reviewed an event, which had taken place at the facility involving an electrical storm. The

inspector noted that the electrical storm had disabled one of two Victoreen criticality detectors and the horns for the BLEU complex criticality accident alarm system (CAAS). This CAAS failure was not noted because the lightning strike had disabled both the alarm and the diagnostic panel that should have indicated alarm failure.

Because the licensee was preoccupied with other effects of the lightning storm, the alarm failure was not noticed for several days. The licensee has since instituted a new requirement to perform a "lamp test" on the diagnostic panel every shift to ensure that it is still working properly. During a subsequent inspection, the licensee stated that it is conducting a comprehensive review of the design of the lightning protection system, to determine compliance with applicable code (National Fire Protection Association 780), and to determine what enhancements can be made beyond the minimal features needed to meet the code. Open Item IFI 70-143/2006-205-02 is closed.

70-143/2005-208-02 IFI This item tracks licensee actions to amend Safety Condition S-9 of the license to eliminate references to American National Standards Institute/American Nuclear Society (ANSI/ANS) series standards and clarify the meaning of "published experimental data."

During a previous inspection, the inspector observed that the licensee was relying on a safety limit of (R) or concentration of (R) material in unsafe geometry Waste Water Treatment Facility (WWTF) tanks. The inspector determined that the (R) limit was a single parameter limit from Table 1 of the consensus standard ANSI/ANS-8.1.

The NFS license application requires the use of limits from Section 4.2.3.1 or the performance of analysis in accordance with Section 4.2.3.2. Section 4.2.3.2 of the license application states, in part, that "nuclear criticality safety analyses shall utilize published experimental data, the results of NFS sponsored critical experiments, or analytical methods which have been validated by comparison with experimental data."

The inspector noted that the (R) safety limit that the licensee had applied to the WWTF tanks was a calculated single parameter limit from Table 1 of ANSI/ANS-8.1 and was based on a subcritical margin of between (R) as noted in technical documentation of the standard.

The inspector noted that the (R) **safety limit exceeded the license limits on effective neutron multiplication (k_{eff}) of 0.90 for normal conditions and 0.95 for credible upset conditions.**

The inspector determined that the current language in Safety Condition S-9 allows the use of a single parameter limit based on a k_{eff} value of 0.98 or less derived from critical experiments.

The licensee asserted that Section 4.2.3.2 of the license application along with Safety Condition S-9 authorized use of the ANSI/ANS-8.1 values as safety limits based on the words "published experimental data" in Section 4.2.3.2 and direct reference to ANSI/ANS standards in S-9. The inspector concluded that data in Table 1 of ANSI/ANS-8.1 did not appear to be published experimental data within the meaning of Section 4.2.3.2 of the license application but was actually a set of single parameter limits produced by computer calculations.

Licensee management **committed to provide a licensee amendment** that would incorporate Safety Condition S-9 into the licensee and clarify the meaning of "published experimental data." The licensee plans to write the amendment to eliminate the need for Safety Condition S-9. This item is closed.

05/30/07 AARM (Agency Action Review Meeting), ML071570135

"NFS is as safe as it's ever going to be" (Commissioner McGaffigan)

06/04/07 NRC Inspection Report 70-243/2007-003 and Notice of Violation, **Severity Level IV Violation**, March 25 through May 5, 2007, **ML073060208**

Open:

70-143/2007-003-01 VIO Failure to implement NFS safety procedures during 306 diesel generator/UPS/ABT maintenance activities

On March 10, 2007, while performing required annual maintenance on the 306 diesel generator and associated equipment, licensee staff failed to conduct safety function activities in accordance with written procedures as follows:

System engineer did not fill out lockout/tagout sheets as the work progressed and did not post them at the work site as required by Section 6.0 of Procedure NFS-GH-36.

Individuals performing lockout/tagout activities were not trained in accordance with the NFS Lockout/Tagout Program as required by Section 9.0 of Procedure NFS-GH-36.

System engineer did not complete Attachment IV of Procedure NFS-SOP-205 as the test was being performed.

Closed:

70-143/2007-002-01 URI Evaluate deficiencies identified during 302 equipment and 306 diesel generator/UPS/ABT maintenance activities for enforcement

07/11/07 **Confirmatory Order of Feb. 21, 2007 Reissued, ML071910431**

07/16/07 NFS Inspection Report 70-143/2007-004, **Severity Level IV Non-Cited Violation, May 6, 2007 through June 16, 2007, ML073050514**

Opened & Closed:

70-143/2007-004-01 NCV Failure to Comply with Operations Procedures

Inspectors noted two examples of procedural violations on June 7, 2007 and June 11, 2007. The **first noncompliance** dealt with the failure to transfer waste water to the proper tank. The **second violation** involved the failure to start ventilation fans associated with a plant process system. Both failures to follow plant operating procedures was a violation of NRC requirements. Being treated as non-cited violations consistent with Section VI.A.8, NRC Enforcement Policy.

Open:

70-143/2007-004-02 IFI Incorrectly designed Check Valve for Application

Original Work Request (#115193 and SWP #07-19-010) instructed maintenance to replace a leaking check valve, however, it was found that this **check valve was not the correct design for this application**. Although this particular work request and associated documentation has been accepted and closed out, **there was no indication that the licensee realized that this should be evaluated further for review to determine the extent of condition, severity of design/installation issues and simply to understand the significance of this particular issue**.

70-143/2007-004-03 IFI Verify Corrective Actions to EIM Form

Inspectors noted that the initial Emergency Information Message (EIM) Form transmitting the Protective Actions Recommendations (PARs) to offsite authorities was inconsistent with Table 5-2 of the Emergency Plan (EP) and the PARs were selected and discussed with offsite authorities located in the ECC.

Licensee discussed plans to review the EIM form for making changes to removed the potential for recording the incorrect PARs.

70-143/2007-004-04 IFI Verify Corrective Actions to Resolve On-Site and

Off-Site Contamination

Licensee's response to control contamination during the simulated accident was considered an area of weakness.

70-143/2007-022-01 IFI Replacement of IROFS

Mass flow meter used in the BPF downblending area never functioned properly from initial startup of the system. Purpose of device was to ensure that the administrative limit of 600 liters was not exceeded during any downblend. IROFS, BDB-9 was replaced by a valve lineup as well as the disabling of the associated transfer pump. A subsequent ISA change took credit for two valves in series (automatic and manual).

IROFS BSX-11 and BCX-15 were replaced by new IROFS BSX-43 and BSX-44. The original IROFS were float valves used in the solvent extraction process in the BPF area and were designed to prevent a red oil explosion. These float valves frequently failed and were thus placed in and out of the manual control mode.

Currently, the entire system is operated exclusively in manual and credit is taken for ensuring adequate level in the feed column (to the evaporator) as well as a visual verification of the absence of an organic layer in the feed column. **The concern is associated with a red oil explosion resulting from organic solution entering the evaporator portion of the system.**

Similar to the above item, it was noted that in building 30 recovery area, failed float valves had compensatory measures embedded in the operating procedures. These compensatory measures allowed continued operation of the system.

10 CFR 70.72 allows a licensee to make changes to the site, structures, processes, systems, equipment, components, etc. without prior commission approval. However, among other requirements, the licensee must demonstrate that when replacing an IROFS listed in the ISA and one that is required to meet the performance requirements of 70.61, the new IROFS shall be an equivalent replacement of the safety function. Equivalent replacement of a safety function refers to controlling the same parameter with at least the same level of reliability and efficacy as the IROFS being replaced.

07/23/07

Platts Inside the NRC. **“NRC Order and related documents on NFS near-miss accident released.** Platts, Volume 29/Number 15/July 23, 2007, ML080320265.

08/27/07

NRC Inspection Report 70-143/2007-005 and Notice of Violation, **Severity Level IV Violation**, June 17, 2007 through July 28, 2007, ML073060138
(Note: Inspectors observed an annual force on force drill conducted from July 10 to July 12, 2007. **This drill was also observed by Commissioner Jaczko on July 11).**

Open:

70-143/2007-005-01 VIO Failure to have approved procedures prior to performing environmental sampling

On June 20, 2007, environmental samples were not being collected and controlled in accordance with written instructions as defined in workplans, procedures, special work instruction and/or letter of authorizations. No NFS approved procedures were in use or available for the final status survey samples pulled for the remediated North Site.

Inspectors noted that the activities of the contractors were not being implemented through procedures approved by the licensee -- Quality assurance plan for environmental sampling (NFS-DC-027, Revision 3).

In addition to the lack of approval of the implementing procedures, the contractors did not demonstrate adequate knowledge of their own procedures. Inconsistencies were noted in procedure implementation ranging from modifications to the sample mixing times to changing of the duties of the radiation technicians. Also, the contractors were not completing the sample entry forms in their entirety and the **contractors' chain of custody process did not meet the licensee's requirements.**

Inspectors discovered that the **Quality Assurance Dept. had not been promptly notified of the upcoming project due to an error in paperwork.** Once these observations were communicated to the licensee's management, the licensee decided to stop all sampling activities to ensure that the project was performed according to NFS procedures and appropriate QA audits were performed. The licensee indicated that all samples generated during the inspection were to be destroyed and performed again according to approved procedures.

Closed:

70-143/2005-007-04 URI Failure to conduct vehicle search (closed as EA-06-182 in Inspection Report 2007-402)

08/14/07 **Release of Nuclear Fuel Services, Inc. Documents, NRC, ML072570107. Documents withheld from public since August 2004. (Actual release did not occur until May and June 2008)**

08/27/07 NRC Inspection Report 70-143/2007-205, Criticality Inspection, August 6-10, 2007, **ML081500189**

Observations and Findings: Inspectors identified a **weakness** in the documentation of IROFS in 54T-07-0015. In the NCSE, the licensee had

identified three enclosures that have (R) spacer barrier installed in the inside of the enclosure to keep material away from the wall of the enclosure (R) spacer barrier was intended to be documented as an IROFS for all three enclosures, but was only documented for one of the enclosures. All three spacer barriers were verified and implemented as if there were IROFS.

Closed:

- 70-143/2005-205-02 IFI Tracks determination of appropriate experimental uncertainties and the reason for the observed spread in effective neutron multiplication factor (k_{eff}) (BLEU validations 54T-03-0053 and 54T-03-0009)
- 70-143/2005-205-04 IFI Tracks specification of which materials cover which portions of the area of applicability (AOA) in BLEU validation reports (BLEU validations 54T-03-0054 and 54T-03-0009)
- 70-143/2005-205-08 IFI Tracks the licensee's determination of the appropriate bounds of the defined AOA in the validation reports covering HEU operations (HEU operation validations 54T-04-0043 and WRS-97-001)
- 70-143/2005-205-09 IFI Tracks the licensee's resolution of inconsistencies between the validation reports and the procedure, and correcting the methods used to verify adequacy of the margin (HEU operation validations 54T-04-0043 and WRS-97-001)
- 70-143/2006-205-03 URI Tracks splitting a downblending accident sequence into additional sequences

Discussed:

- 70-143/2005-208-02 IFI **Tracks licensee actions to amend Safety Condition S-9 of the license to eliminate references to American Nuclear Standards Institute/American Nuclear Society (ANSI/ANS) series standards and clarify the meaning of "published experimental data"**
- 70-143/2007-202-02 IFI **Tracks commitment to clarify license commitments regarding calculation of k_{eff} and the use of positive bias**

Open Item Follow up:

70-143/2005-205-02, IFI These items track licensee commitments to clarify facility validation. The inspectors discussed the 2005-205-04, and licensee's actions to address the various validation- 2005-205-08 related issues.

The licensee expects that with the issuance of American Nuclear Standards Institute/American Nuclear Society (ANSI/ANS) 8.24, "Validation of Neutron Transport Methods for Nuclear Criticality Safety Calculations," and the NRC's Fuel Cycle Safety and Safeguards Interim Staff Guidance-10, "Justification for Minimum Margin of Subcriticality for Safety," that they are now in a position to have these validation reports updated by the end of the year. **When** the validation reports are updated to address the commitments they will be reviewed as part of the normal inspection and will no longer be tracked as IFIs. These items are closed.

70-143/2005-205-09 IFI This item tracks the licensee's resolution of inconsistencies between the validation reports and the procedure, and correcting the methods used to verify adequacy of the margin (HEU operation validations 54T-04-0043 and WRS-97-001).

During this inspection, the inspectors reviewed the updated validation report, 54T-05-0036, and procedure, 21T-05-1758. Both the validation report and the procedure had been updated to remove the inconsistencies between them and the methods used to verify adequacy of the margin had been clarified. This item is closed.

70-143/2005-208-02 IFI This item tracks licensee actions to amend Safety Condition S-9 of the license to eliminate references to ANSI/ANS series standards and clarify the meaning of "published experimental data."

During this inspection the licensee indicated that **work on this open item has not begun yet**. This item remains open.

70-143/2006-205-03 URI This item tracks splitting a downblending accident sequence into additional sequences.

During this inspection, the licensee provided documentation clarifying the licensee position on the URI. The inspectors reviewed the position paper, BPF ISA and the NCSE for the process. The inspectors determined that in this case, splitting the downblending accident sequence into two sequences did not create a new accident sequence because the original sequence bounded any means of

transferring additional solution. The inspectors also noted that the criticality controls did not change. This item is closed.

70-143/2007-202-02 IFI This item tracks commitment to clarify license commitments regarding calculation of **effective neutron multiplication factor** (k_{eff}) and the use of positive bias.

During this inspection the licensee indicated that **work on this open item has not begun** yet. This item remains open.

10/05/07

NRC Inspection Report 70-143/2007-006 and Notice of Violation, **Two (2) Severity Level IV**, July 29, 2007 through September 8, 2007, ML072780519

(Note: One (1) violation involved the failure to obtain approvals for a procedure modification) (Note: during the inspection period, an issue regarding force overtime was addressed. Several individuals were having to work double shifts (up to 16 hours per day)).

Open:

70-143/2007-005-01 VIO Failure to have approved procedures prior to performing sampling

The violation identified a failure of the licensee to follow NFS approved procedures as outlined in the NFS Decommissioning Plan. The inspectors reviewed the licensee's corrective actions and determined that the licensee had revised current procedures to accurately capture decommissioning activities for the North Site; provided training for the contractors involved in the decommissioning activities; and included the involvement of the quality assurance program in the decommissioning process. **However, the violation will remain open until IFI 2007-006-04 is closed.**

70-143/2007-006-03 VIO Inadequate review/approval for a procedure change

During a tour of Area 800, the inspectors reviewed a set of work instructions (WIs) regarding a particular process in use on unit J. WIs are strictly defined in NFS procedure NFS-TS-001, "Preparation and Issuance of Work Instructions and Letters of Authorization (LOA)," Rev. 3 as instructions written to address specific occurrences, processing parameters, and other processing requirements for material or systems. LOAs are simply temporary procedures and have expiration dates. In all cases, WIs will be predefined within a governing SOP or LOA. WIs do not receive the same level of review that a procedure or LOA receives. In this case, the WI was simply written by the process engineer and delivered directly (via an operations supervisor) to operators in the field for immediate

implementation. The inspectors reviewed this particular WI that was associated with a specific lot/batch of material and described under LOA 2054N-004.

The inspectors noted that several valve manipulations were called out and some instructions were somewhat unclear. The inspectors discussed the WI with field operators and noted there was confusion about exactly how to implement some specific steps. The inspectors ultimately determined that this WI went beyond its designated intent and was simply a revision to the associated LOA.

Therefore, as a procedure (or LOA) change, this WI should have received from criticality safety, radiation safety, industrial safety, and environmental protection review, according to Section 2.7.2 of the facility license. Additionally, the license requires prior safety committee review of a procedure change, as well as adequate operator training, prior to placing the procedure change into effect. Improper implementation of procedural instructions without the requisite reviews and training is a violation (VIO) of NRC requirements:

70-143/2007-006-01 URI SRE tests

The inspectors also observed a leak test of a valve in the fuel process. The licensee could not perform the test as written because the instructions were missing specific steps. The licensee entered the issue in the corrective action program (PIRCS 10949). The inspectors identified two additional leak tests in the fuel process that could not be performed as written. The inspectors also noted that the licensee conducted the leak tests last year although they could not be performed as written. The licensee committed to perform an extent-of-condition review of these issues and the review will be tracked as unresolved item (URI) 70-143/2007-006-01.

70-143/2007-006-02 URI Technical basis documentation for a plant modification

During a tour of the fuel processing area, the inspectors reviewed Work Request (WR) #16084. This maintenance involved the replacement of a pump. The pump was being replaced by a different manufacturer with an upgraded thrust bearing. However, the post maintenance testing revealed that the pump had insufficient head such that the associated container could not be placed on recirculation. Subsequent review revealed that the new motor operated at 50 percent of the speed of the previous motor, thus altering the pump curve. The inspectors noted the WR included few details regarding the engineering analysis associated with this plant modification.

10 CFR 70.72(a)(1) requires a configuration management system and it must address the technical basis for any change to structures, systems, or components prior to implementing the change. This issue will be tracked as an unresolved item (URI) 70-143/2007-006-02.

70-143/2007-006-04 IFI Collect samples for radiological sampling

The inspectors reviewed procedures, Quality Assurance Plan for Environmental Sampling Projects, NFS-DC-027, Rev. 4, and Quality Assurance Program, NFS-M-48, Rev. 3, and observed sampling activities out in the field. Section 5.3 of Procedure NFS-DC-027 required the licensee to collect a quality control sample for every ten samples. The procedure listed several options to collect the quality control sample. The options included, matrix spike, field duplicates, equipment rinses and/or analyte-free trip blanks. The procedure did not specifically identify radiological quality control sampling requirements. In addition, a memorandum dated July 10, 2007, discussed control sampling for non-radiological samples but not for radiological samples.

During sampling activities, the inspectors observed the licensee collecting quality control samples for Solid Waste Management Units (SWMU). The SWMU samples are volatile organics and are not radiological samples. The inspectors discussed with the licensee the purpose of quality control sampling for radiological samples and the issue of cross-contamination. The licensee agreed that the radiological quality control samples were not collected at the time of the inspection nor during past sampling activities of Survey Units 11 and 7. The inspectors discussed with the licensee Procedure NFS-DC-027, to address radiological quality control sampling as an Inspector Followup Item (IFI) (70-143/2007-006-04).

On July 31, 2007, **an NRC inspector accompanied the NFS Quality Assurance representative to Teledyne Brown Engineering, Inc., the licensee's contract laboratory, in Knoxville, TN.** The laboratory is responsible for processing of the North Site soil samples. The standard operation procedures for the sample processing, receipt, and control were reviewed. During a facility tour, the inspectors toured the sample storage area, and observed laboratory employees demonstrating chain-of-custody procedures along with equipment used in the sample preparation.

Conclusions: The procedure associated with QA of decommissioning activities was reviewed and observed in the field. **The inspectors determined that the licensee was not collecting radiological quality control samples in the field.** This was identified as an IFI.

Closed:

70-143/2005-004-01 URI Waste transfer without procedural authorization

Waste transfer without procedural authorization. This issue concerned the transfer of waste solution into a storage area without procedural authorization. As a corrective action, the licensee took action with the individual involved in the

issue. The licensee conducted training sessions related to procedure compliance and the use of trained and qualified personnel. The licensee **eliminated standing letter of authorizations that allowed the use of flexible hoses**. The licensee implemented hard piping for all credible situations requiring use of flexible hoses in BPF. This item is considered closed. (EA 06-141).

08/31/07 License Performance Review, Oct. 15, 06 through July 28, 07, **ML072430937**, Three (3) violations previously addressed:

Failure to implement the lockout/tagout procedure, properly train the users on the program and use the appropriate checklist for the testing of the uninterruptible power supply (UPS generator) (**Violation 70-143/2007-003-01**).

Failure to follow, maintain, and develop fire protection procedures which lead to two halon discharges (**Violation 70-143/2007-001-01**).

Failure to implement environmental sampling activities using approved NFS procedures (**Violation 2007-005-01**)

11/05/07 NRC Inspection Report 70-143/2007-207, Criticality Safety Inspection, Oct. 15-19, 2007, **ML073060276**

Open:

70-143/2007-207-01 URI Tracks licensee use of gapped reflector models of fissile systems

When the licensee relies on computer calculations to demonstrate double contingency, subcritical margin, or performance requirements for accident sequences leading to criticality, the calculations are required to use a 12-inch reflector unless conditions of less than full reflection are maintained. The minimum reflector condition allowed by the licensee is a 1-inch thick, tight-fitting, layer of water.

The license application specifically spells out when offset of the reflector is allowed. The inspectors noted that certain licensee calculations associated with gloveboxes contained computer models of fissile units with gaps between the reflector and fissile unit. The inspectors determined that the licensee NCS staff had intermingled requirements for less than full reflection with requirements for incidental reflection.

The inspectors determined that less than full reflection conditions were required to be modeled with a tight fitting layer around the fissile unit. Licensee NCS staff stated their belief during the inspection that tight fitting reflector conditions were not required for less than full reflection models. Inspectors noted that license

requirements regarding reflection were complex and would require further review relative to the licensee models.

Discussed:

70-143/2005-208-02 IFI **Tracks licensee actions to amend Safety Condition S-9 of the license to eliminate references to American Nuclear Standards Insititute/American Nuclear Society series standards and clarify the meaning of “published experimental data”**

70-143/2007-202-02 IFI **Tracks commitment to clarify license commitments regarding calculation of effective neutron multiplication factor (k_{eff}) and the use of positive bias.**

11/14/07 NRC Inspection Report 70-143/2007-208 and Notice of Violation, **One (1) Severity Level IV Violation, Oct. 15-19, 2007, ML073110391; superceded by ML080670299**

(Note: Criticality Safety Inspection of the AREVA Erwin facility; licensed under Nuclear Fuel Services, Inc. (NFS) License Number SNM-124)

70-143/2007-208-01 VIO **Failure to have NCS approval in an SOP, LOA, or other formal method for flexible lines that were located in the OCB as required by procedure**

While conducting a walk-down of the OCB, the inspector observed flexible piping stored in four locations inside the process area. NS-HS-CL-27 requires that any flexible lines and temporary piping in process areas must be approved by NCS (e.g., SOP, LOA, etc.). While interviewing operations staff and NCS engineers, the inspector determined that no formal approval was in place that stated which of the flexible lines were authorized for use in the OCB. SOPs were in place, which required flexible hoses but these SOPs did not identify which hoses were authorized. Storage and use of flexible pipe sections in the OCB without formal approval from NCS contrary to the requirement in procedure NS-HS-CL-27 is a violation.

This weakness was addressed in licensee's corrective action program under Problem Identification, Resolution, and correction system (PIRCS) #8644.

A weakness was noted with the licensee configuration control of the local criticality alarm panel. Licensee generated PIRCS #8593 to address this NRC concern.

There were several instances where issues were not being properly identified in the PIRCS program which licensee has been made aware of by the NRC. Inspectors will continue to monitor this issue to ensure no further examples of documenting issues are identified and will monitor closely the effectiveness of the PIRCS program to properly identify all issues of concern.

Inspectors reviewed compensatory measures associated with the **recently upgraded area LA. LOA-1988L-004 was developed to provide compensatory fire protection measures for this area since all fire protection features had not been completed prior to startup of this area** (IP 88135 and IP 88055).

12/28/07

NRC Inspection Report 70-143/2007-008 and Notice of Violation, **Four (4) Severity Level IV Violations**, Oct. 12, 2007 – Dec. 1, 2007, **ML073620551 & ML080080165**.

Open:

70-143/2007-008-01 VIO Failure to follow radiological control procedures

On Oct. 10, 2007, the inspectors identified contractor personnel working on the 300 complex roof without the required Personal Protective Equipment (PPE) as required by the posted SWP (Safety Work Permits). It was noted that another contractor employee was chewing gum in the radiation controlled area.

On Oct. 30, 2007, personnel working in area 304 did not have the required PPE required by the posted SWP. (Hard hats to prevent contamination).

On Nov. 1, 2007, the inspectors identified licensee personnel working on the 105 Laboratory Ventilation Scrubber without the required PPE as required by the posted SWP. (Individual working in the controlled area without any type of disposable gloves).

70-143/2007-008-02 VIO Inadvertent Criticality Alarm

Inadequately trained personnel mistakenly opened a breaker in a recently installed electrical panel under configuration control. This action de-energized four (4) criticality detectors which caused a criticality alarm and subsequent site emergency evacuation.

The criticality alarm was subsequently determined to be false and was caused by an individual who was attempting to reset a tripped circuit breaker for the microwave oven in Building 107. The individual operated a breaker in the incorrect panel and de-energized four (two pair) of criticality detectors, thus activating the alarm.

The electrical panel had been recently installed as a modification to the criticality detection system where the computer-based system was being replaced by a programmable logic controller system. **The panel and individual breakers were inadequately labeled and the affected site personnel were not adequately trained on its operations.** This is a violation of NFS-GH-901, "Configuration Management Program." Rev. 10, which states in part that "Personnel shall be trained on procedures (such as safety, security, material control and accountability or emergency) which affect the operation of Structures, Systems and Components (SSC) under configuration management.

Approximately 20 minutes after the alarm sounded, the inspectors noticed an individual (operations supervisor) arriving at the assembly area. Upon being questioned, this individual stated that he was late because he delayed evacuating in order to shut down the process. This is a violation of NFD-HS-E-02 which requires all personnel within the protected area to immediately evaluate to the main assembly area.

(Five lines totally redacted on Page 2, Report Details)

70-143/2007-008-03 VIO BPF spill resulting in personnel contamination

On Nov. 8, 2007, a spill occurred within the BPF facility. A clog within the Uranium/Aluminum (U/Al) system developed on the evening shift and the operators were attempting to locate the obstruction. The facility operator opened 1F70 without closing the upstream isolation. This action caused material to flow into a small cup the operator was holding and then spray back up onto the body of the operator resulting in a spill and personnel contamination. Operator had to be decontaminated as a result.

Inspectors noted **two contributory factors to the spill:** An installed pressure gage located between the strainer and the nozzle, would have aided the operator in locating the obstruction. The needle for the gage had broken and fallen to the bottom of the face plate. **No work requests were generated to fix the gage.** The other process train had a broken gage as well. Both gages were last repaired in March/April of 2007. **The inspectors noted an acceptance by the operators to tolerate deficient equipment conditions.**

On Oct. 30, 2007, the inspectors identified licensee personnel performing troubleshooting activities on the area 800 equipment in accordance with an unapproved Maintenance Work Request.

Inspectors determined that there was a lack of procedural guidance in dealing with system obstructions within the U/Al process. **Rather, this troubleshooting activity appeared to be performed via "skill-of-the-craft."**

70-143/2007-008-04 VIO Inadequate Contamination Surveys

Inspectors determined that additional smears for contamination surveys performed in the Navy Fuel area and the BLEU Preparation Facility (BPF) were not taken to define the extent of contamination outward from a contamination spot that exceeded the licensee applicable limits. In addition, the Area Supervisor did not initial and date the applicable survey form indicating the Area Supervisor's notification and the initiation of decontamination actions.

70-143/2007-008-05 URI Review of NFS' verification and validation of third party software used for decommissioning

During inspectors review of the licensee's QA role in the decommissioning project, the inspectors noted that the licensee had yet to perform a verification and validation of the third party software that was going to be used with the sampling results.

Follow up on Previously Identified Issues:

Closed:

70-143/2007-002-02 IFI Upgrade calibration of U/AI flow indicators

Originally, the nitrogen trickle-flow indicators (which were considered safety related equipment (SRE)) were not on a routine calibration frequency. When this issue was discovered and communicated to the licensee, the licensee stated they would upgrade the calibration frequency. The inspector was able to verify during this inspection that the U/AI flow indicators were now set to an annual calibration frequency. However, when the licensee re-calibrated the flow indicators, two of the flow indicators would not calibrate and needed to be replaced. The inspectors had discussions with the licensee regarding the indicators that could not be re-calibrated and the potential extent of condition with regard to SRE that was not on a routine calibration frequency. Following this discussion, the licensee opened a PIRCS items to review the issue. Therefore, based on these actions, this item is now closed.

70-143/2007-005-01 VIO Failure to have approved procedures prior to performing sampling

The violation identified a failure of the licensee to follow NFS approved procedures as outlined in the NFS Decommissioning Plan. The violation will now be considered closed based on the closure of IFI 2007-006-04.

70-143/2007-006-04 IFI Collect samples for radiological sampling

During a previous NRC inspection, the inspectors had identified that the licensee had not been applying their guidance for collecting quality control samples

consistently between radiological and chemical samples. During this inspection, the inspectors were able to verify that licensee Procedure NFS-DC-027 had been modified to more clearly address radiological quality control sampling. The licensee was also properly implementing the procedure in their decommissioning activities. This item is now closed.

70-143/2006-002-03 VIO Unauthorized BPF Exit Points for Visitors

During the follow-up from the last inspection, the licensee had not completed the Corrective action to provide a formal procedure communicating instructions on how to plan facility tours. Operating procedure NFS-GH-91, Revision 26, was revised to include instructions on how to establish temporary access points for controlled areas of facility tours.

Observations:

Inspectors found that the reviewed minutes from the calendar year 2007 meetings included a review of new or revised facilities and equipment, NRC inspection findings, safety-related audit and inspection findings, and **licensing deficiency reports**.

At the time of the inspection, **most licensee waste-generating processes were shut down in support of a plant-wide materials accountability inventory** and the inspector had limited opportunities to observe waste classification and packaging procedures.

2008

- 01/07/08 Letter and Motion to Quash the December 3, 2007 NRC Office of Investigations Subpoena Issued to **Daryl M. Shapiro, Esq.** (16 pages). Note: See Pages 8 & 9, (3) Mr. Shapiro's Role As Investigator Does Not Waive Either Protection. The Commission held "that the fact that licensee officers could have themselves undertaken an investigation of the allegations and drafted a response to the NRC does not eclipse the special role and training that an attorney might bring to bear in "sifting through the facts" for the legally relevant, **particularly given that at the time (the licensee) was the subject of at least two federal investigations into alleged serious regulatory and criminal violations.**" **ML080150036**
- 01/30/2008 NFS License Performance Review, July 29, 2007 through December 31, 2007 **ML080300451**. **"NRC noted an upward trend in the number of procedural violations – including eight violations in a five-month period. This increase in violations appears to be an indicator of declining regulatory performance in this area."**

“At least one of these procedure violations involve **failure to adhere to procedures implemented as a corrective action following the March 2006 incident involving the spill of high enriched uranium solution.** In light of the NFS’ plan for **significant expansion of the Blended Low enriched Uranium (BLEU) facility in 2008,** this area for improvement will continue to be a focus of NRC oversight.”

“NRC identified **management oversight of planning and quality of licensing requests as another problem area needing improvement.**”

Management oversight to ensure adherence to operational, radiological protection, and engineering procedures;

- **Failure** to follow procedure due to the storage and use of flexible pipe sections without formal approval from the nuclear criticality safety group. (VIO 2007-208-01)

- **Failure** to properly implement criticality alarm response procedures following a false alarm. (VIO 2007-008-02)

- **Two (2) examples of failing** to follow procedures: one involving the use of an unapproved work request for operations, and the other which led to the contamination and a slight chemical exposure of an operator. (VIO 2007-008-03)

Three (3) examples of failing to follow Special Work Permits (SWPs) by not using the appropriate personnel protective equipment. (VIO 2007-008-01)

- **Failure** to document and properly implement radiological decontamination procedures. (VIO 2007-008-04)

- **Two (2) examples of failing** to follow SWP radiological control requirements. (VIO 2007-009-02)

- The licensee implemented **operational procedure changes without the required reviews and training.** (VIO 2007-006-03)

- **The licensee failed** to implement the "toll-gate" process that requires documented design goals and meetings to determine the requirements for engineering projects. (VIO 2007-009-03)

Several recent licensing requests have not adequately supported the licensee’s desired operational needs. Ineffective planning and quality resulted in documents that required multiple changes before providing sufficient information to support NRC’s licensing activities. Examples:

- The request to increase its possession limit for high-enriched uranium

(TAC L32637)

- The three revisions of the Fundamental Nuclear Material Control Plan for high enriched uranium submitted in July, November, and December 2007 (TACs L32644, L32656 and L32662)

- The major revision of the Physical Security Plan for high-enriched uranium (TAC L32648)

- The request to establish a Chief Nuclear Officer (TAC L32647).

03/27/08 NRC Investigation No. 2-2006-17, In the Matter of Daryl M. Shapiro, CLI-08-06 Memorandum and Order (10 pages). Docketed 03/27/08; served 03/27/08. **ML080870303.**

04/07/08 Update of Nuclear Fuel Services, Inc. NFS did not meet the criteria established in SECY-02-0216 for discussion at this year's AARM. However, NFS was discussed at last year's AARM meeting and Region II and NMSS recommend that the status of the NFS improvement actions be discussed this year due to the unique aspects of NRC oversight of the facility. **In particular, the establishment of a Safety Culture and Configuration Management Improvement Oversight Panel that is evaluating NFS implementation of the February 21, 2007 Confirmatory Order.**

NFS' current performance, as indicated by the number of violations identified since mid-2007 has not significantly improved since the last licensee performance review (LPR). The violations continue to indicate that NFS needs to improve its management oversight to ensure adherence to operational, radiological protection, and engineering procedures. This area for improvement is longstanding as indicated by two of the previous three LPRs. **ML080580192.**

04/02/08 NNSA and NRC Public Meeting in Erwin to discuss DOE/EIS 0240-SA1 Supplemental Analysis, regarding **1 in 71 Latent Cancer Fatality** for the MEOI near NFS. **ML081130391**

04/22/08 NFS presented the results of the Independent Third Party Safety Culture Assessment to the NRC, **ML081000509**

04/24/08 NRC Inspection Report 70-143/2008-202 and Notice of Violation, **Severity Level IV, March 31, 2008 through April 4, 2008**, Criticality Safety Inspection, **ML081070390.**

Open:

70-143/2008-202-01 VIO Failure to demonstrate the adequacy of

subcritical margin under normal conditions

The inspectors determined that NCSEs were performed by qualified NCS engineers, independent reviews of the evaluations were completed by other qualified NCS engineers, and double contingency was assured for each credible accident sequence leading to inadvertent criticality. With the exception of the NCS analysis for centrifuge bowl cleaning, the inspectors determined that NCS controls for equipment and processes assured the safety of the operations.

When the licensee relies upon computer calculations to demonstrate that an operation is subcritical, Section 4.2.3.2 of the license requires that the NCSE must demonstrate adequate subcritical margin by showing that the neutron multiplication factor (k_{eff}), including any bias and uncertainty, does not exceed a value of 0.90 for normal conditions and a value of 0.95 for failure of a single contingency. Section 4.1.1 of the license application defines normal conditions as the most reactive values of NCS parameters (moderation, reflection, mass, etc.) as limited by identified controls on system parameters. Section 4.2.1.2 of the license states that full water reflection is assumed in determining NCS parameters for individual units, except when controls are established that can maintain conditions at less than full water reflection.

The licensee uses centrifuges in BPF to separate dissolved product from solvent. When centrifuging is complete, the product is removed from the centrifuge bowl in a cleaning station. The inspectors noted that the normal operations for BPF centrifuge bowl cleaning include the transfer of the bowl by hoist or by hand from the centrifuge station, a reflection controlled location, to the bowl cleaning station, another reflection controlled location. The inspectors determined that during this transfer operation there were no controls on reflection for the bowl, and the only NCS controlled parameter was the bowl geometry. The inspectors also noted that the NCSE for the centrifuge bowl cleaning operations did not describe a normal condition for moving the centrifuge bowls. The licensee's NCS staff indicated that models of bowls in the centrifuge bowl cleaning station NCSE had been expected to bound the process of moving a bowl for cleaning.

The inspectors also noted that the NCSE for the BPF Centrifuge Bowl Cleaning Station contained a study in which a single centrifuge bowl was modeled with full water reflection and varying amounts of optimally moderated SNM. The study indicated that k_{eff} is less than 0.90 if there is 6 kg or less of optimally moderated uranium oxide (UO₂) in the bowl, and that k_{eff} exceeds 0.90 if there is 12 kg or more of optimally moderated UO₂ in the bowl. The inspectors noted that when the bowl was completely filled (more than 40 kg) with optimally moderated UO₂ that k_{eff} is less than 0.95. The licensee's NCS staff stated that a centrifuge bowl was not expected to accumulate more material than that equivalent to 6 kg of UO₂, but there was not a specified control that limited the mass of material in the bowl. The inspectors determined that this study was not sufficient to demonstrate

that k_{eff} for the centrifuge bowl transfer operation was less than 0.90 since no mass controls had been established.

The inspectors determined that the licensee was required to demonstrate the adequacy of subcritical margin for bowl cleaning by showing that k_{eff} for centrifuge bowl transfer operations was less than 0.90 under a reasonably defined normal condition. The inspectors did not identify an immediate safety concern regarding the licensee failure to address centrifuge bowl movement because the licensee had numerous options for adequately analyzing centrifuge bowl movement within acceptable subcritical margin, including options related to reflection conditions. The **licensee's failure** to demonstrate the adequacy of subcritical margin under all normal conditions associated with BPF centrifuge bowl cleaning is **Violation (VIO) 70-143/2008-202-01**.

70-143/2008-202-02 NCV Failure to survey filter media prior to packaging for disposal

On March 28, 2008, the licensee reported (NMED 080185) that contaminated cartridge filters were packaged in 55-gallon waste drums without being scanned as required. Individual scanning contaminated items before packaging is an item relied on for safety (IROFS) which assures compliance with waste packaging procedures. The licensee uses letters of authorization (LOAs), a type of temporary procedure, to package these shipments. The licensee indicated that a poorly written LOA listed mass values for items, which indicated to operators that scanning had taken place. Some of the listed mass values were estimates used for another purpose and were not valid for packaging the waste. Two filters had not been scanned at all. Immediate corrective actions included unpacking the drums and scanning all items. The licensee was conducting an investigation, which was expected to identify long term corrective actions. The inspectors did not identify any immediate safety concern regarding this issue and consider this event closed. This non-repetitive, licensee identified and corrected violation is being treated as a Non-Cited violation, consistent with Section VI.A.8 of the NRC Enforcement Policy. The licensee failure to survey filter media prior to packaging for disposal is Non-Cited Violation (NCV) **70-143/2008-202-02**.

Closed:

70-143/2007-207-01 URI Tracks licensee use of gapped reflector models of fissile systems

During this inspection, the inspectors noted several NCSEs where the licensee uses gapped reflector models for SNM handled in reflector controlled areas. The inspectors noted that these gapped reflectors models have less than a one-inch-thick, tight-fitting reflector completely surrounding the fissile system. One **example was shown in inspection report 70-143/2007-207**. The inspectors also noted other examples where the tight-fitting reflector was intended to bound only one person's hands on a much larger unit. The inspectors discussed this modeling

practice with the licensee and stated that it is less conservative than what is typically observed in other licensee's NCSEs. The inspectors did not identify any examples in the NCSEs reviewed during this inspection where the use of gapped reflector models would pose a significant safety problem. The inspectors determined that the license application does not clearly prohibit the use of gapped reflection. **The licensee stated that it intends to clarify its commitments in the license application regarding reflector modeling during the next license renewal.** This item is closed.

70-143/2005-208-02 IFI Tracks licensee actions to amend Safety condition S-9 of the license to eliminate references to American Nuclear Standards Institute/American Nuclear Society series standards and clarify the meaning of "published experimental data."

During this inspection the licensee stated that, due to the impending license renewal, the NRC project manager for the facility had suggested that no further license amendments be submitted unless it was an emergency. The licensee stated that the issue associated with License Condition S-9, reliance on consensus standards, **will be corrected during license renewal.** This item is closed.

70-143/2007-202-02 IFI Tracks commitment to clarify license commitments regarding calculation of effective neutron multiplication factor (k_{eff}) and the use of positive bias.

During this inspection the licensee stated that, due to the impending license renewal, the NRC project manager for the facility had suggested that no further license amendments be submitted unless it was an emergency. During this inspection the licensee stated that the issue associated with positive bias **will be addressed during the next license renewal.** This item is closed.

04/30/08 **NRC Report to Congress on Abnormal Occurrences**, Fiscal Year 2007. NFS is included in Appendix B, Updates of Previously Reported Abnormal Occurrences, **ML081300424**.

05/01/08 NRC Inspection Report 70-143/2008-003, April 21-25, 2008, Criticality Safety (**Note:** Inspection of the AREVA Erwin Facility), **ML081210590**

Inspector observed that the licensee procedure for monthly inspections, NFS-HS-A-C-16 did not accurately represent the process that the licensee staff was using to document monthly inspections.

Closed:

70/143/2007-208-01 VIO Failure to have NCS approval in an SOP, LOA, or

other formal method for flexible lines that were located in the OCB as required by procedure.

This item concerned the failure to have NCS approval in a Standard Operating Procedure (SOP), Letter of Authorization (LOA), or other formal method for flexible lines that were located in the OCB as required by procedure. During a previous inspection, the inspector observed flexible piping stored in four locations inside the process area. NFS-HS-CL-27 requires that any flexible lines and temporary piping in process areas must be approved by NCS (e.g., SOP, LOA, etc.). While interviewing operations staff and NCS engineers, the inspector determined that no formal approval was in place that stated which of the flexible line were authorized for use in the OCB. During this inspection, the inspector determined that all flexible piping in the OCB had been labeled as approved by NCS and NFS-HS-CL-27 had been updated. This item is closed.

05/05/08

NRC Inspection Report 70-143/2008-001 and Notice of Violations, **Two (2) Severity Level IV** Violations, January 1, 2008-April 5, 2008, ML081270020

70-143/2008-01-02 NOV Failure to perform SRE testing in accordance with plant procedures.

Failure of plant staff to adequately perform required annual SRE (Safety Related Equipment) testing of eight of eleven process sleeves in Building 333 **since 2004**, due to the inability to visually verify the condition of the process pipe and sleeve. Visual verification was prevented by the installation of fire grout between the process pipe and sleeve (**Violation 70-143/2008-001-02**).

The licensee had identified an **upward trend in personnel contamination events** and determined that the trend may be due to **degrading human performance and safety culture**.

70-143/2008-01-03 NOV Two (2) examples of failure to follow radiological procedure requirements

On March 3, 2008, a violation was identified when the inspectors noted that an operator, upon exiting the controlled area of U-Aluminum, was wearing only one pair of latex gloves when two were required by the SOP 409 requirements.

On March 4, 2008, an operator was removing his PPE on the controlled side of U-Aluminum and failed to step onto the "step-off" pad in accordance with Procedure NFS-GH-01.

Open/Closed:

70-143/2008-01-01 NCV Failure to adequately maintain BPF downblending In-Line Monitor

A non-cited violation was identified as a result of the Building 333 downblending in-line radiation monitor being in an operable, but **degraded state**.

Closed:

- | | | |
|--------------------|-----|--|
| 70-143/2006-06-01 | APV | Failure to notify the NRC in accordance with 10 CFR 70, Appendix A, (a)(4)(ii) reporting requirements (Paragraph 6). |
| 70-143/2006-06-02 | APV | Failure to verify proper installation of the tray dissolver filter enclosure drains prior to use of the system with fissile material (Paragraph 6). |
| 70-143/2006-06-03 | APV | Failure to meet the performance requirements of 10 CFR 70.61(d) for accident sequences related to handling fissile material in the tray dissolver system (Paragraph 6). |
| 70-143/2006-06-04 | APV | Failure to meet the performance requirements of 10 CFR 70.61(d) for accident sequences related to fissile solution accumulation on the solvent extraction room floor (Paragraph 6). |
| 70-143/2006-06-05 | APV | Failure to assume that fissile solution could be misdirected from the solvent extraction feed transfer line in NCS analysis for the tray dissolver system (Paragraph 6). |
| 70-143/2006-06-06 | APV | Failure to ensure that process systems not approved for use were isolated from active SNM bearing systems and failure to implement facility change process requirements of 10 CFR 70.72 (Paragraph 6). |
| 70-143/2006-06-07 | APV | Failure to use a valid procedure to conduct licensed activities (Paragraph 6). |
| 70-143/2006-06-08 | APV | Failure to report the events concerning the yellow solution in the 2M05 enclosure in accordance with the requirements of Section 5.1 of NFS-GH-65 (Paragraph 6). |
| 70-143/2007-008-01 | VIO | Failure to follow radiological control procedures (Paragraph 6). |

- 70-143/2007-008-02 VIO Inadvertent Criticality Alarm (Paragraph 6).
- 70-143/2007-008-03 VIO BPF spill resulting in personnel contamination (Paragraph 6).
- 70-143/2007-008-04 VIO Inadequate contamination surveys (Paragraph 6).
- 70-143/2007-009-02 VIO Failure to follow radiological procedures (Paragraph 6).

05/22/08

Safety Evaluation Report, ML080980319. Since 2002, a growing number of significant violations occurring at the Nuclear Fuel Services, Inc. (NFS) facility in Erwin, TN, have been reflected in successive License Performance Reviews. Despite numerous root cause investigations and corrective action plans, NFS continued to experience chronic noncompliance issues. Civil penalties and other sanctions imposed by the Nuclear Regulatory Commission (NRC) did not have the desired effect for improving overall compliance with regulatory requirements. The normal enforcement process did not result in adequate improvement. It was the conclusion of the NRC Headquarters and RII staff and management to focus NFS resources on actions that would improve the licensee's program and reduce repeat violations.

06/04/08

Agency Action Review Meeting (AARM), ML081580430. (Victor McCree, Deputy Administrator, Region II) - As part of last year's AARM Commission Meeting, the staff identified a number of areas requiring improvements at NFS, from successive license performance review cycles dating back as far as 2002. **It included procedural adherence issues in the areas of operations as well as material control and accountability, use of the problem identification and corrective action program, as well as in the engineering design verification and configuration management areas.**

In March 2006, a significant safety event involving a spill of high enriched uranium solution due to poor configuration control of equipment in the blended low enriched uranium portion of the facility occurred at NFS. As a result of those events, in February 2007, the NRC did issue a Confirmatory Order with three specific mandates. First, that NFS institute a safety culture assessment and improvement program, second, that NFS modify its configuration management program via a license amendment, and third, that NFS implement specific corrective actions to address the remaining escalated enforcement actions.

We maintain two resident inspectors at NFS and we also extended the amount of core inspections hours that we implement at NFS. Normally, we implement 2,500 hours. In 2007, we actually implemented over 3,500 hours of inspection effort at NFS. NFS's current performance, which is based primarily on the violations

identified over the last year indicates that adherence to operational radiological protection and engineering procedures is an area that warrants additional NFS management oversight. This area of improvement is particularly noteworthy because it's a longstanding area needing improvement at NFS and was identified in two of the three previous license performance reviews.

The NRC received the Independent Safety Culture Assessment on May 15, 2008. The assessment identified 41 findings; 21 were characterized as "most significant," with nine major themes, several of which NFS did not identify in its parallel safety culture study. Those nine areas are organizational values, standards and expectations; the communication of those values, standards and expectations; human performance; ownership and accountability; resources enhancing the effectiveness of programs and processes; tolerance of degraded condition; continuous improvement and benchmarking.

08/04/08

NRC Inspection Report 70-143/2008-002 and Notice of **Severity Level IV** Violation, April 6 –July 5, 2008, **ML082180089 and ML082960665**

Open:

70-143/2008-02-01 VIO Failure to perform plant modifications in accordance with 10 CFR 70.72

In 2007, the licensee failed to adequately document and address the technical basis of a change of equipment. Specifically, the licensee's inadequate documentation and technical basis allowed a raffinate pump to be replaced with a model that had the incorrect motor speed.

On May 13, 2008, the licensee failed to adequately document and address the technical basis for the removal of an item relied on for safety for a temporary modification. Specifically, sodium nitrate low flow switches from the Uranium-Aluminum system were replaced with compensatory measures without adequate technical documentation. These switches ensure the system maintains adequate flow of sodium nitrate to minimize the generation of nitrogen oxide fumes, which would present an asphyxiation hazard.

On May 21, 2008, the licensee failed to perform the necessary procedural changes and training prior to implementing a change. Specifically, a plant change added two electrical disconnects associated with two electric motors. However, the licensee did not detail to the operators that the electrical disconnects affected only the motors, not all the equipment on the motor skids.

70-143/2008-02-02 URI Review Method for Making Changes to Active Safety Work Permits

During routine observation of work activities and review of selected documentation, the inspectors noted that several routine Safety Work Requests had numerous handwritten revisions. NFS Procedure NFS-GH-03, Rev. 12, "Safety Work Permit", "General Requirements" section states "Changes in work conditions or work scope may require modifications to Safety Work Permits (SWPs) prior to the completion of the work or the expiration date. Modifications may be made by a HP, ISS, RT Supervisor, or Plant Superintendent by lining through the current requirement, adding the change as applicable, initializing and dating to indicate approval. If work conditions or work scope change significantly during the work, the permit must be terminated and a new permit initiated to complete the work activity." The inspectors will review the licensee's interpretation of "significantly" during the next assessment period.

Closed:

70-143/2007-06-02 URI Technical basis documentation for a plant modification

This URI was reviewed and discussed in Section 6.b and is an **example supporting violation 2008-02-01 above.**

Other Observations:

Additionally, during the walkdown of the vacuum pumps the inspectors noted that a tag from lockout/tagout #6526 was hung on the incorrect pump circuit breaker. However the main circuit breaker was off and thus the entire system was de-energized. This condition was brought to the attention of supervision and was immediately corrected. **This failure constitutes a violation of minor significance and will not be subject to formal enforcement.**

The inspectors conducted a tour of the Uranyl Nitrate Building of the BLEU Complex. During this facility inspection, the inspectors also reviewed procedures. An internal audit of the environmental program for the site only had a partial review for the BLEU Complex. Even though the environmental data from the BLEU Complex was included in the report; the procedures, people, and facilities were not audited. An independent audit included the BLEU Complex in its review, which fulfilled the license requirement. Several PIRCS items relating to the environmental program were reviewed. The items were discussed with the licensee and several of the corrective actions were confirmed by the inspectors. The inspectors interviewed personnel regarding a recent event in which an off-site licensee received a material shipment from NFS and found that the transport vehicle was contaminated.

09/08/08

Licensee Performance Review (LPR) of Licensed Activities for Nuclear Fuel Services (NFS), Inc, Docket Number 70-143, **ML082520608.**

Program Areas Needing Improvement:

Failure to implement surveillance procedures according to procedure for criticality safety controls. Specifically, the licensee did not adequately verify the presence of process pipe sleeves (an item relied on for safety (IROFS) for fire wall penetrations. Several of the pipe sleeves were concealed with a fire retardant material and could not be verified to be present. (Violation 70-143/2008-001-02, NRC Event #43937).

Failure to adequately demonstrate subcritical margin for routine and expected abnormal conditions associated with the centrifuge bowl cleaning station. Specifically, transfer of bowls from the centrifuge station to the bowl cleaning station was not adequately controlled to assure subcritical margin as described in the nuclear criticality evaluation (Violation 70-143/2008-202-01)

09/11/08 Weaknesses of the Current System of Public Access to Security Information, POGO **ML082660535**.

09/26/08 NRC Inspection Report 70-143/2008-206, Sept. 8-11, 2008, (Criticality Safety Inspection) **ML082620240**

Open:

70-143/2008-206-01 URI Single IROFS protecting an accident sequence not declared as a sole IROFS

During the review of 54T-08-0035, "Nuclear Criticality Safety Evaluation for the High Security Storage Area in Building 311," the inspectors identified an accident sequence protected by a single IROFS where repeated failures of the IROFS were relied on to ensure subcriticality. **Placement of the wrong container on storage area racks or receipt of a Shipping Package with the wrong container or contents is accident sequence 4.15 in 54T-08-0035, which only relies on IROFS 311-1.** IROFS 311-1 requires that an operator verify that any containers entering the rack storage area meet container mass and moderation limits. The analysis states that "IROFS 311-1 would have to fail more than 56 times before a criticality could be possible." Licensee procedure NFS-HS-A-68 for the facility Integrated Safety Analysis (ISA) methodology does not discuss when an IROFS is considered a sole IROFS exceeds the performance requirements of 70.61.

Licensee staff stated that it was common practice in their NCS (Nuclear Criticality Safety) analyses not to consider a control a sole IROFS when that IROFS has to fail multiple times before it exceeds the performance requirements of 70.61. The licensee stated that when an IROFS has to fail once to exceed the performance requirements of 70.61 is when an IROFS would be considered a sole IROFS. The licensee staff indicated that this practice is used multiple times throughout the facility.

10 CFR 70.65 b.8 requires a descriptive list that identifies all IROFS that are the sole item preventing or mitigating an accident sequence that exceeds the performance requirements of 70.61. **Licensee staff indicated that this same issue (relying on the failure of a sole IROFS multiple times) has been raised by NRC technical reviewers during their CDL (Commercial Development Line) amendment. Licensee staff believes that the NRC approved this methodology during a previous license amendment review.**

Closed:

70-143/2008-202-01 VIO Failure to demonstrate the adequacy of subcritical margin under normal conditions

This item concerned the licensee's failure to demonstrate the adequacy of subcritical margin under all normal conditions associated with BPF centrifuge bowl cleaning. During a previous inspection, the inspectors noted that normal operations for BPF centrifuge bowl cleaning included transfer of the bowl by hoist or by hand from the centrifuge station, a reflection controlled location, to the bowl cleaning station, another reflection controlled location.

The inspectors determined that during this transfer operation there were no documented controls on reflection for the bowl, and the only NCS controlled parameter was the bowl geometry. The inspectors also noted that the NCSE for the centrifuge bowl cleaning operations did not describe a normal condition for moving the centrifuge bowls. The licensee's NCS staff indicated that models of bowls in the centrifuge bowl cleaning station NCSE had been expected to bound the process of moving a bowl for cleaning. The inspectors determined that the licensee was required to demonstrate the adequacy of subcritical margin for bowl cleaning by showing that k_{eff} for centrifuge bowl transfer operations was less than 0.90 under a reasonably defined normal condition.

During the current inspection, the inspectors reviewed licensee corrective actions to define the normal condition and assuring adequate controls for moving centrifuge bowls during cleaning operations. The inspectors determined that the licensee had performed additional analysis and identified two new administrative controls to 1) limit personnel around a bowl during movement and 2) prohibit wrapping the bowl in plastic for movement.

The inspectors determined that these new controls adequately establish and maintain the normal condition for bowl movement. The inspectors also reviewed a change to licensee guidance regarding documentation of reflection conditions in NCS analysis. The licensee had also committed to review other NCSEs for similar failures to define normal conditions.

The inspectors determined that the licensee had completed this review and documented 20 issues for correction during future NCSE revisions. The licensee review had focused on reflection conditions and the inspectors determined that none of the issues identified presented an immediate safety concern. The licensee had also committed to submit a license amendment August 29, 2008, to clarify requirements for analyzing reflection conditions. The licensee indicated that the license amendment would now be submitted by December 31, 2008. The inspectors determined that all corrective actions related to NCS analysis of BPF bowl operations were completed and that sufficient written commitments were in place regarding the license amendment.

10/30/08 NRC Inspection Report 70-143/2008-003 and Notice of Violation, Severity Level IV, July 6, 2008 through October 4, 2008, **ML083040312**, (Encompassing Event Reports: 43947, 44417, 44435, 44344, 44345 and 44532 and NMED No. 080056, 080389, 080390).

Open:

70-143/2008-03-02 VIO Failure to inspect fire dampers as required by procedure NFS-GH-22.

The inspectors noted that the **licensee had not inspected the fire dampers for the past two years, including fire dampers designated as IROFS (Items Relied on for Safety)**. The inspectors noted that fire dampers designated as IROFS were not part of the safety related equipment list nor were the fire damper inspections formally integrated into the fire protection program.

70-143/2008-03-03 URI Combustible Material Control in Building 310

An unresolved item was identified to evaluate deficiencies associated with Building 310 Warehouse ISA and management measures for IROFS FIRE-2.

The inspectors reviewed the ISA and the fire hazard analysis (FHA) for Building 300 A/B Warehouse and Building 310 Warehouse. For Building 300 A/B Warehouse, the licensee identified a dry pipe sprinkler system as the only fire-related IROFS. The FHA stated that the combustible loading in the warehouse had increased in the recent past and the installed sprinkler system was not adequate to protect the structure and the actual contents.

During the review of the ISA for Building 310 Warehouse, the inspectors determined that the only identified IROFS was inadequate for meeting 10 CFR 70.61 (b) requirements for the identified high consequence event. **The licensee determined that a fire in the warehouse could result in a high consequence event due to a chemical release.** The licensee only identified a single administrative IROFS to reduced the likelihood. This sole IROFS fails to meet the performance requirements of 70.61 (b).

Inspectors noted that the monthly surveillance in the Building 310 Warehouse had been identifying non-compliances with the Combustible Control Program since July 2008. However, the licensee had not taken effective corrective actions to address the issues. Based on these findings, the **inspectors determined that the management measures in place for IROFS FIRE-2 were not ensuring the reliability of the control to prevent a fire.**

70-143/2008-03-04 IFI Improper Escort Control

During a tour of the plant areas, the inspectors noted an uncleared person was not being properly escorted. This item will be tracked as an inspector followup item to verify the licensee's long term corrective actions.

Other Observations and Findings:

Inspectors evaluated an issue in Area 800 that dealt with the **failure** to reinstall a pre-filter in a glovebox following a change in processed material.

Inspectors noted an issue involving a remote pump that seemed to leave the lines pressurized even when the pump was shut off. Operators had entered the issue into the corrective action system, but the issue had not yet been resolved.

Inspectors reviewed corrective actions and the radiological dose assessment associated with a **personnel contamination event that occurred on August 18, 2008**. The licensee's investigation traced the source of the contamination to an evolution conducted on the evening of August 15, 2008.

Inspectors followed up on Events #44344 and #44345 (**Items Relied on for Safety Discovered Inoperable**). These event reports noted that the installed **nitrogen oxide detectors were determined to be in a degraded condition since the last function test (January 2008)**. The lack of confidence stemmed from the use of an expired test gas used for the instrument calibration.

Inspectors evaluated licensee's initial response to Event Notification #44417 and #44435. Both events dealt with material discrepancy alarms. Licensee's initial corrective actions determined that no actual loss of material occurred.

On Oct. 1, 2008, licensee reported a fitness-for-duty issue in Event Report #44532.

Open/Closed:

70-143/2008-03-01 NCV Failure to Follow a Stop Movement Order

On Aug. 14, 2008, a plant operator was observed operating the shear device within Building 333 during a stop movement order. The stop movement order was in effect while troubleshooting was performed on a pair of criticality detectors.

Closed:

Follow-up on Previously Identified Issues

70-143/2006-07-01 IFI Licensee's actions to address post-maintenance deficiency when safety control affects more than one system.

This IFI was opened to track the licensee's actions with regard to post-maintenance testing of safety controls that affect more than one system. The inspectors reviewed the licensee's actions to combine (or cross-reference) testing procedures for systems with safety controls that affect multiple systems. The inspectors determined that combining the testing procedures into one (or referring to additional procedures that are required to be performed) adequately addressed the issue of testing safety controls that affect multiple systems. Based on the examples reviewed and the licensee's commitment to review the electronic listing of testing procedures to verify if other tests need to be combined, the inspectors determined this item to be adequately addressed.

70-143/2008-01-02 VIO Failure to perform SRE testing in accordance with plant procedures.

The inspectors reviewed the licensee's corrective actions involving the verifications of the pipe sleeve wall-penetrations. Originally, the penetrations, and often the sleeves themselves, were covered in a cement-like fire retardant material. Covering the sleeves with this material made verification of the sleeve presence and integrity nearly impossible. Therefore, the inspectors verified that the wall penetrations now had removable putty, which was required to be removed to verify the presence of the pipe sleeves. Several of the pipe penetrations were moved and no longer required fire retardant material. Based on the verification of the corrective actions, this violation is considered closed.

70-143/2007-03-01 VIO Failure to implement NFS safety procedures during 306 diesel generator/UPS/ABT maintenance activities.

The inspectors reviewed the corrective actions regarding the activities involving the testing of the 306 diesel generator system without approved procedures. The licensee committed to requiring special work instructions to be approved by the engineer's supervisor. The inspectors verified that the special work instructions were approved prior the most recent generator maintenance activities. The inspectors also verified that the lock-out/tag-out procedure was properly modified

to insure NFS employees would always have a lock in place and are last to remove a lock upon completion of work.

70-143/2007-01-01 VIO Failure to Follow, Maintain, and Develop Fire Protection Procedures.

This issue is related to the failure to maintain or revise fire response and operation of Halon Suppression System. The licensee replaced the Halon system with portable fire extinguishers, installed an early warning smoke detection system, and installed/tested a manual pull station in the area. In addition, the licensee provided training to personnel regarding response to fires, operation of fire extinguishers, and safety practices to prevent inadvertent operation of the remaining Halon system.

70-143/2007-01-02 IFI Set Point Calculations.

This issue is related to the licensee's handling of carbon dioxide tank reserve level inspections. The licensee reviewed the carbon dioxide suppression inspection procedure to verify the inclusion of the minimum designed capacity level of the system, as indicated in the set point calculations. The inspectors reviewed the design calculations for the system and confirmed the minimum designed capacity of the system.

70-143/2007-01-03 IFI Old Fire Protection Manual.

The licensee amended the license application to remove the reference to the Old Fire Protection Manual. The licensee determined that the Old Manual was obsolete since the ISA provides the basis for the fire protection program. The inspectors did not identify any safety issue.

70-143/2006-02-03 VIO Failure to Comply with Entry/Exit procedure Requirements From a Controlled Area.

Inspectors reviewed actions taken to ensure that proper controls are established for exiting and entering the Controlled Area when temporary entrance points are established. The licensee actions included arrangements to ensure that designated Health Physics personnel are contacted prior to the scheduled tour or entry into the Controlled Area. Health Physics personnel then ensure that appropriate protective clothing and supplies are made available at the entry and exit location. The inspectors discussed details with licensee personnel to confirm that program details were adequately communicated to responsible individuals.

70-143/2008-01-03 VIO Two examples of failure to follow radiological procedure requirements.

The licensee has established a program to track and trend these type issues as part of their Human Performance enhancement initiative. The inspectors noted that the

examples associated with this violation involved failure to use the prescribed protective clothing and to follow proper controlled area exit procedures. Both incidents were of low safety significance. The inspectors noted that the monitoring program will track and trend the occurrence of these type incidents and corrective actions will be predicated on the safety significance of a specific occurrence. The inspector discussed the details with licensee personnel to confirm that the Human Performance monitoring program will adequately address these type issues and that appropriate mechanisms are in place to initiate appropriate corrective actions.

11/05/08 NRC Inspection Report 70-143/2008-207, Criticality Safety Inspection of **AREVA-Erwin Facility**, Oct. 20-24, 2008, **ML083040131**.

Open:

70-143/2008-207-01 IFI Tracks the licensee's corrective actions to clarify the applicability of the requirements in NFS-HS-CL-27 to the OCB and/or the EFB.

The inspector noted that in procedure, NFS-HS-CL-27, NCS controls were identified as standard practices consisting of limits and controls for both the OCB and the EPB. The procedure did not clearly identify, for each of the standard practices, if they applied to either the OCB or the EPB or to both buildings. The licensee staff indicated that controls in the procedure were not intended to be used in both buildings. The licensee staff committed to revise the procedure by December 2008 to clarify which standard practices are applied to each building.

12/19/08 NFS' Status of Compliance with the Feb. 21, 2007 Confirmatory Order and Future Inspection Verification **ML083540397**

12/31/08 **Indirect transfer of NFS to Babcock and Wilcox.**

2009

01/07/09 NRC Inspection Report 70-143/2008-208. Criticality Inspection Dec. 8-12, 2008, **ML083640296**.

Open:

70-143/2008-208-01 IFI Tracks the licensee's corrective actions to justify the basis for independence when crediting repeated failures of a single IROFS as part of double contingency discussion in Nuclear Criticality Safety Evaluations (NCSEs).

A weakness was identified regarding justification of the basis for independence when crediting repeated failures of a single item relied on for safety (IROFS) as part of double contingency discussion in Nuclear Criticality Safety Evaluations (NCSEs).

The inspectors reviewed several accident sequences in other NCSEs as part of their review of new and revised analyses, and determined that crediting repeated IROFS failures is widespread in the facility. In many cases, the NCSE does not contain sufficient justification of why the multiple failures may be considered independent.

Closed:

70-143/2008-206-01 URI Single IROFS protecting an accident sequence not declared as a sole IROFS.

70-143/2008-207-01 IFI Tracks the licensee's corrective actions to clarify the applicability of the requirements in NFS-HS-CL-27 to the OCB and/or the EPB

01/07/09 Nuclear Regulatory Commission Office of Investigations Report No. 2-2006-017 and NFS Inspection Report 070000143/2008401, NFS Senior Executive Fitness for Duty, **ML090090121**.

On March 9, 2006, a senior executive of NFS consumed alcohol less than 5 hours before a scheduled working tour in apparent violation of 10 CFR 26.20, "Written policy and procedures," subparagraph (a) (1): Despite detection of alcohol on the senior executive's breath and observance of behavior indicating questionable fitness, NFS failed to relieve the senior executive of his duties and failed to perform for-cause testing to determine his fitness for duty, in apparent violation of 10 CFR 26.24, "Chemical and alcohol testing," subparagraph (a)(3); 10 CFR 26.27, Management actions and sanctions to be imposed," subparagraph (b)(1); and NFS-HR-08-001-A, Fitness for Duty Program, Sections E.3.b. and E.3.d.

There are **four examples of this apparent violation**, two of which were willful:

(1) On March 7, 8 and 9, 2006, a security manager detected alcohol on the breath of the senior executive but with careless disregard of applicable requirements, did nothing to remove or initiate removal of the employee for cause testing;

(2) On March 9, a senior security manager detected alcohol on the employee's breath and observed the senior executive engage in an inappropriate angry outburst directed at an NRC inspector. In deliberate violation of applicable requirements, the senior security manager took no action to remove or initiate removal of the

senior executive for cause testing;

(3) On March 9, the senior executive made inappropriate comments of a sexual nature to a female radiation technologist employee in the presence of another radiation technologist employee and their supervisor. Although one radiation technologist believed that the employee appeared and acted impaired, and the other radiation technologist commented that the senior executive must have been drunk, neither the radiation technologist nor their supervisor took any action to remove or to initiate removal of the senior executive for cause testing, and,

(4) On March 9, 2006, an NFS security guard and his supervisor detected alcohol on the senior executive's breath, and the security guard believed the senior executive appeared and acted impaired, but neither the guard nor the supervisor took any action to remove or initiate removal of the senior executive for cause testing.

On April 5, 2006, NFS granted the senior executive Self-Referral Rehabilitation Status in the NFS Employee Assistance Program after he had been notified of an ongoing Fitness for Duty investigation, in apparent violation of 10 CFR 26.20, "Written Policy and procedures," subparagraph (a), and NFS-HR-08-001-A, Fitness for Duty Program, Section G. Employee Assistance Participation.

Sometime after April 5 and before April 30, 2006, on behalf of NFS, and NFS Executive provided the NRC with information, which was materially inaccurate, in apparent violation of 10 CFR 70.9, "Completeness and accuracy of information." Specifically, correspondence addressed to NRC stated that the NFS senior executive had entered a substance abuse rehabilitation program when, in fact he had not done so. The executive provided the inaccurate information with careless disregard to its accuracy. The inaccurate statement was material because it was capable of influencing NRC decisions regarding the NFS response to the March 9, 2006 violation of 10 CFR 26.20 (a) (1).

On April 11, 2006, in apparent violation of 10 CFR 70.9, "Completeness and accuracy of information," a senior NFS manager placed a letter in the senior executive's personnel file, and on June 8, 2006, NFS provided this letter, which was not accurate in all material respects, to the NRC. Specifically, the letter stated that the senior executive had entered a substance abuse rehabilitation program when, in fact, the senior executive had not done so. The inaccurate statement was material because it was capable of influencing NRC decisions regarding the NFS response to the March 8, 2006 violation of 10 CFR 26.20 (a) (1).

In May 2006, in apparent violation of 10 CFR 26.27, "Management sanctions and actions to be imposed," subparagraph (b) (1), and the NFS Fitness for Duty Program, Procedure No. NFS-HR-08-001, Section L. 2. "Impaired Workers," NFS **failed** to determine the senior executive's fitness to safely and competently perform his duties and responsibilities before returning him to duty. The contract

professional retained by NFS to perform a determination of the senior executive's fitness to return to duty could not make the required determination because pertinent information had not been supplied to and considered by the contractor, who subsequently NFS that the senior executive was fit to return to duty. As a result, NFS failed to make the determination required by 10 CFR 26.27 (b) (1) and Procedure No. NFS-HR-08-001 that the senior executive was fit to safely and competently perform his responsibilities.

The information not supplied or considered was that: the smell of alcohol was detected on the senior executive not only March 9, 2006, but also on March 7 and 8, 2006; the senior executive consumed alcohol on March 9, 2006 less than 5 hours before a scheduled working tour; the meeting in which the senior executive was "hot-headed" was an important meeting with regulators of NFS, NRC and the U.S. Department of Energy; the senior executive made inappropriate comments of a sexual nature to a female employee on March 9, 2006; **and the senior executive had been convicted in 1979 of driving under the influence of alcohol, for which his license was suspended and for which he was fined.**

NFS did not provide appropriate training to ensure that employees understood their roles and responsibilities in implementing the Fitness for Duty Program and that employees understood 10 CFR Part 26, "Fitness for Duty Programs," requirements associated with the consumption of alcohol within 5 hours of any scheduled working tour, in apparent violation of 10 CFR 26.21, "Policy communications and awareness training," subparagraphs (a) (1) and (5); 10 CFR 26.22, "Training of supervisors and escorts," subparagraphs (a) (1), (a) (2) and (a) (4); 10 CFR 26.24, "Chemical and alcohol testing," subparagraph (a) (3); 10 CFR 26.27, "Management actions and sanctions to be imposed," subparagraph (b) (1); and NFS-HR-008-001-A, Fitness for Duty Program, Section N.2.

There are two examples to this violation: (1) NFS did not ensure that employees understood that fitness for duty of an employee may be questionable based solely on detection of the smell of alcohol on the employee, and did not ensure that employees understood that aberrant behavior which may require for cause testing means not only behavior out of the ordinary for a particular employee, but also behavior which is aberrant in general; and (2) NFS training sessions and materials failed to expressly and clearly indicate that no employee may consume alcohol within 5 hours of any scheduled working tour, but only indicated that consumption of alcohol within 5 hours of a scheduled working tour may be grounds for cause testing.

Before the NRC makes its enforcement decision, we are providing you an opportunity to either (1) respond to the apparent violations within 30 days of the date of this letter or (2) request a pre-decisional enforcement conference. If a conference is held, it will be closed to public observation in accordance with NRC Enforcement Policy because the findings are based on an NRC Office of Investigations report that has not been publicly disclosed.

In lieu of a pre-decisional enforcement conference, you may also request Alternate Dispute Resolution (ADR) with the NRC in an attempt to resolve this issue. **"The technique that the NRC has decided to employ is mediation."** (Note: The NRC gives NFS a choice, but then makes the decision for them!)

01/12/09 NRC Identification of Apparent Violations from NRC Inspection Report 70-143/2008-03, **ML090120305**.

This letter refers to unresolved item (URI) 2008-003-03 associated with the item relied on for safety (IROFS) identified for the 310 Warehouse. Based on further review of this item, two apparent violations (AV) were identified and are being considered for escalated enforcement action in accordance with the NRC Enforcement Policy.

The **first AV** involves the apparent failure to meet 10 CFR 70.61(e). This regulation requires, in part, that each engineered or administrative control system necessary to comply with the performance requirements be designated as IROFS. The NRC determined that, prior to August 29, 2008, the fire accident scenarios indicated in the 310 Warehouse Integrated Safety Analysis (ISA) summary had insufficient engineered or administrative controls designated to demonstrate compliance with the performance requirements. NRC derived this conclusion from the fact that only one administrative item relied on for safety (IROFS FIRE-2) had been designated to prevent or mitigate a high consequence event.

The **second AV** involves the failure to implement 10 CFR 70.62 which requires, in part, that each licensee establish a safety program that demonstrates compliance with the performance requirements. One of the elements of the safety program is management measures which ensure that administrative IROFS will be available and reliable to perform its intended function when needed to comply with the performance requirements. The NRC determined that, prior to August 29, 2008, Nuclear Fuel Service, Inc. (NFS) had not implemented a safety program that would ensure IROFS FIRE-2 would perform its intended function when needed to comply with the performance requirements. NRC derived this conclusion from the fact that non-compliances with the combustible loading program in the 310 Warehouse (the critical component of FIRE-2) were identified, but corrective actions were ineffective. Specifically, unacceptable amounts of combustible material were found in the warehouse repeatedly for several months.

An open pre-decisional enforcement conference to discuss these apparent violations will be scheduled at a future date. The NRC will contact your staff to coordinate arrangements for the meeting. This conference will be open to public observation in accordance with Section V of the NRC Enforcement Policy.

The decision to hold a pre-decisional enforcement conference does not mean the NRC has determined that a violation occurred or that enforcement action will be

taken. This conference is being held to obtain information to assist the NRC in making an enforcement decision. This may include information to determine whether violations occurred, information to determine the significance of the violations, information related to the identification of the violations, and information related to any corrective actions that were taken or planned.

The conference also will provide you an opportunity to provide your perspectives on these matters and any other information you believe the NRC should take into consideration in making an enforcement decision. In particular, the NRC staff is interested in your assessment of the safety significance of the issues and the potential for a high consequence event. In presenting your corrective actions, you should be aware that the promptness and comprehensiveness of your actions will be considered in assessing any civil penalty for the apparent violation.

Because the NRC has not made a final determination in this matter, no Notice of Violation is being issued for the inspection issues at this time. In addition, please be advised that the number and characterization of the apparent violations described above may change as a result of further NRC review. You will be advised by separate correspondence of the results of our deliberations in this matter. No response regarding the apparent violations is required at this time. However, if important information regarding the apparent violations is identified that is not captured in the 310 Warehouse Integrated Safety Analysis Summary or 310 Warehouse Fire Hazard Analysis, please submit this information at your earliest convenience so that we are afforded the opportunity to review the information prior to the pre-decisional enforcement conference.

02/03/09 NRC Inspection Report 70-143/2008-004 and Notice of Violation, **Two (2) Severity Level IV** Violations, EA 08-342; includes NMED Nos. 080695, 080696, 090002 and NRC Event Nos. 44579, 44584, 44700, 44740, (ML090340111) and ML090400074.

Open:

70-143/2008-004-01 VIO Failure to adhere to plant procedures

On October 17, 2008, when transferring the contents of tank WF-04 to the waste treatment facility, valve WF-51, "Tank XX-WF03 suction" was mistakenly opened and a portion of tank WF-03 was transferred to the waste treatment facility.

On December 4, 2008, operations failed to close valve 3C48 following a transfer of material from the 3-day column to the mix and measure column. Additionally, on December 5, operations failed to verify close valve 3C48 prior to transferring the contents of the 3-day column to the 7-day column. Both actions resulted in the overflow of the mix and measure column.

Operating Procedure (SOP) 401, Section 37, "Tank XX-WF-03/WF-04," Revision 6, Section 6.3 directed the operator to open valve WF-50. However, the

operator mistakenly opened WF-51 and tank WF-03 was transferred instead. The operator subsequently noted the error and secured the transfer. Approximately 3 to 5 inches of the tank contents were transferred. The licensee entered the issue into the Problem Identification, Resolution, and Correction System (PIRCS) as PIRCS item 15829. The Criticality Safety Engineer was notified of the issue and the tanks contents were sampled. Sample results indicated the contents were within acceptable limits. This issue was reported to the Headquarters Operations Officer (HOO) on October 17 as Event Notification (EN) 44579 due to the licensee failing to meet the performance criteria of 70.61.

On December 4, 2008, BPF operations transferred special nuclear material (SNM) from the 3-day column to the mix and measure column. Following completion of this transfer, valve 3C48 was left in the “locked open” position which was contrary to SOP 409, Section 8, “U-Metal Oxidation and U-Oxide Dissolution,” Revision 26, Attachment XV, step 21, which required the valve to be locked closed. On December 5, 2008, BPF operations began a transfer of SNM from the 3-day column to the 7-day column. Step 15 of Attachment V to SOP 409 Section 8 requires valve 3C48 to be verified closed.

Similarly, this step was missed and SNM was transferred from the 3-day column to not only the 7-day column as desired but also to the mix and measure column. At the time, the mix and measure column was approximately full and the column subsequently overflowed to the knockout column. At this point, operations realized an error had occurred and the transfer was secured.

Additionally, during the overflow, an elbow in the wet off gas (WOG) line leaked material and some material wetted the mix and measure columns as well as the adjacent wall. **Operations was unable to complete decontamination of the area within 24 hours and reported the event to the NRC HOO as EN 44700** in accordance with 10 CFR 70.50(b)(1) (See Section 6). The area was subsequently decontaminated, the WOG line repaired, and the issue was entered into the corrective action system as PIRCS item 16452.

On December 22, BPF operations began to fill the caustic tank 6H10 in accordance with procedure SOP 409, Section 24, “333 BPF Process Ventilation System,” Revision 4. This procedure set up the tank for an auto-fill operation. Subsequent to the system alignment, operators noted caustic spilling into the chimney area of building 333 and secured the caustic transfer. Initial diagnosis indicated that the **level probe had failed and the tank overfilled.**

The inspectors noted however, that it was somewhat common knowledge among numerous operators that the level probe was faulty. Other crews had recently performed the same procedure but manually filled the tank since the level probe operation was questionable. Procedure NFS-GH-65, “Problem Identification,” Revision 4, requires all employees who have knowledge of an event to report it in the PIRCS as soon as reasonably possible. This procedure defines an

event to include equipment difficulties. **This equipment difficulty was not entered into the corrective action system and thus the information was never relayed to the operating crew on the evening shift of December 22.**

70-143/2008-004-02 VIO Failure to follow radiological procedures

On Dec. 26, 2008, while preparing to work on the 105 Laboratory Scrubber, licensee contractor personnel failed to read, sign and comply with the requirements of a permit prior to the initial entry into the SWP (safety work permit) area.

There were three contractor personnel already inside the controlled area in the process of dressing out to meet the specified SWP personal protective equipment (PPE) requirements. **When the inspectors pointed this out to the RT (Radiation Tech), he acknowledged the issue, but then turned around and walked off.** Failure to comply with the radiological access requirements was a violation of NRC requirements.

70-143/2008-004-03 AV Failure to designate sufficient IROFS (Regarding fire and safety issues in Warehouse 310. See 70-143/2008-003-03, URI closed)

70-143/2008-004-04 AV Failure of the Safety Program to ensure reliability (Regarding fire and safety issues in Warehouse 310. See 70-143/2008-003-03, URI closed)

70-143/2008-004-05 URI Verification of IROFS Pipe Material

The inspectors performed a review of the ISA changes that were made over the last year in the BPF. The inspectors reviewed the internal authorized changes to determine if the modifications were performed and authorized according to procedure. In addition, the modifications were reviewed to ensure that any potential modifications to an accident sequence were properly accounted for and addressed. The inspectors identified one issue during the review. The issue involved the management measures of the pipes designated as IROFS. The ISA summary stated that the material of construction of these pipes represented a passive engineered control which was to be verified on a periodic basis.

The inspectors reviewed the periodic surveillances to verify the material of construction and found that the verification procedure only verified that the pipe was designated as an SRE. The inspectors found this verification would prevent the material of construction from being modified; however, the verification did not confirm that material of construction for the pipes currently in place was adequate (which an initial purchase order or work request would have confirmed).

When the issue was brought to the licensee's attention, the licensee agreed that the confirmation of the material of construction of the pipes currently installed should

be verified and stored as part of the records for the IROFS. An unresolved item (URI) (URI 70-143/2008-004-05) has been opened to track the licensee's verification of the current material of construction of the pipes designated as IROFS.

Closed:

70-143/2008-003-03 URI Combustible Material Control in Building 310

As stated in the NRC letter to NFS dated January 12, 2008, upon further review of the circumstances surrounding this issue, the NRC determined that **two apparent violations (AVs) had occurred.**

The **first apparent violation** (AV 70-143/2008-004-03) involves the apparent failure to have sufficient engineered or administrative controls designated to demonstrate compliance with the performance requirements.

The **second apparent violation** (AV 70-143/2008-004-04) involves the failure to implement safety program that ensures that administrative IROFS FIRE-2 will be available and reliable to perform its intended function when needed to comply with the performance requirements. Further actions regarding these issues will be tracked according to the AV numbers above. This URI is closed.

Follow up on Events:

The inspectors reviewed EN 44579 (See Paragraph 2a) **concerning the transfer of a waste tank to the waste treatment facility. The incorrect tank was discharged and thus the tank's contents were not verified prior to the transfer.** The licensee's initial evaluation of the event determined that the issue fell within the 24-hour reporting requirements for failing to meet the performance criteria of 70.61 (Ref. Part 70 App A (b) (2)) and notified the NRC Headquarters Operations Officer (HOO) on October 17, 2008, at 8:45 p.m. The event was also entered into the licensee's PIRCS program. The licensee's immediate corrective actions included securing the transfer upon discovery of the error and sampling the tank's contents. Sample results indicated that the SNM was well within limits. The inspectors also noted that prior to entering the subject waste tank, the material passes through an in-line monitor, which would have alerted the operators of the presence of any SNM. This event is closed.

The inspectors reviewed EN 44584 which involved a failure of a component designated as SRE. The component is utilized as an interlock device in area 600 of building 302. **The failure was noted during routine SRE testing where an excessive air gap (>1 inch) was noted between a door and its seal.** The licensee determined that the issue fell within the 24-hour reporting requirements for failing to meet the performance criteria of 70.61 (Ref. Part 70 App A (b) (2)) and notified the NRC HOO on October 21, 2008, at 5:06 p.m.

Based on a review of the ISA, **the failure resulted in a high consequence event becoming unlikely.** The failure mechanism was ultimately attributed to a failed speed controller. The system was shutdown at the time of the failure. Following replacement of the speed controller, the system was restarted. The event was also reported in the licensee's PIRCS program. Long term corrective actions include an evaluation of alternative components. This event is closed.

The inspectors reviewed EN 44700 concerning a spill of SNM. **Failure to follow a plant procedure resulted in an overflow of the mix and measure column in BPF on December 5, 2008.**

During this overflow an elbow failed and sprayed material into the surrounding area. The licensee was unable to clean up the material within 24 hours and thus, pursuant to 10CFR70.50 (b) (1), notified the NRC HOO on December 6, 2008, at 1:18 p.m. The overflow was attributed to a procedure violation and the area was decontaminated on December 7. This event is closed.

The inspectors reviewed EN 44740 which involved a failure of a component designated as SRE. The component is utilized as an interlock device in area 600 of Building 303. The failure was noted during routine SRE testing where an excessive air gap (>1 inch) was noted between a door and its seal. The licensee's determined that the issue fell within the 24-hour reporting requirements for failing to meet the performance criteria of 70.61 (Ref. Part 70 App A (b) (2)) and notified the NRC HOO on December 23, 2008, at 10:36 a.m. Specifically, the interlock function was determined to be degraded.

Based on a review of the ISA, **the failure resulted in a high consequence event becoming unlikely.** This event was similar to a previous event (EN 44584), but the **failure mechanism was determined to in this case to be a failed solenoid.** Similarly, the system was shutdown at the time of the test failure. The event was also reported in the licensee's PIRCS program. This event is closed.

03/16/09 NRC Inspection Report 70-143/2009-005, January 26-30, 2009, **ML090760109**

Observations:

Weakness in timely submissions of reviews.

Weakness when a radiation technician requested assistance to locate unique survey locations due to lack of refresher training

Minor violation identified for failure to return a lapel air sampler to appropriate storage location following use.

Special work permit dated four days after conducting work.

Some radiation technicians were hesitant in initiating stop orders for potential operational safety issues.

04/03/09 Agency Action Review Meeting (AARM). Nuclear Fuel Services, Inc. (NFS), Erwin, TN, SNM-124, Docket 70-143, met the declining “performance trend” criteria established in SECY-08-0135 for Agency Action Review Meeting consideration, ML090550079

Specifically, the U.S. Nuclear Regulatory Commission (NRC) inspections and events at NFS, prior to and during 2006, **revealed significant performance issues that lasted more than one inspection period.** (How about for 53 years?!)

The performance issues resulted in escalated enforcement actions that warranted extraordinary NRC actions (i.e., an **Augmented Inspection Team Inspection in 2006, and issuance of a Confirmatory Order in February 2007**). The Order required NFS to revise its configuration management (CM) programs and implement a comprehensive safety culture improvement initiative.

The NRC response to the performance issues also included heightened NRC oversight at NFS (i.e., additional inspections, the assignment of a second resident inspector, and more frequent Licensee Performance Reviews).

Although the results of our more recent inspections indicate that NFS has made progress in improving its performance, **the problems that led to issuance of the confirmatory order are deeply rooted**, and a sustained effort will be required by the licensee as part of its safety culture improvement initiative to enhance its overall performance. **In addition, the NRC will disposition several apparent violations extending from 2006 to the present with similarities to the performance issues that resulted in the 2007 confirmatory order, and that may result in escalated enforcement.** Hence, a sustained period of heightened oversight by NRC is also warranted.

Oversight of Licensee Actions Regarding February 2007 Confirmatory Order

The NRC staff chartered the NFS Safety Culture and Configuration Management Improvement Oversight Panel (Panel) after the February 2007 Order was issued to provide specific oversight of NFS’s implementation of the Order. The Panel reviewed the qualifications, plan, and schedule of the independent third party performing the initial safety culture assessment (ISCA).

The Panel’s review prompted the licensee to augment their initial assessment strategy, which resulted in NRC granting a 90 day extension for its implementation. The Panel also reviewed NFS’ May 15, 2008, submittal which included the report of the ISCA as well as NFS’ safety culture improvement plan.

In December 2008, the Panel issued a letter to NFS noting that NFS continued to meet the conditions of the February 2007 Order. The Panel further noted that NFS' plan contained only a high level overview of NFS planned actions and that onsite inspection would be needed to evaluate specific details on the implementation of the Plan.

The staff plans to conduct a series of at least five team inspections over and above the core inspection for the facility to examine implementation of the safety culture improvement plan. These five inspections, which are planned between January and August 2009, will include a two-week Problem Identification and Resolution inspection. The planned inspections represent an additional fifty percent above the inspection normal core inspection resources budgeted for the facility.

In addition, the staff is currently developing a strategy to determine appropriate criteria for future modification or closure of the Confirmatory Order. It is anticipated that the strategy will include substantial inspection activities by NRC, including independent NRC assessment of safety culture at NFS through application and adaption of existing inspection tools such as Inspection Procedure 95003.

Pending Escalated Enforcement Actions:

Three pending escalated enforcement actions currently exist at NFS. A fitness-for-duty case (EA-08-103) resulted in the identification of several apparent violations that could result in escalated enforcement, including individual actions.

Apparent violations related to the processing of a weapon onto the site (EA-08-346) were identified that could result in escalated enforcement action.

Finally, an apparent violation that involved the potential willful falsification of medical records (EA-08-321) could also result in escalated enforcement action.

New Ownership:

On December 31, 2008, Amendment 85 to License SNM-124 was issued to reflect an indirect transfer of control of the licensee from NFS Services, LLC, to NOG-Erwin Holdings, Inc. (a subsidiary of Babcock and Wilcox).

On January 1, 2009, David Kudsin became the President of NFS. This was the only personnel change at the site.

04/06/09 Notification of Problem Identification and Resolution (PIRCS) Inspection, 07000143/200910, **ML090960680**.

04/20/09 Notice of Violation, **Two (2) Severity Level IV**, (NRC Inspection Report 70-143/2009-008), **ML091110091**. **Warehouse 310 issue**

70-143/2008-004-03 VIO Failure to designate sufficient IROFS (Items Relied on for Safety)

Prior to August 29, 2008, the licensee failed to designate sufficient engineered or administrative controls to demonstrate compliance with the performance requirements. Specifically, the "Building 310 Warehouse Integrated Safety Analysis Summary," Revision 2, states that a fire accident has the potential to be a chemical high consequence event. Monthly surveillances of the Combustible Control Program were credited as the only IROFS (FIRE-2) for the 310 Warehouse. This single IROFS did not sufficiently reduce the likelihood of occurrence of the event so that the event was highly unlikely. Therefore, NFS was required to designate additional controls as IROFS to ensure compliance with the performance requirements.

70-143/2008-004-04 VIO Failure of Safety Program to ensure reliability

Prior to August 29, 2008, the licensee failed to establish a safety program that would ensure an IROFS would perform its intended function when needed to comply with the performance requirements. Specifically, for the 310 Warehouse, the safety program failed to ensure that IROFS FIRE-2 (a monthly surveillance of the Combustible Control Program) would perform its intended safety function. Multiple issues were identified by the FIRE-2 surveillances since June 30, 2008, but the deficiencies had not yet been effectively corrected by August 27, 2008. This represented a failure of the safety program, required by 10 CFR 70.62, to adequately ensure the reliability of IROFS FIRE-2 to effectively limit the likelihood, and consequently the risk, of a high consequence accident scenario.

Background: (Warehouse 310 Issue)

On August 25 - 29, 2008, the NRC conducted a Fire Protection inspection at NFS. As part of the inspection, the inspectors reviewed the integrated safety analysis (ISA) for the 310 Warehouse and items relied on for safety (IROFS) credited in the ISA to ensure compliance with 10 CFR 70.61 performance requirements.

The inspectors determined that, prior to August 29, 2008, the licensee failed to designate sufficient engineered or administrative controls to demonstrate compliance with the performance requirements. The inspectors also determined that the safety program, required by 10 CFR 70.62, failed to adequately ensure the reliability and availability of IROFS FIRE-2 (inspection of combustibles to ensure compliance with the combustible loading program) to effectively limit the risk of a high consequence accident scenario. As immediate corrective actions, the licensee put in place a 2-hour roving fire watch and reduced the combustible loading in the warehouse.

Discussion

The NRC identified unresolved item (URI) 70-143/2008-03-03 to further evaluate the deficiencies identified with the 310 Warehouse ISA and the implementation of the management measures for IROFS FIRE-2. In a letter to NFS dated January 12, 2008, the NRC identified two apparent violations (AVs) that were considered for escalated enforcement action in accordance with the NRC Enforcement Policy.

The first AV involved the failure to meet 10 CFR 70.61(e). This regulation requires, in part, that each engineered or administrative control system necessary to comply with the performance requirements be designated as IROFS.

The NRC determined that, prior to August 29, 2008, the fire accident scenarios documented in the 310 Warehouse ISA Summary did not designate sufficient engineered or administrative controls to demonstrate compliance with the performance requirements. This conclusion was based on the fact that only one administrative IROFS, FIRE-2, had been designated to prevent or mitigate a high consequence event.

The second AV involved the failure to adequately implement 10 CFR 70.62 which requires, in part, that each licensee establish a safety program that demonstrates compliance with the performance requirements. One of the elements of the safety program is management measures which ensure that administrative IROFS will be available and reliable to perform their intended function when needed to comply with the performance requirements.

The NRC determined that, prior to August 29, 2008, NFS had not implemented a safety program that would ensure IROFS FIRE-2 would perform its intended function when needed to comply with the performance requirements.

This conclusion was based on NFS fire inspectors identifying non-compliances with the combustible loading program in the 310 Warehouse (the critical component of FIRE-2), but licensee corrective actions were ineffective at preventing recurrence of the problem. **Specifically, unacceptable amounts of combustible material were found in the warehouse repeatedly for several months.**

On February 13, 2009, the NRC held a pre-decisional enforcement conference (PEC) to discuss the AVs with the licensee. During the meeting, the licensee presented information regarding the causes and corrective actions that were identified in response to the AVs.

The corrective actions presented by the licensee included: implementation of the Six Sigma process to further reduce combustible loading, upgrade and credit the existing heat detection system as a second IROFS, initiate a project to install an automatic sprinkler system (as a third IROFS), revalidate the warehouse safety analysis to reflect current inventory and operations, and redefine IROFS Fire-2 to provide a 24 hour limit to correct identified deficiencies or to institute a fire watch until corrected.

Following the PEC, the NRC reviewed updated fire scenario calculations submitted by NFS on February 18, 2009 and February 25, 2009. The updated calculations took into **consideration the inventory at the time of the inspection as well as the current inventory in the 310 Warehouse**. NRC fire protection engineers independently verified that the calculations accurately reflected the potential consequences from a fire in the 310 warehouse. **The NRC determined that a fire in the warehouse would appropriately be characterized as a “low” consequence event as defined in 10 CFR 70, Subpart H.**

The NRC further concluded the building inventory would need to increase by an order of magnitude to reach the threshold to be characterized as an “intermediate” consequence event. The NRC notes that the licensee is treating the accident sequence in the ISA as a high consequence event, regardless of the above calculations, due to the fluctuating nature of the 310 Warehouse inventory. **Because the inventory is not under configuration control, NFS does not actively limit the amount of that material that may be stored in the warehouse.**

Even though the inventory is currently below the intermediate threshold, the NRC determined that the licensee has implemented sufficient controls and necessary management measures to ensure compliance with performance requirements of 10 CFR 70.61. The NRC has inspected and verified the improved operations within the warehouse.

Conclusions

The NRC determined that the two violations occurred and were of low safety significance, and therefore are not subject to escalated enforcement actions. Because NRC inspectors identified these issues, the AVs are being processed as two Severity Level IV violations (VIO) pursuant to the NRC Enforcement Policy: VIO 70-143/2009-008-01, Failure to designate sufficient IROFS, and VIO 70-143/2009-008-02, Failure of the safety program to ensure reliability.

NOTE: These violations began as potential Severity Level III Violations. However, a letter from NFS to NRC NMSS, dated February 18, 2009, basically saying that the ISA was excessively conservative and now all the consequences are low changed that. As a result, the violations became two (2) Severity Level IV’s ML090490133.

04/24/09 NRC Inspection Report 70-143/2009-007, **Special Inspection Team (SIT)** inspection, March 23-27, 2009, **ML091140536**.

Inspect and assess the facts and circumstances surrounding the discovery of design issues regarding **23 glove box drains identified as items relied on for safety (IROFS)**. Fourteen (14) glove boxes in the fuels area and nine (9) glove boxes in the BLEU Preparation Facility (BPF) were impacted by this event. The event was reported to the NRC on March 4, 2009 (Event # 44890).

This event may be similar to another glove box event at BPF that occurred October-November 2005 with escalated enforcement issued in March 2006. That event involved inadequate design of a water trap in the drain piping beneath the box rather than accumulation of liquid within the box above the IROFS limit.

Objectives of inspection: 1) review facts surrounding glove box event that occurred March 4, 2009; 2) assess the licensee's response and investigation of event; 3) evaluate licensee's root cause analysis for the late 2005 glove box event for any missed opportunities to identify the current event; and 4) identify any generic issues associated with the event.

Weir lip of boxes was nominally cut to be no more than ½ inch above the glove box floor. A 1-inch depth was a licensee defined criticality safety limit established to preclude against the accumulation of a critical mass of SNM within the glove box.

Test also revealed that the glove box floor was not perfectly level and sometimes had low points due to warping or other slight imperfections.

Inspectors determined that the solution level in several glove boxes could have Exceeded the 1 inch limit in localized areas of the glove boxes where the floor was sufficiently depressed.

Glove boxes were modified to limit the weir height to less than ¼ inch. In some cases, the weir height was reduced to less than 1/8 inch as a precautionary measure.

Inspectors determined no correlation between the 2005 glove box violation and the 2009 discovery of the glove box deficiency.

05/01/09 NRC Inspection 70-143/2009-202, April 6-9, 2009, **ML091110102**.

The inspection focused on the most hazardous activities and plant conditions; the most important controls relied on for safety and their analytical basis and the principal management measures for ensuring controls are available and reliable to perform their functions relied on for safety.

The inspection consisted of analytical basis review, selective review of related procedures and records, examinations of relevant nuclear criticality safety (NCS)-related equipment, interviews with NCS engineers and plant personnel, and facility walkdowns to observe plant conditions and activities related to safety basis assumptions and related NCS controls. Throughout this inspections, observations were discussed with your managers and staff.

Open:

70-143/2009-202-01 IFI Tracks the licensee's submission of an amendment request to clarify the license requirements regarding modeling of reflection.

The inspectors reviewed the sensitivity calculations for k_{eff} as a function of solution height, and determined that these results showed a large amount of margin to criticality. However, the inspectors noted that the licensee had originally modeled one glovebox with 12" of full water reflection, but as the solution depth increased, reduced the external reflection to 4". The calculations showed that the glovebox would be subcritical ($k_{eff} + 2\sigma < 0.95$) with a solution height of 2.6" with 4" external reflection.

However, the glovebox would just be subcritical with a solution height of 1", if 12" external reflection were assumed. The NCSE did not provide any explanation of why less than full water reflection was assumed in the case with 2.6" of solution. The licensee stated that the glovebox integrity acted as a positive reflection control, but it was not clear to the inspectors how this could limit reflection conditions outside the glovebox. The licensee further stated that the license allows it to assume 4-inch thick water blocks to simulate personnel around equipment (i.e., "slabmen"), and that assuming a tight-fitting 4-inch thick water reflector all around the sides and top of the glovebox is clearly more conservative than this.

The inspectors discussed the license requirements with the licensee's personnel and determined that they appear to require full water reflection whenever reflection is not controlled, and that use of the "slabmen" only appears to be allowed in the context of using nominal reflection (when a 1" tight-fitting water reflector is too conservative). The inspectors further noted that an unresolved item (**URI 70-143/2007-207-01**) on another aspect of modeling reflection was previously opened, which was closed based on the licensee's commitment to submit an amendment request to clarify the license commitments regarding reflection. **The licensee did submit an amendment request to clarify the license requirements related to modeling of reflection, but subsequently withdrew it.**

During the course of this inspection, the licensee committed to re-submit its amendment request with more justification than was previously done, by the end of 2009. The submission of an amendment request to clarify the license requirements regarding modeling of reflection will be tracked as **Inspection Follow-Up Item (IFI) 70-143/2009-202-01**.

Because of the margin in the height of solution needed for criticality, the lack of spills in the affected gloveboxes, and the presence of redundant transparent drains, with all their attendant surveillance, the inspectors determined that the likelihood of criticality, and the safety significance of the glovebox drain issue, was very low.

The licensee's failure to adequately control the configuration of gloveboxes as required in the criticality evaluations is considered a violation of minor significance and will not be subject to formal enforcement action.

Discussed:

70-143/2008-208-01 **IFI** Tracks the licensee's corrective actions to justify the basis for independence when crediting repeated failures of a single IFORS (Item Relied on for Safety) as part of double contingency discussion in NCSEs (Nuclear Criticality Safety Evaluations)

During this inspection, the inspectors reviewed the changes to NFS procedure NFS-HS-A-58, "Nuclear Criticality Safety Evaluations," Revision 11, dated March 27, 2009. Revision to this procedure was part of the corrective action for PIRCS 16531 (December 11, 2008).

The inspectors verified that the **licensee had added a requirement to justify the basis for independence when crediting repeated failures of a single IROFS, but did not provide any more specific guidance on how this is to be done.** No new or revised NCSEs have been developed since the current revision of this procedure has gone into effect. Because of the lack of specific guidance in the procedure, or any examples to provide assurance that this requirement will be implemented correctly, this item will remain open until inspectors can review its implementation.

05/04/09 NRC Inspection Report 70-143/2009-001, January 1 through April 4, 2009, **ML091240427**. Includes: NMED Nos. 090236, 090369, 090380
NRC Event Nos. 44848, 44887, 44890

Inspectors found a fire alarm horn in the Secondary Alarm Station (SAS) improperly muted with tissue paper. An investigation was initiated on May 9, 2008 by the NRC, Office of Investigations, Region II, to determine whether during an undetermined time period a contract security officer employed by Murray Guard Corp. at NFS, or an employee of NFS willfully tampered with the fire alarm annunciation system in the Secondary Alarm Station (SAS). Additionally, the ensuing investigation obtained information the fire alarm annunciation system in the Central Alarm Station (CAS) was also tampered with.

Region II substantiated the fire alarm annunciation system in the CAS and SAS were willfully tampered with by unidentified individual(s) who had access to the CAS and SAS fire control panels. The willful violations (not obtaining approval prior to impairing the fire alarm annunciation system) caused NFS to be in violation of their license requirements. The failure constitutes a violation of minor significance and is not subject to formal enforcement. (Case Report 2-2008-041).

Inspectors reviewed **Event Report 44848**, concerning a **contaminated worker sent to a medical facility**. Several small pinholes in the installed glovebox gloves were identified. All glovebox gloves were reviewed and some replaced due to inadequate glove thickness.

Inspectors reviewed **Event Report 44887**, which involved a failure of a component designated as safety related equipment (SRE).

The component is utilized as an IROFS in area F of Building 302. The failure was noted during routine SRE testing where the subject IROFS (level switch) failed to fulfill its safety function in securing a pump in the presence of a low fluid level. The licensee determined that the issue fell within the 24-hour reporting requirements for failing to meet the performance criteria of 10 CFR 70.61 as required by 10 CFR Part 70 App A (b) (2)) and notified the HOO on March 3, 2008, at 3:32 p.m. **Based on a review of the ISA, the failure resulted in a high consequence event failing to meet the highly unlikely category**. The system was shutdown at the time of the failure. The inspectors concluded that the licensee corrective actions were appropriate

Inspectors reviewed **Event Report 44890**, involving potential inadequacies of glove box overflow drains ability to perform their safety function.

The licensee found that some of the calculations for glove boxes drains may not meet the design criteria as specified in the ISA. Specifically, the sizing of the overflows may not accommodate the credible flow rates into the associated glove boxes. To resolve these questions, NFS performed field tests using a glove box on February 26, 2009 and February 27, 2009. Initial results of these tests indicated that the discharge flow rates were sensitive to drain weir height and glove box floor flatness. This caused NFS to question the ability of the drains to perform their intended function. NFS, therefore, generated a plant-wide list of all potentially affected glove boxes and suspended operations in all affected glove boxes on February 27, 2009. Uranium-bearing materials were removed from the glove boxes and all of the affected glove boxes were tagged out of service. Engineering evaluations of the affected glove boxes were performed and preceded through March 4, 2009. As a result of the engineering evaluations, it was determined that in some instances a single drain alone was not capable of maintaining a solution depth to within design parameters in some localized areas within the glove box. Modifications were made to the drains to restore the glove box functionality.

On March 4 at 3:18 p.m., the licensee reported this condition to the HOO in accordance with 10CFR70 Appendix A, Section a (5) as a loss of control where only one IROFS remains available to prevent a criticality event. The NRC initiated a Special Inspection Team to review the issue and licensee's follow up evaluation. The results of the assessment are documented in NRC Report 2009-007, dated April 24, 2009 (ADAMS accession number ML091140536)

05/14/09 NFS is in attendance once again at the Agency Action Review Meeting (AARM), (ML091390764). Tim Lindstrom, NFS General Manager, stated that "SCUBA Team had over 40 specific what we would call significant findings. They were all in the 13 safety culture component areas. Lindstrom said we recognize that we're not here because of our performance in 2008, we're here because of our performance over a broader period. It didn't occur overnight and it's not going to be solved overnight."

05/2009 NRC Report to Congress on Abnormal Occurrences. **An abnormal occurrence is an unscheduled incident or event that the Commission determines to be significant from the standpoint of public health or safety. For Fuel Cycle Facilities: Absence or failure of all safety-related or security-related controls (engineered or human) for an NRC-regulated lethal hazard (radiological or chemical) while the lethal hazard is present. NUREG-0090, Vol. 31.**

Appendix B – Updates of Previously Reported Abnormal Occurrences – Spill of High-Enriched Uranium solution at Fuel Fabrication Facility, March 6, 2006, Nuclear Fuel Services, Erwin, Tennessee.

Update on Actions Taken to Prevent Recurrence:

One of the root causes of the HEU spill was the licensee's **failure to manage the configuration of its processing system.**

Another apparent cause of the HEU spill was **safety culture deficiencies** at the licensee's facility.

The Commission also released 727 redacted documents to the public regarding NFS that had previously been withheld from 2004-2007 during the Official Use Only policy.

06/15/09 NRC Inspection Report 70-143/2009-203, May 18-22, 2009, ML091470447.

Open:

70-143/2009-203-01 IFI Tracks revision of the licensee's CAS operation and testing procedure description of manual alarm activation.

A weakness was identified regarding the licensee CAS operation and testing procedure description of manual alarm activation.

The inspector noted that the licensee's operation and testing procedure for the facility CAS requires that the alarm panel be observed at times when the horns are switched out of automatic. Licensee staff explained that the objective of the panel monitoring was to note if the CAS went into alarm and switch the horns back to

automatic in order to cause a facility evacuation.

The inspector observed that an alarm condition would be indicated by a red light on the panel. The inspector further observed that the procedure did not describe how an alarm condition would manifest itself or how the observer could cause an alarm signal. The inspector noted that the staff designated to perform the function were able to adequately describe their duties so that there was no immediate safety concern. The licensee's management agreed that improvement of the CAS operation and testing procedure was warranted. Licensee revision of the CAS operation and testing procedure to describe manual alarm activation will be tracked as Inspector Follow-up Items (IFI) 70-143/2009-203-01.

07/06/09

NRC Inspection Report 70-143/2009-010, April 27-29, 2009, **ML091880007**.
PIRCS (Problem Identification, Resolution and Correction System)
Inspection

As part of the February 2007 Confirmatory Order, NFS was required to implement a safety culture improvement plan. **Two pieces of a strong safety culture are an effective corrective action program (CAP) and a safety conscious work environment (SCWE).**

NRC does not regulate NFS's safety conscious work environment; however, NFS is required to implement a CAP (Corrective Action Program) as detailed in its license.

The inspection results indicate that NFS has made improvement in certain elements of a corrective action program, including the willingness of employees to identify problems as they arise. **However, the inspection also indicated that there is room for improvement in the facility's corrective action program with regard to the aspects of "evaluation of issues" (specifically, the application of extent of condition reviews) and "effectiveness of corrective actions" (i.e., implementing corrective actions to successfully prevent reoccurrence).** Finally, the results of interviews with employees indicate that NFS has made progress in cultivating a safety conscious work environment among the radiation protection organization.

Identification of Issues

The team determined that the licensee was generally effective in identifying problems and entering them into the CAP. There was a low threshold for entering issues into the CAP. This conclusion was based on a review of the requirements for initiating PIRCS as described in licensee procedure NFS-GH-65, "Problem Identification," management expectation that employees were encouraged to initiate PIRCS for any reason, and the very few deficiencies that inspectors identified during plant walkdowns not already entered into the CAP. Site management was actively involved in the CAP process and focused appropriate

attention on significant plant issues, as evidenced by the number of “management by walking around” (MBWA) observation forms initiated.

The licensee did not have a formal trending program in place for early identification of adverse trends. However, the Quality Assurance (QA) department did identify negative trends through periodic audits. For example, issues regarding control of contractors and Lockout/Tagout (LOTO) compliance. Issues identified by QA were appropriately entered into PIRCS.

Additionally, the team reviewed the monthly self-assessment status report for the corrective action program, and determined this document to be essentially a trend report, tracking performance indicators such as numbers of PIRCS initiated by month, as well as timeliness of problem resolution. The report accurately identified trends and documented areas needing improvement, such as effectiveness of corrective actions. However, the team noted that no PIRCS were initiated as a result of the conclusions in the monthly report.

Based on reviews and walkdowns of the Fuel Manufacturing Facility (FMF), the Oxide Conversion Building (OCB), and the Blended Low Enriched Uranium Preparation Facility (BPF), the inspectors determined that, in general, deficiencies were being identified and placed in the CAP. **However, inspectors noted many flanges and fittings, which appeared to be leaking a caustic solution that had not been entered into PIRCS. Interviews determined this to be a long-standing problem. A self-assessment observation, which stated that “the area appeared in poor shape to the uninitiated” was indicative of a tolerance for this degraded condition.** In accordance with the guidance in licensee procedure NFS-GH-65, an example of a qualified problem to be reported in PIRCS is a “Spill, leak or release of radiological or non-radiological liquid, solid, or airborne contaminants indoors or outdoors.” **The failure to initiate PIRCS for this degraded condition was contrary to licensee procedures but was determined to be of minor safety significance as the leaks did not appear to be active.**

Based upon the evaluation of specific PIRCS reviewed by the inspection team during the onsite period, the team concluded that problems were generally prioritized in accordance with the licensee’s CAP guidance as described in approved procedures. Prioritization level for each PIRC written was reviewed at the PIRCS screening meeting, and investigation levels were assigned based on safety significance. Management reviews of PIRCS conducted by the CARB were thorough, and adequate consideration was given to corrective actions for the most significant PIRCS. **However, the team determined that investigations assigned to PIRCS were not always consistent with the PIRCS “Investigations Guidelines” for initiation of apparent cause and small team root cause investigations. The team identified several examples where guidelines called for a minimum of a small team root cause investigation for which there was either no investigation assigned, or an apparent cause investigation was assigned instead.**

The team noted that seldom was there adequate documentation to support conclusions for apparent cause investigations. PIRCS requiring apparent cause investigations would solely document the apparent causes determined using the TapRoot root cause methodology. The lack of documentation in some cases made it difficult for inspectors to determine the adequacy of the apparent cause investigations to support their conclusions. For example, in PIRCS 10918, initiated due to errors found in checkweigh sheets, the apparent cause was determined to be “**A task was performed in a hurry or a shortcut used,**” with no amplifying information documented to support that conclusion.

The team also identified that the applicability of extent of condition reviews were not formally evaluated as part of the PIRCS evaluation process. Extent of condition was occasionally considered during evaluation of PIRCS, but the evaluation process was not formalized. The team identified several examples of PIRCS that appeared to warrant an extent of condition review, but one was not performed or limited to the process area in which the failure occurred. The following are some examples: PIRCS 17584, corrective actions for a level switch failure limited to FMF; PIRCS 12186, corrective actions involving the improper troubleshooting of clog limited to the process area where problem occurred; PIRCS 16605, application of extent of condition review limited to FMF; and PIRC 16579, corrective actions regarding improper rigging by contractors limited to the contractor that made the error.

Additional observations by the team are detailed below. The events identified by the team were indicative of ineffective evaluation of issues but did not constitute violations of regulatory requirements.

PIRCS 9938 was initiated as a result of work stoppage due to contaminated product material. The PIRC problem stated “Suggest investigating initial rework of material to understand why reworked material is still contaminated.” The apparent cause investigation did not address why the reworked material was still contaminated. The corrective actions focused on reprocessing the material instead of determining the cause of the contamination and initiating corrective actions to prevent recurrence.

PIRCS 10678 was initiated as a result of a failed bearing on a ventilation fan and was assigned a small team root cause investigation. There was no documentation to verify that similar bearings for other ventilation fans were inspected as part of an extent-of-condition evaluation. Additionally, the licensee was unable to determine the actual failure mechanism, stating that routine preventive maintenance is performed on the fans, and routine checks are made for temperature and vibration. However, there was no indication that the PM records were reviewed, or when the last checks for vibration were made prior to failure. The licensee documented the root cause as “Problem not anticipated,” which appeared to be inadequate to determine corrective actions to prevent recurrence.

PIRCS 16179 was initiated as the result of an NRC violation regarding the failure to perform a required annual inspection of fire dampers. The licensee's review determined that these inspections were not included on the Safety-Related Equipment (SRE) or Preventative Maintenance (PM) programs to assure that they were performed. There was no documentation to verify that the licensee had determined the extent of condition through examining the lists of required inspections to ensure all required inspections were listed.

PIRCS 15943 was initiated following a failure of IROFS FIRE6-1 during routine testing. The cause of the failure was the malfunction of a SRE air solenoid valve. This valve was fitted with a speed control device equipped with a screw-needle valve to control the rate that air was bled from the valve. The licensee investigation determined that the adjustment screw was fully closed preventing any air from being bled from the valve, therefore preventing the valve from performing its design function. The screw was readjusted which allowed the SRE valve to operate as intended. However, the actual cause of how the adjustment screw became fully closed was not determined. The licensee did not document whether an extent of condition evaluation was performed to assess other similar model valves in this or other comparable IROFS.

PIRCS 16741 was initiated following a failure of IROFS FIRE6-6 during routine testing. The failure was caused by the malfunction of an SRE air solenoid valve (a model of valve different from the documented finding immediately discussed above). The licensee's corrective action was to replace the valve with a newer model successfully used in another part of the plant. The valve's actual cause of failure was not determined. No documentation existed to support the decision made to change the type of valve nor was there an evaluation performed documenting why the newer valve would improve performance. In addition, the licensee did not document whether an extent of condition evaluation was performed to assess other similar valves in this or other comparable IROFS.

The team determined that the licensee appeared to have a "broke-fix" approach that resulted in actions primarily focused on correcting the symptoms to problems and not necessarily focused on the identification of the root or apparent causes. Several repetitive events identified by the team were indicative of ineffective corrective actions, but they were not violations of regulatory requirements:

PIRCS 10918 was initiated due to errors found in checkweigh sheets. The corrective actions were to fix the errors and reissue the documents. There were no actions implemented to correct the cause of the problem. **Five weeks later, PIRC 11293 was initiated as a result of multiple additional checkweigh sheet errors.**

PIRCS 9148 was initiated as a result of a spill following changing of a filter in a glove box. PIRCS 17369 and 18348 were initiated as a result of spills encountered during subsequent change-outs of the same filter. The

reoccurrence of the problem led the team to conclude that the true root cause had not been found and therefore the corrective actions were ineffective.

PIRCS 9786 was initiated due to foreign material being found while processing a product. The cause was attributed to a deteriorating gasket. **The same condition occurred approximately five weeks later. Two years later, PIRCS 17712 documented the same condition and cause, finally culminating in the licensee changing vendors and gasket material.**

PIRCS 11611 was initiated as a result of a filter change, which resulted in a spill and contamination event. No corrective actions were initiated to prevent recurrence. Two years later, PIRC 17506 was initiated due to a repeat event. Corrective actions included procedure changes, new training requirements, and an equipment modification.

PIRCS 12815 was initiated after a container of material was discovered in a storage rack not approved for that type of material. The licensee determined root causes of the event to be a failure of configuration control of the storage system and a failure to train personnel to be knowledgeable of the storage requirements. The licensee's investigation specifically identified the following lessons learned:

“When installing new storage units or equipment in an area, the units/equipment should be designed to meet the current requirements of the area” [configuration control]; and, “**Appropriate personnel were not adequately trained with regards to (storage of) material and associated security requirements.**”

While the licensee did provide immediate training to personnel working in this area, none of the corrective actions implemented by the licensee addressed configuration control or ongoing employee training or training for new employees, as identified in the lessons learned.

The team determined that effectiveness reviews were initiated for some corrective actions, but there was no formal guidance in assigning those reviews. With the exception of those conducted and tracked by QA, effectiveness reviews were not given unique corrective action numbers for tracking, nor were due dates for completion typically assigned.

The team determined that effectiveness reviews were focused primarily on the implementation of the corrective action instead of on how effective the corrective action was in addressing the original problem.

The team identified one example where an effectiveness review was not timely. **In PIRCS 721**, initiated due to a scale not having an SRE tag attached, an effectiveness review was assigned to corrective action 378. The corrective action was to include SRE training in all clerk and supervisor job requirements. The

corrective action was completed in June 2003, but the effectiveness review never completed. Upon questioning, it was determined the job requirements subsequently changed, and so the effectiveness review was not performed.

The team noted that the licensee was not consistent in documenting immediate or subsequent corrective actions initiated on the PIRCS. Several PIRCS were closed with no documentation of any corrective actions having been performed. The team identified the following additional **examples of ineffective corrective actions**:

PIRCS 14405 was initiated as a result of a nitric acid pump being replaced with an incorrect pump. The small team root cause investigation documented five root causes. However, there were no associated corrective actions associated with two of those root causes: **inadequate pre-job briefs and lack of supervision**.

PIRCS 12194 was initiated to perform a common cause analysis due to violations identified by NRC inspectors. As part of the investigation, several areas for improvement were identified and communicated separately to the Director, Safety and Regulatory Management, **none of which were documented in the corrective action program**.

PIRCS 14537 was initiated on July 22, 2008, and its apparent cause evaluation had three corrective actions associated with it. However, the corrective actions were never implemented due to a software glitch that caused a PIRCS entry to be effectively “lost” within the computerized system. **The manager assigned to approve the apparent cause corrective actions did not exist**. The three corrective actions assigned were given initial completion dates of February 28, 2009. However, as of the date of the inspectors’ review, no activity associated with the corrective actions had commenced. **The inspectors noted that no PIRCS audit function was able to uncover this anomaly**. The inspectors brought this issue to attention of licensee management.

The licensee generated **PIRCS report number 18828** to document, evaluate, and, if necessary, implement corrective actions for the items identified during this inspection.

Conclusions

No findings of regulatory significance were identified. The licensee was adequately identifying and entering issues into the CAP. However, the licensee’s performance in determining and implementing effective corrective actions for issues indicated room for improvement. In addition, the licensee demonstrated inconsistent use of extent of condition evaluations for issues.

Despite the lack of a formal operating experience program at NFS, the team determined the licensee was evaluating external operating experience in the form of NRC generic communications and vendor bulletins. **Licensee staff proactively**

search the communications located on the NRC public website for issues potentially applicable to NFS. The operating experience coordinator indicated that Part 21 issues were being evaluated at the site; however, the team could not find any documentation to confirm that such evaluations were being performed. The Part 21 issues sampled by the team were not applicable to the plant.

The team determined that lessons learned identified as a result of PIRCS investigations were not being formally tracked, nor were they being communicated to the licensee staff. This resulted in recommendations not being implemented in a timely manner and problem recurrence. Capturing these lessons learned as internal operating experience and communicating these lessons to all staff would increase the probability of preventing recurring problems.

The team identified the following examples where the lack of corrective actions associated with lessons learned resulted in recurring problems. These issues did not constitute violations of regulatory requirements:

PIRCS 9786 was initiated due to foreign material being found while processing a product. The lesson learned was that gasket material on the vessel in question requires periodic replacement. The same condition occurred approximately five weeks later. The licensee changed vendors and initiated use of a new gasket material nearly two years after identification of the lesson learned following a reoccurrence of the issue. The inadequate initial corrective actions stemmed from the licensee's apparent cause investigation, which determined this issue to be a "tolerable failure."

PIRCS 10918 was initiated due to errors found in checkweigh sheets. The lesson learned from the apparent cause investigation was that checksheets should be issued one at a time, but there was no corrective action associated with that conclusion. Five weeks later, **PIRCS 11293** was initiated as a result of multiple checksheets being issued that still contained errors. The conclusion of the PIRCS screener was "Lessons learned is not intended to be a procedure." The PIRCS was closed out without any subsequent corrective actions. Subsequently, Quality Control's normal practice was modified to issue checksheets one at a time, which incorporated the lesson learned.

Conclusion. The licensee's lessons learned evaluations, which at times had identified effective corrective actions to prevent reoccurrence, **were not formally evaluated and tracked.**

The team also reviewed a number of MBWA (management by walking around) observation forms. The licensee credits MBWA observations as part of their self-assessment program. The forms documented management observations in areas of

safety, facilities condition, personnel work practices, maintenance, radiological protection, security, and conduct of operations.

Many of the observation forms reviewed identified issues that needed improvement or were determined to be unacceptable in several areas, but there was no amplifying information provided. Some forms documented areas needing improvement for which an entry into PIRCS was required by procedure, such as pipes, vessels, and roofs leaks, but no entries in the CAP could be found.

Additionally, many forms identified recommendations for improvement, but the team found no mechanism for translating these recommendations into actions, such as a PIRCS entry.

The team also determined that functional area managers, such as those for the CAP and configuration management, were unaware of the requirement to maintain self-assessment action lists for long term corrective actions, as described in NFS-GH-945. The team determined this to be contrary to the procedure in that long term corrective actions from self-assessments were being tracked through other means.

07/22/09 NRC Inspection Report 70-143/2009-009 (**Operational Readiness Review**) for new Commercial Development Line (processing UF6), ML092050562.

08/10/09 NRC Inspection Report 70-143/2009-205, Criticality Safety Inspection, July 13-17, 2009, ML092120606

Discussed:

70-143/2009-202-01 IFI Tracks the licensee's submission of an amendment request to clarify the license requirements regarding modeling of reflection

During a previous inspection, an Unresolved Item (URI 70-143/2007-207-01) had been closed based on the licensee's commitment to submit an amendment request. However, **IFI 70-143/2009-202-01** was subsequently opened because the licensee withdrew its amendment request. During the current inspection, NFS provided the inspectors with a revision to the section of the license renewal application dealing with reflection control, **submitted on June 30, 2009**.

The inspectors discussed the revised language with the licensee and determined that it appeared to be an accurate representation of the licensee's current technical practices. **The adequacy of the proposed revision will be reviewed in the license renewal process. The licensee stated that it still intends to submit an amendment request so that the issue can be resolved sooner than completion of license renewal, and therefore the IFI will remain open until submission of the amendment request.**

Closed:

70-143/2008-208-01 IFI Tracks the licensee's corrective actions to justify the basis for independence when crediting repeated failures of a single IROFS as part of double contingency discussion in NCSEs.

The inspectors had left the item open pending review to verify correct implementation of these requirements. During the current inspection, the inspectors reviewed the NCSEs revised since the new version of NFS-HS-A-58 took effect. One NCSE, 54T-09-0032, "Nuclear Criticality Safety Evaluation for Waste Water Treatment Facility," Rev. 4, dated May 2009, had accident sequences **crediting repeated failures of the same IROFS**. The inspectors noted that the NCSE Table 4-1, entitled "Risk Index Assignment," specifically indicated where controls were credited more than once in the same sequence.

The inspectors reviewed the three sequences and determined that the licensee did include additional justification for why the repeated failures were independent. In one case, it would require a large number of failures before criticality would be possible. In all three cases, the licensee stated that the failures would occur on different days and most likely be different individuals. The licensee explained that the wastewater tanks take at least several shifts to fill and empty, and that there are several operators on each shift. (The controls involve draining the tanks and performing a visual or nondestructive assay inspection before a new batch can be introduced.) In addition, each sequence would still meet the highly unlikely requirement without crediting multiple failures, so the repeated failures were just defense-in-depth. After discussion with the licensee, the inspectors concluded in each case the sequence met the criteria for independence specified in Attachment III to NFSHS-A-68.

70-143/2009-203-01 IFI Tracks revision of the licensee's CAS operation and testing procedure description of manual alarm activation.

During a previous inspection, the inspectors noted that the AREVA Erwin oxide conversion facility CAS operation and testing procedure requires that the alarm panel be observed at times when the horns are switched out of automatic. During the previous inspection, licensee staff explained that the objective of the panel monitoring was to note if the CAS went into alarm and switch the horns back to automatic in order to cause a facility evacuation.

During the previous inspection, the inspectors observed that an alarm condition would be indicated by a red light on the panel and that the procedure did

not describe how an alarm condition would manifest itself or how the observer could cause an alarm signal. The licensee committed to revise the CAS operation and testing procedure to describe manual alarm activation.

During the current inspection, the inspectors observed that the licensee had revised the CAS operation and testing procedure to inform operators that local alarms are received at the panel when the horns are switched off and that the procedure includes direction to operators on identification of criticality events.

08/12/09

NRC Inspection Report 70-143/2009-002 and Notice of Violation, **Severity Level IV**, April 5, 2009 through June 30, 2009, **ML092240064**.

Open:

70-143/2009-002-01 VIO Improper Securing of IROFS (Items Relied on for Safety) During System Operation

On April 27, 2009, while conducting a daily tour in processing area 800, the inspectors noted an audible alarm indicating a loss of exhaust ventilation for the area. The operator quickly responded to the alarm panel and noted that exhaust fan B801 was not running and attempted to restart the blower; however the fan would not restart. The operator then began to implement Standard Operating Procedure (SOP) 401, Sec 8, "Area 800." Step 8.19 of this procedure addresses a low differential pressure across fan B801, which indicates a fan failure. This exhaust fan is used to safely remove combustible gases from the process in area 800. The operator then attempted another restart of the fan but again the fan would not run.

Concurrently, the operator also noted a loss of the room exhaust fan B802 as indicated by an alarm. Both fans are considered IROFS. After the loss of both fans, the operator secured combustible gas to the system as required by Step 8.19.2 and notified supervision.

Following an initial investigation by supervision, it was discovered that maintenance personnel were on the building roof performing preventative maintenance on fans B801 and B802. After completion of maintenance, the fans were restarted and the licensee began an investigation of the event.

Problem Identification Resolution and Correction System (PIRCS) item #18418 for this event implemented a small team root cause investigation. During this investigation, the licensee noted that in addition to violating SOP 401 by securing the fans (credited as IROFS for an analyzed accident sequence) during system operation, the maintenance personnel performing the work failed to utilize locks/tags while working on the fans contrary to procedure NFS-GH-36, "Lockout/Tagout," Revision 7.

The inspectors evaluated the significance of the loss of ventilation during operations. Exhaust blowers B801 and B802 are identified in the Integrated Safety Assessment (ISA) as IROFS.

The associated high consequence accident sequences involve the prevention of a buildup of combustible gases in Area 800. Given the failure of the IROFS, the resulting risk index indicated the performance criteria of 10CFR70.61 were still being met. The risk was minimized due to the existence of combustible gas detectors as well as the operator's prompt isolation of the combustible gas to the system.

However, the associated risk to operation was increased and the improper securing of the fans was considered a more than minor violation. Improperly securing exhaust ventilation fans contrary to procedure as well as the failure to follow lockout/tagout procedures constitutes a violation of NRC requirements.

Closed:

70-143/2008-004-02 URI Review Method for Making Changes to Active Safety Work Permits

The inspectors reviewed the August 2008 Health Physics Audit of the Safety Work Permit Program. The audit reviewed each of the changes made to a SWP and revealed that only a small number of the changes were significant. The inspectors reviewed the revised SWP procedure and observed that the procedure included the definition of a significant change. A significant change to an SWP constituted an upgrade to stricter PPE requirements, implementation of companion permits (such as confined space permits), or an unexpected change in radiological conditions. A significant change will terminate the SWP and a new SWP will be created by authorized personnel. The program review and procedural changes were adequate to close the unresolved item.

70-143/2008-004-02 VIO Failure to Follow Posted Safety Work Permit Requirements

The inspectors discussed the violation and subsequent corrective actions with the licensee management. The inspectors reviewed the revisions to the procedure and Radiation Technician Job Coverage Responsibility lesson plan as referenced by the Reply to Notice of Violation sent on March 5, 2009. The revision determined that the work site is not "active" under a SWP until the SWP is officially posted. Once the SWP is posted, all requirements of the permit are in force. The inspectors interviewed plant personnel and determined that they understood the change in the procedures. The corrective actions were adequate to close the violation.

Other:

Plant Tour: The inspectors performed periodic tours of the outlying facility areas during the inspection period and determined that equipment and systems were operated safely and in compliance with the license. **The focus of these tours centered around the evaluation of potential missile hazards and missile protection features**, combustible material storage and fire loading, hazardous chemical storage, adequate storage of compressed gas containers, potential degradation of plant security features, and potential fire hazards.

The inspectors performed a detailed review of Safety Work Permit (SWP) #13144 which involved **decontamination activities associated with a spill** in glove box 3C08 in Building 333.

The inspectors **noted a weakness** while observing the surveillance in that three-way communications were not used when verifying by radio that an operator in an adjacent area had properly aligned valves and switches in support of a test. The licensee stated its intent to assess the need to implement three-way communications while conducting safety-related activities.

08/14/09

License Performance Review for Nuclear Fuel Services, Inc. (NFS), Docket Number 70-143, SNM-124, July 6, 2008 through April 5, 2009, **ML092260139**. **(Three (3) Severity Level IV violations** previously identified in Inspection Reports)

The licensee mistakenly opened a valve that allowed the transfer of solution to the waste treatment facility, by-passing the IROFS requiring sampling prior to discharge. In addition, on two other occasions, operators failed to close a valve following and prior to transfers of material. Both these actions resulted in an overflow of material that resulted in the use of the glove box drains. The glove box drains are IROFS, and NRC's expectation is that IROFS are not routinely challenged by process upsets. **(VIO 70-143/2008-004-01)**

The licensee failed to inspect fire dampers identified as IROFS for two inspection periods. The requirement to inspect the fire dampers was specified in the fire protection procedures; however, due to a communication error, the maintenance department's procedures were not updated to include the inspection of the fire dampers. **(VIO 70-143/2008-003-02)**

The licensee's safety program failed to ensure the effectiveness of the combustible control program inspections identified as an IROFS for the 310 Warehouse. Licensee procedures addressed inspection requirements associated with combustible loading limits for the 310 Warehouse, however, procedural controls were not adequate to prevent repeated occurrences of excessive combustible loading. **(VIO 70-143/2009-008-02)**

10/19/09

NRC Event Report Number 45446. (Accident occurred on Oct. 13, but was not reported until Oct. 19). (See **NRC AIT Report**, 70-143/2009-011, dated March 19, 2010 for details). (NFS receives “special” treatment thanks to an NRC policy of a five-day lag time between an event and its posting to the Event Notifications)

On Oct. 13, 2009, NFS began using the Bowl Cleaning system to dissolve U-Al (Uranium-Aluminum) fines (very small particles of U-Al) rather than adding them to the normal dissolver column. The fines were loaded into strainers and placed directly into the bowl to be dissolved with nitric acid. After the dissolution process began, the operator noticed that the temperature of the system was increasing and that NOx (in the form of a brown cloud) was beginning to form inside the Bowl Cleaning station containment vessels. System was shutdown. The NOx detector designated as an IROFS (Item Relied on for Safety) alarmed and the facility was evacuated.

On Oct. 19, 2009, based on the revised NOx generation rate, it was determined that insufficient IROFS were in place and that the performance criteria of 10 CFR 70.61 were not met.

Radiological hazard: High-Enriched Uranium, approximately 1,000g; isotope: U-235 quantity approximately 710g. **Chemical hazard:** NOx (Nitrogen Compound) gas, approximately 1.85 lbs.

Potential worker and public exposure

10/22/09

NRC Augments Inspection at Nuclear Fuel Services. NRC News Release, Office of Public Affairs, Region II, Atlanta.

The NRC has formed an Augmented Inspection Team to further review the circumstances associated with an Oct. 13 incident at Nuclear Fuel Services facility in Erwin, Tenn.

That incident involved unexpected levels of heat and nitrogen compound gas fumes during the dissolution of scrap material from Department of Energy projects containing low levels of uranium. (**Note: Uranium was high-enriched**).

“This particular incident did not involve nuclear criticality issues, but it shows the need for NFS management to improve some aspects of their operational and decision-making processes,” said NRC Region II Administrator Luis Reyes. “Upgrading our inspection to an AIT underscores our commitments to evaluate these issues thoroughly and ensure they are being properly addressed.”

11/12/09

NRC Inspection Report 70-143/2009-003 and Notice of Violation, **Severity Level IV**, July 1, 2009 to September 30, 2009, **ML093160774**.

A violation was identified for the failure to implement a safety program that would ensure IROFS FIRE-15 and 28 would perform its intended function when needed to comply with the performance requirements. An unresolved item (URI) was opened to review licensee's analysis that demonstrates compliance with 10 CFR 70.61 during 105 Laboratory roof replacement activities. A second unresolved item (URI) was opened to review licensee's analysis that demonstrates compliance with 10 CFR 70.61 without crediting the building 105 laboratory sprinkler system as an IROFS.

Open:

70-143/2009-003-01 VIO Failure to implement a safety program required by 10 CFR 70.62

From November 19, 2007 to September 4, 2008, the licensee had not implemented a safety program that would ensure IROFS FIRE-15 and IROFS Fire-28 would perform their intended function when needed to comply with the performance requirements.

Specifically, the licensee did not identify that IROFS FIRE-15 was going to be impaired during the 105 Laboratory roof replacement activities and failed to implement IROFS FIRE-28 as soon as IROFS FIRE-15 was impaired to ensure that an adequate safety margin was maintained.

This represented a failure of the safety program to adequately ensure the reliability of IROFS FIRE-15 and 28 to limit likelihood, and consequently the risk, of a high consequence accident scenario.

The failure to implement a safety program in accordance with 10 CFR 70.62 is a violation of NRC requirements.

70-143/2009-003-02 URI Analysis of Fire in Building 105

The inspectors noted that the fire safety consequence analysis of the ISA stated, in part, that **even a small fire had the potential to exceed the high consequence threshold for both occupational and environmental chemical consequences, and the intermediate consequence threshold for a radiological consequence.**

The inspectors determined that from November 19, 2007 to September 4, 2008, the licensee did not have sufficient IROFS in place to reduce the likelihood of occurrence of a high consequence event as required by 10 CFR 70.61(b) performance requirements.

At the time of the inspection the licensee did not have sufficient information to demonstrate that they were meeting 10 CFR 70.61 performance requirements. An unresolved item (URI) was opened pending the review of the licensee's analysis.

70-143/2009-03-03 URI **Implementation of recommendations of Fire Hazard Analysis**

In addition, the inspectors noted an inconsistency in the 105 Laboratory ISA related to the potential consequences that could result from a fire in the 105 Laboratory. The Fire Safety Consequence Analysis section stated, in part, that even a small fire could result in a high consequence event.

However, later in that section, the ISA stated that consequences from a fire were low. These assessments were based on the **Fire Hazard Analysis (FHA) for the 105 Laboratory, prepared on September 3, 2004**. The FHA considered the entire laboratory as a single fire area.

However, the FHA assumed that the potential of a fire to spread to adjacent laboratory work areas was highly unlikely due to the intervening masonry block walls and sprinkler protection, which is credited as IROFS FIRE-15. As a result, the sizes of the modeled fires were significantly smaller compared to a fire involving the entire laboratory, which could result in a high consequence event.

The inspectors noted that the expectation that the fire was not going to spread beyond the area of origin was based on the implementation of several recommendations to improve and correct deficiencies identified with the installed sprinkler system.

The FHA made the recommendation to extend sprinkler coverage to the unprotected areas of the 105 Laboratory. In addition, the FHA made recommendations in the areas of obstructions to water discharge pattern, excessive sprinkler spacing and area of coverage, need for installation of additional sprinklers, replacement of painted sprinkler heads, and the need for testing a sample of the existing wax-coated sprinklers to verify operability.

The inspectors walked down IROFS FIRE-15 and noted that the licensee had not implemented any of the FHA recommendations. Therefore, IROFS FIRE-15 did not meet the requirements specified in the FHA to support the conclusion of meeting the performance requirements.

Since the licensee did not implement the FHA recommendations, the inspectors determined that the licensee could not credit the sprinkler system as an IROFS to ensure that a fire would result in a low consequence event. **The inspectors noted that the licensee had been operating the 105 Laboratory in this condition for over five years.**

At the time of the inspection, the licensee did not have sufficient information to demonstrate that it was meeting the performance requirements in 10 CFR 70.61

with IROFS FIRE-15 not meeting the FHA requirements. An unresolved item (URI) was opened pending the review of the licensee's analysis.

Discussed:

70-143/2008-004-01 VIO Failure to adhere to plant procedures.

The inspectors reviewed the corrective actions taken to address this violation. While the initial corrective actions were complete, the inspectors observed that tanks WD-01 and -02 had similar discharge piping configuration as WF-03 and -04. This item will remain open for further NRC review of the licensee's extent of condition analysis.

70-143/2008-004-05 URI Verification of IROFS Pipe Material.

The inspectors reviewed the licensee's progress in verifying that pipe material, credited as an IROFS, had been properly verified. The inspectors reviewed the licensee's updated procedure for the verification of IROFS piping (NFS-GH-939, "Piping Integrity Plan, Revision 3). The inspectors noted that the procedure was adequate to meet the intent of the IROFS requirements.

The licensee had not completed the verifications of all of the IROFS piping of the facility at the time of this inspection. Therefore, this item will remain open until the verification is complete. Thus far, no pipe designated as an IROFS was determined to be composed of the incorrect material.

70-143/2007-008-05 URI Review of NFS's verification and validation of software used for decommissioning.

The verification and validation of software used for decommissioning was discussed; however, the license was not ready to close the item. The licensee will be ready to review the issue after the first Final Status Survey report is completed and submitted to the NRC.

70-143/2005-003-04 IFI Elevated isotopic analysis on a stack sample above the licensee's action limit. This item was closed in Inspection Report 2005-007.

The inspectors re-evaluated the methodology used to calculate the dose to the maximally exposed individual (MEI), the resultant dose to the MEI, and the corrective actions taken to prevent recurrence. The inspectors determined that the licensee used approved methodology and an off-site laboratory accredited by the National Environmental Laboratory Accreditation Program to aid in determining the dose to the MEI. The dose value was below the 10 CFR 20.1301 limits of 100 mrem in a year and 2 mrem in any one hour. The inspectors determined that the mechanical corrective actions taken to prevent recurrence had been installed and were functional. The inspectors had no new concerns.

Follow up on Event Report 45179:

The inspectors reviewed Event Notification (EN) 45179 (Nuclear Material Event Database # 090573), which involved a degradation of the public address (PA) system.

June 30, 2009, an individual located in a subcontractor trailer in the protected area noted that PA announcements related to fire alarm testing could not be clearly heard.

Degradation of the PA system was suspected and the issue was entered into the corrective action system as PIRCS #19511. Subsequent investigation revealed that the cause of the degradation was due to damaged speaker wire caused by the installation of a new fire suppression system in the 310 Warehouse.

Specifically, a technician had recently drilled a hole to install a support bracket and inadvertently drilled into the affected speaker wire as it was not encased in conduit. This event was reported to the NRC Headquarters Operations Officer (HOO) on July 1, 2009. The event was reported pursuant to 10 CFR 70.50 (b)(2) as equipment that failed to function as designed when the equipment is required to prevent exposure to radiation exceeding regulatory limits.

Because the PA system is part of the criticality alarm system (CAS), the CAS system for the 310 Warehouse and the contractor trailer was inoperable due to the degraded PA system. The PA system was repaired and fully tested and returned to service on July 3.

The inspectors reviewed the 30-day written response to the event dated July 30, 2009. Long term corrective actions include the addition of new design requirements to ensure PA speaker wiring is installed within conduit or approved mounting brackets. EN 45179

Follow-up on Previously Identified Issues:

Closed:

70-143/2006-014-02 VIO Failure to follow Lockout/Tagout procedure.

The inspectors reviewed the corrective actions taken to address this particular violation, e.g., Lockout/Tagout procedure training. The inspectors had no additional concerns.

70-143/2006-002-02 URI Failure to control electrical schematic diagrams under configuration control.

The inspectors discussed with the licensee how they controlled electrical schematic diagrams. The inspectors noted that electrical diagrams were included in the configuration management program database and they linked to the respective equipment number, including safety related equipment. The inspectors also noted that changes to electrical diagrams were handled through the change control process, which required a detailed review of the change. The inspectors determined that the licensee was controlling electrical diagrams in accordance with license requirements.

70-143/2007-006-03 VIO Inadequate review/approval for a procedure change.

The inspectors reviewed the licensee's corrective actions involving a process engineer that had written a Work Instruction that did not follow the requirements for writing a standard operating procedure or letter of authorization. The inspectors reviewed the revised procedure that governed the issuance of Work Instructions and reviewed several Work Instructions that were in use in the facility. No issues were noted with these documents.

70-143/2007-009-03 VIO Failure to Implement the Tollgate Process for the BPF U-Metal Project.

The inspectors reviewed the licensee's corrective actions involving the failure to properly apply and document the Tollgate process for the BPF U-metal project. The inspectors reviewed the application of the Tollgate process on the modification of the 800 Area. The inspectors noted that the project engineers had properly applied and documented each of the Tollgate process milestone reviews. The inspectors' interviews with several project engineers demonstrated adequate knowledge and application of the Tollgate process.

70-143/2007-004-03 IFI Verify Corrective Actions to Emergency Information Message (EIM).

The EIM form (Attachment E to Procedure NFS-HS-03) was modified to include a requirement that the assistant ECD update the EIM and attach a copy of the offsite protective action recommendations (Attachment F to Procedure NFS-HS-03) for transmittal to offsite authorities. **The licensee continues to evaluate the procedure used for offsite dose projections (NFS-HS-E-09) based on site physical and operational changes.** The inspectors concluded that the corrective actions were adequate.

70-143/2007-004-04 IFI Verify corrective actions to resolve the **onsite and offsite contamination.**

The inspectors observed the licensee performing contamination surveys of personnel and equipment during the simulated response. A contamination control zone was established and maintained throughout the exercise. Examples were

noted where response personnel removed gloves in areas potentially contaminated to perform life-saving actions, such as taking vital signs, but were later checked for contamination prior to leaving the area. The inspectors concluded that based on the response, the training provided to both onsite and offsite personnel regarding contamination control was adequate.

11/14/09 **NRC Event Report Number 45497. Fire in Process Glove box.**

On Nov. 14, 2009, at approximately 0730 there was a heated high pressure release from the 5A/5B UF6 cylinder in the CDL (Commercial Development Line) facility, Sublimation Station 3. At the time of the upset, the operators were in the process of preparing the cylinder for sublimation. They had just satisfactorily performed the valve leak checks and were performing the cylinder pressure test. The cylinder was not being heated.

The upset occurred when the cylinder valve was opened to vent the cylinder to column 1D01. The release ruptured the connective Teflon tubing that was enclosed in braided stainless steel. When flame was observed the operator actuated the CO2 release valve and extinguished the flame. Damage appears to be: Braided Teflon tubing, singed area on lexan cover of the enclosure and possible leak on the inlet and outlet side of the eductor.

11/24/09 **NRC Issues Confirmatory Orders to Nuclear Fuel Services and its Contract Physician, NRC News Release, Office of Public Affairs, Region II, Atlanta**

The NRC has issued **four (4) Confirmatory Orders** requiring Nuclear Fuel Services and the company's contract physician to correct deficiencies stemming from a former senior company executive's violation of the NRC's fitness for duty requirements and the failure to administer required hearing tests to security officers.

The orders related to the fitness for duty issue require the Erwin, Tenn. Based nuclear fuel fabrication facility to modify its fitness for duty procedures and training and establish avenues for the reporting of substance abuse-related concerns, including the creation of a corporate ethics hotline and policies allowing for anonymous reporting.

An extensive NRC investigation and review found that a senior executive at NFS consumed alcohol less than five hours before a scheduled working tour of the facility in **2006, an apparent violation of federal regulations**. The NRC determined that the company failed to immediately relieve the executive of his duties and also failed to administer testing to determine his fitness for duty. Additional apparent violations were identified related to the company's review of the matter and the executive's return to work. That executive is no longer employed by NFS and the company was acquired by the Babcock and Wilcox Co. in early 2009.

The company's contract physician provided incomplete information to a contract professional retained by NFS to determine whether the senior executive was fit for duty. The NRC found that this lack of information caused NFS to make a less than fully-informed decision about the executive's status before he was returned to duty.

The contract physician also provided inaccurate information to NFS about the executive having entered a substance abuse rehabilitation program when he had not done so.

The order noted that NFS has completed "disciplinary action and organizational change with respect to the senior executive."

Two separate and unrelated orders require NFS and its contract physician to review processes, establish appropriate standards and take other corrective actions after a process error led to two security officers not being given required hearing tests. The contract physician certified that guards were medically qualified for duty despite not having taken the hearing test, but the officers were tested later and passed.

The Confirmatory Order document the commitments NFS and the physician have made to the NRC, and those detailed were agreed upon as a result of the NRC's Alternative Dispute Resolution process. The ADR process uses a neutral mediator with no decision-making authority to assist the NRC and its license holders in resolving differences regarding enforcement actions.

The NRC will not issue any violation or take any other enforcement action related to these issues. However, the NRC staff will evaluate the commitments during future inspections.

12/31/09 All processes suspended at Nuclear Fuel Services, Inc. (Event Report 45601)

2010

01/07/10 NRC Issues Confirmatory Action Letter to Nuclear Fuel Services, NRC News Release, Region II, Atlanta

The Nuclear Regulatory Commission today sent a letter to Nuclear Fuel Services detailing the company's commitments for actions to assure the agency that NFS can safely operate the plant. The company has agreed to suspend production at its Erwin, Tenn. Facility until the items are completed.

The NRC's Confirmatory Action Letter (CAL) is designed to address issues that contributed to recent events at the facility, including an Oct. 13 incident being reviewed by an NRC augmented inspection team. The letter is being issued to

detail and confirm NFS's agreement to take certain actions in response to shortcomings identified by the inspection team.

Although NFS can continue work in other areas such as construction and transportation, the company has agreed that the process lines at the facility will remain out of service until the NRC is satisfied that the issues have been addressed. The NRC will verify through further inspections that the items in the letter have been successfully completed before production is resumed.

"This letter clearly lays out the NRC's expectations for both short and long-term actions that NFS will take to address the concerns our inspectors have identified," said NRC Region II Administrator Luis Reyes. "We believe suspending operations is appropriate given the current situation, and the lines will not restart until NFS meets its commitments."

Issuance of a confirmatory action letter does not preclude the NRC from taking other actions for any violations of NRC requirements that may be identified. (emphasis added)

01/08/10

NRC Inspection Report 70-143/2009-207, Dec. 7-10, 2009, Criticality Safety Inspection, **ML093620101**

Observations and Findings:

With regard to specific NCSEs, the inspectors questioned why the NCSE for Sublimation Stations 1 & 2 was revised twice within a week, and determined that these revisions were for unrelated changes made as part of initial start-up of this new operation.

Inspectors noted that in several NCSEs, the licensee took credit for initiating and enabling events such as the rate of buildup on a HEPA filter, the amount of material that would be released from a UF6 cylinder during a leak, etc. For some of these initiating and enabling events, the basis was not apparent from a review of the NCSE and associated documentation.

In addition, the inspectors reviewed new operations that had not yet been field verified, such as the design of portable favorable geometry columns for reagent addition to the BPF solvent extraction process, and the design of the saw for size reduction of MTR fuel. The inspectors determined, based on the established controls, that these operations would also be conducted safely and in accordance with regulatory requirements.

During a walkdown of Area 800 the inspectors identified some 2 liter contains and 1 liter contains that were stored in the corner of the area. The containers had some type of liquid in them but not all of them were marked with the contents of the container and some of the containers were not marked "No SNM Allowed." NFS-HS-CL-04 states in part, "Favorable containers that are not being used to

contain SNM are permitted provided they are labeled as to their contents and with the words "No SNM Allowed."

The area supervisor and NCS staff walked down the area and identified that the containers contained the chemical that is used in Area 800. They also identified two containers that did not have the appropriate contents label and "No SNM Allow" label. The containers were subsequently marked with the appropriate labels and a problem report was generated (PIRCS #22422).

The inspectors determined that the operations in the area do not generate SNM solutions and that none of the containers that were being stored in the area contained SNM. The inspectors considered the risk significance of this **failure to follow procedure NFS-HS-CL-04 to be minor** because of the operations in the area and that no SNM was in the containers. **This failure constitutes a violation of minor significance and is not subject to formal enforcement.**

Open:

70-143/2009-207-01 IFI Tracks licensee's demonstration of applicability of, and compliance with, License Application Section

Inspectors noted, in their review of the revised BPF U-Aluminum Dissolution NCSE, that the licensee stated it was no longer required to perform inspections of borosilicate glass columns in this area, allowing the columns to be reclassified as configuration controlled equipment (CCE) rather than safety-related equipment. Inspectors reviewed the memorandum that justified this, dated February 6, 2009.

The BPF processes still place reliance on the borosilicate glass, but no longer require an annual inspection of the glass thickness based on examinations of inspection data taken from 2006 to 2009, consisting of 220 tests with 3520 individual glass thickness measurements (taken at many different axial and radial locations along and around each column).

Inspectors reviewed this data and the licensee's evaluation thereof, and concluded that the data did adequately demonstrate there was no measurable thinning of the glass over this time, justifying their reclassification as CCE.

However, the inspectors noted that Section 4.2.1.9 of the License Application, "Fixed Neutron Absorbers," states: The use of a neutron absorber as a criticality controlled parameter is acceptable if the following criteria are met...

Procedures are established to verify the presence and continuing effectiveness of fixed neutron absorbers before use and periodically thereafter.

Controls are exercised to maintain the continued

presence and the intended distribution and concentration of fixed neutron absorbers.

The inspectors questioned how these requirements would be met if the required glass thickness inspections were discontinued. The licensee stated that it believed it was allowed to discontinue the inspections, but that there was no documented basis for doing so.

The licensee had issued Problem Identification, Resolution, and Corrective System (PIRCS) 7419 on May 25, 2006, with an action to “generate basis documents for glass columns to address fixed neutron absorber requirements in license.” Subsequent to this, the due date had been extended several times, from May 1, 2007, to October 1, 2007, to October 1, 2009, and finally to October 1, 2010.

The licensee stated that it was uncertain whether Section 4.2.1.9 even applied to the glass columns, noting that: (1) the most significant effect (in terms of system reactivity) of glass thinning was increasing fissile dimensions, not reducing neutron absorption; and (2) there was considerable margin in both glass thickness and boron loading, such that only ~50% of the boron was needed to maintain k_{eff} below the upper subcritical limit.

The licensee also stated that, as part of license renewal, it had submitted changes to Section 4.2.1.9 of the license application, which state that controls are to be exercised to maintain the continued effectiveness of absorbers “as necessary.” However, this is not the version of the application currently in effect.

Inspectors determined that the stated specifications for the borosilicate glass (i.e., in the U-Aluminum Dissolution NCSE) include NCS limits on the B₂O₃ content and 10B enrichment, as well as the glass thickness. Therefore, it appears that reliance is being placed on both the inner diameter and the material properties of the glass columns, even if only partial credit for boron is needed to demonstrate subcriticality, which would mean that this section of the application does apply.

Inspectors determined, however, that the **failure to do inspections has at most minor safety significance, because of the large margin inherent in facility calculations, and because the licensee’s inspection data convincingly demonstrate the lack of any measurable thinning of the glass over time.** In fact, there is not foreseeable credible mechanism that could reduce the glass thickness by the 50% required to exceed the upper subcritical limit.

Therefore, there is no safety concern with the discontinuation of glass column inspections (as long as current chemical conditions in this area are maintained). The licensee has committed that it would complete its evaluation of the applicability of License Application Section 4.2.1.9, and justifies how it is meeting the license requirements, by June 30, 2010.

Demonstration of applicability of, and compliance with, License Application Section 4.2.1.9 will be tracked as **IFI 70-143/2009-207-01**.

Closed:

70-143/2009-202-01 IFI Tracks licensee's submission of an amendment request to clarify the license requirements regarding modeling of reflection.

This concerned the licensee's planned submission of an amendment request to clarify license requirements regarding modeling of reflection in criticality calculations, as it had committed to do in a previous inspection. The licensee subsequently submitted an amendment request, but later withdrew it. In a previous inspection, the licensee had stated its intention to resubmit with more justification by the end of 2009. Following the inspection, on **December 15, 2009, the licensee resubmitted its amendment request**, which will be reviewed by licensing staff. This issue is now closed.

01/20/10 **NRC Event Report Number 45642. Potentially Overpressurized UF6 Cylinders**

UF6 cylinders are in storage. The cylinders consist of 1s/2s, hoke tubes, and 5A cylinders. The UF6 is contained in the cylinders, which are in DOT shipping containers (20PF1 and 6M containers).

Calculations were performed that indicated that the theoretical pressure in some of the cylinders exceeds the service pressure (200 psi) and some exceed the hydrostatic test pressure (400 psi).

DOE literature indicates that the burst pressure for a 5A cylinder is (approximately) 8,000 psi. The age of the cylinders is 1950s (to) 1980s. The potential pressure in the cylinders is estimated to be by liberation of fluorine gas in the cylinders. Access to the areas has been restricted. The cylinders potentially contain fluorine gas.

(Note: Cylinders have been stored at NFS, inside City Limits of Erwin, since 1999. In the March 2010 NRC AIT Report, NFS said they did not know the cylinders contained F₂ (Fluorine Gas), which is lethal).

02/12/10 NRC Inspection Report 70-143/2009-004 and Notice of Violation, **Severity Level IV, Oct. 1, 2009 through Dec. 31, 2009, ML100430924**. Includes NMED Nos. 090788, 090838; NRC Event Nos. 45446, 45497, 45601.

70-143/2009-004-01 VIO Inadequate design of a system containing SNM

Plant operations activities were generally performed safely and in accordance with approved procedures with the following exceptions: On Oct.

13, an over temperature event occurred in the Uranium Aluminum bowl cleaning station. This event resulted in establishment of an Augmented Inspection Team and the results of which will be documented in report 70-143/2009-011. On Nov. 14, a fire occurred in a sublimation station of the Commercial Development Line, which damaged equipment and resulted in the shutdown of the line.

A violation of 10 CFR 70.72(a)(1) was identified for the failure to adequately address the material compatibility of uranium hexafluoride vent hose materials with F₂ gas that may be present in the storage cylinders.

A change was made to the facility to install uranium hexafluoride sublimation stations. The impacts from fluorine oxidation of components that controlled licensed material, namely the flexible hose piping with passed special nuclear material from a uranium hexafluoride cylinder to the sublimation station, were not addressed prior to implementing the change and placing the system in service. This event was self-revealing following a small glove box fire on Nov. 14, 2009, when a hose containing uranium hexafluoride was damaged by a rapid oxidation reaction with fluorine gas.

Licensee established a full root cause team, which enlisted the assistance of National Nuclear Security Administration (NNSA) experts in UF₆ processing. The cylinder contained approximately 11.4 kilograms of uranium (U) at ~97% enrichment and was believed to have originated from the K-25 plant (Oak Ridge, TN) circa the early 1960's. Documentation was poor due to the age of the cylinder.

Details of the UF₆ accident:

This cylinder was the second large cylinder to be processed in the CD line. The first cylinder was processed with no upsets. However, the operators had noted a large amount of heel material remaining in the cylinder following sublimation.

The cause of the fire was later determined to be from residual fluorine (F₂) gas residing in the top of the cylinder. Fluorine is considered a strong oxidizer that rapidly reacts with organic material. The root cause team noted that the hose may have been kinked and thus caused potential cracking of the internal Teflon lining. The F₂ gas could then react with the internal fiber braid lining that surrounded the Teflon. This braiding likely became a source of fuel for the fire. No ignition source would be required to start this type of fire.

The F₂ gas is created from the radiolytic decomposition of UF₆. This well understood phenomenon is caused by the high specific activity (SA), i.e. curies/gm, of high enriched uranium (HEU). In fact, the SA for HEU is approximately 100 times greater than natural uranium (due to the relatively higher amount of U-234). The U-234 is naturally occurring in uranium and increases

along with U-235 during the enrichment process. The U-234 has a very short half-life when compared to U-235 and U-238.

This short half-life results in a similarly higher specific activity. This higher activity greatly affects the resulting specific activity of the HEU and thus, on a per gram basis, the HEU has a much higher specific activity than natural uranium. This conclusion was supported by the large amount of heel material (UF5) found remaining following processing of the first 5A cylinder.

Based on discussions with other NFS personnel who have had experience processing these cylinders in the past, the piping connecting to the vent lines of these cylinders was not a stainless steel braided, Teflon-lined hose but instead a solid metal (for example, Copper or Monel) tube that would not react with F2 gas. **This historical knowledge had not been passed on to the engineers that designed the sublimation system.**

The NNSA consultants also noted that chlorine tri-fluoride (ClF3) had been used as a chemical additive in the past. This chemical is also highly reactive, potentially explosive, and was noted as a potential cause for the fire.

However, NNSA also speculated that the reaction in this event would most likely have been more violent if ClF3 was the source. Thus, the licensee concluded that the oxidizing agent was more likely to be F2 gas.

Additionally, the licensee found that a potential precursor event may have occurred the day before this event (on November 13). The larger UF6 cylinders (5A/5B) have a vent valve for the cylinder as well as a vent valve for the dip tube. The dip tube is a pipe that travels to the bottom of the cylinder and is used for purging purposes. In this instance, the operator was preparing the same cylinder that was later involved in the event.

While opening the vent valve on the dip tube, the operator noted a small burning ember that floated past the stainless steel portion of the dip tube vent hose to a portion of the hose that was opaque. The ember hit the inside of the opaque hose and then extinguished itself. The occurrence was immediately entered into the corrective program.

The corrective actions however were not thorough or comprehensive. The opaque hose was replaced (changed to a stainless steel, instead of polymer, construction). The inspectors concluded that a more in-depth examination of the event may have led the licensee to recognize the F2 gas phenomenon before the fire occurred.

The inspectors confirmed that a glove box fire was analyzed in the fire hazards analysis (FHA) for the CD line. However, no credit was given for the CO2 system in the ISA. The CO2 was to be used to put UF6 into a solid form in the event it vaporized in the glove box. The CO2, however, was mentioned in the FHA.

The licensee's approach to a fire in a sublimation station was not to attempt extinguishment. **Instead, the operator was expected to see the fire, flee the area, and then sound the alarm.** Using this approach, no exposure to the operator would occur. **Thus, the accident sequence of a fire in a single glove box was not specifically analyzed in the ISA.** The licensee only analyzed larger fires that damage several glove boxes and subsequently breaches the building. The licensee demonstrated compliance with NRC regulation (specifically, 10 CFR 70.61) by limiting the amount of cylinders stored in the processing area.

Procedures limit the number of cylinders in the area to a maximum of three. For a large fire in the CD line, this constraint would limit UF6 exposure at the site boundary to below regulatory requirements.

10 CFR 70.72 (a)(2) requires that prior to implementing any facility change, the impact of the change on the control of licensed material shall be addressed.

Prior to implementing the change allowing the operation of the CD line, the licensee failed to address the impact of radiolytic buildup of F2 gas in the UF6 cylinders would have on the components that control SNM.

The licensee's failure was of low safety significance because the accident was adequately bounded by the ISA and the IROFS in place ensured that the performance requirements were met. **This failure is a violation of NRC requirements and will be tracked as VIO 70-143/2009-004-01.**

Following the event, the licensee shutdown all sublimation activities in the CD line until root cause(s) could be determined.

The inspectors noted that regarding the fire that occurred on November 14 in the CD line glove box, a previous PIRCS entry from the day before dealt with a related anomaly within this glove box. However, the corrective actions were not thorough or comprehensive, and the **evaluation failed to probe deep enough into the issue such that the follow on event was not prevented or mitigated.**

Uranium-Aluminum (UAl) Over Temperature Event

On October 13, 2009, the UAl system in BPF experienced an upset condition when UAl fines were added directly to the UAl bowl cleaning station (as part of a newly approved process change to the facility) and then mixed with nitric acid. The resultant chemical reaction generated an excessive amount of heat and nitrogen oxide and/or nitrogen dioxide (NOx) gases.

The upper level building NOx gas alarm was received and all personnel evacuated building 333. **After dissipation of the NOx gas via the building scrubber**

system, personnel re-entered the area to assess the system condition. The wet off-gas (WOG) overflow lines (transparent polyvinyl chloride) were noted to have deformed slightly due to the heat of reaction. Additionally, NOx gases were noted in the overflow column.

By design, the overflow column is vented to the plant off-gas (POG) system via a siphon break. **The POG system is directly connected to the building scrubber system, which processes the effluent gasses to allow release to the environment below regulatory limits (?).**

On October 19, the NRC dispatched a special inspection team (SIT) to the site. Following a more detailed review of the event, the licensee reported this event to the Headquarters Operations Officer (HOO) pursuant to 10 CFR 70, Appendix A (b)(1) as a potentially unanalyzed condition (Event Notification (EN) No. 45446). Following the report to the HOO and a reevaluation of the event by the NRC, the SIT was upgraded to an Augmented Inspection Team (AIT) on October 26.

This event will be discussed in detail in the AIT inspection report 70-143/2009-011. The licensee shut down the UAI system for the remainder of the inspection period while a root cause team reviewed the event, developed causal factors, conducted an extent of condition review, and conducted an extent of cause review.

The inspectors reviewed EN (Event Number) No. 45601 involving a press release issued on December 31, 2009. This press release dealt with a suspension in productions operations following the normal holiday period, which ended Dec. 28. **The decision to keep the facility shut down was made by the licensee after discussion with NRC about a steadily declining trend in facility performance. The EN (Event Notification) was issued to comply with 10 CFR 70, Appendix A, which requires a report to the HOO concurrent with any press release that deals with a situation related to the health and safety of the public or the environment.**

03/02/10 NRC Public Meeting, Erwin, TN. Discussion of AIT Report (not yet released). Another public meeting promised prior to restart. **Meeting did not happen.**

03/19/10 NRC (Region II) Augmented Inspection Team (AIT) Report 70-143/2009-011, (completed on Jan. 7, 2010), contained eight (8) Unresolved Issues (URIs), **ML100780127**, 55 pages.

70-143/2009-011-01 URI Failure to properly classify Enterprise Change Requests (ECRs).

The Change Control Board (CCB) review represents management's review of the Enterprise Change Requests (ECRs). Urgent ECRs can be "expedited" and potentially by-pass the CCB review more quickly. (Report details, Page 3)

70-143/2009-011-02 URI Failure of CCB to identify deficiencies in the ECRs.

The CCB's review of ECR 20091919, which authorized the processing of fines directly to the Bowl Cleaning Station (BCS), failed to identify that the design requirements and design basis were affected by the direct addition of fines into the BCS without first processing the material in the UAI dissolvers. (Report details, Pages 3 & 4)

70-143/2009-011-03 URI Failure to perform adequate technical reviews.

The technical reviews failed to identify that processing UAI fines directly in the UAI BCS, without processing the material through the caustic dissolution and centrifuge steps, was not analyzed in the ISA as part of the UAI design basis. (Report details, Page 4)

70-143/2009-011-04 URI Failure perform safety reviews to assure that the facility ISA was not adversely affected by the change, operational safety was not compromised, and that assumptions and commitments were maintained.

The safety reviews failed to consider the impact on NOx generation rates due to the greater surface area of the UAI fines and failed to note that direct input of material into the BCS inherently adversely affects the ISA as the ISA assumed only material first processed in caustic dissolution is placed in the BCS. (Report details, Page 4)

70-143/2009-011-05 URI Failure to properly implement change review documentation in accordance with 10 CFR 70.72

The failure to have a written evaluation that provided the bases for the determination that the changes did not require prior NRC approval. (Report details, Page 8)

70-143/2009-011-06 URI Failure to meet performance requirements of 10 CFR 70.61(b) (Insufficient IROFS)

The operations that occurred on Oct. 13, 2009 in the BCS failed to meet the performance requirements of 10 CFR 70.61 (b) due to insufficient IROFS being available. (Report details, Page 18).

70-143/2009-011-07 URI Failure to maintain process safety information pertaining to the performance and technology of BUA-43 (IROFS) by 10 CFR 70.62(b).

The team reviewed the technical basis for IROFS BUA-43 indicated that the licensee had not adequately quantified the effectiveness of this IROFS. The licensee failed to present adequate calculations that indicated that sufficient addition of the chemical reagent would prevent the release of excess NOx. (Report details, Page 18)

70-143/2009-011-08 URI Failure to identify engineered or administrative controls as IROFS required by 10 CFR 70.61(e).

The licensee's failure to identify engineered or administrative controls as IROFS for several accident scenarios in fuel manufacturing, Uranium oxide, UAl, and the CDL processes involving NOx generation. (Report details, Page 19)

03/23/10 **NFS Authorization to Resume Operation of Navy Fuel Process Line Operation**

04/22/10 Public Meeting to Discuss Restart
(Once again, forced overtime (16-hour) shifts was mentioned by the NRC).

05/26/10 NRC Inspection Report 70-143/2010-007, Notification of Pre-decisional Enforcement Conference regarding **Five (5) Apparent Violations** associated with the process upset condition that occurred in the bowl cleaning station of Oct. 13, 2009, **ML100780127**.

70-143/2009-011-06 AV Failure to meet Title 10 of the Code of Federal Regulations (10 CFR) 70.61(b).

This regulation requires, in part, that the risk of each credible high consequence event be limited and that engineered or administrative controls shall be applied as necessary to reduce the likelihood of occurrence.

NRC determined that, prior to Oct. 13, 2009, **NFS failed** to comply with the following procedures:

On Oct. 13, 2009, Nuclear Fuel Services, Inc. (NFS) operated the bowl cleaning station without sufficient engineered or administrative controls to comply with 10 CFR 70.61(b) **because only one item relied on for safety (IROFS), BPF-43 (NOx detection), had been designated to prevent or mitigate a high consequence accident scenario/sequence.**

70-143/2009-011-01, AV Multiple failures to follow procedures for

02, 03, and 04

configuration management

70-143/2009-011-05 AV Failure to meet the requirements of 10 CFR 70.72, which requires licensee to maintain records of written evaluations that provide the bases for the determination that a change to its facility does not require prior NRC approval.

The inspectors determined that an inadequate 10 CFR 70.72 review was conducted based on reviews of the Safety and Regulatory Review Routing Forms used for the ECRs 20092008 and 20091919 that led to the upset event of Oct. 13, 2009.

70-143/2009-011-07 AV Failure to maintain process safety information required by 10 CFR 70.62(b).

This regulation requires, in part, that licensees maintain process safety information pertaining to the performance and technology of the process to enable the performance and maintenance of the integrated safety analysis. Prior to Dec. 11, 2009, NFS failed to maintain process safety information that would have provided reasonable assurance that IROFS BUA-43 (chemical addition) could perform its intended design function as described in the integrated safety analysis.

70-143/2009-011-08 AV Failure to identify Engineered or Administrative Controls as IROFS required by 10 CFR 70.61(e)

This regulation requires, in part, that the licensee designate engineered or administrative controls as IROFS if they are required to meet the performance requirements of 10 CFR 70.61 (b). Prior to Dec. 11, 2009, NFS failed to identify engineered or administrative controls as IROFS for several accident scenarios involving excessive nitrogen compound gas generation in the fuel manufacturing, uranium metal/oxide, uranium aluminum, and commercial developments lines in order to meet the performance requirements of 10 CFR 70.61(b).

At this pre-decisional enforcement conference, NRC requests that NFS present their perspective on why their corrective actions from the Safety Culture Improvement Initiative did not effectively address these performance areas and what actions you are taking as a result.

06/02/10

NRC Restart Readiness Assessment Team Report No. 70-143/2010-005, Feb. 22, 2010 through March 22, 2010; presented orally in public meeting on April 22, 2010; **however, this written report was not released until June 2, 2010, ML101530164**

Concerns involved the adequacy of Nuclear Fuel Services' (NFS') management oversight of facility process changes, perceived production

pressures, lack of questioning attitude by workers and management, and poor communications

70-143/2009-011-08 URI Failure to identify engineered or administrative controls as IROFS required by 10 CFR 70.61(e)

The AIT noted that the licensee could not provide an adequate technical basis for IROFS BUA-43. The team noted that, as a result of the AIT review, the licensee created new IROFS in the BPF U-Al system in place of BUA-43 in order to comply with 10 CFR 70.61. **However, NFS chose to leave BUA-43 in place as a defense in depth measure though no credit for it is assumed in the ISA. Therefore it is not risk indexed as required by NFS' ISA program.**

The team observed that the licensee's ISA program did not consider all initial conditions and assumptions used as inputs to safety calculations to be IROFS. The availability and reliability of IROFS to perform their intended safety function are ensured through the use of specific management measures directed by 10 CFR 70.62(d). **A vulnerability could exist because, without appropriate management measures assigned, the results of those safety calculations could be changed in a non-conservative manner by a deviation from any of the stated initial conditions or assumptions. The practice of not including management measures for initial conditions and assumptions will be also reviewed as part of URI 70-143/2009-011-08.**

Actions Prior to Restart of Operations:

1. The restriction NFS management put in place following the Bowl Cleaning Station incident prohibiting the processing of granular metallic "fines" in the Uranium-Aluminum process will be institutionalized.

Restriction on processing granular metallic fines did not fully meet facility management expectations for clarity and recognition – the U-Al Dissolution procedure did not include a picture of the fines. **And, changes were not initially captured in the procedures as "Commitments," making it vulnerable to change in the future.**

2. NFS will institutionalize improvements to the change control process (CCP), which was delineated in a temporary procedure. Training on the process will be provided to appropriate operations, technical, oversight and management staff.

Regarding process changes, the **new definition of an urgent change was not implemented as intended.** When the licensee revised the plant-wide change process procedure, the word "would" was changed to "could," which was less restrictive and subject to greater mis-interpretation, therefore, could result in future non-conservative decision-making when utilizing the urgent change

provision. This was contrary to the intention of the licensee's corrective action.

3. The incident investigation, including detailed causal analysis of the Bowl Cleaning Station incident will be completed.

Team noted that the Root Cause Analysis (RCA) Team did not conduct a detailed internal operation experience (OE) review, specifically search the PIRCS database for past change process problems to determine if they had similarities to this event. TapRoot team leader indicated that the database was too complex and not conducive to performing effective searches. He also indicated that root cause personnel were not trained on conducting PIRCS database searches.

Licensee's TapRoot investigation identified three causal factors (CFs), two contributing causes (CCs) and three lessons learned (LL) associated with the Oct. 13, 2009 bowl cleaning station event:

- CF#1: **Failure** to implement the plant-wide project management control procedure NFS-TS 009, "Configuration Management of Process Change," originally issued in 2007, which led to an inadequate review of the chemical process change associated with the procedure revision to process granular aluminum fines in the BCS.
- CF#2: **Inadequate review** of the process change by the Integrated Safety Analyst (ISA) Team Leader which led to the failure to request a review by the chemical analyst.
- CF#3: **Inadequate technical basis documentation** to support the process change which led to the failure to understand its impact.
- CC#1: **Workload, production pressure, and competing priorities** contributed to the development, approval, and implementation of a major process change without appropriate attention to detail.
- CC#2: The option to process aluminum fines in the BCS was implemented to **prevent generating what was perceived to be a large number of waste containers.**
- LL#1: Investigate reports of problems with the electronic procedure change software resulting in unexpected changes to the word processing documents.
- LL#2: Routing mark-up copies of the procedure as part of the process change package would facilitate a more thorough review and reduce errors.
- LL#3: Significant process changes should not be implemented on an off-shift without ensuring adequate technical support.

However, as previously discussed in the NRC AIT Report 70-143/2009-011,

The licensee's causal factors and contributing causes did not focus on the **lack of management oversight or the lack of questioning attitude** that was demonstrated by the licensee's staff and management thorough the review and approval of the ECR (Enterprise Change Request) that allowed the processing of granular fines in the Bowl Cleaning Station.

To address these **Safety Culture aspects of the event**, the licensee performed a **separate Safety Culture Implication Review (SCIR) investigation**. SCIR identified several safety culture components that contributed to the performance issues, including: **decision-making, accountability, operating experience, resources, work control, work practices, continuous learning environment, organizational change management, and safety policies**. Team concluded that the SCIR effectively identified safety culture weaknesses that were not addressed by the original RCA associated with the licensee's TapRooT investigation.

4. The near-term corrective actions needed to address the causal factors identified by the investigation of the BCS incident will be determined and implemented.

Team noted **following weaknesses or comments in several PIRCS** (Problem Identification, Resolution, and Correction System):

PIRCS #C10680 (Review of potential adverse work environment of personnel in Process Engineering department):

The team noted that the original due date for the completion of this corrective action was January 15, 2010, prior to restart of the facility. However, the assigned due date was changed to May 1, 2010, which changed the completion priority to a post-restart action. The only documentation regarding the change in PIRCS #C10680 was a note that the due date was changed at the request of the Vice President of Operations.

The team noted that this was one of several **corrective action commitment details or due dates that were changed without thorough documentation or evidence of initial CARB (Corrective Action Review Board) reviews**. The licensee initiated PIRCS #C11978 to address this and similar issues.

PIRCS #010616 (Develop and implement a project management program to be executed for new projects or changes to current processes):

The licensee's TapRooT investigation noted that a Quality Assurance (QA) Audit in 2008 identified the lack of procedural guidance for providing the technical basis of process changes (PIRCS #P15957). The proposed corrective action for this QA issue, documented in PIRCS #C7816, was to create such a document. As a result, a draft engineering department "How-To-Guide" was created titled

“Preparation of Technical Basis Documentation for ECRs.” **This guide was never approved and issued.**

The TapRoot investigation stated that “this issue will also be addressed by the corrective actions for CF#1.” Based on review of PIRCS #010616, as well as the other corrective actions associated with CF#1, the **team found no documented evidence that this issue was formally addressed.**

The corrective actions associated with PIRCS #010616 involved enhancements to the facility process change program (via revision of NFS-CM-004 and the implementation of NFS-TS-009) which included requirements for conducting and documenting technical basis reviews. While detailed technical basis review guidance was provided in these procedures, the **team noted that the draft How-To-Guide contained content and information beyond what had been implemented in the procedures or in the associated training.**

Following discussions with the licensee on this issue, PIRCS #15957 was updated by QA personnel indicating that the **original actions were ineffective and should be corrected.** PIRCS #012046 was initiated to address this problem. The licensee indicated that a review of the technical basis preparation guidance contained in the draft How-To Guide would be conducted against the guidance currently contained in NFS-CM-004 to determine if NFS-CM-004 should be enhanced.

PIRCS #011172 (Conduct a review of procedures, policies, etc, for instances of institutionalized priorities over safety or production pressures):

The licensee’s review of the sampled facility procedures and policies identified several actions. For example, it was identified that a more detailed review of the practices associated with SOP-392, “Work Request Procedure” was needed. In addition, **it was identified that Process Engineers should be instructed to consider production over safety during their routine procedure walk downs and reviews. However, the team noted that specific PIRCS corrective action items were not created to ensure that these actions would be implemented.** To address this issue, the licensee initiated PIRCS #C11972.

PIRCS #C11113 was associated with a SCIR corrective action to conduct peer-checks of ISA Team Leader decisions that process changes do not require ISA technical reviews.

The PIRCS document stated that “instead of requiring a peer-check, Screening Guidelines have been provided in Attachment A of NFS-GH-A-67 to clearly identify under what circumstances no technical ISA review is required.”

The team noted that there was no explanation or basis documented for this decision or whether the CARB had agreed with this decision. In that there

was already a corrective action developed from the SCIR investigation to develop these same Screening Guidelines (via PIRCS #C11114, described above), the change to the action of PIRCS #C11113, effectively deleted the action.

The team interviewed one of the SCIR team members who indicated that they had intentionally included both actions due to the importance of eliminating the error-likely situation and single point failure from occurring (i.e., making the same error that occurred in the BCS event).

This SCIR team member stated that he was unaware of the decision to revise PIRCS #C11113. The team discussed the concerns with management who subsequently revealed that the decision to revise the action of PIRCS #C11113 was made at the recommendation of the newly appointed Director of Safety and Regulatory based on his experience at another fuel facility.

In lieu of the peer-check, it was decided that the Screening Guidelines associated with PIRCS #C1 1114, alone would provide adequate actions to address the problem. The team concluded that this was another example where corrective actions were revised without clear documentation of the basis for the changes and without CARB involvement in the initial decision-making.

5. The extent of condition reviews of process area safety basis conducted after the BCS incident will be expanded to include the BPF-U-ox Dissolution Process.

The original extent of condition analysis performed by the licensee following the BCS event utilized what the licensee described as a “vertical slice.” NFS chose to perform the extent of condition review by selecting and analyzing only those systems that might be subject to a variability of material.

In this original extent of condition, the licensee addressed the potential for variability of material composition and how this condition could affect other plant processes. **However, this initial analysis did not identify that the U-ox system was vulnerable to material variability.** Based on the ALT’s review, it was noted that different types of oxides could be introduced into the U-ox system.

The licensee expanded the extent of condition review to include the U-ox dissolution process. The team reviewed the revised extent of condition analysis described in NFS Investigation PIRCS #110389 and noted that it was very detailed and evaluated many of the vulnerabilities of the U-ox system. **However, it failed to specifically address the failure mode associated with material variability.** This deficiency was brought to the attention of licensee management.

6. An extent of cause analysis for each causal factor will be completed and specific interim corrective actions will be identified and implemented as appropriate.

There was only a limited attempt to determine the actual extent of each cause within the organization. Licensee acknowledged this approach as a potential vulnerability for future investigations and appropriately captured the concern in PIRCS #P22890.

7. Each facility accident scenario involving nitrogen compound gas (NO_x) generation will be re-evaluated to ensure appropriate IROFS have been identified and implemented to provide adequate protection and that management measures for those IROFS are sufficient to ensure these IROFS are available and reliable to perform their intended safety function when needed.

Note: In the Event Report for the Bowl Cleaning Station incident, NFS used the words “nitrous” oxide in a description of the gas generated. This same incorrect information was also used in subsequent NFS news releases and therefore transmitted by the media – even describing it as “laughing gas” in an Associated Press article. Members of the public addressed this error at the NRC Public Meeting on Oct. 29, 2009, and again in subsequent meetings, conversations, and emails. **Yet, after all of the attention given to using the correct description “nitrogen compound gas,” as late as May 20, 2010, NFS continued to use “nitrous” oxide in their releases to the media. And, at the AARM Meeting on May 27, 2010, Victor McCree, Region II Deputy Administrator, perpetuated this incorrect information, “nitrous oxide,” in his presentation to the NRC Commissioners about NFS!**

NFS chose to leave BUA-43 in place as a defense in depth measure though no credit for it is assumed in the ISA. Therefore it is not risk indexed as required by NFS’ ISA program. The practice of putting non-risk-indexed IROFS for low consequence events was not specifically addressed in NFS’ ISA program documents.

During a review of the newly created IROFS for NO_x scenarios, the team noted that NFS developed management measures to ensure their effectiveness. However, **the licensee did not address the effectiveness of the management measures associated with these IROFS.**

Team observed that the licensee’s ISA program did not consider all initial conditions and assumptions used as inputs to safety calculations to be IROFS. The availability and reliability of IROFS to perform their intended safety function are ensured through the use of specific management measures directed by 10 CFR 70.62(d).

A vulnerability could exist because, without appropriate management measures assigned, the results of those safety calculations could be changed in a non-conservative manner by a deviation from any of the stated initial conditions or assumptions. **The practice of not including management measures for initial**

conditions and assumptions will be also reviewed as part of URI 70-143/2009-011-08.

8. Following completion of restart actions. NFS will have an independent review conducted to verify implementation of the restart actions. Personnel participating in these reviews will have no responsibility for the conduct or oversight of NFS operations.

NFS assembled six individuals to conduct the independent review. The on-site portion of the team's assessment was limited to just four days. It appeared to have adequate breadth, but review of issues may have **lacked depth due to the short amount of time spent at NFS. In many cases the assessment consisted of reviewing the supporting documentation supplied by NFS and did not include independent sampling. The lack of depth was illustrated by the types of observations that the NRC evaluation team had that were not identified by the NFS Independent Review Team.**

9. NFS will allow sufficient time for NRC to perform inspections of restart actions. The NRC will be provided with a two-week notice prior to the time NFS management would like for the NRC team to arrive at the NFS site.

On February 9, 2010, David L. Kudsin, President NFS, issued a letter to Luis A. Reyes, NRC Region II Administrator, stating that the IRT had completed their review of restart actions required by the CAL. The letter noted that the IRT concluded that NFS had satisfactorily completed the list of "Actions Prior to Restart of Operations" for the Naval product line and the BLEU Preparation Facility.

10. Implement a Senior Engineering Watch (SEW), to provide additional technical coverage on the process floor. The SEW will have the sole duty of providing independent technical oversight of process operations to promote the identification, adjudication and resolution of potential safety concerns. The SEW will functionally report to the Vice President of Operations. NFS will maintain this watch for a minimum period of 6-months after restart of all operations.

Team determined that the on shift activities of the SEW were appropriate to the level of activity taking place within the facility. However, the team noted that the decreased amount of activity taking place at the licensee's facility during the inspection period limited the number of opportunities for direct observation of SEW activities. SEW needs to be assessed during and after licensee's restart activities.

11. Implement an initiative to increase management presence and engagement on the process floor that will better enable open and timely communication of potential safety concerns. This initiative will be structured

around a series of daily meetings held by management with processing personnel.

Team conducted seventeen (17) interviews with licensee personnel various departments and experience levels, to assess their knowledge of the initiative, gather their insights on the level of management presence at daily meetings and assess their ability to openly communicate with licensee management.

Team identified that several employees did not have a firm understanding of the Employee Concerns Program (ECP). Team also identified that **some employees were not aware of their ability to directly contact the NRC in order to raise safety concerns.** The team conveyed these issues to the licensee. The licensee initiated PIRCS # P23575 in response. **Team also noted that training on the ECP and methods to raise safety concerns were part of the licensee's upcoming preparations for restart.**

12. Develop updated programmatic guidance to provide specific criteria to invoke Corrective Action Review Board (CARB) review of investigations, corrective actions and effectiveness reviews to help ensure appropriately broad investigations and effective corrective actions.

Stakeholders for most agenda items were not present to provide amplifying information or answer questions. This negatively impacted the effectiveness of the CARB.

The majority of items reviewed were rejected due to lack of provided documentation. This problem could have been remedied prior to the convening and negatively impacted the effectiveness of the CARB.

The effectiveness of the meeting was negatively impacted when it was abruptly ended due to licensee scheduling conflicts.

The team conveyed these issues to the licensee and noted that they were being reviewed for incorporation into an ongoing effort the licensee is undertaking to improve their CAP.

- The meeting lacked an expectation of formal communications when assigning ownership of problems, investigations, and corrective actions.
- To an observer, ownership of problems, investigation, and corrective actions were not evident.
- The group facilitator has the potential to affect the rigor with which PIRCS entries are evaluated during the meeting. Some facilitators negatively impacted the rigor of evaluations.

- Some items used during the PRG meeting, such as investigation assignment guidelines and risk definition tables, were not proceduralized.
- The effectiveness of the meeting was negatively impacted multiple times when it was abruptly ended due to licensee scheduling conflicts.

13. Revise and implement the procedure that requires processes, process parameters and process inputs be clearly defined prior to implementation. This program is designed to prevent changes such as a change in the composition and physical characteristics of the feed material that may result in abnormal occurrences during processing.

Team noted the primary changes were to set safety and regulatory compliance as a priority ahead of quality and cost, and to clarify the documentation upon which the changes are evaluated. These changes are labeled as “Commitments,” to prevent changes in subsequent revisions. This corrective action was approved by the CARB on March 3, 2010, **but concurrence on the procedure and its final implementation had not yet been completed prior to the end of the inspection.**

Team also reviewed the commitment the licensee has made to review all new business opportunities or potential changes to existing HEU contracts through NFS-TS-009. Finally, the team noted the **final approval and release of each new or changed material will be from the President of NFS.**

The engineers and operators voiced concern regarding the volume of reviews and approvals for minor procedural changes and work requests.

14. Conduct an independent review of NFS’ investigation processes. This review will be conducted by a subject matter expert (SME) to establish a plan to implement enhancements necessary to ensure adequate breadth and depth of investigations.

Team noted that the licensee has a current contract with Certrec Corp. for ongoing CAP (Corrective Action Program) support as this program, which includes investigations, is improved. Team identified following items:

- The licensee’s procedures did not contain training requirements for personnel who would normally conduct ACEs (Apparent Consequence Evaluations).
- The licensee’s procedures did not contain any specific guidance or requirements for the conduct of ACEs.
- The licensee’s SOW (Statement of Work) with the Certrec Corp. did not contain specific language requesting a review or assistance with enhancing the licensee’s ACE process. It appeared to be understood by both parties that this was indeed part of the Certrec Corp. effort.

15. Revise the procedure that provides guidance for preparation of set-point analysis documentation to enhance the basis of evaluation, specifically to provide guidelines for justifying the basis for critical parameters.

Licensee has committed to **“evaluate the ISA program”**, including benchmarking against similar programs associated with other facilities by Dec. 31, 2010, and implement any necessary enhancements. These actions will be entered and tracked in the Corrective Action Program.

MANAGEMENT ISSUES

1. Management Oversight of Facility Process Changes

Based on that review, it was determined that, **except for the weakness in properly incorporating the more restrictive definition of an urgent facility change**, the licensee had effectively institutionalized the enhancements from the interim guidance.

A change that is determined to have an impact of the safety and regulatory basis must be approved in writing by the Vice President of Operations, Director of Safety and Regulatory, Director of Fuel and Operation, and Director of Applied Technology, prior to commissioning the change.

A minor weakness was identified regarding the clarity of the criteria in NFS-CM-004 for initiating the enhanced technical basis reviews associated with the conduct of NFS-TS-009.

- Some concerns were expressed over the clarity of the guidance regarding when enhanced technical basis reviews associated with NFS-TS-009 were necessary.
- Some concerns were expressed over the excessive amount of time needed to prepare ECRs which meet the expectations for COB reviews; however each indicated that management had reinforced the need for quality and safety over production impact.
- Some concerns were expressed that the corrective action program was being inundated with low threshold issues that were taking their time away from more significant priorities.

2. Perceived Production Pressures

Production pressure, or the prioritization of production over safety, was cited as an NRC concern in the NFS CAL of January 7, 2010. In order to evaluate the licensee’s response to this concern, the team conducted interviews with plant personnel and reviewed documented actions by the licensee.

Eight interviews specifically addressing production pressure were conducted with site personnel, including upper level management, process engineering, first-line supervisors, and hourly operators. Selected personnel were from across all three production lines (Navy Fuel, BPF, and CDL).

Thirteen (13) separate actions were documented by the licensee to address perceived production pressure.

Many of the interviews confirmed that production pressures were present among the staff and within the upper management prior to the BCS event. However, management's current expectation that safety is the top priority was well documented in a number of separate communication efforts, including large group presentations, small group discussions, and the conduct of Operations standard.

One widely held concern was that these communications took place during the shutdown period, and that during operations the philosophy might revert back to a production over safety mentality.

The licensee completed an organizational realignment such that responsibilities for Operations and Project Management are separated. The staff perceives the separation of these two competing interests as an important barrier to preventing production pressures. Prior to the separation, the Operations division was tasked with both operating the facility safely, and fulfilling contractual obligations, which were closely tied to financial goals. With the creation of the Project Management division, fulfillment of contractual obligations is no longer an Operations division responsibility and production over safety questions, raised by Operations, would presumably move up to the President. The separation of the operations and project management functions is viewed as a positive step in reducing production pressure.

3. Evaluate NFS' actions and progress toward fostering a questioning attitude by workers and management

The team interviewed seventeen NFS employees to evaluate the effectiveness of the licensee's efforts to cultivate a questioning attitude in their employees. The team selected five hourly workers, three engineers, four first line supervisors and five senior managers. Within each group, the team ensured a diverse range of experience by selecting employees with little or no NFS work experience to those employees who exceeded thirty years of NFS work experience. The selection was primarily concentrated on staff from the Navy Fuel line.

The team also interviewed staff working on all three shifts. In addition, the team reviewed the materials presented at both the All Hands meeting as well as the small group meetings. The team reviewed a select group of revised procedures to

verify the promotion of questioning attitude before proceeding when uncertain about a process or procedure.

The majority of staff interviewed felt they had always had the ability to raise questions but there may have been more production pressure in the past. The team noted that, while there is a current emphasis placed on lowering the threshold for uncertainty and encouraging a questioning attitude, **many interviewed were unsure if it would continue at the same level once operational and shared that concern with the team.**

The team noted that this emphasis is an ongoing process and that cultivation of a questioning attitude may take a while to permeate the organization.

4. Communications

The team also observed the licensee's communication processes in several situations, including a variety of meeting types as well as verbal and written exchanges between licensee managers, supervisors, hourly employees, and contract personnel.

The team determined that NFS-SO-09-006 addressed certain aspects of communication within the licensee's organization. **It did not, however, provide specific guidance regarding management expectations for the different methods of communications used within the licensee's organization.**

The team noted that most employees interviewed conveyed a strong sense of optimism that the licensee's organization was on the right path, however, **they were skeptical of whether the changes will persist over the long term. The team noted that this is an ongoing process that will need to be monitored.**

READINESS TO RESTART NAVY FUEL

To evaluate whether the issues identified by the NRC in late 2009, which led to the issuance of the Confirmatory Action Letter, have been sufficiently addressed, the staff further evaluated the Navy Fuel line in the areas of procedures, maintenance, corrective actions and investigations.

2. Maintenance

The team found that a formally structured evaluation that included specific criterion for review of all outstanding work and the associated rationale for deciding which items were to be completed **had not been conducted** at the time of the inspection.

The licensee's informal lists of items considered by engineering, operations, and management necessary to be completed were not consolidated into any one

database or list, nor designated by work request identification numbers versus by general topic areas. In addition, since the restart had been delayed, further work related items were being added; however, tracking of these additional items were not in all cases updated on the recovery plan lists, nor were the additional work request packages located on the operating floor marked as “Restart” as previous work packages had been.

The team independently reviewed in detail the status of 12 of the 26 open Major work requests, 17 of the 46 open Minor 2 work requests, and 16 of the 94 open Minor 1 work requests associated with the Navy Fuel line. Based on this review, the team found that most Major and Minor 2 work requests were adequately identified for restart; **although the licensee’s decision-making process was poorly documented** as mentioned previously.

However, the team found that the licensee had focused little effort in evaluating open Minor 1 work requests, especially those that were initiated prior to NFS shutdown of the Navy Fuel line in late 2009. As a result, the team identified several Minor 1 work requests that either **should have been identified as restart items but were not**, or needed additional licensee review to confirm whether they were acceptable for post-restart completion. **The most notable item identified by the team included the calibration of important plant equipment associated with work request number M141767.** This work request was not identified by the licensee’s screening as necessary for restart when it should have been.

The team discussed the implementation status of outstanding Navy Fuel line modifications with managers in the process engineering department and conducted field walk downs of the operating area where the modifications were being implemented. **The team was told that most modifications had been completed to the point where post-modification testing was the next stage in the process.**

However, from a review of the work request packages that were posted at the job locations, the team noted that **none of the modifications selected had been inspected by the process engineers responsible for the modifications.** This inspection ensures that the field modification work was performed in accordance with the work requests and to identify any rework that might be necessary due to work installation errors or problems. This phase of the modification process has to be completed before any post-modification testing can be conducted. **The team noted that many of the modifications had been waiting for these engineering inspections between one and two weeks.**

4. Investigations

The licensee had an event on February 19, 2010, which caused an inadvertent criticality alarm and evacuation (PIRCS #P23389). (Note: No Event Report can be found on this event).

07/29/2010 NRC Inspection Report No. 70-143/2010-002, April 1, 2010 to June 30, 2010, and Notice of Violation, Severity Level IV, (ML102220146)

Opened:

70-143/2010-002-02 VIO Failure to establish an inspection program for sprinkler systems designated as IROFS

Prior to May 28, 2010, the licensee failed to establish a safety program that would ensure that an engineered IROFS would be available and reliable to perform its intended function when needed, to comply with the performance requirements. Specifically, the licensee's inspection, testing, and maintenance program did not have requirements for inspecting the wet-pipe sprinkler systems designated as IROFS as required by NFPA 25. The affected IROFS included FIRE-9, FIRE-10, FIRE-12, FIRE-15 and FIRE-32. The inspectors determined that due to the lack of inspection the licensee did not identify that the sprinklers designated as IROFS were in a degraded condition. The degraded condition consisted of the following: 1) inadequate sprinkler coverage per fire area, 2) inadequate distance between sprinklers, 3) inadequate distance between sprinkler heads and the adjacent wall, and 4) excessive area of protection per sprinkler.

70-143/2010-002-03 URI Evaluation of combustible loading of Tube Cleaning Room due to tar roof and resulting consequence evaluation

The inspectors noted that one open Fire Hazard Analysis (FHA) recommended removing a highly-combustible tar mezzanine roof cover in the tub cleaning room (TCR). The inspectors noted that the licensee determined **that a fire in the TCR could result in a chemical intermediate consequence event to the public.** The licensee credited control of combustibles, IROFS FIRE-2, as a sole IROFS for this accident sequence.

70-143/2010-002-04 URI Evaluation of analysis supporting "unlikely" probability of fire in solvent extraction area.

The inspectors identified a fire accident sequence in the BPF SX system that could result in an intermediate consequence event as defined in 10 CFR 70.61. The licensee credited the ignition characteristics (flash point) of the solvent as an enabling event to reduce the likelihood of solvent ignition. The licensee based this likelihood on a solvent ignition sensitivity test performed on April 4, 2002. However, the licensee did not have a documented test plan that described the conditions under which the test was performed, or whether the

ignition sources used were representative of all potential ignition sources that could be present in the solvent extraction process area. The inspectors determined that an enabling event frequency of -2 was not appropriate because the licensee did not have the technical basis to support the assigned enabling event frequency.

Opened & Closed:

70-143/2010-002-01 NCV Failure to Comply with Criticality Safety Procedures.

On May 26, an NFS engineer noted that contaminated trash item used to clean up Area 200 was placed in a large volume waste bag. This is contrary to procedure NFS NFSHS-CL-10, "Nuclear Criticality Safety – Fuel Manufacturing Facility," Rev. 24. This procedure requires that trash essentially be stored in 2 liter bottles to ensure a favorable geometry. The trash item was accidentally rolled into the workers glove and then placed in an unfavorable geometry waste bag. The glove was ultimately retrieved and disposed of in accordance with NFS-HS-CL-10. NFS entered the issue into the corrective action program (CAP) as Problem Identification, Resolution and Correction System (PIRCS) item #24817. Failure to follow criticality safety procedures is a violation of NRC requirements. This non-repetitive, licensee-identified and corrected violation is being treated as a non-cited violation (NCV), consistent with Section VI.A.8 of the NRC Enforcement Policy

Closed:

70-143/2007-004-02 IFI Incorrectly Designed Check Valve for Application.

This IFI was opened due to an apparent lack of an adequate evaluation associated with the discovery of an installed check valve in Building 302 that did not meet the specified design requirements. Specifically, the installed check valve had a cracking pressure lower than specified in the design documents. The valve was replaced with the correct valve under Work Request #115193.

70-143/2008-002-01 VIO Failure To Perform Plant Modifications In Accordance With 10CFR70.72.

The licensee failed to document the technical basis for three plant modifications. The inspectors noted a general lack of rigor and in some cases a total lack of a written technical basis for plant modifications.

70-143/2009-003-02 URI Analysis of Fire in Building 105

Licensee committed to bring the Building 105 sprinkler system into compliance with NFPA 13 (2010 edition). The licensee stated that the sprinkler upgrade project would be completed on December 2010.

70-143/2009-003-03 URI Implementation of Recommendations of Fire Hazard Analysis. (Paragraph 5.c) (see above)

09/02/2010 Notice of Violation, Exercise of Enforcement Discretion, and **Proposed Imposition of Civil Penalty - \$140,000** (NRC Inspection Report 70-143/2010-10), (**ML102450223**).

Potential for a high occupational consequence when processing this material required the presence of additional items relied on for safety. Five violations of NRC requirements occurred. Potential safety significance to the workers was high due to the possibility of an acute chemical exposure to NOx gas released inside the facility. **NFS' previous enforcement history in these areas, and other escalated enforcement in the past several years is especially poor and well documented.**

Violations Assessed a Civil Penalty:

On October 13, 2009, the licensee failed to apply engineered controls, administrative controls, or both, to the extent needed to reduce the likelihood of occurrence of the event so that, upon implementation of such controls, the event is highly unlikely or its consequences are less severe. Specifically, the licensee failed to implement sufficient items relied on for safety to prevent or mitigate the production of nitrogen compound gas generation, which could have led to a high consequence event.

Prior to October 13, 2009, the licensee failed to follow Procedure NFS-CM-004, when assigning Enterprise Change Requests (ECRs) 20092008 and 20091919 as urgent. Specifically, these ECRs were assigned as urgent, but did not address failures which were adversely impacting personnel safety or significantly impacting operations. Instead, the ECRs involved the implementation of a method to process fines material.

Prior to October 13, 2009, the licensee failed to follow Procedure NFS-CM-005. Specifically, CCB's review of ECRs 20092008 and 20091919 authorized the processing of fines directly in the bowl cleaning station. CCB's review failed to identify, however, that the design requirements and design basis were affected by the direct addition of fines into the bowl cleaning station without first processing the material in the uranium-aluminum dissolvers.

Prior to October 13, 2009, the licensee failed to follow Procedure NFS-GH-901, involving the technical reviews as documented in ECRs 20092008 and 20091919. Specifically, the licensee failed to identify that processing uranium aluminum fines directly in the bowl cleaning station, without processing the material through the caustic dissolution and centrifuge steps, was not analyzed in the integrated safety analysis as a part of the uranium-aluminum design basis.

Prior to October 13, 2009, the licensee failed to maintain records of written evaluations that provided the bases for the determination that a change to its facility did not require prior NRC approval. Specifically, the inspectors determined that an inadequate 10 CFR 70.72 review was conducted based on reviews of the Safety and Regulatory Review Routing Forms used for the change requests that led to the October 13, 2009 event.

This is a Severity Level III Problem; Civil Penalty - \$ 140,000

Violations Not Assessed a Civil Penalty:

Prior to December 11, 2009, NFS failed to maintain process safety information that would have provided reasonable assurance that a chemical addition item relied on for safety (BUA-43) could perform its intended design function as described in the integrated safety analysis.

This is a Severity Level IV Violation

Prior to December 11, 2009, NFS failed to identify engineered or administrative controls as items relied on for safety for several accident scenarios involving excessive nitrogen compound gas generation in the fuel manufacturing, uranium-metal/oxide, uranium-aluminum, and commercial development lines in order to meet the performance requirements of 10 CFR 70.61(b).

This is a Severity Level IV violation

End of Violations

Added:

Nine (9) Known Environmental Releases Which Triggered Outside Notification

8/29/1997, Ground Water leak during transfer to Waste Water Treatment Facility (WWTF). Notified TDEC and NRC

9/4/1998, Sewer discharge to Town of Erwin Publicly Owned Treatment Works (POTW) exceeded Gross Beta limits of 300 pCi/l. Notified Erwin Utilities and NRC

5/12/1999, Sewer discharge to Town of Erwin Publicly Owned Treatment Works (POTW) exceeded 25pCi/l for U238. Notified Erwin Utilities and NRC

8/3/2000, The May 2000 monthly isotopic composite sample result for Waste Water Treatment Facility (WWTF) discharges was elevated. Notified NRC

8/8/2000, Groundwater infiltration caused an overflow of lab waste water pit. Notified TDEC and NRC

11/19/2000, A defect in the floor trench of the Waste Water Treatment Facility (WWTF) was identified during an inspection. Notified TDEC.

9/22/2003, The Waste Water Treatment Facility (WWTF) discharged a batch with elevated nitrite plus nitrate attributes. Notified TDEC.

2/05 & 3/05, Sewer discharge to the Erwin Publicly Owned Treatment Works (EPOTW) exceeded the Technical Review Criteria and the monthly Average permit limit for U-238 in March 05.

Source: 2009 NFS Environmental Report , Table 2, Page 2-17, (ADAMS #ML91900072)

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