

NFS Violation History
1974-Present
for the
Safety Evaluation Report
regarding the
40-yr License Renewal Request

Submitted by

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Nuclear Fuel Services, Inc (NFS)
Erwin, Tennessee
(Known) Violations 1974-2010
(as of October 2010; research continues)

1974 (AEC)

10/04/74 Order to Show Cause why activities in MBA 6 should not be suspended pending resolution of the large quantity of **material unaccounted for** (MUF.) Hearing Before the Subcommittee on Energy Conservation and Power, p.72, 9/18/86

1977 (AEC)

4/12/77 **Failure** to properly implement the security program, Civil Penalty - \$53,000
Hearing Before the Subcommittee on Energy Conservation and Power, p.72, 9/18/86

1979 (NRC)

1979 In 1979, the plant was unable to account for a reported 48 pounds of highly enriched uranium. The NRC allowed NFS to resume operations **after citing the plant's importance to the Navy**, but the Commission concluded that it could not definitely rule out theft of the missing material. Hearing Before the Subcommittee on Energy Conservation and Power, p.17, 9/18/86

1980

02/25/80 Enforcement Conference to discuss the inadvertent shipment of cylinders containing UF₆. Hearing Before the Subcommittee on Energy Conservation and Power, p. 73, 9/18/86

1981

04/10/81 Management meeting to discuss the analysis and evaluation of an apparent internal exposure to a quantity of material in **excess of regulatory limits**.
Hearing Before the Subcommittee on Energy Conservation and Power, p.72, 9/18/86

1982

- 02/82 – 02/85 **Six (6) violations** issued for inadequate controls for worker intakes and inadequate systems for monitoring intakes. Investigations of unusual exposures have been, at times, superficial or not performed at all. NFS has show reluctance to expend effort to improve worker intake control measures. **Part of the problem can be attributed to inadequate control of operations and maintenance, the age of the facility, and lack of engineering control features.** Hearing Before the Subcommittee on Energy Conservation and Power, p.11, 9/18/86
- 02/08/82 Notice of Violation for **overexposure** of an individual to a quantity of material in **excess** of 10 CFR **limits**. **Severity Level III**—No civil penalty. Hearing Before the Subcommittee on Energy Conservation and Power, p.72, 9/18/86
- 06/17/82 Enforcement Conference to discuss inadvertent shipment of low enriched uranium (Hereafter LEU) to another licensee. Hearing Before the Subcommittee on Energy Conservation and Power, p.72, 9/18/86
- 08/09/82 Notice of Violation for inadvertent shipment of radioactive material – **Severity Level III**, civil penalty \$2,500. Hearing Before the Subcommittee on Energy Conservation and Power, p.72, 9/18/86

1983

- 07/20/83 Enforcement Conference to discuss licensee corrective actions regarding shipment of (low specific activity) LSA to waste burial site in 55-gallon drums in which two drums were punctured by contained metal objects.
- 08/17/83 Notice of Violation for shipment of Low specific activity (LSA) waste in which two 55-gallon drums were **punctured** by contained metal objects. **Severity Level III**, no civil penalty. State of South Carolina imposed \$1,000 civil penalty. Hearing Before the Subcommittee on Energy Conservation and Power, p.72, 9/18/86
- 09/08/83 Enforcement Conference to discuss **repetitive violations regarding failure to follow procedures apparently caused by inadequate management controls**. Hearing Before the Subcommittee on Energy Conservation and Power, p.72, 9/18/86

1984

- 1984 Between January-March 1984, **nine (9) examples of failure to follow operating procedures or posted nuclear safety limits** were identified. A **Confirmatory Action Letter (CAL) dated 2/9/84 was issued**. These examples were collectively treated as a **Severity Level III** violation. Because of the numerous examples cited, and the fact that NFS had prior warning of the problem through their internal audit program, the civil penalty was increased by 50%, to a total of \$18,750. NFS paid the penalty without protest. Hearing Before the Subcommittee on Energy Conservation and Power, p.32, 9/18/86 Three Months! (License Violation?)
- Corrective Actions taken by NFS, documented in the Feb. 9, 1984 CAL, included: Revision of procedures; additional training of workers, increased frequency of **nuclear safety audits** (each shift), management evaluation of audit findings, and feedback to training and procedure reviews.
- 02/16/84 **Enforcement Conference to discuss probable cause of the recurrent nuclear criticality safety violations.**
- 05/09/84 NRC fined NFS \$18,750 for **multiple violations of nuclear criticality safety control measures during the handling of special nuclear material** (Hereafter SNM). Hearing Before the Subcommittee on Energy and Power, p.17 & p.72, 9/18/86
- 06/13/84 Enforcement Conference to discuss the resolution of **Material Access Area barrier degradation.**
- 07/27/84 Notice of Violation for **failure to establish an adequate physical protection system** in allowing degraded Material Access Area barriers. **Severity Level II** - \$100,000 proposed, but later mitigated to \$50,000 after review of corrective actions taken. Hearing Before the Subcommittee on Energy and Power, p.73, 9/18/86
- 10/29/84 Enforcement Conference to discuss NRC concerns regarding a **buildup of uranium-235 in the ventilation systems** and licensee's remedial action program. Hearing Before the Subcommittee on Energy and Power, p.73, 9/18/86
- In October 1984 it was determined that during the period of **July-September 1984, accumulation of uranium bearing solids greater than action limits** were found in the HEU Scrap Recovery Building **ventilation system tanks**. Consequently, **materials accumulated in the ventilation system, which exceeded the criticality safety action limits.** Hearing Before the Subcommittee on Energy and Power, p.32, 9/18/86 (License Violation?)

Because both nuclear safety and safeguards conditions were degraded for a **significant period of time**, this violation was judged to be a **Severity Level II**, and a proposed \$20,000 civil Penalty and an Order Modifying License were issued. The Order redefined what was to be accomplished in an “investigation” and broadened the responsibility of the Internally Authorized Change (IAC) Council to include oversight similar to that of a Plant Safety Review Board.

In response to the NRC, NFS: denied the violation, i.e. that an investigation was not performed; protested the imposition of civil penalty, and proposed modifications to the Order Modifying License.

12/04/84 Enforcement Conference to discuss **airborne exposure and health physics**
& 12/19/84 **radiation protection & problems.** Hearing Before the Subcommittee on Energy
and Power, p.73, 9/18/86

1985

02/01/85 Enforcement Conference to discuss **airborne exposure and health physics radiation protection & problems.** Hearing Before the Subcommittee on Energy and Power, p.73, 9/18/86

02/21/85 Order Modifying License and Notice of Violation - **Severity Level II** regarding build-up of uranium-235 in **ventilation systems**. Civil Penalty \$20,000 proposed but reduced to \$15,000 on basis of licensee's extensive corrective actions. Hearing Before the Subcommittee on Energy and Power, p.73, 9/18/86 **"This action was based on a violation involving the accumulation of uranium-bearing solids in process equipment above specified limits, where the licensee failed to make appropriate investigations and take appropriate corrective action"**. Office of Inspection and Enforcement, Notification of Significant Enforcement Action, EN-85-014A, 11/27/85 (See 10/29/84)

05/01/85 Notice of Violation for **failure to establish, maintain, and follow health and safety procedures and to make the necessary surveys to comply with 10 CFR 20 regulations**. **Severity Level III – Civil Penalty \$18,500**

11/85 NFS fined \$15,000 for the accumulation in a ventilation duct of enough uranium for a theoretical **critical mass**. (Fortunately, the uranium was sufficiently spread out that a critical **chain reaction** did not occur.) Hearing Before the Subcommittee on Energy and Power, p.17, 9/18/86 (See 10/29/84 and 2/21/85)

1986

01/07/86 Enforcement Conference to discuss **failure of security guard to detect weapon**
& 01/21/86 **in truck which entered the plant.**

- 03/26/86 Enforcement Conference to discuss details and related activities pertaining to a **waste drum sent to burial site with small holes in side of drum near the top.** Hearing Before the Subcommittee on Energy and Power, p.73, 9/18/86
- 06/05/86 Pond Project Decommissioning - NFS. NFS was given the option of either an "Agreed Order" or an "Issued Order". The NRC had given NFS permission to leave the ponds in place until the "End of Plant Life" -- stated to be 40 to 50 years from now. Letter from TN Dept. of Health and Environment, Office Correspondence, Subject: Pond Decommissioning at NFS, 6/05/86 to Dr. Michael Bruner (Note: NFS applied for a 40 year license extension on June 30, 2009; see ML091900063)
- 06/17/86 **Failure** to notify NRC of the introduction of an unauthorized firearm in the prescribed manner; **failure** to prepare procedures which were sufficiently detailed to implement the required level of search; and **failure** to fully implement self-imposed corrective actions. Hearing Before the Subcommittee on Energy and Power, p.73, 9/18/86

1990

- 11/28/90 **Proposed Civil Penalty of \$10,000.** Failure to provide a siphon break or other means of preventing the **transfer** of HEU solution to an unsafe geometry tank and **exceeding the station procedural concentration limits for uranium in two tanks on 11/28/90.** The violation was aggregated as a **Severity Level II** problem because sufficient material was available and there was an existing pathway which, in combination, could have resulted in a **criticality.** Office of Enforcement, Notification of Significant Enforcement Action, EN 91-019, EAs 90-124 and 94-004, March 15, 1991 (License Violation?)

1991

- 1991-2000 Between November 1991 and December 2000, NFS reported **10 Criticality Safety Events.** Criticality Safety Event Reporting Experience at NRC Regulated Fuel Cycle Facilities, 3/29/01, p.3, ML010880027
- 01/10/91 NRC Inspection Report 70-143/90-29, Dec. 10-14, 1991

70-143/90-29-01 IFI Revise calibration procedure to include lapel sampler flow calibration

Inspector observed the semi-annual flow calibration of a lapel sampler. Calibration data was recorded by the technician on a data sheet, however, **no procedure was used to perform the calibration. Further investigation by the inspector revealed that procedure did not exist.** By the end of the inspection, licensee indicated that Procedure NFS-HS-AO5 "Calibration of Radiation Monitoring Instruments", would be revised to include lapel sampler calibrations

by March 31, 1991.

70-143/90-29-02 IFI Implementation of QA plan for radwaste shipment preparation process

Shipment of Plutonium Contaminated Wastes (86750)

Inspectors reviewed the following procedures, which were applicable to the decommissioning project. These procedures provided guidance for properly classifying, marking, labeling and inspecting packages of waste generated from the plutonium decommissioning activities and for producing an accurate manifest of radioactive materials contained in each shipment.

Licensee indicated that a shipment of waste was scheduled for the week following this inspection and that it was to consist of fifty 71-gallon square steel drums and four B25 boxes. Licensee indicated that detailed checks had been performed on the shipment preparation process, but **no formal quality assurance (QA) plan had been developed for the process**. Licensee indicated that a QA plan would be developed and implemented by Jan. 31, 1991.

70-143/90-29-03 IFI Implementation of procedure for gaseous effluent analytical result evaluation

Inspectors determined that for the period reviewed, the gaseous effluents had been sampled and analyzed at the required frequencies. Licensee indicated that whenever the measured activities were higher than typical levels, a process engineer was notified and the process engineer was responsible for determining whether an assignable cause could be identified.

It was noted that the licensee's analytical results for the daily samples were recorded in units of disintegrations per minute (dpm) whereas the decommission plan specify the licensed limits and actions limits in units of microcuries per milliliter (uCi/ml).

Licensee indicated that an implementing procedure would be established to formalize the process of evaluating analytical results and making the required notifications whenever licensed or action limits are exceeded. This new procedure would be implemented by March 31, 1991

Other:

Town of Erwin Publicly Owned Treatment Works (POTW) (88045)

Inspector discussed the status of the old digester at the POTW with licensee representatives and toured the POTW facility accompanied by a licensee representative and the POTW supervisor.

The POTW facility was equipped with two digesters which were used to process sanitary sewage by bacterial action. The new digester used a heated process for digesting the sludge while the old digester used an unheated or cold process. Construction of the new digester was completed in December 1988. Once the new digester began to be used, the old digester was used intermittently as a holding tank to store processed sludge from the new digester prior to transfer of the sludge to the drying beds. **After drying, the sludge was currently being taken to a private farm to be spread in pasture land as fertilizer. Previously, the sludge had been used onsite at the POTW for backfill during construction activities.**

The licensee and the State of Tennessee had been splitting samples of the processed fluid sludge on a monthly basis and analyzing the samples for uranium. The collection point for the sludge was the transfer pipe to the drying beds. The inspector reviewed monthly licensee data for the sludge from 1987 to May 1990. Uranium-234 values ranged from 10 pCi/gram dry to 550 pCi/gm dry with most values between 100 pCi/gm dry to 300 pCi/gm dry.

In all cases, Uranium-234 concentrations were higher for samples collected from the old digester. Inspector reviewed graphed data for the average uranium-234 concentrations for the years 1986 to 1989.

Calendar Year	Average U-234 concentration (pCi/gm dry)
1986	550
1987	220
1988	140
1989	80

Discussions with the POTW supervisor indicated that NFS was the sole source of the elevated uranium concentrations in the sludge.

Inspector reviewed average annual gross alpha data for the NFS municipal sewer based on volume weighted averages:

Calendar Year	Municipal Sewer Average Gross Alpha Concentrations (pCi/l)
1981	3710
1982	6350
1983	2950
1984	763
1985	733
1986	831
1987	748
1988	224
1989	254

Discussions with the licensee indicated that the **major change in sewer effluents occurred in 1987 when the liquid discharges from the onsite laundry and the Building 105 laboratory were routed to NFS's wastewater treatment facility rather than being discharged directly to the sewer.** The current inputs to the municipal sewer were toilet, sink, and shower discharges from buildings: 100, 105, 220, 234, 320, 345 and 350. Building 220 also contained a laboratory sink, which discharged to the sewer. **Storm water run-off for the NFS site entered a series of drainage ditches that flowed to the Banner Spring Branch, which was not part of the sewer system.**

As reported in previous inspections reports (70/143/88-31, 70-143/89-07) POTW personnel planned to clean the old digester at some point and remove all of the accumulated sludge. On Aug. 6, 1990, licensee and State of Tennessee visited the POTW and collected split samples from two locations in the top sludge layer in the old digester. This layer was less dense than the fluid sludge and was estimated to be five to six feet thick. The samples were analyzed by the licensee's vendor for radioisotopes as follows:

		pCi/gm dry	wet/dry (gm)
Sample #1	Uranium-234	1310	399/76
	Uranium-235	28.8	
	Uranium-238	24.8	
Sample #2	Uranium-234	1350	370/70
	Uranium-235	29.3	
	Uranium-238	18.9	

Based on these values, licensee calculated the percent enrichment to be 15.3 percent and 19.4 percent. The total uranium-234 activity in the top sludge layer was calculated by inspectors to be 0.068 curies assuming the sludge layer was six feet thick and the sludge density was 1.0 gm/ml and using the tank diameter of 45 feet and average isotopic values.

The POTW supervisor informed the inspector that the fluid sludge was below the top sludge layer and that a layer of heavy silt and deposits had accumulated in the bottom of the tank. **Supervisor also indicated that there was no way to measure the thickness of the bottom sediment layer, which could contain sufficient uranium residue to require disposal as a radioactive waste.**

In examining the old digester, inspector noted that the tank was not full and that the top of the sludge appeared to be approximately six feet below the top of the tank. The POTW supervisor informed the inspector that the overall height of the tank was 21 feet so that the fluid sludge and **sediment would be approximately nine feet high in the tank.** The POTW supervisor also informed the inspector that

the last transfer from the old digester to the drying beds occurred October 17, 1990.

03/20/91 **Notice of Violation (NOV) and Proposed Imposition of Civil Penalty in the amount of 10,000 issued to NFS.** This action is based on a **Severity Level II** problem associated with **two violations**. The **first violation** involved the failure to evaluate a piping system for the siphoning or overflow of fissile solutions into an unsafe (nonfavorable) geometry tank and the failure to provide a means of preventing transfer of highly concentrated solution to a nonfavorable geometry containment. The **second violation** involved the failure to adhere to procedural limits for uranium contained in a waste-receiving tank. A **Severity Level III violation** not associated with a civil penalty was issued for **multiple examples of failure to follow operating procedures**. (EA-90-124; EA-91-004). NRC: Escalated Enforcement Actions Issued to Material Licensees, <http://www.nrc.gov/reading-rm/doc-collections/enforcements/actions/>.

03/20/91 **Failure** to evaluate a piping system for the siphoning or overflow of fissile solutions into an unsafe geometry tank and the **failure** to provide a means of preventing transfer of a highly concentrated solution to a non-favorable geometry containment. **Failure** to adhere to procedural **limits** for uranium contained in a waste receiving tank. A **Severity Level III** violation was issued for multiple examples of failure to follow operating procedures. A proposed Imposition of Civil Penalty in the amount of \$10,000 was issued to NFS based on a Severity Level II problem associated with the two violations described above. EA-90-124; EA-91-004, Notice of Violation and Civil Penalty, Severity Level II, NRC: Escalated Enforcement Actions Issued to Materials Licensees, 3/20/91

1992

01/29/92 **Notice of Violation (NOV) was issued to NFS.** This action is based on a **Severity Level III** violation, which involved the inadvertent transfer of an unauthorized amount of license material from a safe geometry vessel to an unsafe geometry vessel without the required verification. (EA-91-186). NRC: Escalated Enforcement Actions Issued to Materials Licensees <http://www.nrc.gov/reading-rm/doc-collections/enforcement/actions/>.

1993

01/19/93 **Notice of Violation (NOV) and Proposed Imposition of Civil Penalties in the amount of \$37,500 was issued to NFS.** This action is based on (1) a Severity Level II violation associated with a proposed civil penalty in the amount of \$25,000 involving the **failure to adhere to procedures for controlling fuel manufacturing waste activities which resulted in an explosion and fire in the HEU Recovery Facility**, and (2) a Severity Level III violation associated with a proposed civil penalty in the amount of \$12,500 involving **the inadvertent**

transfer of a solution from a favorable geometry vessel to an unfavorable geometry tank. In addition to these violations assessed civil penalties, **four (4)** Severity Level IV violations were issued involving failure to follow regulatory requirements. NOV and Civil Penalty, (**SL II and SL III**), \$37,500, (EA-92-231), NRC: Escalated Enforcement Actions Issued to Materials Licensees, <http://www.nrc.gov/reading-rm/doc-collections/enforcement/actions/>

1995

07/25/95 NRC Inspection Report 70-143/95-04 and Notice of Violation, June 26-30, 1995, **Severity Level IV**

70-143/94-04-01 VIO Failure to provide annual refresher training to members of the Emergency Response Organization (ERO) on specific roles and responsibilities, as required by Section 7.7.1 of the Radiological Contingency Plan (RCP)

08/28/95 NRC Inspection Report 70-143/95-05 and Notice of Violations, **Two (2) Severity Level IV (cited) and two non-cited violations**, July 24-28, 1995.

Open:

70-143/95-05-01 IFI Review completed Tri-Annual Audit Report

70-143/95-05-02 VIO Failure to follow procedure NFS-HS-01 Contamination Control resulting in numerous examples of eating, chewing and smoking in controlled areas.

During tours of the facility controlled areas on July 23, 1995 and July 25, 1995, numerous examples and quantities of breath mints, used and unused smoking materials, non-prescription drugs, throat lozenges, candy and candy wrappers, gum and gum wrappers, used and unused eating implements, were found in Building 302/303 and in the men's change facility, the women's change facility and the office support facility for those buildings.

Note: This violation has been previously cited in Inspection Report 92-98, dated Nov. 19, 1992 and a repeat violation citation in Inspection Report 93-03 dated March 19, 1993. Your long-term corrective actions for this violation should take into consideration why previous corrective actions have not precluded recurrence.

70-143/95-05-05 VIO Failure to provide the required radiation protection training for contractors required by 10 CFR 19.12 and NFS-HS-GH-39.

70-143/95-05-03 NCV **Allowing contractor to work on contaminated
70-143/95-05-04 NCV equipment or in a controlled area with a RWP**

On July 18, 1995 and July 24, 1995, a non-license contractor performed maintenance work on a **contaminated dump truck in a controlled area without receiving the requisite required training.**

Closed:

70-143/95-02-01 VIO Failure to obtain multiple required urine samples specimens in accordance with procedure NFS-HS-A-06 Determining Bioassay Frequency

This violation was identified in Inspection Report 70-143/95-02 conducted February 13-17 and March 14-15, 1995.

70-143/95-02-02 VIO Failure to utilize properly lapel air samplers in accordance with procedure NFS-HS-GH-29 Proper Use and Handling of Lapel Air Samplers

This violation was identified in Inspection Report 70-143/95-02 conducted February 13-17 and March 14-15, 1995

70-143/95-05-03 NCV Failure to perform an adequate radiation contamination release survey required by procedure NFS-HS-GH-46

70-143/95-05-04 NCV Failure to prevent a contractor from working on contaminated equipment or in a controlled area without a RWP (Radiation Work Permit)

1996

04/02/96 NRC Inspection Report 70-143/96-05, April 3-11, 1996, **Incinerator Fire, Four (4) Severity Level IV Violations, Fine \$12,500. Site Area Emergency.** Fire in exhaust duct system connected to an incinerator and the ventilations ductwork for Bldg 300 complex. NFS estimates less than 100 grams of uranium may have been in the incinerator and ductwork involved in the fire.

Failure to implement and maintain an incinerator configuration control and management system

Failure to institute adequate procedures and multiple failures of the plant staff to follow procedures

Failure to identify the incinerator as safety-related, which led to failure to implement a preventative maintenance and surveillance program for components essential to safety

Failure to implement an adequate training program for personnel operating the incinerator equipment

05/21/96 NRC Inspection Report 70-143/96-05, Augmented Inspection Team (AIT), April . 3-11, 1996.

Inspection included a review of facts and circumstances that led to the fire in the ventilation ducting of the 300 Complex on April 2, 1996. The AIT concluded that insufficient cooling of the incinerator exhaust caused the fire. This resulted from less than adequate water flow to and in the pre-quench tank, **caused by operating the equipment in an altered configuration from the intended design.** The problem with water flow resulted from less than adequate: 1) procedures, 2) maintenance and surveillance of incinerator equipment, and 3) implementation of incinerator procedures. The AIT concluded that the onsite and offsite radiological impacts were minimal.

08/13/96 Region II in conjunction with the Office of Nuclear Material Safety and Safeguards confirmed actions to be taken by the Nuclear Fuel Services relative to determination of root causes of **recent criticality alarm system failures, system repair, and performance testing**, SECY 96-0183, Week ending August 16, 1996, **ML072540515**

08/21/96 EA 96-213 Nuclear Fuel Services, Erwin, TN. A notice of violation and Proposed Civil Penalty in the amount of \$12,500 was issued to NFS on August 21, 1996, for **numerous failures** involving **inadequate configuration control, inadequate procedures, and failure to follow procedures.** NRC Office of Enforcement Annual Report, Fiscal Year 1996, (**ML091390385**).

1998

02/06/98 Nuclear Fuel Services began processing high-enriched uranium aluminum alloy scrap on Feb. 2, 1998. This is the initial portion of the process to down blend this material to low enriched uranium, NRC NMSS Items of Interest, Week ending Feb. 6, 1998, **ML99292032**. NFS is planning to startup its downblending operation in March 1998, NRC NMSS Meeting, week ending Feb. 27, 1998, **ML042300530**

05/20/98 The Director, Office of Nuclear Material Safety and Safeguards (NMSS), and staff from the Division of Fuel Cycle Safety and Safeguards and telephonically Region II management, met with representatives of NFS to discuss the NFS

appeal of a recent **Severity Level IV** violation. The violation concerned the apparent **failure** to adhere to a procedural requirement to perform and document double contingency analysis for a process step in high-enriched uranium scrap recovery operation. An NRC decision concerning that violation is pending. NRC NMSS Items of Interest, Week Ending May 22, 1998, **ML992889958**.

07/17/98 NFS began downblending high enriched uranium to low enriched on July 16, 1998, NRC Region II Items of Interest, week ending July 17, 1998.

08/11/98 NRC Inspection Report 70-143/09-03, Repeat Violation. Having unfavorable geometry glove bags in the process area

09/15/98 NRC Inspection Report, January - September 1998

Surface water monthly composite samples collected in June 1998 showed elevated gross beta activity levels (factor of 10 or higher than normal) for Martin Creek and Banner Spring Branch downstream samples. The elevated beta activity was attributable by the licensee to be from **Technetium-99 (Tc-99) releases from processing activities in the 200 complex. Tc-99 was suspected to have entered the groundwater, which accounts for some of the Banner Spring Branch flow.**

Significantly elevated Tc-99 activity levels were observed in groundwater-monitoring well 38. The well 38 Tc-99 activity was significantly higher than previous monitoring periods (approx 12 Pci/l average) in last two months of 1997. Licensee said increase due to leaks from the 200 complex east dike area containing the blow-down tank and the High-enriched Particulate Air (HEPA) filter tank. Inspection told licensee that activity in well 38 should be closely monitored and appropriate correction action taken if well 38 concentrations continue to remain escalated.

Groundwater monitoring wells associated with the radiological burial ground (down-gradient wells (60, 6DB, and 95A) and maintenance shop (108A and 109A) **showed elevated gross alpha and beta activities which was consistent with previous reporting periods.** In addition, wells LO-2A and 97A (down-gradient wells from 6,000 gallon underground wastewater tanks) **contained elevated uranium concentrations as reported in previous monitoring periods.** The licensee indicated that this was due to existing contamination and not due to the tanks leaking.

Building 234 monitoring wells (234-2 and 234-3) exhibited elevated gross beta activity levels during the second quarter of 1998. The licensee stated that these elevated beta levels could be attributed to Tc-99 releases from the 200 Complex dikes.

Offsite environmental air samples at the perimeter sampling station at Banner Hill Road (No. 323) indicated an alpha activity level at approximately twice that observed at the background site. The licensee attributed this elevated activity to releases associated with processing activities at the 200 Complex.

10/19/98 NRC Inspection Report, Oct. 11, 1998- Nov. 21, 1998, Violation of NRC requirements. **Repeat Severity Level III Violation**

Criticality Safety Buildings 220/230/233, Section IX, Unfavorable Geometry Containers, Subsection E, requires that "unless otherwise authorized, plastic bags with a capacity greater than 4 liters which are in a process area must have the bottom corners cut out (i.e. $\frac{3}{4}$ " or larger cut) or else be tightly taped shut at all times (except when someone is physically placing authorized contents into the bag or removing such material from bag). Contrary to above, on Oct. 19, 1998, three bags of greater than four liters in volume (which were not otherwise authorized) were located in frames in the 220, 230 and 233 process areas without the bottom corners having been cut out as required to prevent the possibility of a buildup of liquid. The bags were not tightly taped shut or attended by an individual placing or removing authorized contents.

1999

06/99 NRC Inspection Report, 70-143/99-06, June 7-18, 1999, Summary of Integrated Inspection efforts that involved a special operational readiness review team inspection of the licensee's **proposed operation of a manufacturing process. Specifically, the NRC inspection team concentrated on the licensee's operational readiness in areas 300-500 and the proposed operation to process high-enriched uranium.** (This appears to be the pre-BLEU inspection).

Criticality Safety

A weakness was identified associated with the practice of using draft references to support the technical safety basis of a final evaluation.

A question was raised concerning whether the **seismic response** of some of the partitions supporting the storage racks were engineered to the seismic robustness of the remainder of the building.

South Rack Storage Area Operations. During the walkdown, the inspectors were concerned with the concrete block partition walls on which some of the racks were placed. These partitions were four feet apart and were constructed of solid eight inch thick concrete blocks extending 9.5 to 13.5 ft. high. No restraints to limit lateral motion of the partitions during minor earthquakes were noted.

Vault Bin Storage Area Analysis. The analysis included an interaction analysis of both the South Rack Storage area and the Vault Bin Storage area. The interaction analysis was also performed using "Oak Ridge" concrete, which is assumed to contain 0.62 wt percent hydrogen. This concrete was more conservative than the actual NFS concrete.

Fire Safety

The inspectors determined that the level of fire protection was not adequate. The level of protection was contrary to accepted industry standards and NRC expectation for defense in depth protection for Areas 300-500.

The licensee Fire Hazard Analysis (FHA) adequately captured the potential consequences of fire involving Areas 300-500, **but were not addressed in the integrated safety analysis (ISA).**

Environmental Protection and Waste Management

The effluent and environmental monitoring programs provided **reasonable assurance** that effluents to the environment would be less than regulatory limits and that **any significant impacts of plant emissions on the surrounding environment would be adequately quantified.**

Report Details

A weakness was identified associated with the practice of using draft references to support the technical safety basis of a final evaluation.

The laboratory relied extensively on administrative controls and permanent criticality postings were not yet posed in the laboratory; however, the licensee indicated that these postings would be in place when the laboratory was in use.

Inspectors walked down the ventilation condensate drain line in the Building 300 Complex and determined that condensate could collect in the ventilation ducts from various process areas and outside air.

Waste Tanks: NCSA 54X-99-0030 covers the accumulation and staging of waste water in the tanks and subsequent transfer of this waste to the site Waste Water Treatment Facility. **The inspectors reviewed the evaluation and discussed apparent deficiencies** with the plant Nuclear Criticality Safety staff. Changes to the evaluation were generated to correct the identified deficiencies.

Waste Handling: The licensee stated that drum arrays with uniform fissile material load would remain subcritical with 1050 grams per drum **(over five times the limit)** based on areal density calculation.

Operator Experience and Training: Several of the operators that were to be utilized in the Naval fuel process were involved in the startup and check out of the equipment. However, additional operators were required to operate the facility and those individuals were unable to obtain the experience as those involved in the initial plant startup and testing.

Observations and Findings:

Open:

70-143/99-02-02	IFI	Review the process for performing code validations and maintaining configuration control of the code.
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The current code validation fails to comply with the license requirement to describe the area of applicability. Specifically, the area of applicability was overly broad and extensions of benchmark data were not technically justified.

Closed:

70-143/98-03-03	IFI	Review licensee's ability to maintain the fire protection valves in the pit vaults in reliable and credible condition.
70-143/99-02-01	IFI	Program Implementation of NCS Requirements
70-143/99-02-03	IFI	Review the structural issue concerning the steel support columns and the floor flatness
70-143/99-05-01	IFI	Review process equipment cooling water system with respect to leakage of water into the 601 process vessel or elevator pit
70-143/99-05-02	IFI	Review the licensee's revised spilled materials nuclear criticality safety evaluation prior to process startup
70-143/99-05-03	IFI	Review the ventilation, fire suppression and open container transport system as they pertain to the 600 and 700 process area equipment
70-143/99-05-04	IFI	Review SOP-401 to ensure that operators physically verify the operation of the automatic valves to shut off the flammable gas supply to the 600 processing area

70-143/99-05-05 IFI Review the licensee's additional testing and verification of SREs related to preventing fires or explosions in the 600 process area prior to process startup

10/19/99 Nuclear Fuel Services, Inc, Erwin, Tennessee, Supplement III, EA 99-218.
Notice of Violation for **Three (3) Severity III** violations, Inspection Report 70-143/99-01, **ML003729792**, NUREG-0940, Enforcement Actions.

A Notice of Violation for a Severity Level **III** violation was issued October 19, 1999. The action was based on violations involving: **(1) the failure to conduct or to conduct adequately two independent visual and detector searches by two individuals for a container removed from an access area.** This resulted in the unauthorized removal of seven grams of Uranium-235 contained in high enriched uranium from the Building 233 vault to a Building 236 storage area, and **(2) occurred as a result of the first violation, and involved the unauthorized storage of the 55-gallon drum containing the SNM in a location not approved for SNM storage, and the failure to assure that the movement of this material out of the vault was properly documented by the material control and accounting system at the facility.** A civil penalty was not proposed because this was the first escalated action in two years and credit was warranted for corrective actions which included long-term training enhancements for security personnel.

2000

08/02/00 **NFS stopped discharges from the Waste Water Treatment Facility due to elevated laboratory analyses results for uranium in a composite of individual releases for the month of May 2000.**

08/11/00 **Special Inspection Team** conducted the exit meeting for a special inspection to review the indications of a **release in May 2000 of elevated concentrations of uranium to the Nolichucky River.** The team concluded that the **sample showing elevated levels of uranium was not representative of actual releases.** The team identified several issues related to sampling handling and control.

10/19/00 NRC Inspection, **Severity Level IV Violation**

Failure to conduct quality assurance program to assure compliance with the waste classification requirements specified in 10 CFR 61.55

Failure to include appropriate group notifications of LSA-11 on the shipping

2001

06/21/01
to 08/23/01

Accountability Failure at Nuclear Fuel Services

In June 2001, there were **several failures** to follow procedures at Nuclear Fuel Services, Inc. (NFS) that resulted in **two containers of strategic special nuclear material (SSNM) not being recorded in the licensee's computerized inventory of material.**

On June 22, 2001, two containers of SSNM were sealed with tamper-indicating devices (TIDs) and moved from one location to another inside of a secured material access area without the appropriate computer transactions being performed that track and account for the SSNM. Shortly thereafter, the licensee's material control and accounting (MC&A) program identified that two TIDs were not with other unused TIDs and computer records did not show that they had been used to seal SSNM-bearing containers. NFS searched for the TIDs and when they could not be found, concluded that they had been lost.

On August 10, 2001, the licensee conducted a routine semi-annual physical inventory of the material stored on site and found two containers of SSNM in secure storage, but not listed in the inventory records.

On August 23, 2001, during the process of reconciling the inventories, the licensee determined that these two containers had been sealed with the missing TIDs and placed in secure storage without the appropriate computer records being made.

In **April 2002**, this material discrepancy came to the NRC's attention, and subsequently, the NRC initiated the review of the event and continued follow-up activities with NFS. The consequence of the errors in the material control program was that there was no record that the material had been removed from the process area and placed in the storage area. The licensee apparently failed to meet several regulatory requirements for accounting for SSNM. The NRC determined in **July 2002 that there had been an actual event, and it was potentially significant enough to warrant special inspection.** On **July 21, 2003**, the Region II Administrator and other regional managers attended a **closed Predecisional Enforcement Conference** with Nuclear Fuel Services, Inc. The purpose of the conference was to discuss apparent violations involving material control and accounting.

During August 26-27, 2002, the NRC conducted an inspection of the circumstances involved. Several apparent violations of regulatory requirements were identified. On **October 3, 2002**, the NRC met with NFS in a **closed meeting** to express concerns about the licensee's implementation of their program for control and accounting of special strategic nuclear material in light of a loss of control event reported in an NRC inspection report. **The NRC issued a Confirmatory Action Letter (CAL) on October 15, 2002** to document licensee's commitments to corrective actions in this safeguards area.

09/24/01 (NRC Letter), **Severity Level III Violation**, Fine \$30,000 (not given)

Violation pertaining to the storage of up to 20 kilograms of HEU in bins for approx 46 days without adequate CAS (criticality alarm system) Bldg 306E; **3/19-23/2001** Inspection; **7/20/2001** Pre-decisional enforcement conference coverage ML012690259, IR-01-203.

2002

09/09/02 NRC Inspection Report 70-143/2002-205 and Notice of Violation, **Severity Level IV**, Aug 12-15, 2002.

70-143/2002-205-02 VIO Failure to follow procedures during the operation of Tank WD-02 resulting in an inadvertent discharge of fissile solution.

Tanks WD-01/02 were used to accumulate aqueous waste prior to discharged to receiving tank T-9 in the waste processing area. Procedures required tanks WD-01/02 to be recirculated for an hour or more and sampled prior to discharge to assure that the solution concentration is less than the discharged limit. On July 17, 2002, a licensee operator aligned WD-02 valves for recirculation and turned on the pump. Upon checking the system, approximately 30 minutes later, the operator discovered that approximately 70% of the tank contents had been pumped to T-9. The operator shut down the process and reported the problem.

70-143/2002-205-02 NCV Placing the 500 Area SRE (Safety Related Equipment) switch in the "off" position.

The NRC is concerned that your staff has not taken a broad enough view of the failure of multiple independent NCS (Nuclear Criticality System) controls.

10/3/02 **Senior Management Meeting with Nuclear Fuel Services.** One purpose of the meeting was to express NRC's concerns about the licensee's implementation of their program for **control and accounting of strategic special nuclear material** in light of a loss of control event reported in an NRC Inspection report. NRC will prepare a **Confirmatory Action Letter (CAL)** to document the licensee's commitments to corrective actions in this safeguards area. Weekly Information Report, Week Ending October 11, 2002, **ML022940120**.

10/15/02 NRC Inspection, July 7 - Aug 31, 2002, **Severity Level IV Violations**,

Failure to control access to protected area.

Failure to comply with criticality safety posted instructions

Failure to make a required report to the NRC

11/08/02

NRC Inspection, Sept. 1 - Oct. 12, 2002, **Severity Level IV Violations**

Failure to implement precautions as specified in an authorized radiation work permit.

Failure to administer non-routine activities as specified by an authorized RWP (Radiation Work Permit)

Failure to administer routine and repetitive activities in a radiologically restricted area by the use of operating procedures

Licensee stored multiple SNM-bearing containers in a location within Bldg 306 West. NDA Scanning Facility, which was neither designated for storage nor approved by a posted station limit card. Requires the 300 Complex Facility Mgr to maintain copies of approved station limits. The position of 300 Complex Facility Manager had not been established to maintain copies of the approved station limits.

On July 9, 2003, the "Guidelines and Expectations for the Implementation of Nuclear Criticality Safety Evaluations" had not been established prior to the licensee conducting the implementation of nuclear critically safety evaluation NCS-07-01, Rev. 1

2003

04/01/03

NRC Abnormal Occurrences Report to Congress, Fiscal Year 2002, **ML030970356**. Accountability Failure at Nuclear Fuel Services in Erwin, TN. (See 2001)

05/03/03

Results of the NRC Agency Action Review Meeting (AARM), April 22-23, 2003. **"Only those plants with significant performance problems are discussed at the AARM.** The plants discussed are those whose performance has resulted in them being placed in either the multiple/repetitive degraded cornerstone or unacceptable performance columns, **ML031250269, pages 4 & 5.**

Mr. Martin Virgilio, Director, NRC Office of Nuclear Materials Safety and Safeguards (NMSS) provided a brief description of the process that NMSS employed in assessing licensee performance trends to arrive at which licensees would be considered to be discussed at the AARM. This process is described in SECY-02-0216. Mr. Virgilio stated that NMSS worked with the Office of State and Tribal Programs and Regional Administrators to perform a screening review

and concluded **that only one facility, Nuclear Fuel Services (NFS) in Erwin, Tennessee, needed to be discussed at the AARM.**

Mr. Luis Reyes, Regional Administrator, Region II, led a discussion of Nuclear Fuel Services, Inc. The License Performance Review (LPR) identified the following areas as needing improvement: **ensuring procedural compliance (identified in each of the last 3 years); implementation of material control and accounting (MC&A) program; and completeness of license amendment applications. Mr. Reyes discussed the uniqueness and importance of the facility, MC&A inspection findings, which resulted in a confirmation action letter and an Office of Investigation (OI) investigation; unresolved items; and upcoming Licensee and NRC actions.**

As a result of these discussions, the senior managers concluded that the performance of Nuclear Fuel Services, Inc. does not meet the criteria in SECY-02-0216 for discussion at the Commission briefing on the AARM."

10/9/03 Staff from the Office of Nuclear Material Safety and Safeguards, the Office of Nuclear Security and Incident Response and Region II met with Nuclear Fuel Services, Inc. concerning root causes and corrective actions for **recent failures**. Over the past year, NRC identified issues related to the **security program, the material control and accountability program, and procedural compliance and management oversight.**

10/17/03 Violation and Imposition of Civil Penalty of \$60,000, **Severity Level III**, Aug. 26-27, 2002 Inspection; Jan. 6-15 Inspection; **4 investigations** completed in Nov. 2002/March 2003/April 2003.

10 NRC Violations; seven violations were for Category 1A strategic special nuclear material (SSNM) unaccounted for approximately 6 weeks beginning in June 2001. (**Significant breakdown in NFS' implementation of its MC&A systems**). NFS was unaware and had no record that the material had been placed in a storage vault for 6 weeks.

NOTE: Escalated enforcement for 2 years. Three other violations of lesser significance, Severity Level IV.

10/26/03 NRC Inspection Report 70-143/2003-205, Nov. 3 through 7, 2003, **Severity Level IV Violation, ML050120035**

Closed:

70-143/2003-007-01 URI Determination of adherence to NCS requirements

Open/Closed:

70-143/2003-205-01 NCV Failure to assure that fissile material stored in designated stored areas met NCS requirements

2004

01/16/04 NRC Office of Investigations Report No. 2-2003-024 (NRC Inspection Report No. 70-143/2002-011), Nov. 24, 2002-Jan. 18, 2003, **ML081500552**

OI investigation substantiated that the decommissioning supervisor **willfully authorized the transfer of low-enriched uranium solution without conducting required verifications and reviews** prior to and/or during the transfer. Based on the NRC's review, **it appears that a causal factor for the first line supervisor's willful actions was a lack of clear direction from NFS management which tasked this individual to perform multiple oversight activities and conflicting work assignments (in this case, asbestos abatement activities and LEU solution transfer activities).**

01/26/04 NRC Inspection Report No. 70-143/2003-010 and Notice of Violation Special Inspection Team (SIT), Dec. 15-18, 2003, **Severity Level IV, ML081440508**

70-143/03-10-01 VIO Three examples of failure to implement NCS program procedures

On and before December 17, 2003, the licensee **failed to comply with the storage requirements of NFS-HS-CL-13**. Specifically, the licensee stored multiple SNM containers in a location within the facility, which was neither designated for storage nor approved by a posted station limit card. The licensee's failure to comply with the storage requirements of NFS-HS-CL-13 is one example of a violation of Section 2.7 of the license application (**VIO 70-143/2003-010-01a**)

On and before December 17, 2003, the licensee was **not maintaining copies of approved station limits** as described in licensee procedure NFS-HS-CL-13. Specifically, the position of Manager had not been established to maintain copies of the approved station limits. The licensee's failure to comply with the requirements of NFS-HS-CL-13 is another example of a violation of Section 2.7 of the license application (**VIO 70-143/2003-010-01b**)

On July 9, 2003, the licensee **failed to conduct the implementation of NCSE NCS-07-01** as described in licensee procedure NFS-HS-A-62. Specifically, the "Guidelines and Expectations for the Implementation of Nuclear Criticality Safety Evaluations" had not been established prior to the licensee conducting the implementation of nuclear criticality safety evaluation NCS-07-01. The licensee's

failure to comply with written procedures is another example of a violation of Section 2.7 of the license application (**VIO 70-143/2003-010-01c**).

Worker exposed to Plutonium 239/240 on October 11, 2003 at Building 234. Respirator malfunctioned. Testing indicated contamination above license action limits. Intake of 1.73 E-5 uCi was added to worker's dose record for calendar year 2003. Net impact is a CEDE of 7.4 mrem.

02/23/04 NRC Inspection Report No. 70-143/2004-1, Nov. 30, 2003 through Jan. 24, 2004, **ML081440460**

Closed:

70-143/2003-03-03 VIO Failure to Post Contaminated Areas (Para 4.b).

This issue concerned posting of areas identified to be above fixed contamination limits. The inspector reviewed the licensee's first two replies, dated August 13, 2003, and September 16, 2003, as well as the NRC's letter of October 3, 2003, which requested additional information regarding short-term corrective actions. The inspector reviewed subsequent licensee responses of October 31, 2003, and November 18, 2003. The licensee adequately addressed immediate actions with procedural changes and personnel counseling and training. The licensee adequately addressed long-term corrective actions with upgrades to the radiological technician training program.

On January 8, 2004, the licensee identified a **radiological technician (RT) had become contaminated with beta contamination**. The individual had responded to assess and survey liquid dripping out of a damaged ventilation duct. A small amount of liquid dripped on the individual's head, and a subsequent survey identified 98,000 disintegrations per minute per 100 square centimeters (dpm/100 cm²) beta radiation. The individual was promptly decontaminated and his skin dose was estimated to be less than two milli-rad, which is much less than one percent of the allowed skin dose. The technician was assessed to have no internal dose from the event. The area was promptly decontaminated, the surrounding area was surveyed to assure no spread of contamination, the source of the contamination was assessed, and the damaged section of **ventilation duct was temporarily repaired with a viton patch**. The licensee inspected a significant portion of the ventilation system on-site and found minor flaws but no additional areas requiring immediate action. The inspector walked down the area and adjacent ventilation ducts, reviewed survey records, and interviewed the RT, his supervisor and health physics personnel involved. No significant issues were identified.

The inspector received additional information from the licensee on a potential defect in Mine Safety Appliance (MSA) Ultraview masks, which are used extensively at the licensee's Erwin facility. This issue was previously discussed in NRC inspection reports 70-143/2003-07, paragraph 4.e, and 70-143/2003-09,

paragraph 4.a. The issue concerned small defects, which were identified by close inspection of respirator masks by NFS personnel. NFS referred the issue to MSA and requested assistance to determine the cause. While MSA noted some damage could be expected from use, MSA acknowledged the majority of defects noted were due to production problems and also identified corrective actions, such as reworked molds to reduce stress concentrations and 100 percent visual inspections during manufacturing, which have already been taken.

Open:

70-143/2004-01-02 AV Failure to perform required reviews and verifications (Paragraph 2.b).

This issue was originally identified in URI 70-143/2002-11-01, and was identified as an AV in NRC letter to NFS, **ML040200551**, dated January 16, 2004, relating to EA-03-178. This issue concerns procedural violations, which occurred on January 12, 2003, and is assigned a number here for administrative tracking purposes.

70-143/2004-01-03 AV Failure to perform a detailed criticality safety evaluation (Paragraph 2.b).

This issue was originally identified in URI 70-143/2002-11-01 and was identified as an AV in NRC letter to NFS, **ML040200551**, dated January 16, 2004, relating to EA-03-178. This issue concerned a failure to perform a detailed criticality safety evaluation, as required by section 4.1.2 of the license application, for a temporary operation, which occurred from September 9, 2002, through January 12, 2003. This issue is assigned a number here for administrative tracking purposes.

70-143/2004-01-01 URI Control of Process Waste System Valve Positions (Paragraph 2.a).

An unresolved item was identified regarding the control of the position of process waste tank valve (R) Lack of information in the maintenance records of SRE equipment and preconditioning SRE prior to testing were potential weaknesses in the site maintenance program.

On December 31, 2003, the licensee identified residual water in tank when it was believed that the tank contents had been transferred to the wastewater treatment facility (WWTF) on the previous shift. Operators performing the required non-destructive assay survey after the transfer found more than expected activity, which led to an inspection of the tank and subsequent discovery of the residual water. The area supervisor directed the operator to recirculate and sample the tank contents in order to determine the level of (R) material present. The supervisor subsequently discovered the discharge valve to the WWTF, (R), was open when it was required to be locked shut whenever a transfer to WWTF was

not in progress. This requirement was to prevent an inadvertent transfer of waste solution to the WWTF which may have an unacceptably high level of (R) material. The licensee investigated the event and found that an inadvertent transfer had in fact occurred on July 17, 2002, under similar circumstances. (See NRC integrated inspection report 70-143/2002-205, section 4.0, violation (VIO 70-143/2002-205-02).

As an immediate corrective action to the December 31 occurrence, the licensee added another level of control to this operation by requiring a supervisory verification that (R) was shut prior to commencing tank re-circulation. The licensee also planned to evaluate system design changes to include engineered controls. NFS Standard Operating Procedure (SOP) 401, section 6.3, required the or A (R) tank to be pumped until empty, rinsed and pumped dry, and to be locked shut when transfer the tank to WWTF was completed. On December 30, 2003, tank (R) was found not to be empty and it was not locked shut after transfer of the tank's contents to WWTF was stopped. Also, SOP 401, section 6.2, required verification that (R) was locked shut prior to recirculating tanks.

On December 31, 2003, (R) was left open when tank (R) was recirculated. In order to complete NRC review of this event, this issue will be tracked as unresolved item.

The inspector noted that from September through December 2003, the licensee had performed three repair actions on valve (R). The inspector reviewed maintenance, post maintenance test, and periodic testing records for valve (R) and noted that although a separate maintenance record existed for each repair, the records did not document whether the valve had been replaced, repaired, or adjusted. Furthermore, maintenance records did not identify what parts or equipment had been utilized for repairs or replacement. Interviews conducted with NFS maintenance staff indicated the inspector's observations were typical of maintenance department records.

Separately, the inspector reviewed periodic testing and identified that the first three steps of the safety related equipment (SRE) periodic test for valve were adjustments and valve cycling which are examples of preconditioning maintenance. The inspector noted that preconditioning reduced the value of performing a periodic test because the performance of preconditioning maintenance prevented any assessment of the ability of the equipment to perform its function prior to the test. No other examples of preconditioning were identified and licensee management indicated this problem was not typical of SRE tests.

The inspector noted that, although not an NRC violation, the lack of information in the maintenance records reviewed was a potential weakness in that the records did not provide support for trend analysis of SRE failures and also did not provide documentation to support the configuration control program. Likewise,

preconditioning performed as part of periodic testing of SRE would be considered a potential program weakness.

Closed:

70-143/2002-11-01 URI License Condition Interpretation for a
Temporary Operation (Paragraph 2.b). License
Condition Interpretation for a Temporary Operation

This issue concerned a transfer of solution which contained = material from favorable to unfavorable geometry vessels. Two apparent violations (AVs) were identified from this issue, which are documented in the following entries.

03/09/04 Briefing to the Commission on Nuclear Material Safety and Safeguards (NMSS) Programs, Performance and Plans – Material Safety, **ML040711192**

Martin Virgilio, NMSS, speaking: Somewhat in the background, maybe operating in the shadows of some of the higher profile activities, we have our materials casework.

I'll start with one example, the Blended Low-enrichment Uranium Fuel Facilities Project. Again, this is a contested case, so what I can say is very limited in this area. But, the overall goal of this project is to take highly enriched uranium from the Department of Energy and convert it by blending into a low-enriched uranium for use as fuel in the Tennessee Valley Authority's nuclear power reactors. The second area I wanted to touch on was, we're working very closely with Region II on the Nuclear Fuel Service. This is a facility where NRC has **heightened its oversight of Nuclear Fuel Services' fuel manufacturing operation in Erwin, Tennessee. This is a result of some performance problems that we observed in the safety, security, and materials control and accounting programs.** We've developed, and the licensee in parallel, has developed and implemented a number of programs around this facility.

NFS has developed improvement initiatives and are looking to change their performance. We'll monitor to make sure they are, in fact, making good on their promises. And, we've been meeting with the licensee management on a quarterly basis. And, we've put additional resources to enhance the onsite Resident Inspector Program at that facility.

Commissioner Merrifield speaking: NFS Erwin is currently in their heightened NRC oversight. Now, they've recently reorganized and **appointed a new company president, Kerry Schutt.**

03/11/04 NRC Inspection Report 70-143/2004-201, and Notice of Violation, Feb. 23 through 27, 2004, **Severity Level IV Violation, ML081440450**

70-143/2004-201-01 VIO Failure to control six greater-than (R) plastic bags in the (R)

Safety function procedures NFS-CL-10, Rev 22, requires that unfavorable geometry bags (those greater than 3.3 liters) shall only be opened for the minimum time necessary to perform the task and must otherwise be kept flat, closed, sealed or have the bottom corners cut out leaving openings in the bag of at least 1.5" in length while in Bldg 302, 303 and Area 800.

On and before Feb 25, 2004, the **licensee failed to control unfavorable geometry bags** with volumes greater than 3.3 liters. Specifically, six plastic bags with volumes greater than 3.3 liters were opened and **left unattended in the 800 area** without having 1.5" openings cut in the bottom corners.

70-143/2004-201-02 IFI Tracks resolution of criticality alarm system equipment and installation problems

Inspectors observed that the licensee's Criticality Alarm System (CAS) has had 27 trouble alarms since Nov. 2003 when the licensee began substantial installation of new CAS equipment. Likely cause of the trouble alarms was associated with the installation (i.e. placement, mounting, and wiring). Licensee had identified corrective actions, but corrective actions were not complete.

03/12/04

License Performance Review for Nuclear Fuel Services, Inc., Docket 70-143. Jan. 20, 2003 and ending Jan. 24, 2004, **ML081440081**

PERFORMANCE AREA: SAFETY OPERATIONS. This area is comprised of chemical safety, nuclear criticality safety (NCS), plant operations, fire safety, and management controls. Program Areas Needing Improvement:

Documentation and communication of facility safety information and controls to workers.

A detailed criticality safety analysis was not performed when changes to existing equipment and procedure changes were made in order to process licensed material where more than a safe mass existed and double batching was possible (Inspection Report (IR) 2004-001)

Mass (R) limits for (R) containers of (R) were exceeded when material was moved from one (R) area to another by operators who did not know the NCS requirements for the (R) area (IR 2003-205).

(R) containers of (R) exceeded the (R) (H/X) ratio established by NCS for a (R) area because, in part, no method of verifying the actual H/X ratio of the material prior to placing the material (R) had been established (IR 2003-205).

Approximately 25 grams of uranium metal shavings ignited inside of a glass vial after being shaken while a sample was being extracted. The investigation noted that in designing this process, NFS had only focused on whether or not the material was **pyrophoric**, and had not utilized available industry experience and procedures on combustibility. Furthermore, (R) had supplied recommendations to the licensee, which were not followed (IR 2003-006).

A violation was issued for the storage of special nuclear material (SNM) (R) containers in the (R) scanning facility without proper safety postings (**part of violation (VIO) 2003-010-01**).

Program Areas Needing Improvement (continued):

Management/Supervisory oversight of process operations to ensure compliance with regulatory requirements.

Lack of supervisory oversight for a waste transfer operation in (R) the caused solution to be transferred from a favorable to an unfavorable geometry vessel that was over the allowed procedural concentration limit. The supervisor failed to properly check all lab results and equipment conditions before approving the transfer. An apparent violation was identified for the supervisor failing to perform required verifications (IR 2004-001)

A transfer of liquid process waste from the waste disposal (WD) (R) was performed that did not meet NCS limits for uranium concentration (VIO 70-143/2003-09). The licensee investigated the event and found that the operator had correctly recorded the sample results on the run sheet but did not review procedure to double check the limit. The operator incorrectly recalled the release limit and informed the supervisor that the sample results were satisfactory. The supervisor also recalled the limit incorrectly and approved the transfer.

Failure to maintain a control in the (R) process area according to the configuration management control program, which led to a small fire (VIO 2003- 03-01).

03/29/04

Notice of Violation, **Severity Level III**, Office of Investigations Report No. 2-2003-024 and NRC Inspection Report No. 70-143/2002-011, (Kelvin D. Hopson Incident), **ML081500238 and ML081500239**

Decommissioning Supervisor caused licensee, Nuclear Fuel Services, Inc. (NFS), to be in violation of a license issued by the Commission. Specifically, supervisor caused NFS to be in violation of Safety Condition S-1 of Special Nuclear Materials License No. SNM-124, Section 2.7 of the License Application, and NFS Letter Of Authorization (LOA) - 8828-036, Handling Miscellaneous Solutions During the (R) D&D Projects, when he deliberately failed to verify by

review of the ASEAS (At-Site Environmental Sample Assay System) sample result that discard limits were met, failed to verify that calculated sample results agreed within (R) did not notify the nuclear criticality engineer that the sample results were above the limits, did not perform required verifications of valve positions and tank indications, and did not observe the transfer of low enriched uranium solution as required by licensee procedures. Furthermore, the NRC determined that these actions constituted deliberate misconduct, which resulted in the transfer of low enriched uranium solution without required verifications being conducted prior to and during the transfer.

03/30/04 Relaxation of Section III.A of Order dated August 21, 2002, to incorporate Revision 1 (R) for Nuclear Fuel Services (TAC L20810), EA-04-051. **Failure to adhere to this schedule will constitute a violation of requirements and will be further evaluated for enforcement action. ML081500557**

04/02/04 NRC Inspection Report No. 70-143/2004-02, Jan. 25 through Mar. 6, 2004, **ML081440459**

Inspector Observations: **Two events in licensee laboratories demonstrated weaknesses in radiological controls and communication of safety information to laboratory workers and management**

The **first event** concerned a spill of depleted uranium in the laboratory. Although the spill was promptly cleaned up and personnel in the area were checked for contamination, there was a notable delay in the safety office being informed. Therefore, the personnel involved and the area of the spill were, not promptly surveyed by a qualified radiological control technician (RT). Surveys were finally performed the next day by a qualified RT and indicated contamination had been properly controlled and was not spread.

The **second event** occurred in the (R) laboratory and concerned use of a sealed glass ampule containing (R) of Plutonium (Pu) 239, (R). In order to utilize the ampule contents, the chemist snapped the top off the ampule with thumb pressure, with hands protected by latex gloves. The ampule top snapped off but left a sharp edge, which gave the chemist a small cut on the thumb. Surveys detected low levels of contamination, which was reduced to background after washing. The inspector reviewed the results of three urine bio-assays which were analyzed by an independent laboratory. The laboratory results indicated that a minor uptake of radioactive material had occurred, and the resulting dose estimate was a small fraction of -the limit allowed by 10 CFR Part 20. At the time of this inspection, the licensee continued to monitor the person involved by analyzing additional bio-assay samples and refining the estimated dose.

The inspector reviewed laboratory precautions contained in standard operating procedure (SOP) 387 and found there were no specific precautions for opening sealed glass ampules. SOP 387 stated special instructions may be issued for

utilizing Pu in the laboratory, but in this case, special precautions or safety instructions were not issued.

The inspector interviewed the chemist involved and found the chemist was a qualified radiological worker with an understanding of the material being handled. **The chemist stated no special precautions or safety instructions had been provided for this work.**

The chemist also stated it had been roughly a year since (R) had last utilized a sealed glass ampule. The inspector noted that some type of special precautions for this operation would have been appropriate. Each of the above events could have been a more serious event and could have resulted in spread of contamination or greater exposure of personnel. The events together indicated laboratory management and laboratory workers should focus additional attention on radiological controls and safety.

70-143/2004-02-01 URI Unresolved item was identified to track an issue of contaminated intermodals shipping containers, which had been returned to the licensee's vendor.

The licensee has been engaged in a large scale effort to excavate a radiological burial ground at the Erwin facility and ship contaminated soil and debris in intermodal shipping containers to the Envirocare disposal site in Utah. For economic reasons, the licensee recently planned to slow down the pace of excavation and shipping of this material, and therefore began to return some of the leased intermodals to the vendor, MHF Logistical Solutions, in Pennsylvania.

On January 15, 2004, the licensee was notified by MHF, that radiological contamination had been detected in several of the returned intermodals. The licensee sent a health physicist (HP) to MHF to investigate the issue. The HP found maximum fixed contamination levels to be 804,000 disintegrations per minute (dpm) beta, and 408 dpm alpha. The HP also found smearable contamination levels to be 1268 dpm per 100 square centimeter (cm²) beta and 20 dpm/100cm² alpha. The licensee planned to evaluate methods to have better surveys performed on returned intermodals and also planned to return the contaminated intermodals to service.

The licensee investigated the circumstances surrounding the shipment of the intermodals and determined that out of a fleet of 471 containers, 194 had recently been sent to MHF. Of the 194, NFS determined that 104 were shipped directly from NFS, and the remaining 90 were shipped from Envirocare to MHF. The investigation concluded that the contaminated intermodals had been surveyed by Envirocare, and that Envirocare had shipped the intermodals to MHF at the direction of NFS.

This position was contradicted by a letter sent to Envirocare from NFS dated January 16, 2004, which requested that Envirocare investigate the issue. This letter stated that the intermodals were decontaminated and free released by Envirocare "prior to return to NFS". The letter stated that "based on the free release criteria shipping documentation provided by Envirocare", NFS subsequently shipped the containers to MHF. **The inspector made the licensee aware of the contradiction between the investigation conclusion and the January 16 letter.**

05/17/04 NRC Inspection Report No. 70-143/2004-03 and Notice of Violation, **Severity Level IV**, March 7, 2004 through April 17, 2004, **ML081440458**

Open:

70-143/2004-03-02 VIO Failure to Conduct a Detailed Criticality Safety Analysis

Section 4.1.2 of the License Application, Responsibilities for Nuclear Safety, states that each proposed change to existing equipment or addition of new equipment used in the processing or storage of licensed material, and any procedure changes resulting there from, will receive a nuclear safety review. Section 4.1.2 further states that all changes, modifications, or additions will receive a detailed criticality safety analysis as outlined in Section 4.3, unless the following criteria are met: less than a safe mass, as defined in Section 4.2.1.3, exists and there is no possibility of double batching material.

Contrary to the above, from September 9, 2002 through January 12, 2003, operations, which involved more than a safe mass of licensed material where double batching was possible were performed under temporary procedures which involved changes to existing equipment, without performing a detailed criticality safety analysis. This is a **Severity Level IV** violation

70-143/2004-03-03 VIO Failure to Comply with Written Procedures Impacting Fire Safety

B. Safety Condition **S-1** of Special Nuclear Materials License No. SNM-124 authorizes the use of licensed materials in accordance with the statements, representations, and conditions in the License Application and Supplements.

Section 2.7 of the License Application, Procedures, states SNM operations and safety function activities are conducted in accordance with written procedures as defined in Sections 1.7.4 and 1.7.5.

Contrary to the above, the **licensee failed to conduct safety function activities in accordance with written procedures as described in the following examples:**

1. Standard Operating Procedure - 392, Work Request, Revision 9 dated

December 2, 2002, states the following:

- a. Section 4.1 states, in part, that the initiator is responsible for obtaining initial permits as specified on the Work Request Form and also has the responsibility for determining the requirements as identified in Safety Considerations, Special or Other Safety Considerations, and Permits/Other. For all items, the initiator is responsible when the work request approval is complete, to insure all yes/no fields are checked.
- b. Section 5.16 states, in part, that work that involves penetrating a firewall should be indicated and must be coordinated with Industrial Safety. In addition, Industrial Safety should be contacted if there is uncertainty whether the wall is considered a firewall.
- c. Section 5.13 requires "A detailed description of the work to be performed or the problem encountered on the piece of the equipment" when completing a work request form.

On February 24, 2004, NFS work request 80896 was approved to replace an emergency light (R). The initiator failed to follow SOP-392 requirements as identified in "Safety Considerations", "Special or Other Safety Considerations", and "Permits/Other" in the work request form and insure all "yes/no" fields were checked. Also, the initiator **failed** to indicate or coordinate with Industrial Safety that the work involved penetrating a firewall. In addition, the initiator **failed** to provide a detailed description of the work to be performed. **These failures led to a penetration in a firewall that went undetected for several days, therefore having inadequate compensatory measures in place to ensure the integrity of the firewall.**

2. Procedure NFS-HS-GH-25, "Hot Work Procedure, Revision 2" dated April 1, 1999, Section 5.5.61 and 5.7.5 state, in part, that "Fire watches will maintain visual observation of the hot work activity at all times. **On March 16, 2004, a fire watch failed to maintain visual observation of the hot work activity at all times.**

3. Procedure NFS-HS-A-71, "Pre-Fire Plan Administration, Revision 0," dated September 15, 2002, Section 4.1.1 states, that "The Industrial Safety Specialist/Fire Protection will receive notification via the Engineering Project Internally Authorized Change process when a new facility or project is being designed so that a Pre-Fire Plan is developed for use as needed during construction and subsequent operations."

Prior to March 19, 2004, **new projects (R) had been in operation for approximately twelve months and six months, respectively. The licensee failed to incorporate these projects in the Pre-Fire Plan.**

(The three examples above constitute a Severity Level IV Violation 70-143/2004-03-03, Failure to Comply with Written Procedures Impacting Fire Safety).

06/28/04 NRC Inspection Report No. 70-143/2004-04, April 18, 2004 through May 29, 2004, **ML081440457**

70-143/2004-04-01 NCV Failure to verify uranium level in waste solution

Standard Operating Procedure 401, Section 8-2, required dual independent samples be drawn, analyzed and verified (R) prior to transfer. Failure to verify (R) was 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.

70-143/2004-04-02 AV Inadequate Engineered Control

Section 4.1.1.1 of the License Application, Engineered Controls, stated that **Engineered controls detect an undesired situation and implement corrective action without requiring human intervention**. It further stated that Engineered Controls must be capable of performing the criticality safety purpose for which they are specified. Failure of an engineered control to be capable of performing the criticality safety purpose for which it was specified is a violation of NRC requirements.

Observations and Findings:

Inspector observed a 38 percent increase in the Deep Dose Equivalent (DDE) for CY 2003. The licensee attributed the change to a 23 percent increase in the monitoring population for CY 2003, **an increase in inventories, and activities associated with the Tennessee Valley Authority (TVA) Project**.

Based on environmental dosimetry results of April 2004, the maximum assigned public exposure closest to the fence line was 81 mrem/yr. **The inspector determined that this exceeded the licensee's ALARA goal of 80 mrem/yr.** The licensee attributed this change to the storage of natural uranium oxide in drums in Building 310 and took appropriate corrective action to adhere to the ALARA limit. (ALARA goals and objectives were approved by the Safety and Safeguards Review Committee – **an NFS committee**)

One deficiency was identified because of a poor ALARA evaluation. The operations involved the handling of material in and out of a dry glove box enclosure. The evaluation made incorrect assumptions concerning contamination in the dry glove box, the location of material inside the dry glove box, the position of stationary air samplers around the dry glove boxes, and the height of the individual performing the operation. **These incorrect assumptions ultimately**

lead to an individual exceeding the Derived Air Concentration (DAC) action levels in the area and unexpected contamination inside the dry glove box.

During the review, the licensee's staff **documented unusually high contamination ranging from 100,000 disintegrations per minute (dpm) to 300,000 dpm inside a dry box enclosure located in the process area.**

08/02/04 NRC Inspection Report No. 70-143/2004-05, March 29, 2004 through June 18, 2004, **ML081290542**

Observations and Findings:

From discussions with the licensee and a review of the licensee's ISA report, the inspector noted that the licensee did not identify any IROFS for the radiation protection area. The licensee also indicated that the radiation protection program for the BPF process would remain consistent with NFS's radiation protection program, with some minor changes. **These changes emphasized the need to address the increased external gamma radiation present in the uranium (R) and uranium (R) feed material.** The licensee indicated that posting, boundaries, and dose rate status maps with the results of daily surveys would be placed in areas where increased external radiation existed.

The licensee discussed with the inspectors the ALARA goal for this calendar year. Based on the licensee's calculations, a limit of 500 mrem/yr for external exposure and a limit of 500 mrem/yr for internal exposure would be established for the BPF operations. The inspector emphasized the need to readjust the action limits for the BPF operations in order to provide some level of notification to let the radiation safety staff of some adverse trend developing. The licensee decided to set alarm limits of 20 mrem total dose on the electronic dosimeters, but no action limit was established for extremities in the BPF facility.

Management Measures and Configuration Management: The inspector reviewed the configuration control program to assess the adequacy of the administrative controls designed to ensure that changes to IROFS were properly reviewed and approved. The inspector reviewed the change process, as described in "Safety and Regulatory Review Routing Form" with a cognizant safety engineer. Multi-discipline safety review of changes were performed in order to verify if the ISA Summary or SRE characteristics were affected, followed by a management review. **The inspector concluded that the configuration control program, administered as described, was adequate to ensure proper control of IROFS.**

08/09/04 NRC Inspection Report No. 70-143/2004-07, May 30, 2004 through July 10, 2004, **ML081290541**

Observations: **LEU (Low enriched uranium) operators and area supervisor were not cognizant of the multiple emergency stop functions nor their effort on system operation.** Corrective action **was planned** by the facility manager.

08/10/04 **Confirmation of Closed Pre-decisional Enforcement Conference** (NRC Inspection Report No. 70-143/2004-04, Nuclear Fuel Services, Inc., Docket 70-143, EA-04-113, **ML081370277**. **The purpose of this meeting is to discuss the apparent violation associated with information reported by NFS to the NRC on May 14, 2004, regarding the inability of an engineered control to meet specified performance criteria.**

08/22/04 **OUO (Official Use Only) policy begins.** All information about NFS, to include inspection reports, event reports, and meetings were withheld from the public and continued to be withheld until August 31, 2007. Inspection reports and other documents for this three-year period would not be released until Congress urged NRC to do so in a July 3, 2007 letter. Then, it took the NRC until May and June 2008 to release the documents with redactions.

08/27/04 NRC Inspection Report No. 70-143/2004-204, (Criticality Inspection), July 26, 2004 through July 30, 2004, **ML081440202 and ML08140201**.

70-143/2004-204-01 IFI Tracks revision of the UNB NCSE and the resulting impact on bounding assumptions

The inspectors learned that the licensee plans to eliminate controls on the introduction of (R) into UNB where uranyl nitrate solution (UNH) is stored (R). Based on laboratory scale experiments performed in 1997 and 2004 and a technical article published in 1968, the licensee determined that the UNH tanks remain subcritical even when filled with the most reactive precipitate. Based on this conclusion, the licensee is revising the underlying nuclear criticality safety evaluation (NCSE) and plans to revise the ISA summary and work procedures to eliminate controls after the NCSE is approved. The controls in question concern introduction of materials such as cleaning agents into UNB where they may be introduced to the UNH (R) and reduce the pH resulting in precipitation of uranium. The licensee determined that precipitation results in a precipitate mixture rather than accumulation of uranium (R).

The inspectors were concerned that the licensee had not considered how the elimination of controls on precipitating agents would affect assumptions for other aspects of the UNB operation. The licensee showed that the current analysis was performed with no free acid in the UNH models, which they consider to be an optimal assumption. **The inspectors observed in a technical article that UNH without free acid has the worst characteristics relative to density increase resulting from freezing, specifically that during freezing, the UNH may**

exceed a critical density. The licensee had not implemented any changes at the time of the inspection.

70-143/2004-204-02 IFI Tracks implementation of final corrective actions to assure criticality alarm audibility in a suspect area

The inspectors noted that a criticality alarm actuation and evacuation occurred at the facility on July 14, 2004, due to a lightning strike. During the evacuation, some participants stated that they had been unable to hear the alarm or that the alarm annunciation was not loud enough. The licensee determined that all employees evacuated as required. Licensee staff performed an audibility check immediately after the evacuation and determined that sound levels had declined in some areas of the plant; these areas were restricted pending investigation. Licensee technical staff traced the problem to a newly-installed amplifier with incorrectly set voltage. The licensee reset the voltage and performed decibel measurements throughout the plant. The inspectors determined that even with the amplifier turned down the alarm annunciation met license commitments.

The licensee identified an area where alarm audibility remains suspect due to the presence of an air conditioner. The licensee-implemented interim compensatory measures to require that a door to the area remain open at all times to ensure audibility of the criticality alarm. The licensee is evaluating permanent corrective actions for this suspect area. Licensee staff was not able to establish quantitative sound measurements for the suspect area with both the alarm and air conditioner running simultaneously. The inspectors determined that interim corrective actions were adequate to ensure immediate and complete evacuation of the facility during a criticality alarm evacuation. Implementation of final corrective actions to assure criticality alarm audibility in the suspect area will be tracked as **IFI 70-143/2004-204-02.**

08/27/04 Exercise of Enforcement Discretion, Inspection Report 07000143-04-004, Enclosure 2, **ML081500428**

From system startup in 1999 until May 14, 2004, an engineered control was unable to detect an undesired situation, was unable to implement correction action without requiring human intervention, and was not capable of performing the criticality safety purpose for which it was specified.

09/14/04 NFS – Operation of Blended Low-enriched Uranium Oxide Conversion Building and Effluent Processing Building.

Note: This letter confirms our discussion of Sept. 10, 2004 in which you were advised that the NRC has no objection to the introduction of low enriched uranium into processes in the Oxide Conversion Building and Effluent Processing Building. The staff also conducted interviews with Nuclear Fuel Services, Inc.,

and Areva/Framatome personnel who will be involved in the process including employees in operations, technical support and management. **It is our understanding that on-the-job training will be completed during startup of the facility.** In addition, we noted that the **Scrap Dissolver was not ready for inspection.** During our inspection, we also noted that a **portable, unanalyzed and unfavorable geometry, High Efficiency Particulate Air ventilation unit was in the facility during the inspection.**

09/20/04

NRC Inspection Report No. 70-143-2004-08 and Notice of Violation, **Severity Level IV**, July 11, 2004 through August 21, 2004, **ML081440246**.

70-143/2004-08-04 VIO Failure to Follow an SRE Test Procedure

On July 26, 2004, the licensee **failed** to perform an SNM operation in accordance with written procedures as defined in Section 1.7.4 and 1.7.5. Specifically, a safety related equipment (SRE) test was not performed as written in the work order procedure. The SRE test required that air flow be established on the SRE filters prior to obtaining a differential pressure reading on the Magnehelic gauge. However, the licensee **failed** to establish airflow and recorded the inaccurate readings on the gauge. The resulting values (R) were below the minimum expected value for the differential pressure across the individual filters (R). Operations continued to use the filters since the filters were new installed

In response to the fire event (R) the licensee replaced damaged lexan panels and high efficiency particulate air (HEPA) filters (which were SRE) and performed SRE tests to verify their ability to perform their safety function. The inspector reviewed the records of the tests and noted that the values obtained for the differential pressure across the filters fell below the minimum expected value. However, operation of the equipment continued due to the filters being newly installed. Also, the test did not clearly state what the acceptable operating values were and also did not clearly state required action if values outside the expected values were obtained. This observation was brought to the attention of the supervisor. After reviewing the test and the equipment, it was determined that the SRE test was conducted without airflow through the filter, which was a procedural requirement of the test. The tests were then reformed and the expected values were obtained. The inspector noted the SRE test required that air flow be established on the SRE filters prior to obtaining a differential reading on the Magnehelic gauge. **However, the licensee failed to establish air flow and recorded the inaccurate readings from the gauge.** The resulting values (R) were below the minimum expected value for the differential pressure across the in dual filters (R). **Failure** to perform the SRE test in accordance with procedure was a violation of NRC requirements (**VIO 70-143/2004-08-04**), Failure to follow an SRE Test Procedure. The licensee planned to rewrite the SRE test to clearly set acceptable operating values for filters.

Conclusions: A violation was identified for failing to perform an SRE test in accordance with procedures.

Open:

70-143/2004-08-03 URI Fire

The inspector reviewed the licensee response to a fire event that occurred in (R) to verify that the licensee adequately ensured that any necessary safety controls were adequately tested. On July 26, 2004, a fire occurred (R), which was reported to the NRC and tracked as NRC **Event Report 40901**. No one was injured and only minor damage occurred (R) enclosures. The cause of the fire was determined to be (R) which was introduced into (R) line through a temporary manifold on (R). Based on document reviews and interviews with the system engineer, the unit had been placed under configuration control, and the licensee had properly authorized the installation of the temporary manifold (R). The purpose of the manifold was to facilitate purging and gage calibration. However, the reason for failing to remove or isolate the manifold prior to tying in the (R) was being reviewed by the licensee's root cause investigation into the event. Pending NRC review of the results of this investigation and subsequent corrective actions, this issue will be tracked as **URI 70-143/2004-08-03**, Fire in the 800 Area.

Note: Event Report 40901 states that the fire was in the Off-Gas Process Line. Radiological hazard involved a quantity of highly enriched Uranium

70-143/2004-08-02 URI Improper Actions During Criticality Alarm

On August 2, a criticality alarm occurred due to momentary high readings on the (R) detector pair. The cause for the spike in readings was unknown at the time. Subsequently, the licensee determined electrical interference from a malfunctioning circuit was the cause and was engineering a solution. The Inspector observed evacuation and recovery actions, noted the licensee diligently analyzed radiation levels with local surveys to ensure a criticality had not occurred, and noted no significant deficiencies. The licensee identified that later on August 2, at approximately 12:15 pm, troubleshooting was in progress with the speaker amplifiers off in accordance with procedure NFS-HS-A-21. A system alarm occurred and, contrary to NFS-HS-A-21, supervisors analyzed criticality monitor readings, concluded no criticality had occurred, and did not energize the speaker amplifiers to sound an evacuation alarm. Thus, **a criticality accident alarm occurred but no site evacuation occurred**. Pending further NRC review of this event, this issue will be tracked as unresolved item (**URI 70-143/2004-08-02**), Improper Actions During Criticality Alarm.

70-143/2004-08-01 NCV Failure to perform nuclear criticality safety inspection

On August 8, 2004, the licensee identified in PIRCS report 3050 that an NFS supervisor failed to perform a daily nuclear safety inspection in accordance with procedure NFS-HS-CL-25, Revision 2, Nuclear Criticality Safety, UNB, step 4.12.2, Supervisory Inspections. This inspection was to be performed daily while the facility was manned by operations personnel. On August 8, the licensee was unloading a truck containing uranyl nitrate. The **supervisor, normally assigned to the oxide conversion building (OCB), was filling in for the UNB supervisor on that day. It was the third time he had filled in as the UNB supervisor.** He had been trained on CL-25, but **forgot to perform the procedurally required inspection.** Licensee corrective actions included refresher training on procedural requirements. **Failure** to perform the daily supervisor nuclear criticality inspection, when operations personnel were in the building, prior to receiving a shipment of uranyl nitrate, was a violation of NRC requirements. 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, (NCV 70-143/2004-08-01), failure to perform nuclear criticality safety inspection.

Conclusions: The inspector identified a non-cited violation for failure to follow the licensee's nuclear criticality safety procedure for the Uranyl Nitrate Building

70-143/2004-08-05 IFI Removal of lamps, which are a fire hazard

On August 3, 2004, inspector responded to a fire (R). A ceiling light fixture (R) caught fire. Fire was the result of the failure of the lamp element inside the light fixture causing the acrylic reflector to catch fire and melt.

During follow up reviews, the inspector discussed the root cause and proposed corrective actions as a result of the fire with licensee staff. PIRCS report 2975, stated that the investigation would be completed in one week's time. The licensee had performed an apparent cause investigation. However, **due to competing issues and communications problems among licensee staff, the investigation took two weeks to complete. The light fixture was removed on August 18, 2004.** The licensee continues to work on this issue to determine the extent of condition of an apparent fire hazard with the old style lamp and availability of a different style lamp, which would not produce molten metal fragments upon failure. **However, at the time of this inspection, the licensee had not established a project to replace the lamps, which were a fire hazard.** Since no project had been established to replace the lamps, this issue will be tracked as inspection follow-up item, (IFI 70-143/2004-08-05), removal of lamps which were an apparent fire hazard.

Observations and Findings:

On July 14, 2004, the inspector observed a spray release of water and dilute sodium hydroxide solution from a flange in the feed piping (R) while the flange was being disassembled for maintenance. Solution sprayed supervisor in chin and

neck area below the face shield. **Investigation revealed the precautions taken to depressurize system were inadequate** and also that the chemical resistant suit should have been closed at the neck.

Inspector noted that stacks (R) accounted for greater than 90% of the airborne radioactive material released from the facility from January 1, 2003 to August 4, 2004. As of December 31, 1003, the licensee's facility consisted of 16 airborne release stacks. **The inspector noted that although stacks (R) were reported as having air emissions greater than the ECL specified in 10 CFR Part 20, the concentrations at the off-site locations were significantly less than the concentrations reported at the stack due to the atmospheric dispersion that occurs before the effluents exits the site.**

Inspector noted that from August 2003 to April 2004, stack (R) had frequently exceeded licensee established action points. In each case, the licensee took appropriate action and issued a Notification and Investigation of Elevated Stack Effluent Concentration for stack (R) to the responsible building manager in accordance with health and safety procedure NFS-HS-A-54, Effluent Control and Environmental Monitoring Action Levels and MDC Requirements, Revision 4, April 15, 2003. The licensee recognized that the action levels were lowered in May 2003 to accommodate the ALARA goal for radioactive airborne emissions. Upon review of the action levels, the licensee determined that they appeared to be set at unnecessarily low levels, since when the action levels were exceeded, it would result in a negligible individual dose. Licensee indicated that a re-evaluation of the technical basis for the action levels specified in NFS-HS-GH-40 be completed to determine if the action levels should be increased.

Inspector noted that volume of waste stored in warehouse was high relative to the availability of storage space. Also there was evidence of **water intrusion problems from the roof of the facility.**

10/06/04 **Exercise of Enforcement Discretion** (NRC Inspection Report No. 70-143/004-04, Nuclear Fuel Services, Inc. – Docket No.70-143)

Violation involved NFS's identification of a previously unidentified failure mode for a piece of safety-related equipment during an Integrated Safety Analysis (ISA) review required by 10 CFR Part 70, Subpart H. **(2-1/2 lines redacted)**. Because the instrument did not meet its performance criteria, only one credited criticality control (Redacted) in place. The amount of material available was sufficient to form a critical mass, and the inability of the instrument to perform its specified criticality safety function under certain conditions constitutes a violation of Section 4.1.1.1. of NFS's License Application.

Therefore, to emphasize the importance of self-identification and correction of violations, and in consideration of the merits of this case, **I have been authorized, after consultation with the Director, Office of Enforcement, to**

propose that neither a civil penalty, nor Notice of Violation be assessed or issued in this case. (Last 11 lines Redacted). Signature: /RA/ William D. Travers, Regional Administrator.

10/18/04 NRC Inspection Report No. 70-143/2004-11, Operational Readiness Review, August 16 through August 20, 2004 and August 30 through September 3, 2004. **ML081440452**

Purpose of the inspection was to determine whether activities specified in license Amendment 51, dated July 30, 2004, and the associated Safety Evaluation Report could be conducted safely and in accordance with NRC requirements. License amendment authorized the operation of the Oxide Conversion Building (OCB) and Effluent Processing Building as the third phase of the Blended Low Enriched Uranium (BLEU) Project.

Operations/Nuclear Criticality Safety/Fire Protection/Management Measures:

As a result of the inspection, several SRE tests and other IROFS documents were revised to adequately demonstrate and document the IROFS safety function

Two setpoint calculations had not been formally documented

Items identified as "sole IROFS" for the OCB were adequately implemented and provided the required safety function. IROFS that had been modified by the licensee after the NRC approved the ISA Summary maintained their specified safety functions and were within the scope of modifications allowed by NRC regulations and guidance.

Management measures for IROFS, as described in the ISA Summary **appeared to provide adequate administrative controls for configuration, maintenance, functional testing, periodic maintenance and audit review**

The NCS evaluations for two process areas were found by inspectors to need improvements.

One fire safety system was identified by inspectors to have not been adequately tested.

11/01/04 NRC Inspection Report No. 70-143/2004-09, August 22, 2004 through October 2, 2004, (Non-Cited Violation), **ML081440455**

70-143/2004-09-01 NCV Failure to wear required personal protective equipment

The inspector reviewed two events involving failure of equipment containing special nuclear material. On September 21, the licensee identified a pin-hole in

the (R) in the BPF. The hole was underneath a (R) which had experienced a failure and the licensee concluded the most likely cause of the hole was electrical arcing. Minor levels of contamination were noted and corrected and the hole was weld-repaired.

On September 23, the licensee identified a complete failure of the (R), which allowed material to spill out. Several personnel were contaminated while attempting to contain the material. The highest level noted was approximately 565,616 disintegrations per minute per 100 square centimeters (dpm/100cm²) on one arm, which was successfully decontaminated, and 10-20 dpm/100cm² in each nostril of same person. Bio-assay samples were collected from personnel in the vicinity and results were noted by the inspector to be below investigation levels. High-volume air samples collected in the area indicated airborne activity levels were below the derived air concentration (DAC) limit for the area. No significant deficiencies were noted in licensee response to either incident.

Based on personnel dosimetry results as of September 2004, the maximum assigned Deep Dose Equivalent (DDE) and Committed Effective Dose Equivalent (CEDE) exposure were well below regulatory limits and ALARA goals. The total effective dose equivalent (TEDE) of occupational workers associated with fuel manufacturing activities had decreased in comparison to the previous reporting period. The licensee attributed the decrease to implementation of the ICRP 68 dose methodology, which was implemented in January 2004. **However, in the down blending areas, the licensee noted an increase in the DDE. The increase was attributed to the radioactive material inventory and the nature of selective work activities, including interaction with the BLEU material, which had an increased external gamma hazard.** The licensee continued to make ongoing improvements in the down blending area to further reduce the external gamma hazard. At the time of this inspection, the licensee used personnel dosimetry badges along with Self-Reading Dosimeters (SRD) in the receipt, check-weighing, movement and operation of the BLEU material. The licensee compared the SRDs to the personnel dosimetry badges (used for final dose record) to evaluate the external exposures for select operations. Most readings with few exceptions were within the monthly-established ALARA goal.

After interviewing the licensee's staff and reviewing the licensee's monthly Health Physics reports and radiation work permits, the inspector determined that the licensee had experienced an unusually high incidence of radiological contamination problems in the BPF. Upon further review of the PIRCS, the inspector determined that **eight personnel contamination events were recorded in PIRCS for the month of August 2004.**

The inspector reviewed several of the events in detail by reviewing the incident logs and interviewing the radiation staff and personnel involved in the incidents. One of these incidents, documented in PIRCS 3175, occurred on August 26, 2004. A licensee operator cleaned up a spill in the BPF facility, wearing latex gloves,

safety glasses and coveralls issued by the plant. **Chemical gloves and a chemical apron were not utilized.** Contamination was detected when the individual was surveyed. A survey of the individual after decontamination showed contamination levels of 40,000 dpm/100cm² on the lower portion of the individual's arms and both sleeves of the coveralls and 1100 dpm/100cm² in the operator's hair. A maximum activity of 65,659 dpm/100cm² was detected on the individual's right arm. Decontamination was successful, and lapel and bioassay results showed minimal activity. SOP-409, General Requirements for the BLEU Preparation Facility, Section 1, Chemical Spills, required individuals to wear, as a minimum, face shields or safety glasses, chemical gloves and chemical apron, when spills were out of containment. **Failure to utilize the chemical gloves and chemical apron was a violation of NRC requirements.** 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, (NCV 70-143/2004-09-01). The licensee's corrective actions included requiring radiation work permits (RWPs) for cleanup of future spills and supplemental training for personnel on cleaning up spills.

The inspector determined from other PIRCS entries and further discussions with the licensee regarding the incidents that the personal protective equipment (PPE) originally used for general cleanup was inadequate for certain jobs in that the suits tore easily. After further investigation, the licensee switched to more durable equipment. In addition, the licensee stated that operators were not doffing the PPE correctly, and **cross contamination had occurred in several incidents.** The inspector determined that after the incidents the licensee had incorporated additional training on doffing PPE, cleaning up chemical spills and requiring a radiation work permit for cleaning up spills and leaks.

70-143/2004-09-02 IFI Verify the adequacy of the corrective actions to resolve the areas of poor exercise performance

Section 7.3.1 of the Emergency Plan required that an emergency exercise be conducted biennially. The inspector reviewed the exercise scenario and objectives for adequacy in testing the onsite response capability. The inspector also evaluated the licensee's performance in responding to the simulated emergency and the critique to self identify areas of improvement.

The inspector compared the exercise scenario to training exercises conducted by the licensee to ensure that the participants were not trained on similar conditions as those postulated for the NRC evaluated exercise. No problems were noted. The exercise scenario simulated (R) at the BLEU Complex which resulted (R). The scenario was realistic and well planned. The use of props at the incident scene enhanced the experience for responders and observers.

Offsite exercise participants included local fire departments, Quality Care Ambulance Service, Unicoi County Memorial Hospital, and Johnson City Medical Center (that included air transport of a simulated injured victim by

helicopter), and Unicoi County Emergency Management. The licensee's response to manage the postulated accident was considered minimally successful. The emergency classification was correctly determined in a timely manner, notifications to offsite authorities were completed within the required time limits, initial protective action recommendations based on accident conditions were correct, and frequent discussions were observed between the licensee and Unicoi County Emergency Management authorities.

However, the **inspector noted the following aspects of the licensee's performance was inadequate: poor command and control of activities at the incident scene as related to access control and contamination control; no briefing was provided to offsite response personnel at the incident scene or the Emergency Control Center (ECC); no dosimetry or radiological survey personnel was assigned to the offsite fire brigade for monitoring potential exposures and contamination to personnel and equipment; the response to provide triage to victims was delayed; and the failure to assign radiation protection personnel with survey equipment to accompany the contaminated accident victim to the Unicoi County Hospital for assessing and advising medical personnel regarding contamination.**

The licensee acknowledged the areas of poor performance and attributed the weaknesses to the lack of resources to support the On-Scene Coordinator, and procedural changes necessary to ensure that the appropriate actions were being taken by support groups in the implementation of response activities. The licensee stated that corrective actions would be taken to resolve the weaknesses and a limited scope drill would be conducted to determine the adequacy of the corrective actions. The licensee was informed that the corrective actions to resolve the response weakness would be tracked as an inspector follow-up item (IFI 70-143/2004-09-02). The licensee conducted a critique following the exercise which afforded players, controllers, evaluators, and observers an opportunity to provide comments. The critique was a candid assessment of the response and several items were identified by the licensee for program improvement or corrective actions.

12/09/04 NRC Inspection Report No. 70-143/2004-206 and Notice of Violation, **Severity Level IV, November 1 through 5, 2004** (Criticality Safety Inspection), **ML081440245, ML081440507, ML081440515, ML081440516**

70-143/2004-206-01 VIO Failure to comply with the (R) material handling requirements of 55T-04-0033 and the Station Limits Card requirements of NFS-HS-CL-19-01

During a tour of the BPF, the **inspectors identified two examples where grossly contaminated and visibly damp absorbent material were not being stored in accordance with licensee procedure 55T-04-0033. The inspectors noted that**

the as-found absorbent material was stored in potentially unfavorable geometry plastic bags having potential volumes greater than (R). The inspectors observed that the plastic bags had been used to seal the bag-out ports (R).

On and before November 2, 2004, the licensee failed to comply with the (R) material handling requirements of 55T-04-0033. Specifically, the **licensee did not store contaminated absorbent material (R).** The failure to comply with the (R) material handling requirements of 55T-04-0033 is an example of **Violation (VIO 70-143/2004-206-01).**

During a walkdown of the (R) Warehouse the inspectors noted a criticality safety posting near the receiving desk that was different than the others in the building. A licensee criticality safety engineer noted that the posting was a previous version that did not arise from a criticality safety analysis. The licensee immediately removed the outdated posting. Section 2.7 of the license application requires operations and safety function activities to be conducted in accordance with written procedures. Step 1.0 of licensee procedure NFS-HS-CL-19-01, "Nuclear Criticality Safety (R) Warehouses," Revision 3, dated October 25, 2004, states, in part, "This supplement documents the currently approved Station Limits Cards for the Warehouses. The Station Limit Cards are to be posted on or near each location and it must be in accordance with this document." Contrary to the above, on or before November 2, 2004, the licensee had a criticality safety posting displayed in the (R) Warehouse which was not at an approved location and was not in accordance with the procedure. Specifically, the licensee had an outdated posting displayed at the (R) Warehouse receiving desk. The **failure to comply with the Station Limits Card requirements** of NFS-HS-CL-19-01 is another example of **Violation (VIO 70-143/2004-206-01).**

70-143/2004-206-02 IFI Tracks development of additional guidance to ensure accurate and complete technical reviews

On and before November 2, 2004, the licensee failed to ensure the completeness and accuracy of the basis for NCS evaluation 54T-04-0119. The licensee's failure to ensure the completeness and accuracy of the basis for NCS evaluation 54T-04-0119 is a violation of minor risk significance and will not be subject to further enforcement action.

During the inspection, the licensee agreed to develop additional guidance for technical reviews to ensure that reference documents that justify the technical bases of subcritical limits are accurate and complete before operational implementation. The licensee's development of additional guidance to ensure accurate and complete technical reviews will be tracked as Inspection Follow-up Item (IFI 70-143/2004-206-02).

70-143/2004-206-03 IFI Tracks upgrading of criticality alarm system coverage calculations

During a tour of the (R) warehouse, the inspectors observed (R) material storage bins (R). The bins were in use for storage of (R) material. Licensee staff indicated that the bins had been in the warehouse for approximately 20 years, had originally been used for the storage of (R) material in shipping configuration and were not required for currently stored material. Licensee staff also indicated that the criticality alarm coverage calculation for the (R) Warehouse was one of the oldest calculations and did not consider the presence of the high density bin walls. During the inspection, licensee staff demonstrated coverage of the warehouse by performing a point depletion calculation. The inspectors agreed that the result given by the licensee calculation adequately demonstrated that the minimum accident of concern would not be shielded from the criticality alarm system detectors by the high density concrete bin walls.

Based on the inspectors' original concern that the calculations for the (R) Warehouse were dated, licensee staff indicated that the 15 criticality coverage calculations were being updated with 11 already completed. The remaining four calculations are expected to be completed next year. Upgrading of criticality alarm system coverage calculations will be tracked as (IFI 70-143/2004-206-03).

70-143/2004-206-04 URI Tracks licensee's investigation of the aborted transfer and identification of long-term corrective actions to prevent recurrence

On October 26, 2004, the licensee initiated a transfer of low concentration highly enriched uranium solution from the favorable geometry caustic discard tanks associated with the process to an unfavorable geometry receiving tank. The licensee determined that the transfer was initiated based on samples from a previously transferred, solution batch. The licensee reported that the transfer was terminated by activation of an active engineered control, initiated a full team TapRoot investigation, and a facility safety-stand-down. Immediate corrective actions taken by the licensee included sampling and laboratory analysis of the solution held up in the discharge line, non-destructive analysis scans of the receiving tank and transfer lines.

The licensee's investigation into the cause of the aborted transfer was not completed by the end of the inspection. The licensee's investigation of the aborted transfer, and identification of long-term corrective actions to prevent recurrence will be tracked as Unresolved Item (URI 70-143/2004-206-04).

The licensee NCS procedure for the BPF requires NCS approval of temporary fixtures used in the facility. The licensee issued an LOA to allow the transfer of solution to facilitate inventory. The inspectors were concerned that the LOA did not specifically control the fixture, a flexible hose, used for the procedure by specifying diameter, length, or connector information. The licensee agreed that this was an important aspect of actually controlling temporary fixtures. Section 2.7 of the license application requires operations and safety function activities to

be conducted in accordance with written procedures. The LOA, in Section 3.3, specified that the hose must be attended at all times when removed from the approved storage location.

Contrary to the above, the licensee reported that on October 25, 2004, the hose was found connected to the system and unattended after the operation was completed. The licensee immediately removed the hose. The licensee viewed the event as an isolated procedure violation of a non-NCS requirement. The inspectors noted that the risk significance of the procedure violation was low due to the shape and length of the hose and the expected M material content of the transferred solution. 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.

Conclusions: In the area of NCS reported events, an unresolved item was identified associated with the licensee's investigation of the aborted transfer of highly enriched uranium solution from favorable geometry to unfavorable geometry, and **identification of long-term corrective actions to prevent recurrence. A non-cited violation was identified associated with the discovery of an unattended temporary fixture in the BPF.**

12/13/04 NRC Inspection Report 70-143/2004-10 and Notice of Violation, **Severity Level IV**, October 3, 2004 through November 13, 2004, **ML081440453**. (Note: **Inspection Report is in two (2) parts**).

Closed:

70-143/2003-09-01 VIO Failure to meet nuclear criticality safety limits for a transfer of liquid process waste.

The inspector noted that on October 26, **the licensee shut down high-enriched uranium operations in the BPF due to an unfavorable trend in operational events**. These events included an item relied on for safety (IROFS) out of service due to operational errors (see paragraph 5.b of this report), procedural requirements not followed for temporary equipment (see **NRC report 70-143/2004-206**), and failure to follow criticality safety requirements for discard of waste containing (R) material (see **NRC report 70-143/2004-206**). The inspector followed licensee investigations and self-assessment and corrective actions during this period, which **included oversight by a special board comprised of NFS management and non-NFS consultants**. The **senior BPF project and operations management team had been changed on October 4**, and the new team prepared a plan to address operational issues, training, housekeeping, supervision, and review and improvement of procedures. The oversight board reviewed and approved the written plan for restart and operations improvements and committed to individually review the start of each HEU process operation.

Since **inventory was in process with a list date of November 5**, specific instructions were provided for a safe and orderly completion in accordance with approved procedures. Additional supervisory and safety personnel were to cover each shift during the recovery period. **The NFS President and the BPF senior project manager conducted safety stand-down meetings with employees**, and additional seminars were conducted on nuclear criticality safety. Additional on-the job (OJT) training requirements were imposed, and management conducted individual interviews and training sessions with the BPF supervisors. By interviews and personal observations, the inspector verified each of these corrective actions was carried out. **The inspector also attended training and briefing sessions and daily project planning meetings.**

On October 27, the inspector identified an open, intact, plastic bag in a columns area in the BP (R). The bag appeared to have been previously used to contain equipment, but was empty when identified. NFS procedure NFS-HSCL-26 stated unfavorable geometry bags (R) may be opened (R) for the uses specified, and stated the bags shall otherwise be kept flat, closed (by hand), sealed (e.g. taped or heat sealed), or have the bottom corners cut out leaving openings in the bag (R). **Failure to maintain this intact bag in a flat or closed condition was a violation of NRC requirements (VIO 70-143/2004-010-01), Uncontrolled Unfavorable Geometry Container**

Conclusions: The licensee temporarily shutdown HEU operations in the BPF due to violations of operations and safety procedures in order to develop and implement performance improvement measures.

70-143/2004-10-02 NCV Failure to follow operations procedure that lead to a compromised fire safety IROFS (Event #41097, Safety Related Needle Valves in Incorrect Position)

Note: According to the event report, Potential Health and Safety Consequences were **“Potential vulnerability to workers and public of a high consequence event involving failure of safety controls that were designed to prevent a hydrogen explosion in the BLEU Preparation Facility U-Aluminum Dissolution gloveboxes/dissolvers**

The inspector reviewed the circumstances involving the reportable fire safety event that the licensee reported on October 6, 2004 (NRC Event Number 41097). The (R) system had **two fire safety** IROFS systems to prevent a (R) accumulation in the (R) enclosures. During operations on October 6, 2004, an engineer identified that one of the fire safety IROFS systems was inoperable (IROFS (R)).

The needle valves for the rotameters (R) were found to be shut, which prevented the system from being able to perform the (R) nitrogen purge of the system upon detection (R). The second fire safety IROFS system was the trickle-nitrogen flow, which performed a (R) change out (R). No accumulation of (R) had

occurred and the trickle-nitrogen purge was still operational, therefore, the safety significance of the event was low.

However, according to the (R) operating procedure, the rotameter valves (R) were to be verified to allow at least (R) of nitrogen flow prior to initiating operations. **The failure to verify that the rotameter valves were open prior to operations was a violation of NRC requirements.** This non-repetitive, licensee-identified and corrected violation is being treated as a noncited violation (NCV), consistent with Section VI.A.8 of the NRC Enforcement Policy (NCV 70-143/2004-10-02).

Additionally, during the review of the (R) procedure, the inspector noted that the procedure did not have a good method for operators to verify the valve positions of the rotameters. The rotameters could only be verified to have flow during a nitrogen purge. This condition was not stated in the procedure. The licensee acknowledged this and corrected the procedure. The inspector also identified to the licensee that no method existed to allow the system line up to be verified during system operation. The licensee planned to review this deficiency.

The inspector reviewed operations in BPF following the reportable event. The inspector noted that the (R) system was not in stand-by mode as defined in the procedure. The procedure stated that to enter stand-by mode, (R) must be shutdown. The inspector noted that the (R) were still operating, but no solutions or chemicals were being added to the (R) (material was present (R) however). The licensee had kept (R) to avoid excessive wear and tear (R). However, the inspector noted that the current status of the (R) system was not clearly described in the procedure. The inspector informed the area supervisor that the lack of guidance on the operational status of (R) could confuse operators since the area procedure lacked this guidance. The licensee acknowledged the inspector's concerns regarding the lack of guidance on the operational status of the (R) in the procedure.

Open:

70-143/2004-010-03 VIO Failure to maintain configuration control of temporary equipment

The inspector noted the implementation of configuration control following the completion of (R) project was not clearly defined in the Internally Authorized Change (IAC) procedure. Based on interviews conducted with licensee personnel, the understanding was that once drawings for the system were given approval by the Safety and Safeguards Review Committee (SSRC), the drawings (which should be as-built) and system were placed under configuration control. The inspector informed the licensee that the lack of guidance for defining when a system is placed under configuration control was a weakness. The licensee stated that the procedure would be reviewed to address the issue.

One violation was identified for the failure to properly implement the work request procedure for an IAC. A weakness was noted in the licensee's procedure for implementing configuration control in IACs.

Closed:

70-143/2004-08-03 URI (R) **(Fire, July 27, 2004)**

The inspector followed-up on unresolved item (URI) 70-143/2004-08-03 (R) By reviewing the licensee's completed investigation that was performed for the fire that occurred on July 27, 2004 (NRC event number 40901). The licensee's investigation determined that prior to beginning operations, a temporary manifold was installed for calibration purposes. Due to delays in performing the calibration, the manifold was unknowingly left on the equipment after the work request for the installation of the system was completed. By that time, operations were authorized to begin introducing chemicals into the (R). Shortly after the introduction of chemicals, a fire occurred in the (R) due to the explosive gases traveling through the temporary manifold into the inert gas lines. According to Section 5.20 of SOP 392, "Work Request," during the installation of equipment, the initiator should have noted changes that deviated from the approved installation work request. The inclusion of the temporary manifold into the system without either a work request authorizing its installation, or the modification of the installation process drawings approved by the Safety and Safeguards Review Committee (SSRC), constituted a failure to note changes that deviated from the approved installation. The licensee's investigation also noted that the licensee had not closed the gas sampling valves that the temporary manifold was connecting, which allowed the explosive gas to mix into the inert gas line, resulting in the fire.

The Letter of Authorization (LOA) that authorized the operation of the new units (LOA-1903J-083) indicated that the gas sampling valves were to remain closed during operations. Prior to July 27, 2004, the licensee failed to close the gas sampling valves during operations. These two examples of failure to follow procedures constituted a violation of NRC requirements (VIO 70-143/2004-010-03). URI 70-143/2004-08-03, Fire (R) is closed.

Discussed:

70-143/2004-08-05 IFI Removal of lamps which are a fire hazard

Removal of lamps, which are a fire hazard. This issue concerned metal halide lamps in the facility which have the potential to ignite the lighting fixture upon failure. The inspector discussed with the licensee the corrective actions available to address the potential fire hazard posed by the lamp bulbs currently installed at the plant. The licensee had yet to decide on a course of action with regard to the replacement of the lamp bulbs, if any were going to be replaced. This item remained open.

Observation: Housekeeping in the BPF. Inspector noted excessive accumulation of potentially contaminated trash, in that unfavorable geometry trash containers were overflowing onto the floor. The inspector found that the licensee did not have an approved process for the disposal of more than minor amounts of radioactive trash, and during an intense maintenance period, was initially unable to package and remove radiologically contaminated trash at the rate it was generated.

12/16/04 Closed Meeting to be held January 5, 2005 with the NRC. **Purpose is to afford NFS, Inc. the opportunity to discuss its performance since the last management meeting and the results or outcomes achieved thus far in improving both safety culture and regulatory performance. ML081500236**

2005

02/11/05 NRC Inspection Report 70-143/2004-207 and Notice of Violation, (Criticality Inspection), **Four (4) Severity Level IV Violations, December 13, 2004 through December 17, 2004, ML081440512 and ML081440512**

70-143/2004-207-01 VIO Failure to comply with the unfavorable geometry bag handling requirements of NFS-HS-CL-27

During a tour of the Oxide Conversion Building (OCB) Conversion Area, the inspector identified an open, unfavorable geometry bag (R) which was not kept flat, closed (by hand), sealed, or had the bottoms cut out leaving two openings in the bag of at least (R) in length as required by Section 4.10.3 of licensee procedure NFS-HS-CL-27. The inspector observed that the bag had not been closed, modified, or removed from the area upon completion of the activity, which required the use of the bag.

Safety Condition No. S-1 of Special Nuclear Material License No. 124 requires that material be used in accordance with the statements, representations, and conditions in the license application dated July 24, 1996, and supplements thereto. Section 2.7 of the license application requires operations and safety function activities to be conducted in accordance with written procedures. Step 4.10.3 of licensee procedure NFS-HS-CL-27 requires bags be opened for the minimum time necessary to perform the task. Otherwise, unfavorable geometry bags shall be kept flat, closed (by hand), sealed, or have the bottoms cut out leaving two openings in the bag (R) of in length.

Contrary to the above, on and before December 14, 2004, the licensee failed to comply with the unfavorable geometry bag handling requirements of NFS-HS-CL-27. Specifically, the licensee did not close, modify, or remove the unfavorable geometry bag from the area upon completion of the , which required

the use of the bag. The licensee's failure to comply with the unfavorable geometry bag handling requirements of NFS-HS-CL-27 is a low risk-significance violation of Section 2.7 of the license application (VIO 70-14312004-207-01).

70-143/2004-207-02 IFI Failure to get NCS approval prior to storing (R) containers

The inspector observed that the nuclear criticality safety evaluation (NCSE) for the (R) had been recently revised to account for the storage of (R) containers. The inspector noted that the previous station limit card for the storage (R) had authorized a maximum of (R) shipping cans, which have approximately (R) containers. The inspector noted that the licensee's investigation into the issue determined that the storage of (R) containers on (R) had begun without the prior NCS approval required by Section 4.1.6 of the license application. The inspector reviewed the licensee's revised NCSE, including Monte Carlo calculations, and verified that the storage of the (R) containers was of low risk significance since system reactivity with the (R) containers did not exceed the 0.95 upset limit. This non-repetitive licensee-identified and corrected violation is being treated as an NCV consistent with Section VI.A.8 of the NRC Enforcement Policy. (NCV 70-143/2004-207-02).

70-143/2004-207-03 IFI Tracks the licensee's actions to adequately justify the acceptability of replacing an engineered control with an administrative control

The inspector observed that the NCSE for the Downblending operation had been recently revised to replace an active engineered NCS item relied on for safety (IROFS) with an administrative control. The inspector noted that IROFS (R), the Rosemount density transmitter on the staging columns, had previously been relied upon to isolate the favorable geometry staging columns from the unfavorable geometry blending tank when the concentration of highly enriched uranyl nitrate was less than (R).

Given recently observed human performance issues in the BLEU Preparation Facility (e.g., October 25, 2004, reportable event associated with failure to sample uranium (R) solution prior to transfer from favorable to unfavorable geometry tanks), the inspector questioned the licensee's justification for replacing the engineered Rosemount control with an administrative sampling control when the root cause investigation team for the reportable event recommended replacing another administrative sampling control with an active engineered control.

During the inspection, the licensee committed to ensure that the NCSE for Downblending adequately justified the acceptability of replacing an engineered control with an administrative control in a human performance challenged operating environment. The licensee's actions to adequately justify the acceptability of replacing an engineered control with an administrative control will be tracked as Inspector Followup Item (IFI 70-143/2004-207-03).

70-143/2004-207-04 IFI Tracks the licensee's actions to revise the NCSE for the Scrap Dissolver operation

The inspector noted that double contingency (R) of the NCSE for the Oxide Conversion Building Scrap Dissolver was not adequately established. The inspector observed that (R) required supervisory permission to unlock a transfer valve in the line between a favorable geometry mop sink and the unfavorable geometry natural uranium dissolver. The inspector observed that double contingency protection was provided by two administrative controls: (1) the prohibition on transfer of containers from the enriched uranium process areas to the natural uranium process area; and (2) the requirement for a supervisor to unlock the transfer valve isolating the mop sink from the natural uranium dissolver. According to the NCSE, the supervisor was expected to unlock the transfer valve when he/she determined that the solution to be transferred contained only natural uranium. The inspector questioned the adequacy of this control since the supervisor would not normally be present when the mop sink was filled, and would have no means for positively verifying solution enrichment (e.g., no requirement to perform dual, independent sampling prior to transfer).

The inspector determined that double contingency (R) had, therefore, not been established. Because the Scrap Dissolver part of the Oxide Conversion Building had not been granted readiness to operate by the NRC, and the mop sink was not authorized for use, the inspector determined that the licensee's failure to establish double contingency for (R) was a violation of minor safety significance, and not subject to further enforcement action. During the inspection, the licensee committed to revise the NCSE for the Scrap Dissolver operation to adequately demonstrate double contingency protection. The licensee's actions to revise the NCSE for the Scrap Dissolver operation will be tracked as (IFI 70-143/2004-207-04)

70-143/2004-207-05 VIO Failure to ensure that k-effective values for credible abnormal conditions did not exceed the 0.95 limit

On December 17, 2004, the licensee transferred materials to a storage area without being transferred thru a particular device as required by the Standard Operating Procedure (SOP). This device was designed to prevent a more reactive/incorrect material type from being transferred to the storage area. In the unlikely event that a more reactive/incorrect material type was added to the process, the particular device prevented this material from being transferred to the storage area. A root cause investigation was initiated as a result of the event. Transfers via (R) equipment were suspended until compensatory measures could be put in place. A Letter of Authorization (LOA) was put in place which highlighted the use of the transfer device and which required additional labeling of the components in the system. In addition, the NCSE was reviewed to

determine whether the device should have been credited as an administrative control or eliminated altogether.

The inspector reviewed (R) NCSE and noted that the accident analysis focused on the potential for criticality in the storage area. The inspector observed that controls for preventing the introduction of more reactive materials and the installation of the passive engineered device were selected by the licensee to demonstrate that the likelihood for transfer of the more reactive materials to the storage area was highly unlikely. The inspector noted that the licensee performed calculations on the storage area to further demonstrate safety margin by assuming the more reactive materials had been transferred to the storage area. The inspector questioned, however, the credibility of the accident analysis since a credible mechanism for transferring the more reactive materials could not be postulated. The inspector also questioned whether the licensee's consideration of the more reactive material being in the storage area adequately demonstrated that the 0.95 k-effective limit was not exceeded for credible abnormal conditions.

The inspector reviewed the input file referenced by the NCSE for the (R) system which included the more reactive material in the storage area and independently verified the k-effective reported in the (R) NCSE. The inspector modified the input file to relocate the more reactive materials to the head end of the process and observed that the calculated k-effective exceeded 0.95. The inspector determined that placing the more reactive materials in the head end of the process, (R) produced a more reactive configuration than the base case considered in the NCSE.

The inspector discussed this issue with the licensee's NCS engineer and determined that the calculation referenced in (R) did not support the licensee's position that introduction of a single batch of more reactive material into the head end of (R) would be less than 0.95. The licensee's NCS engineer performed additional calculations with more realistic modeling assumptions (e.g., offset reflection) and was able to demonstrate the resulting k-effective would be less than 0.95. Although (R) did not credit the reflection controls credited (R) in the NCSE, the reflection controls were adequate to keep the system k-effective less than 0.95.

Safety Condition No. S-1 of Special Nuclear Material License No. 124 requires that material be used in accordance with the statements, representations, and conditions in the license application dated July 24, 1996, and supplements thereto. Section 4.2.3 of the license application requires that the k-effective for a failure or a single contingency not exceed 0.95, including bias and uncertainty. (R) of 54X-04-0001, "Nuclear Criticality Safety Analysis (R) Facility," Revision 0, dated March 9, 2004, identifies the introduction of more reactive materials in (R) as a failure or single contingency.

Contrary to the above, on March 9, 2004, (R) NCSE failed to ensure that the introduction of the more reactive materials in (R) process would not result in a k-effective exceeding **0.95**.

Specifically, (R) analysis did not consider optimal placement of the more reactive material. Because reflection controls were maintained, the licensee's failure to ensure that k-effective values for credible abnormal conditions did not exceed the 0.95 limit is a low risk-significance violation of Section 4.2.3 of the license application (**VIO 70-143/2004-207-05**).

Conclusions: In the area of NCS reported events, a violation was identified regarding the failure to ensure that k-effective values for credible abnormal conditions did not exceed the 0.95 limit.

70-143/2004-207-06 VIO Failure to demonstrate that the concentration was less than (R)

Safety Condition No. **S-1** of Special Nuclear Material License No. 124 requires that material be used in accordance with the statements, representations, and conditions in the license application dated July 24, 1996, and supplements thereto. Section 4.1.1 of the license application requires that all process equipment and systems be designed to incorporate sufficient factors of safety to require at least two unlikely, independent, and concurrent changes in process conditions before a criticality is possible (R) of NCSE 54T-04-0014, Revision 2, dated April 2, 2004, identifies the requirement to demonstrate by way of dual samples and analyses that the U235 is less than (R) before liquid waste effluent is released from favorable geometry (R) to unfavorable geometry tanks.

Contrary to the above, on October 25, 2004, the licensee released liquid waste effluent from the Caustic Discard (R) without the demonstration that the U235 concentration was less than (R). Because less than a safe mass of enriched uranium was involved in the transfer, the licensee's failure to demonstrate that the concentration was less than (R) is a low risk significance violation of Section 4.1.1 of the license application (**VIO 70-143/2004-207-06**).

02/18/05 NRC Inspection Report 70-143/2004-12 and Notice of Violation, **Severity Level IV**, November 14, 2004 through January 22, 2005, **ML081440451**

One (1) violation in the area of **implementation of changes to procedures**. **One (1) apparent violation and three (3) non-cited violations**

Closed:

70-143/2004-12-01 NCV Failure to Follow Posted Criticality Safety Instructions.

On October 8, five sample bottles exceeded the mass limit specified on the criticality safety posting for individual bottles. Additionally, when received into the lab, the samples were not weighed as required by the criticality safety posting. The licensee's investigation found that the total mass limit for the lab stations were not exceeded. **Failure to follow the posted criticality safety instruction was 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 (NCV 70-143/2004-12-01), Failure to Follow Posted Criticality Safety Instructions.

70-143/2004-12-02 VIO Failure to complete training on procedural changes.

The inspector reviewed the licensee's training system in regard to issuing procedural changes in the form of letters of authorization (LOAs). The inspector found that LOA 1953K-006 was issued to improve a safety measures (R), and was effective on December 21, 2004. On January 5, 2005, the inspector found that the information tags required by the LOA were installed as required, but that training for all supervisors and operators had not been completed. Further review revealed that the LOA had not been entered properly into the training and qualification (T&Q) system as a job requirement. After the corrected entry in the T&Q system was made, the inspector found that some operators were still assigned without having completed the required training. In review of this item, the inspector noted new procedures or changes are put into the T&Q system and the system puts qualified operators in a "disqualified" status until training is completed. Normal shift job assignments then cannot be made for those operators since they are in a disqualified status. This routine occurrence is dealt with by supervisors making the job assignments in a "training" status, until the operator completes required training. This practice appears to diminish the effectiveness of the formal qualification system in place, in that no strict control is in place to require operational and safety significant changes to be promptly reviewed. License Application section 2.7.2, Operating Procedure Changes, required analyses, reviews, testing, and training to be completed before procedural changes were implemented. **Failure to complete training on LOA 1953K-006 prior to implementation was a violation of NRC requirements (VIO 70-143/2004-12-02).**

70-143/2004-012-03 IFI Changes to Process Safety Controls

The inspectors reviewed the different mass control systems utilized by the licensee as criticality safety controls for the (R) processes. The NFS (R) system in the BPF area were designed with an engineered criticality safety control system designed to prevent exceeding the allowable mass limit of uranium when loading. This control was known as the Safety Related Equipment Process Logic Controller (SRE PLC). Additional safety controls on control of mass were utilized for the (R) process, depending on the type of feed material. During (R) operations, other items relied on for safety (IROFS) on the system included administrative measures and inspections to limit mass and holdup and a physical barrier to

prevent (R) from (R). During oxide operations, although there were defense-in-depth measures including procedural guidance and posted instructions, only two IROFS were required: the SER PLC and an administrative prohibition on adding (R) to the system.

The SRE PLC system worked on the principal of measuring input and output in order to calculate a mass balance on the (R) process. The input of the system was a direct scale measurement of material being added to the system. The process output was determined by a (R) instrument system, which determined (R) density, volume, and total grams (R)

Operational difficulties and system inaccuracies were apparent in the system as the (R) system went through initial operation beginning in June, 2004.

The licensee addressed one issue of clogged instrument lines by making the instrument taps larger and of a different configuration. The licensee addressed other system problems and published a detailed Error Analysis, which the inspectors reviewed. The analysis documented the errors and inaccuracies in the measurement system arising from the following areas: variability of free acid in the solution; temperature effects and lack of temperature compensation; excessively long runs of instrumentation piping; lack of fine control on nitrogen purge flow; electrical errors including analog to digital signal conversion; an inaccurate SRE PLC software formula; and intrinsic instrument error. The SRE PLC software formula was corrected promptly. Recommendations to address the remaining issues were included in the error analysis. While still evaluating some of the recommendations for implementation, the licensee decided to substitute an administrative control for the safety function performed by the (R) system, and removed the system as an input to the SRE PLC. The resulting system utilized the SRE PLC as an enhanced administrative control that relied on operator action for some measurements and data entry. This modification to the safety controls of the (R) system will be tracked for further NRC review as Inspection Follow-up Item (IFI 70-143/2004-012-03).

70-143/2004-12-04 AV Degraded SRE PLC

Due to the operational difficulties experienced by the licensee, the inspectors reviewed (R) process operation. On January 7th, the inspector identified that the SRE PLC was carrying a negative holdup value (R). Additionally, the inspector noted that in December 2004, the negative balance had been as high as (R). The licensee reviewed the PLC program and determined that a negative balance would be added to the normal operational limit, and therefore the system would not control or limit the mass in the enclosure to specified values. The criticality safety mass limits were (R). The (R) system was operating in the mode when this issue was identified. The process was shut down until the compensatory measures were implemented, which included visual inspections and zeroing the SRE PLC prior to each batch. The inspector reviewed the compensatory measures, prescribed in an LOA, to operate the system and found no issues. Degradation of the safety

function of the SRE PLC was an apparent violation of NRC regulations, which will be tracked as **AV 70-143/2004-12-04**, pending further NRC review.

70-143/2004-12-05 URI Mixing and Sampling Tests Not Completed

During the week of December 13, 2004, the inspectors observed preparations and system operation for the first down-blend operation of the BLEU project. The inspector reviewed sample results from the prepared high enriched blendstock, and verified enrichment and density were less than the specified limits (R)

The inspector noted that some mixing and sampling tests for BPF equipment, required by 10 CFR 74.59, had not been completed satisfactorily at the time of this inspection. Additionally, mixing and sampling tests on the caustic waste storage columns had not been performed even though the system had been in use for the last six months. This issue will be tracked as unresolved item (**URI 70-143/2004-12-05**).

70-143/2004-12-06 NCV Failure to annunciate a CAAS alarm

70-143/2004-08-02 URI Improper Actions During Criticality alarm

This issue concerned the operation of the criticality accident alarm system (CAAS) speaker amplifiers during maintenance operations. The licensee identified that on August 2, at approximately 12:15 pm, troubleshooting was in progress with the speaker amplifiers off in accordance with procedure NFS-HS-A-21. A system alarm occurred due to an inadvertent spike on a detector pair. The personnel monitoring the system analyzed criticality meter readings, concluded no criticality had occurred, and did not energize the speaker amplifiers to sound an evacuation alarm. This action was contrary to NFS procedure HS-A-21, Section 5.8, which required a system alarm condition to be either annunciated on system alarm speakers or announced on the public address system. **Failure to annunciate or announce a CAAS alarm was a violation of NRC requirements.** This non repetitive, licensee-identified and corrected violation is being treated as a noncited violation (NCV), consistent with Section VI.A.8 of the NRC Enforcement Policy (NCV **70-143/2004-12-06**, Failure to annunciate a CAAS alarm.) **URI 70-143/2004-08-02 is closed.**

70-143/2004-207-04 IFI Double Contingency Protection for the Scrap Dissolver

During inspection 70-143/2004-207, the inspectors noted that double contingency for Scenario 1.1.2 of the NCSE for the Oxide Conversion Building Scrap Dissolver had not been adequately established. IFI 70-143/2004-207-04 was opened to track the licensee's actions to revise the NCSE for the Scrap Dissolver operation.

The inspectors observed that double contingency protection for Scenario 1.1.2 (now renumbered as 4.1.5) was provided by two administrative controls: (1) the prohibition on transfer of containers from the enriched uranium process areas to the natural uranium process area; and (2) supervisory verification that the volume of solution being transferred (R). The inspectors noted that the (R) limit was based on calculations demonstrating enriched solution transferred to the unfavorable geometry dissolver tank was necessary to exceed the (R) limit.

70-143/2004-12-07 IFI Contamination (R)

The inspector observed the licensee's actions to address elevated radiation levels measured in the (R) area of BPF. The source of the elevated levels was believed to have been contaminants in the BLEU material in process in the building, as well as storage (R). **Measured radiation levels varied from 0.4 to 12 milli-Rem/hour (mR/hr), with most areas measuring between 0.5 and 1.0 mR/hr.** The licensee had posted a map of radiation levels at the entrance to the space, trained individuals to minimize time in the area, and was monitoring individual dose on a daily basis with digital alarming dosimetry. The inspector noted the elevated readings could cause some operators to reach their administrative limits sooner than the licensee had anticipated. The licensee planned to explore other alternatives, such as temporary or permanent shielding.

The inspector noted the licensee had experienced several occurrences of **contaminated shoes of personnel** (R), and also had identified elevated contamination levels, slightly above the 500 disintegrations per minute (dpm) limit, (R) on several occasions. The inspector noted the licensee performed detailed surveys, improved cleaning practices in the area, and also reviewed and improved some work practices in an effort to reduce contamination levels. These efforts reduced instances of excessive contamination but did not eliminate the problem. This issue will be tracked for further NRC review as inspection followup item (IFI 70-143/2004-12-07).

Closed:

70-143/2004-12-08 NCV Failure to perform contamination survey

On November 10, the licensee, removed contaminated trash (R) without a contamination survey and without other controls such as enclosing the trash bag in a second, clean, plastic bag. The licensee properly documented the problem and the planned corrective actions in PIRCS. NFS procedure GH-01 required items being removed from a controlled area to be surveyed before release. **Failure to survey items removed from a controlled area was 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 (NCV 70-143/2004-12-08), Failure to perform contamination survey.)

01/25/04
to 01/22/05

NRC License Performance Review of NFS, ML081370278

The LPR for the previous review period also concluded that management oversight for certain operations needed improvement. Weaknesses in oversight and procedural compliance have continued into this LPR period and now have been, found in new or modified operations. As such, your prior corrective actions have not been broadly effective. In new or modified operations, a number of procedural violations were identified, many of which stemmed from operational difficulties during facility/process start-up and in the control of modifications. Our current review also concluded that improvements were needed in the development and documentation of nuclear criticality safety bases and the oversight of your (R) program. We note that your longer-term corrective actions, in response to previously identified (R) issues, are expected to improve your (R) program

The results of our review will be discussed with you at your facility on April 14, 2005. The meeting will be closed to the public and will discuss the material in the enclosure, which pertains to sensitive unclassified information.

NFS' performance and ongoing facility changes warrant increased NRC oversight with additional inspection effort. The regulatory oversight will continue at an increased level and involve routine inspections of facility modifications, with a focus on new operations, and continuing actions to improve management oversight of safety performance, including the review of nuclear criticality safety evaluations.

PERFORMANCE AREA: SAFETY OPERATIONS. This area is comprised of chemical safety, nuclear criticality safety (NCS), plant operations, and fire safety. Program Areas Needing Improvement:

Procedural adherence in new or modified operations areas

The licensee compromised an item relied on for safety (IROFS) when they **failed** to demonstrate that the concentration of the material in the (R) BLEU Preparation Facility (BPF) was less (R) prior to discharge (**VIO 2004-207-06**).

The licensee compromised an IROFS when they **failed** to control (R) unfavorable geometry bags that were open and unattended (R) (**VIO 2004-201-01**).

The licensee compromised an IROFS when they **failed** to remove an unfavorable geometry bag from the Oxide Conversion Building process area after use (**VIO 2004-207-01**).

The licensee compromised an IROFS when they **failed** to remove an unfavorable geometry bag from (R) (**VIO 2004-10-01**).

The licensee **failed** to verify the availability of a fire safety IROFS for the (R) system (Non-cited Violation (NCV 2004-10-02).

The licensee **failed** to follow fire safety procedures that involved new areas/modifications (VIO 2004-03-03).

Improper implementation of the Letter of Authorization (R) allowed a temporary hose to be stored in an area (R) where solutions are processed (NCV in IR 2004-206).

The back-up supervisor for the uranyl nitrate building **failed** to perform the daily NCS inspection (R) (NCV 2004-08-01).

The Letter of Authorization for the (R) was **not properly implemented and led to a fire** (R) (VIO 2004-10-03).

Development and Documentation of NCS Bases

The NCS evaluation (R) **failed** to adequately demonstrate a k-effective below 0.95 (VIO 2004-207-05).

An **engineered control was not capable** of performing the NCS purpose for which it was specified (**Enforcement Discretion**, Inspection Report (IR) 2004-04-02,).

The NCS evaluation for the (R) operation had been modified to replace an active engineered control with an administrative control. The (R) NCS evaluation lacked justification for replacing the engineered (R) control with an administrative sampling control in a human performance challenged operating environment (**Finding in IR 2004-207**).

The NCS Department **failed** to evaluate the use of a new (R) container (R) prior to use (NCV 2004-207-02).

PERFORMANCE AREA: FACILITY SUPPORT. This area is comprised of maintenance and surveillance, training, emergency preparedness, and management controls. Program Areas Needing Improvement:

Control of modifications, especially those involving electronic controls

(Note: Three-line entry **redacted**)

A safety related equipment (SRE) process logic controller (R) was identified as being **degraded** (**Apparent Violation (AV) 2004-12-04**).

(Note: Two-line entry **redacted**)

A fire resulted when the work request procedure was not adequately performed for the installation (R) due to a weakness in the licensee's procedure for implementing configuration control in Internally Authorized Changes (**VIO 2004-10-03**).

04/04/05 NRC Inspection Report 70-143/2005-01 and Notice of Violation, **Two (2)**
Severity IV, January 23, 2005 through March 5, 2005, **ML081440195**

70-143/2005-01-01 VIO Failure to conduct downblending operations in accordance with approved temporary procedure.

The inspector observed downblending operations in order to verify compliance with approved procedures. On February 9, the inspector noted letter of authorization (LOA) 18771-038 was in effect which specified compensatory measures for item relied on for safety (R) being out of service. The function of IROFS (R) was to shut down the process when (R) had been downblended. Compensatory measures included a lock-out/tag-out of a transfer pump and valve which could add solution to the (R). The LOA also specified a verification that (R) volume was (R).

This verification was performed informally, in that results were not documented. The last compensatory measure required was to periodically verify, during downblend operations, that the volume of the (R) did not decrease during the blend operation in order to ensure the (R) were not inadvertently being downblended. This last step was not accomplished and the operator and supervisor were not aware of the requirement. The LOA did not require a record of either of the column volume checks, which decreased the effectiveness of the LOA.

Additionally, the operator displayed poor awareness of safety system status in that the operator was not aware that IROFS (R) was out of service. License Application section 2.7 states SNM operations and safety function activities are conducted in accordance with written procedures as defined in Section 1.7.4 and 1.7.5. **Failure** to conduct downblending operations in accordance with approved procedure LOA 18881-038 was a violation of NRC requirements (**VIO 70-143/2005-01-01**).

70-143/2005-01-02 IFI Control of temporary fixtures

The inspector reviewed the use of temporary equipment in order to determine that temporary equipment was authorized and criticality controls were adequate. The inspector noted a temporary hose was in use in the (R) area in the BPF, and that use of the hose was authorized by an LOA. But the inspector noted that the LOA did not specify the diameter, length, or connector information of the temporary fixture and questioned whether the hose had been adequately evaluated and

approved from a criticality safety standpoint. In response, a licensee NCS engineer evaluated the temporary fixture as being safe, tagged it as being approved, and the licensee agreed to evaluate information, which should be included in an LOA when authorizing use of temporary fixtures. The inspector noted an identical issue in NRC report 70-143/2004-206, section 5.0, which identified that an LOA used to authorize a temporary hose did not specifically control the fixture by specifying diameter, length, or connector information. The report further stated that such information was an important aspect of controlling temporary fixtures. Pending further NRC review, this issue will be tracked as inspection followup item (IFI 70-143/2005-01-02).

Closed:

70-143/2004-12-04 AV Degraded SRE PLC

70-143/2005-01-03 VIO Failure of the SRE PLC to be capable of performing its function (Open)

The SRE PLC was an engineered control designed to control the mass of (R) material present in (R) system by detecting holdup and also by limiting the amount of material which the operator could add to the system. By system design, holdup should have appeared as a positive mass balance carried over from one batch to the next. **The issue concerned the degradation of the control, which occurred when a negative mass balance was carried over from one batch to the next.** Additional information was made available to the inspector after NRC report 70-143/2004-04 was issued, which clarified the PLC software function. The licensee found that the PLC program would subtract any existing mass balance from the operational limit to compute an allowed batch limit, and then compare and limit the computed value to the normal operational limit. **The control was degraded because when a negative balance was carried over, holdup was masked up to the amount of the negative balance. This was significant because holdup of material actually occurred in every batch. This was due to the method of operation, where the licensee typically loaded a new batch on top of a heel remaining from the previous batch.** Holdup also could have occurred as undesirable accumulation of (R) material in the process. **Therefore, the SRE PLC was unable to detect holdup and control the amount of (R) material in the system.** License Application section 4.1.1.1 required that engineered controls be capable of performing the criticality safety purpose for which they are specified. **Failure of the SRE PLC to be capable of performing the criticality safety purpose for which it was specified was a violation of NRC requirements (VIO 070-143/2005-01-03).** AV 70-143/2004-12-04 is closed

70-143/2004-08-05 IFI Removal of lamps, which are a fire hazard

This issue concerned metal halide lamps in the facility, which have the potential to ignite the lighting fixture upon failure. The inspector discussed with the

licensee corrective actions taken by the licensee in order to resolve this issue. The licensee decided to replace the affected lamps with a new model that addressed the fire hazard. The licensee also removed the existing stock of the affected lamps from the warehouse. Based on documentation review and interviews, the inspector determined that the corrective actions were appropriate. This item is closed.

Inspector Observations:

On March 1, the licensee identified an issue involving a process upset in the (R), which was documented as Problem Identification, Resolution and Corrective Action System (PIRCS) (R). This issue required nuclear criticality safety (NCS) resolution and one of the directions verbally conveyed by NCS was to assay a particular process vessel, then hold the vessel for disposition. The operator, upon reviewing the assay results indicating an insignificant special nuclear material (SNM) content, placed the vessel back into service. Therefore, although the vessel was safe to place back in service, the instructions from NCS were not formally communicated and not fully carried out. The licensee assessed the cause of this issue to be informal communications, specifically a lack of a standard NCS hold document. No violation of NRC requirements occurred, but the issue illustrated a **weakness in the licensee's ability to formally communicate NCS instructions for abnormal situations.**

The inspector reviewed an incident where improper wiring of a band heater on the (R) system created a fire hazard. When the system was started for normal operation, the band heater overheated as indicated by the red glow of the energizing equipment, thus creating a fire hazard. The licensee improved system safety by adding ground fault interruption features to the heater power supplies, but acknowledged the issue was an example of improper maintenance actions creating a fire hazard.

04/25/05 NRC Inspection Report **71-0249/05-201**, March 7-11, 2005, and Notification of Violation (**Four (4) Severity Level IV**), **ML051160008**, (**Note: Different Docket No. 71-0249 and involvement by AREVA**)

Purpose of inspection was to determine if NFS's activities associated with the transportation of radioactive material were being performed in accordance with the requirements of 10 CFR Parts 21 and 71, applicable certificates of compliance, and the U.S. Nuclear Regulatory Commission (NRC) approved quality assurance (QA) program.

Based on the results of this inspection, the NRC has determined that violations of requirements occurred. The nature of the violations is of concern to the NRC and Merits particular attention by NFS management.

Conclusion: Sampled procurement documents exhibited numerous discrepancies and inconsistencies such as missing signatures, incomplete check-off blocks, and missing attachments. Part 21 applicability was not specified on one purchase order. NFS procedures did not provide a systematic process and clear requirements for placing and maintaining vendors on the AVL. Vendor qualification records did not indicate evaluations adequate for the material or service being procured. The AVL listed vendors for all procurement categories, but did not provide information regarding the category of material or service each vendor was qualified to provide.

Four (4) Severity IV Violations as follows:

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 (per 10 CFR 71.137).

Failure - NFS issued PO0412052298 on 12/6/04 without prior QA approval of the requisition and without including the required quality requirement for nonconformance disposition. (per 10 CFR 71.109).

Failure - NFS issued PO0412052298 on 12/6/04 and failed to specify that the provisions of Part 21 applied to the procurement (per 10 CFR 21.31)

Failure to adequately evaluate and quality Century Industries for design, testing, and fabrication activities performed under PO0303038655.

Inspector Observations: This issue involved reporting the leakage incident with a tank trailer. The reporting requirement was not updated to the new Part 71 rule that became effective on October 1, 2004 (6 months ago).

04/26/05 NRC Inspection Report 70-143/2005-201, (Criticality Inspection), March 28 through April 1, 2005, **ML081480313 and ML081480314**

Inspector Observations:

The inspectors observed that the licensee's detector placement methodology employed a conservative source term based only on the prompt gammas emitted by primary fission events. The inspectors observed that the dose contribution from prompt neutrons, neutron-induced photons, and delayed fission/activation product photon was excluded from the coverage analyses. In addition, the inspectors observed that prompt gammas from secondary fission events were omitted.

The inspectors observed that a reportable event occurred at the facility on March 24, 2005, involving the licensee's discovery of an existing container storage (R)

which lacked a passive design feature for precluding storage of containers in the support framework between authorized container storage locations. Passive design feature was an Item Relied on for Safety (IROFS). **See Event Report 41523 and FC070005.**

Open:

70-143/2004-206-01 VIO Failure to comply with the (R) material handling

This item tracked the licensee's failure to comply with the (R) material handling requirements of procedure 55T-04-0033 and the Station Limit Card requirements of procedure NFS-HS-CL-19-01. The inspectors verified that corrective actions included operator instructions for not using the bag-out port sleeves for storage or collection of waste materials and work requests for establishing additional waste material storage locations. During tours of the process areas, the inspectors did not identify any additional examples of failures to comply with the procedural requirements. The inspectors determined that the licensee's corrective actions were adequate for preventing recurrence. This item is closed.

70-143/2004-206-02 IFI Tracked licensee's development of additional guidance to ensure completion of accurate and complete technical reviews.

This item tracked the licensee's development of additional guidance to ensure the completion of accurate and complete technical reviews. During inspection 70-143/2004-206, the inspectors had noted that a key technical reference associated with the revision to the Waste Water Treatment Facility NCS evaluation had not been completed prior to implementation. The inspectors reviewed the completed technical reference and verified that the technical basis for the new Waste Water Treatment Facility limits were adequately justified and documented. The inspectors reviewed the licensee's revisions to procedure NFS-HS-A-58, "Nuclear Criticality Safety Evaluations," Revision 8, dated February 22, 2005, and determined that adequate guidance for both NCS analysts and independent reviewers had been developed to ensure that all references or studies used in the performance of an NCS evaluation and relied on for safety are complete. This item is closed.

70-143/2004-207-03 IFI (See Event Report 41149, Failure of Safety System Causing Unfavorable Geometry and FC050002, Failure to follow procedure or wrong procedure used)

This item tracked the licensee's actions to adequately justify the acceptability of replacing an engineered control with an administrative control. During inspection 70-143/2004-207, the inspectors observed that the NCSE for the Downblending operation had been recently revised to replace an active engineered NCS item

relied on for safety (IROFS) with an administrative control. Given recently observed human performance issues in the BLEU Preparation Facility (e.g., **October 25, 2004, reportable event associated with failure to sample uranium (R) solution prior to transfer from favorable to unfavorable geometry tanks**), the inspectors had questioned the licensee's justification for replacing the (R) control with an administrative sampling control when the root cause investigation team for the reportable event recommended replacing another administrative sampling control with an active engineered control. During this inspection, the inspectors observed that the NCSE for the Downblending operation was in the process of being revised to specify that the administrative sampling control was enhanced by an independent third party (process engineer) to ensure the **blend recipe** produced the target enrichment (R). On the basis that the enhanced administrative sampling control had the same risk indexing as the (R) control being replaced, the inspectors determined that the likelihood for a criticality accident was not increased and that criticality safety was adequately maintained. This item is closed.

05/16/05 NRC Inspection Report 70-143/2005-02 and Notice of Violation, (**Three (3) Severity Level IV and one (1) Non-Cited**), March 6, 2005 through April 16, 2005, **ML081440509**.

Four (4) violations of NRC requirements occurred. The violations were noted in the areas of control of maintenance, nuclear criticality safety, and radiation protection. **Of particular concern was a violation, which demonstrated poor utilization of lessons learned from previous violations.** (See specifically VIO 70-143/2005-02-01, Control of Danger Tagged Components)

Open:

70-143/05-02-1 VIO Control of Danger Tagged Components

Section 2.7 of the License Application, Procedures, states "SNM operations and safety function activities are conducted in accordance with written procedures as defined in Section 1.7.4 and 1.7.5. Procedure NFS-GH-36 required locks and tags to be removed from isolation points prior to testing or operating the system for restart.

Contrary to the above, prior to March 15, 2005, the licensee **failed** to remove the required locks and tags from isolation points prior to operating the system for restart in that the outlet valves on the three-day columns were opened and the high enriched uranium (HEU) storage system was operated with danger isolation tags installed.

On March 15, the inspector observed the outlet valves (R) were open, but had danger isolation tags as well as system isolation tags installed. The lock-out/tag-out administrative control sheet indicated the valves should still be closed for maintenance on the associated transfer pump. The inspector observed

maintenance on the pump to be complete. The licensee investigated the problem and found maintenance personnel had apparently not removed the danger isolation tags after completion of maintenance activities. The licensee further found that inexperienced personnel misunderstood the lock-out/tag-out procedure, and had opened the valves in order to perform system testing. NFS procedure NFS-GH-36 required tags to be removed when work on the system is completed, prior to testing or operating the system for restart. 'Failure to remove tags prior to restarting the system was a violation of NRC requirements (**VIO 70-143/2005-02-01**), Control of Danger Tagged Components.

The licensee performed interviews and re-instruction of supervisors, and **planned** additional formal training on the subject. In followup observations, the inspector subsequently found the administrative requirements of the lock-out/tag-out program were not being consistently applied in the (R) fuel area. The licensee **planned** to broaden the review of lock-out/tag-out operations to include fuel operations.

Open:

70-143/05-02-02 VIO Failure to Lock Shut Discard Control Value

Section 2.7 of the License Application, Procedures, states "SNM operations and safety function activities are conducted in accordance with written procedures as defined in Section 1.7.4 and 1.7.5." Standard Operating Procedure (SOP) 401, section 4A-302, required (R) to be shut and locked after completion of a discard operation.

Contrary to the above, on February 9, 2005, the licensee **failed** to shut and lock (R) after completion of a discard operation.

The inspector reviewed an event involving transfer of waste solutions from favorable to unfavorable geometry storage (R). On February 9, an operator performed an authorized transfer operation, by discarding solution from a favorable geometry to an unfavorable geometry storage (R). **One IROFS** which provided for safe operation of this system was dual independent sample verification of (R) material concentration prior to discard. Another required administrative control in the area was a block and bleed valve, which was required to be locked shut unless an approved discard was in process. A **second IROFS** was an in-line monitor, which functioned as an engineered control to monitor discards from favorable to unfavorable geometry.

After completion of the authorized discard, the operator attempted to perform an operation on (R) which contained (R) material (R). The operator apparently attempted to transfer some of this (R) solution to an adjacent favorable geometry storage area, so that it could be diluted by addition of either process waste solutions or water prior to discard. This operation was allowed by procedure.

However, when the operator began this operation, the in-line monitor for this system alarmed and shut the automatic isolation valves. Samples were analyzed from the piping at the in line monitor and results indicated the presence of solutions **above the (R) material concentration limits for discard.**

The investigation found the operator apparently forgot to shut and lock the block and bleed valve at the end of the authorized discard, and inadvertently attempted to discard the high bank, which caused the in-line monitor to alarm. Standard Operating Procedure (SOP) 401, Section 4A-302, required valve to be locked shut after completion of a discard. Failure to lock shut valve (R) was a violation of NRC requirements, (VIO 70-143/2005-02-02), Failure to Lock Shut Discard Control Valve. **This failure to follow procedure defeated an IROFS requiring dual independent sample verification of (R) material concentration.**

The licensee investigated the event and found no indications of malfunction or valve leakage (R). The licensee's investigation noted there was no run-sheet or check list verification that the discard valve was locked shut upon completion of a discard operation. The investigation recommended establishing this verification on an operator's checklist, with space for the supervisor to verify valves were unlocked and locked. It also recommended evaluating the feasibility of having the supervisor unlock and lock the valve, and also having the supervisor observe the discard operation. It made a general recommendation to evaluate an improved design.

The inspector made several additional observations. On April 18, the inspector interviewed licensee management and found that **immediate corrective actions did not appear to be prompt in addressing prevention of recurrence of this event.** Although the operator involved and some other operators had been interviewed, the licensee still had not conducted any documented training to refresh operators on the safe operation of this system.

Conclusions: A violation was identified for failure to remove danger isolation tags prior to system operation for testing. A violation was also identified for failure to lock shut a discard control valve. Implementation of corrective actions to prevention a recurrence of the event were not prompt. A procedural weakness was identified, which was not addressed by the NCS flow-down. Poor operational practices were identified which could bypass administrative safety controls and challenge engineered safety controls. Procedural guidance relating to supervisory control of abnormal operations was not followed. Finally, extent of condition reviews for previous similar violations appeared incomplete, in that operating experience from previous similar events was not applied to areas with identical vulnerabilities. (See Previous NRC reports 70-143/2002-205 and 70-143/2004-01)

Closed:

70-143/05-02-03 NCV Failure to Analyze Required Effluent Samples

Section 3.1.2 of the license application requires work performed in radiologically restricted areas to be controlled by operating procedures or a radiation work permit (RWP).

Contrary to the above, on March 30, 2005, work performed in a posted contaminated area in the low enriched uranium area was not controlled by operating procedure or RWP.

On March 28, the licensee identified that analyses for effluents from the BLEU complex to the municipal sewer did not include a monthly composite sample for insoluble radioactivity. The inspector reviewed available records, and noted the highest monthly composite results for gross alpha was 1.62 picocurie per liter (pCi/l). The average daily result for gross alpha for the time period from August 1, 2004 through March 17, 2005 was less than 1 pCi/l, with the highest reading being 8.6 pCi/l. Sample results for gross beta were similarly very low. The action level per license application table 5.1 was 300 pCi/l gross alpha and 6000 pCi/l gross beta. Therefore, although sample results for insoluble activity were not obtained, results for gross activity demonstrate that levels of discharge were a small fraction of allowable limits. The licensee investigated the issue and found Procedure NFS HS-B-68 had not been revised to add the requirement for monthly insoluble activity analyses required by license application Table 5.1.

A review of plant operations revealed that **monthly samples were required but not obtained for September, October, and November of 2004, and January, 2005**. The BLEU complex was shutdown for maintenance during December 2004. The licensee was able to perform the analysis on a February 2005 sample, which had been retained, and found insoluble activity to be 0.883 pCi/l gross alpha, and 8.32 pCi/l gross beta.

Planned corrective actions include a change to the procedure and further reviews to ensure all required samples are addressed. **Failure to perform monthly composite samples for insoluble radioactivity for the BLEU complex sewer was 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 (NCV 70-143/2005-02-03).

Open:

70-143/05-02-04 VIO Failure to Control Work in Contaminated Areas by Written Procedures

The inspector observed cleaning operations on March 30 on the low enriched uranium (LEU) side. The area (R) had been previously posted by the licensee as a controlled area, with an RWP providing instruction for access. However, on

March 29, the licensee noted on a routine survey that some of the room outside this area had elevated contamination levels up to 12,000 disintegrations per minute (dpm) alpha activity, and the entire room was posted as a contaminated area.

Subsequently, the inspector observed an operator mopping the floor, wearing hospital "scrub" pants, a T-shirt, and disposable shoe covers and latex gloves as personal protective equipment (PPE). The inspector assessed this as inadequate PPE for cleaning activities inside a contaminated area, and the licensee did not disagree. The inspector noted no RWP was written or posted to provide instructions to the operator for cleanup in this area, and also noted the SOP for the area did not specify required PPE for cleanup of low levels of contamination. As immediate corrective action, the licensee provided an RWP to address the activity which required a smock, in addition to gloves and shoe covers.

License Application section 3.1.2 required work in radiologically restricted areas to be performed in accordance with either an operating procedure or RWP.

Performing radiation safety activities without written procedures was a violation of NRC requirements (VIO 70-143/2005-02-04), Failure to control work in contaminated areas by written procedures.

Reviewed:

70-143/04-201-02 IFI Resolution of criticality alarm System equipment and installation problems (Reviewed)

The inspector noted the licensee continued to experience trouble conditions and false alarms as documented in inspector followup item.(IFI) 70-143/2004-201-02. Numerous trouble conditions and single detector alarms were documented in the problem identification, resolution and corrective action system (PIRCS). On April 7, a false criticality alarm resulted in a site evacuation during installation of new criticality alarm system components. The licensee's vendor spent several days on-site reviewing system installation and operation, and was attempting to assist the licensee in resolving this issue.

Closed:

70-143/04-12-03 IFI Changes to the (R) Process Safety Controls

This issue referred to changes of an engineered safety control to administrative or enhanced administrative controls. The inspector noted the licensee made the changes due to equipment difficulties, which degraded the function of the engineered controls. The inspector noted the administrative controls were adequately documented in approved procedures, and provided adequate safety function. The issue was reviewed by headquarters criticality inspector, and

additional information on this issue is documented in NRC inspection report 70-143/2005-201. This item is closed.

70-143/04-12-07 IFI Contamination (R)

This issue relates to persistent elevated contamination levels and instances of contaminated shoes (R). The inspector reviewed the licensee's immediate and corrective actions, reviewed survey records (R) since the occurrences, and interviewed licensees' representatives. The inspector determined that the licensee had reduced shoe contamination from exiting (R) and reduced the excessive contamination (R). The inspector noted the licensee had an optional "plant shoe" policy, which allowed (R) personnel to wear company issued shoes when working (R). The licensee also improved cleaning practices and placed a step on "sticky" pad at all entries for contamination control. Results of these controls have reduced the contamination trend of personnel and equipment (R). This item is closed.

Inspector Observations:

A **spill occurred on March 21, 2005** where an operator, while attempting to unclog a transfer line, caused a quick disconnect hose to come loose **spilling approximately 10 grams of material**. The inspector observed a radiation technician perform high volume air sampling at the spill (R).

The licensee revised their ALARA TEDE goal for the BPF area from 0.5 rem to 1 rem due to the external radiation challenges in the BPF area.

The inspector reviewed external radiation hazards and determined from discussions that the **licensee had notice elevated air sample results from the (R) areas. Licensee identified the problem as a seal malfunction.**

The inspector noted that the licensee continued to have **problems with water infiltration from underground springs and adjacent man-made ponds in the North Site area.**

05/23/05 Notice of Violation, Severity Level III, Nuclear Fuel Services, Inc., NRC Office of Investigations, Report 2-2004-003, (EA-04-199), **ML081500424 and ML081500429**, Exercise of Enforcement Discretion (addressed, by name, to individual process operator)

An inspection completed by the NRC on Jan. 24, 2004 and an Office of Investigation (OI) investigation was completed on March 3, 2005 concerning circumstances at NFS on Dec. 30 and 31, 2003 that a process waste collection tank (WD tank) discharge valve to the WWTF, (R) was open when it was required to be locked closed. NRC staff concluded the **violation was due to the deliberate misconduct of the process operator involved**. The violation was characterized as a Severity Level III. A base penalty of \$32,500 was considered.

Because your facility has been the subject of escalated enforcement action within the last two years, the NRC considered whether credit was warranted for *Identification and Corrective Action* in accordance with the civil penalty assessment in Section VI.C.2 of the Enforcement Policy.

Violations involving deliberate misconduct are of particular concern to the NRC, because our regulatory program is based on the integrity of licensees, contractors, and their employees. In addition, the NRC holds licensees responsible for the actions of their employees. Therefore, based on the above and in accordance with the NRC Enforcement Policy, the NRC concluded that this violation should be characterized at Severity Level III.

In this case, because NFS identified the issue, credit was warranted for the factor of *Identification*. Credit was also warranted for the factor of *Corrective Action*. Therefore, I have been authorized to propose that no civil penalty be assessed in this case. Signed /RA/ by Loren R. Plisco, Acting for William D. Travers, Regional Administrator, Region II.

06/02/05 NRC Inspection Report 70-143/2005-203 (Criticality Inspection), and Notice of Violation (**Severity Level IV**), May 2 through 4, 2005, **ML081480315 and ML081440203**.

Open:

70-143/2005-203-01 VIO Failure to establish double contingency for the backflow of solutions into the (R) dilution process ventilation system

The inspectors determined that the NCS analysis for the BLEU process ventilation system took credit for to prevent backflow of (R) solution in the system. This component, although found in similar systems, was not present in the BLEU dilution off-gas section of the process ventilation system due to the desire to prevent (R) from entering (R). This analytical deficiency was identified by NCS staff during review of an event involving the discovery of uranium contaminated caustic solution of the (R) dilution system HEPA filter housing.

Section 4.1.1 of the license application requires that all process equipment and systems be designed to incorporate sufficient factors of safety to require at least two unlikely, independent, and concurrent changes in process conditions before a criticality is possible. Scenario 4.1.3 of nuclear criticality safety evaluation (NCSE) 54T-04-022, Revision 2, dated April 27, 2004, takes credit for (R) and a drain or two drains to prevent solution from backflowing into the ventilation system.

Contrary to the above, as of April 28, 2005, the BLEU (R) dilution ventilation system had only one drain and no (R) so that double contingency was not

established (R). **Failure to establish double contingency for the backflow of solution into the (R) dilution process ventilation system is Violation 70-143/2005-203-01.** (Note: Could redaction be "Uranium-Aluminum Hydrogen?" See Event Report 41651)

70-143/2005-203-02 URI Failure to recognize a potential NCS violation during review of an internal event

The inspectors determined that the licensee requires corrective actions be developed and assigned as part of its internal tracking system, PIRCS. The inspectors noted that the licensee had assigned corrective actions for an **internally reported event from April 7, 2005, in which misaligned valves in the BLEU process area resulted in a spill of uranium contaminated caustic solution.**

The inspectors noted that an assigned corrective action for the event was to evaluate instrument low points and HEPA filter housings for caustic hold up. **The inspectors noted that the corrective action was to be completed by April 29, 2005, which meant that more than 3 weeks had been assigned to accomplish the corrective action even though an accumulation in a HEPA filter housing would violate NCS controls.**

The inspectors felt that the review of the event in question was weak since an NCS engineer with more than 2 years experience had participated in the initial review and assignment of corrective actions. Review of the caustic spill event is included in the ongoing review of the HEPA housing caustic solution accumulation event. The failure to recognize a potential NCS violation during review of an internal event will be tracked as Unresolved Item (URI **70-143/2005-203-02**).

70-143/2005-203-03 URI Investigation and identification of potential NCS control failures resulting in (R) solution accumulation in the BLEU (R) process off-gas system

HEPA Housing event

On April 28, 2005, during operations of the (R) system, an alarm was received indicating a problem with the (R) dilution HEPA filter. Investigation determined that the HEPA filter housing (R) contained caustic solution (R) in the housing. Solution was not expected in the housing due to drains in the ductwork. As shown in Figure 1, the solution accumulation was in the section of the housing containing the first HEPA filter, which was saturated.

The (R) system was shut down pending completion of the licensee investigation and correction of the cause of the accumulation. Because the system was shut

down, the inspectors had no immediate safety concerns but noted that the event appeared to violate off-gas system NCS controls such as the HEPA drain.

Licensee investigation and identification of potential NCS control failures resulting in (R) solution accumulation in the BLEU (R) process off-gas system will be tracked as URI **70-143/2005-203-03**.

Closed:

70-143/2004-207-04 IFI Tracks the licensee's actions to revise the NCSE for the Scrap Dissolver operation

This item tracks the licensee's actions to revise the NCSE for the scrap dissolver operation to adequately demonstrate double contingency protection. The inspectors had questioned the adequacy of an administrative control requiring the supervisor to be present when the mop sink was filled because the supervisor would have no means for positively verifying solution enrichment (e.g., no requirement to perform dual, independent sampling prior to transfer). The inspectors observed that the licensee's revisions to the NCSE included new requirements for the supervisor to verify that the solution being introduced into the mop sink is natural uranium by observation of the unique natural uranium container. In addition, the inspectors observed that the NCSE had been revised to require supervisory verification that no more than (R) is (R) from the favorable geometry mop sink to the unfavorable geometry natural uranium dissolver tank. The inspectors determined that double contingency protection for the scenario had been established. This item is closed.

Discussed:

70-143/2994-207-05 VIO **Failure to ensure that k-effective values for credible abnormal conditions did not exceed the 0.95 limit**

This item concerned the licensee's failure to ensure that k-effective values for credible abnormal conditions did not exceed the 0.95 limit. **The licensee denied the violation, and the NRC is reviewing the denial.** This item remains open.

70-143/2004-207-06 VIO **Failure to demonstrate that the concentration was less than (R) prior to a caustic discharge**

This item concerned the licensee's failure to demonstrate that concentration was less than (R) prior to a caustic discharge transfer. The inspectors reviewed the licensee response to the violation and determined that the licensee has not completed all corrective actions contained in the response. This item remains open.

On April 7, 2005, (R) of caustic solution to the floor in the BLEU Process Facility. Figure 1 contains a representation of this drain labeled (R). The licensee indicated that this event occurred during an attempt to return caustic discharge solution to (R) with an incorrect valve line-up and while level transmitters were giving incorrect level readings. (Note: **Figure 1 completely redacted**)

As a result, caustic solution was pumped into the (R) dilution system through the process off-gas lines. Corrective actions included revising work instructions and replacing the level transmitters. The inspectors had a concern regarding the investigation of the event and assignment of short-and long-term corrective actions as noted in Section 2.0 above. The inspectors determined that the licensee's immediate corrective action of shutting down the(R) system was appropriate and eliminated any immediate safety concern.

06/27/05 NRC Inspection Report 70-143/2005-03, (Non-cited Violations), April 17, 2005 through May 28, 2005, **ML081440517**

Reviewed:

70-143/2004-201-02 IFI Tracks resolution of criticality alarm system equipment and installation problems

The inspector interviewed maintenance personnel in charge of the criticality monitors, criticality alarms and in-line monitors. Personnel interviewed explained how the maintenance process worked for these particular items of nuclear safety equipment, which included calibrations and functional testing. The inspector reviewed the department. The inspector reviewed the number and type of difficulties the licensee continued to experience with the criticality alarm system. These problems included repeated trouble alarms and sporadic high radiation alarms by criticality alarm detectors. Although the licensee's periodic testing using installed check sources and external test sources routinely demonstrated the system's reliability, the number of trouble alarms and false high radiation alarms continued to be an area of concern. This issue was noted in past reports and tracked as Inspection Follow-up Item (**IFI 70-143/2004-201-02**). The licensee continued working with the equipment vendor to resolve the problem.

Closed:

70-143/2005-03-01 NCV Failure to Store Special Nuclear Material (SNM) in Accordance with Procedure

On May 9, 2005, the licensee identified a container stored in an unauthorized location (R) designed with several different types of shelves, and as noted on the NCS posting, different containers were allowed to be stored on each type of shelf. In this case, the similarity between shelves led to confusion on the part of operators and supervision, and an incorrect decision resulted in a container being

stored on an unauthorized location. Failure to store a container of SNM in accordance with the NCS posting was a violation of License Application section 2.7. 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 (NCV 70-143/2005-03-01), Failure to Store SNM in Accordance With Procedure.

70-143/2005-03-02 NCV Failure to Operate the (R) System in accordance with procedure

Event Number 41651: On April 7, 2005, the licensee attempted to rework (R) waste solution. The operation required manipulation of several manual valves, and the lineup was performed in error such that the waste solution was pumped to the off-service (R) column. The operation eventually filled the column, which overflowed into the (R), filled the process off-gas piping, and overflowed into the (R) dilution ventilation system on the roof. The operation was finally shutdown when solution was discovered that had drained from the ventilation system onto the operating spaces floor. The event was reported to the NRC on April 29, and the NCS aspects of the event were discussed in NRC report 70-143/2005-203, which included a notice of violation. This report dispositions the operational aspects of this event. Failure to operate (R) in accordance with procedures was a violation of License Application Section 2.7. This non-repetitive, licensee-identified and corrected violation is being treated as an NCV, consistent with Section VI.A.8 of the NRC Enforcement Policy (NCV 70-143/2005-03-02), Failure to Operate in accordance with procedure.

The event highlighted poor operational practices (R). In addition to the failure of the operator to follow procedure, the procedure required supervisory verification of the valve lineup.

This verification was not performed in an independent, thorough manner which contributed to the event. Also, the (R) were instrumented with a level indication and alarm system. This system alarmed several times during the event, correctly indicating the column was full and automatically shutting down the transfer pump. Due to interaction with the nitrogen purge system and other design issues, the alarms were able to be reset which allowed the operators to continue the operation. The operators assumed the alarms were meaningless since the (R) was not in service, and therefore did not adequately investigate the alarms. Also, there was apparently no validation of expected system response to the operation in progress. Although a significant volume of liquid was moved, there was inadequate validation that the operation was proceeding as expected.

The operator and supervisor involved were re-trained on system operation, procedural compliance and independent verification. **Subsequently, when the full extent of the issue was realized on April 28, the (R) system was shutdown for review and revision of the safety basis, and also design and completion of physical modifications to the system.** Additionally, all operations staff were re-

trained on system changes, alarm assessment and response, and procedural compliance.

70-143/2004-10-01 NOV Uncontrolled unfavorable geometry container was found in the BPF

An uncontrolled unfavorable geometry container was found (R). The inspector verified the licensee had emphasized in their training the correct procedure for handling containers in the area. Operators interviewed explained the enhanced administrative controls put in place. The operators were also capable of describing the situation that lead to the violation.

70-143/2005-01-03 NOV Failure of the Uranium (R) SRE PLC to be capable of performing its function

The SRE PLC was an engineered control (R). This issue concerned the degradation of the control (R). The licensee addressed this process deficiency by replacing certain functions of the SRE PLC with administrative controls. As a result, the SRE PLC still (R) performed, but required operator entry of some information. The inspector observed operator training on this process. The trainer went over all the steps of the procedure and best practices to obtain (R) measurements and how to use that information in conjunction with the system PLC. The inspector was able to verify that the present enhanced administrative controls put in place adequately addressed the deficiency presented by the (R) PLC.

70-143/2004-09-02 IFI Verify the adequacy of the corrective actions to resolve the areas of poor exercise performance

In response to the performance deficiencies in the biennial exercise conducted on (R), the licensee conducted a limited scope exercise (R) on which incorporated as exercise objectives the performance deficiencies noted in the biennial exercise. In addition, the inspector reviewed the following corrective actions the licensee had taken to improve exercise performance: (1) conducted on-scene coordinator (OSC) training and added a new pool of OSCs; (2) added an OSC response board to the ECC; (3) revised NFS-HS-E-03 to enhance role and responsibilities of emergency response organization (ERO, OSC, and ERO support; (4) revised NFS-HS-E-1 1 for scene control and contamination control with illustration; and (5) added a BLEU complex mobile rad cart.

Open:

70-143/2005-03-03 NOV Control of Process Waste System Valve Position

Closed:

70-143/2004-01-01 URI Control of Process Waste System Valve Positions

This issue concerned control and verification of the position of valve (R) in the process waste discard system. A severity level three violation was issued by letter dated May 23, 2005. No response from the licensee was required. For tracking purposes, this is **violation 70-143/2005-03-03, (EA -04-199), Failure to Control Waste Process Valve Position. URI 70-143/2004-01-01** is closed.

70-143/2005-03-04 IFI Elevated Isotopic Analysis on a Stack Sample
above the Licensee's Action Limit

On April 28th, the licensee identified a buildup of liquid waste in the (R) dilution ventilation system (R). As a result of the incident, the licensee shutdown the ventilation system and removed the filters for several days to facilitate cleaning and engineering assessments. The licensee did not maintain a record of system operation during this period and did not utilize a lock-out/tagout process to ensure the system was not inadvertently operated. During routine stack sample collection on May 2, 2005, the licensee determined that the sample from the (R) dilution stack (R), BPF Process Exhaust (R) indicated an initial elevated reading of 53,961.90 disintegrations per minute (dpm) for alphas, and 192,528.74 dpm for betas. The samples were held for 7-days and recounted by the licensee to allow radon and its associated daughters to decay. After the 7-day decay count, the alpha reading indicated 3,381.48 dpm and the beta reading indicated 1,267.10 dpm. The licensee's action limit for alpha is 130 dpm and 5,000 dpm for betas. As of May 19, 2005, the alpha reading on the stack air filter was still above the licensee's action limit of 130 dpm. The licensee **plans** to submit the filter offsite for isotopic analysis. Pending further evaluation of this issue, analysis results and assessment of possible release, this issue will be tracked for further NRC review as **IFI 70-143/2005-03-04, Elevated Isotopic Analysis on a Stack Sample Above the Licensee's Action Limit.**

08/05/05 NRC Inspection Report 70-143/2005-04, May 29, 2005 through July 9, 2005,
ML081480303

Open:

70-143/2005-04-01 URI **Waste Transfer without procedural
authorization**

On June 1, a licensee employee transferred (R) waste into a storage area. The transfer necessitated the use of a temporary hose, since piping was not installed between the points. The operation apparently was not addressed by approved, written procedures. The issue was identified and investigated by the licensee, and documented as Problem Identification, Resolution and Corrective Action System (PIRCS) item 5267. This issue will be tracked as unresolved item (URI 70-143/2005-04-01), pending further NRC review.

70-143/2005-04-02 URI **Failure to utilize required respiratory protection**

On June 22, an active radiological maintenance area was present (R). This maintenance area was identified by radiation work permit (RWP) 05-04-032, which specified the precautions and personal protective equipment required for entry. The RWP specified that a full face negative pressure respirator was required until a high volume (HV) air sample had been performed to verify airborne contamination levels in the work area were within acceptable limits. The licensee identified that in spite of this posting, personnel had entered the area prior to the collection of the HV air sample and without utilizing a respirator. This issue was identified by the licensee and documented as PIRCS item 5396. This issue will be tracked as unresolved item (URI) 70-143/2005-04-02, pending further NRC review.

70-143/2005-04-03 IFI Poor maintenance practices resulted in increased exposure

During the period from May 9 through May 20, the inspector noted several occurrences of high airborne contamination levels (R). The licensee identified and corrected the source of the recurring high airborne condition, although this took several days due to intermittent operation of the various equipment involved. The licensee routinely monitored the production areas by stationary air sample cards, which were collected and counted at the end of each shift, excluding weekends. If the initial count observed from a certain station was above the investigatory limit, a HV sample was collected and counted. If the results from the HV count indicated a high airborne condition, then respiratory protection was utilized by any personnel who required access to the area. These procedures were adequately followed by the licensee, but due to the inherent time delay in detecting a high airborne condition, some exposure to employees resulted. The inspector reviewed the licensee's dose assessment and found eight employees were assigned doses of approximately 10 - 16 millirem (mRem). The licensee found the cause of the high airborne condition to be due to poor maintenance practices, where components of certain equipment were re-used in spite of being contaminated. This issue will be tracked as IFI 70-143/2005-04-03, pending further NRC review of As-Low-As-Reasonably-Achievable (ALARA) practices.

Discussed:

70-143/2005-03-04 IFI Elevated Isotopic Analysis on a Stack Sample above the Licensee's Action Limit

Elevated isotopic analysis on a stack sample above the licensee's action limit. This issue concerned an elevated result on a stack sample above the licensee's action limit on May 2, 2005. The reading was above the plant action limits of 130 disintegrations per minute (dpm) for alpha and 5,000 dpm for beta. During the

inspection the licensee had not received the results from an outside lab for the isotopic analysis.

The licensee had initiated an investigation but was unable to state how much material might have been vented out the stack. Although the licensee believed the ventilation system was shutdown for a period of approximately one week, no record of operation or shutdown was available. The licensee was unable to show that the system was locked and tagged out. In this case, the system should have been shut down due to an alarm condition, then maintained in a shutdown condition for maintenance. However, since the system normally operated continuously and no system isolation or lockout was utilized, the inspector questioned how the licensee maintained control over the system. This item will remain open pending further evaluation of the operational status of the system and also pending receipt of isotopic analysis of the sample.

09/09/05 NRC Inspection Report 70-143/2005-205 and Notice of Violation, Severity Level IV, August 8 through 12, 2005, (Criticality Safety Inspection), **ML081490101**

Open:

70-14312005-205-01 IFI Tracks the licensee's revision of the (R) NCSE to clearly articulate the technical basis

The inspectors reviewed the licensee's changes made to the NCSE. The inspectors noted that the NCSE had been revised to **eliminate a physically impossible accident scenario that was the subject of VIO 70-143/2004-207-05**. The inspectors observed that the **revised NCSE still did not clearly articulate the worst case normal condition model as required in Section 4.1.1 of the license application**. The inspectors noted that section 2.7 of the licensee's NCSE Writer's Guide stated that NCS engineers should strive to communicate very clearly what is intended in the NCS evaluation. The inspectors discussed this concern with the NCS manager, who **committed** to revise the NCSE to clearly articulate the technical basis. The licensee's revision of (R) NCSE to clearly articulate the technical basis will be tracked as an IFI.

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

The inspectors reviewed the validation reports 54T-03-0054 and 54T-03-0009, applicable to the Blended Low-Enriched Uranium (BLEU) processes, and determined that each adequately determined an AOA (Area of Applicability) and USL(Upper Safety Limit) for BLEU (Blended Low Enriched) operations (**15 out of 18 lines redacted**).

The inspectors noted that the two BLEU validation reports appeared to use a methodology that differed from that in other validation reports on-site, and appeared to differ from the single-sided lower tolerance limit approach specified in procedure NFS-HS-A-63. The licensee stated that this was due to the validation being performed by the **BLEU contractor (Framatome ANP)**, rather than Nuclear Fuel Services (NFS) NCS staff. Upon further review, the inspectors determined that the method was in fact consistent with the single-sided lower tolerance limit with a 95/95 confidence.

The inspectors, however, identified a number of other concerns with the two BLEU validation reports (**7 lines redacted**)

The inspectors observed that large spreads in the data could be attributable to the use of critical experiments that are not well characterized (R). Therefore, the inspectors questioned whether the (R) experiments analyzed were of sufficient benchmark quality to be used for validation. The licensee **committed** to determine the appropriate experimental uncertainties and the reason for the observed spread in k_{eff} values. Determination of the appropriate experimental uncertainties and the reason for the observed spread in k_{eff} values in the BLEU validations will be tracked as (**IFI 70-143/2005-205-02**).

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)

The inspectors also noted that the computer platform and operating system used to perform the validation was not indicated. (**23 lines redacted**)

The licensee committed to reanalyze the normality of the data. The impact of the lack of normality of the data on the adequacy of the 0.97 k_{eff} limit in the BLEU validations will be tracked as (**IFI 70-143/2005-205-03**)

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

The inspectors also determined that the definition of the **AOA** corresponded to the range of important parameters covered by the benchmark experiments as a whole, but that it was not sufficiently detailed to convey the fact that certain materials covered only certain portions of the range. (**3 lines redacted**). The licensee committed to examine the coverage of different parts of the **neutron energy range by materials in the critical experiments**. The specification of which materials cover which portions of the AOA in the BLEU validation reports will be

tracked as (IFI 70-143/2005-205-04).

70-143/2005-205-05 VIO Failure to prohibit use of positive bias in calculating USL values for HEU operations

Section 2.7 of the license application requires operations and safety function activities to be conducted in accordance with written procedures. Procedure NFS-HS-A-63, Section 6.2, "Validation of NCS Analytical Methods," states, in part, that "The maximum allowed k_{eff} or k_{safe} value (R) where.. the bias and bias uncertainty are determined (R) at the 95% confidence level." In addition, "Only negative bias values are used, positive bias values are (R)"

Contrary to the above, in validation reports 54T-04-0043 and WRS-97-001, the licensee established upper safety limits (USLs) using the 95/99.9 single-sided tolerance limit approach, but took credit for positive bias in several subgroupings of the data. This resulted in an over-estimation of the USL for two of the high-enriched uranium subgroupings and, in one instance, for the entire set of experiments analyzed. Use of positive bias resulted in a USL greater than the maximum allowed k_{eff} limit of 0.95 for abnormal conditions, when assuming positive biases to be zero would have resulted in a USL less than 0.95.

The inspectors also reviewed the validation reports 54T-04-0043 and WRS-97-001 which were performed by NFS NCS personnel (7 lines redacted) For each of these subgroupings, the licensee calculated a USL using the 95/95 single-sided lower tolerance limit approach, as specified in procedure NFS-HS-A-63. The inspectors noted, however, that some of these subgroupings exhibited a positive bias (R). Procedure NFS-HS-A-63, Section 6.2, Step 5, contains the following equation for calculating the USL:

(Equation redacted)

(Next three lines redacted). Procedure NFS-HS-A-63, Section 6.2, Step 5c, also specifies that only negative bias values are to be used (R). However, in validation reports 54T-04-0043 and WRS-97-001, the licensee used the following equation to calculate the USL

(4 lines redacted)

If the USL calculated as above exceeded the maximum allowable k_{eff} of 0.95 the licensee concluded that applications within the AOA in the report would be acceptably subcritical with a maximum k_{eff} of 0.95 (for abnormal conditions). The inspectors recalculated the USL for those subgroupings, which had a positive bias, and noted that in some cases this resulted in a USL below 0.95. (Four lines redacted). **Based on these results, the conclusion that the k_{eff} limit of 0.95 was shown to be acceptable based on the validation was erroneous.** The use of positive bias in the HEU operation validations is a violation of the validation procedure, and will be tracked as VIO 70-43/2005-205-05. The licensee stated

during the inspection that in its view, the license allows the use of positive bias, notwithstanding statements in Section 4.2.3.2 to the effect that positive values (R) p. 44 of Chapter 4.0 of the license application). The licensee stated that this particular section of the license application does not apply to validation, but to individual k_{eff} calculations, and that this section was nonetheless superceded by License Condition S-10. **The NRC does not agree with this interpretation, but rather believes that the intent of the license was to preclude the use of positive bias in calculating maximum k_{eff} limits.**

The inspectors determined that this raised a safety concern, which needed to be addressed promptly as to whether there was adequate assurance that the licensee's abnormal condition cases were subcritical. The licensee stated that there was additional conservatism in the statistical methodology used to calculate the USL, due to its use of a 95/99.9 confidence criterion in implementing the single-sided lower tolerance method (i.e., 95% confidence that 99.9% of all future calculations below the USL will be subcritical). License Condition S-10 allows use of a 95/95 confidence criterion with the single-sided lower tolerance method. The licensee recalculated the USLs for all subgroupings in the affected validations, by zeroing out the positive biases and switching to a 95/95 confidence criterion. The results of this analysis showed that in all cases the licensee could demonstrate a USL exceeding 0.95. Upon making this determination, the inspectors concluded that the maintenance of subcriticality had been adequately addressed such that the safety concern was resolved.

In response to this violation, the licensee made certain **commitments** to ensure the continued subcritical operation of the facility. The licensee's commitment to revise the validation reports to calculate the USL without crediting positive bias will be tracked as (See below: IFI 70-143/2005-205-06 and IFI 70-143/2005-205-07)

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

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 use of positive bias

IFI 70-143/2005-205-06. The licensee has also **committed** to maintain the current prohibition on the use of positive bias in the procedure for performing code validation and verification, and to work with the NRC's licensing staff to clarify license commitments regarding the calculation of k_{eff} in general, and the use of

positive bias in particular. These commitments are closely related and will be tracked as IFI 70-143/2005-205-07.

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 validations 54T-04-0043 and WRS-97-001)

The inspectors also observed that the definition of the AOA in the HEU operation validation reports seemed overly broad. Although there was a large number of benchmark experiments, the AOA was defined to include all chemical and physical forms, geometries, reflection conditions, and any values of enrichment, moderation and density. Due to the lack of parameter trending in the HEU operation validation reports, it was difficult to confirm the exact bounds of the AOA. The licensee committed to reexamine the definition of the AOA. Determination of the appropriate bounds of the defined AOA in the validation reports covering HEU operations will be tracked as (IFI 70-143/2005-205-08).

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)

However, the inspectors determined that with the exception of low-enriched (R) experiments, the subcritical margin thus determined was (R), so that there would have still been adequate margin (R) if the lower tolerance limit method had been used. (Low-enriched (R) are not typical of facility operations, with the possible exception of the BLEU project, which is covered by the other validation reports discussed previously). In principle, however, the different uses of these terms and inconsistencies between the validation reports and the applicable procedure (e.g., using the confidence limit, which is not discussed in the procedure, to calculate the margin of subcriticality) could lead to considerable confusion and could lead to having less than the minimum margin required. The licensee **committed** to consult with outside experts and revise the validation reports appropriately. The resolution of inconsistencies between the validation reports and the procedure, and correcting the methods used to verify adequacy of the margin, will be tracked as IFI 70-143/2005-205-09.

Closed

70-143/2004-201-02 IFI Tracks the licensee's resolution of criticality accident alarm system equipment problems related to the installation of new detectors and monitors

This item concerned resolution of criticality accident alarm system equipment and installation problems. During inspection 70-143/2004-206, the inspectors had

determined that funds to conclude the criticality alarm system upgrade project had been allocated and that the project included a central, continuously-monitored alarm station. During this inspection, the inspectors determined that hardware and software issues associated with the replacement project had been resolved, and that the licensee was on track to complete the project by the end of this fiscal year (October). The inspectors also determined that the current incidence of trouble alarms was limited to the older detectors, which had not yet been replaced due to operational constraints in the production areas. The inspectors also determined that criticality accident alarm system coverage continued to be maintained by the older detectors despite the occurrence of trouble alarms. This item is closed.

70-143/2004-206-03 IFI Tracks the licensee's upgrading of criticality accident alarm system coverage calculations

This item concerned the licensee's upgrading of criticality alarm system coverage. During inspection 70-143/2004-206, the inspectors were concerned about the adequacy of older criticality coverage calculations. The inspectors were informed by licensee staff that 11 of 15 criticality coverage calculations had been revised. During this inspection, the inspectors determined that the remaining four calculations had been completed. The inspectors reviewed one such calculation, 21T-05-0103, "Demonstration of Criticality Accident Alarm System (CAAS) Detector Coverage for the (R)," which was still in draft during the inspection. The licensee informed the inspectors that the final version of the calculation, which was not expected to differ from the draft, would be approved once the criticality accident alarm system replacement project was completed, and the final locations of the replaced detectors were documented. The inspectors determined that the draft calculation was performed correctly and demonstrated acceptable detector coverage. The inspectors noted that the calculation results were conservatively biased low since secondary gamma sources were ignored from the calculation. This item is closed.

70-143/2004-207-05 VIO Failure to ensure that k_{eff} values for credible abnormal conditions did not exceed the 0.95 limit.

This item concerned the licensee's failure to ensure that k-effective values for credible abnormal conditions did not exceed the 0.95 limit. During inspection 70-143/2005-205, the inspectors questioned the credibility of the accident analysis since a credible mechanism for transferring the more reactive materials could not be postulated. During this inspection, the inspectors reviewed the licensee's revision of the (R) NCSE and determined that the affected scenario had been eliminated from the NCSE. This item is closed.

Discussed

70-143/2003-10-01 VIO **Three examples of a failure to follow procedures**

One example concerned the licensee's storage of SNM (R) containers in

(R) facility. During inspection 70-143/2003-10-01, the inspectors observed the storage of drums containing (R) in a location, which was not posted with a storage station limit card. The inspectors noted that the location was not designated for storage by licensee procedure NFS-HS-CL-13, "(R)" Rev. 14, dated September 17, 2002, which applied to the scanning facility. During this inspection, the inspectors verified that the licensee revised the (R) facility posting to include storage of the drums.

A **second** example concerned the failure of the licensee to create a position that was required by procedure to maintain copies of station limits. During inspection 70-143/2003-10-01, the inspectors noted that section III.A of licensee procedure NFS-HS-CL-13 required the (R) Facility Manager to maintain copies of the approved station limits. Through further discussions with the licensee, the inspectors determined that the (R) **Facility Manager position had not been established**, and that copies of the approved station limits were, therefore, not being maintained as required. During this inspection, the inspectors noted that licensee procedure NFS-HS-CL-13 had been revised to eliminate the (R) Facility Manager position.

A **third** example concerned the failure of the licensee to establish a required guidance document. During inspection 70-143/2003-10-01, the inspectors noted that section 5.1 .b of licensee procedure NFS-HS-A-62, "Implementation of Nuclear Criticality Safety Evaluations," Rev. 2, dated June 20, 2001, **required the conduct of implementation in accordance with a document, which could not be located by the licensee.** The inspectors had determined that the required document entitled, "Guidelines and Expectations for the Implementation of Nuclear Criticality Safety Evaluations," had not been established prior to implementation. **During this inspection, the inspectors noted that licensee procedure NFS-HS-A-62 had been revised to eliminate the required guidance document.** The inspectors determined that the licensee adequately completed the necessary corrective actions to both address the violation and prevent recurrence. This item is recommended for closure in the next Region II resident inspection report.

09/19/05 NRC Inspection Report 70-143/2005-007 and Notice of Violation, **Three (3) Severity Level IV, July 10 through August 20, 2005, ML081480306**

Open:

70-143/2005-07-03 VIO Failure to utilize respirators when required

Standard Operating Procedure 401, Section A, required that in the event of loss of process ventilation, personnel must utilize full face respirators until the processes were in safe shutdown.

On August 9, 2005, the (R) lost process ventilation, but plant staff inside the

Complex did not don full-face respirators

On August 9, the B (R) (R) lost process ventilation when a short commercial power outage occurred. The ventilation outage lasted less than an hour and no elevated levels of airborne activity were detected. The inspectors evaluated licensee response to the event, and found that two groups of personnel inside the (R) did not immediately evacuate or don full-face respirators. (R) stationed at the access control point were unaware that a loss of process ventilation had occurred, and therefore did not don respirators.

Also, plant staff performing operations at the loading dock check-weigh station were not supplied respirators, and were unable to leave the area due to (R). They took actions to comply with those requirements, and then exited the area.

SOP 401, Section A, required that if process ventilation was lost, plant staff in the affected areas must don full face respirators until the processes were in safe shutdown mode. Failure of plant staff to don full-face respirators or evacuate was a violation of NRC requirements, and will be tracked as VIO 70-143/2005-007-03.

**70-143/2005-07-1 VIO Failure to review and follow RWP procedures
(3 examples)**

The plant staff **failed** to conduct safety function activities in accordance with written procedures related to the radiation work permit (RWP) program as described in the following three instances:

On July 20, 2005, Radiation Work Permits (RWP) area banner tape was not used to mark the boundaries for work as specified on RWP 05-02-009.

On July 20, inspectors noted work in progress to dismantle the top (R), at the (R) processing area. Inspectors noted the technicians took safety precautions in accordance with RWP 05-02-009, but that the work area was only posted on the ground floor level, not where work was in progress on the second floor. **Plant staff believed that a "vertical envelope" was created by the posting on the ground floor, but since employees did not have to cross that posting to access the second floor work site, the ground floor posting was not an adequate posting for the second floor.** NFS-GH-42 required RWP Area banner tape to be used to mark the boundaries of the RWP area as required within the applicable RWP. RWP 05-02-009 required a roped off (posted) area with a minimum radius of five feet from the work area. This failure to post an area around an RWP work area was a violation of NRC requirements and will be tracked as the second of three examples comprising VIO 70-143/2005-007-01.

On August 3, 2005, the licensee terminated RWP #05-41-064 prior to completion Of required monitoring and surveys, in that work areas with open piping and visible contamination were not monitored or surveyed.

On August 3, the inspectors toured (R) and observed open piping flanges and visible residue on pipes and on the floor (R). The inspectors determined that work activities in the area were addressed by RWP #05-41-064, and 11 that an RT had recently released the area and terminated the RWP. Plant staff responded to the inspectors inquiries by posting the area and performing monitoring and surveys. **The licensee found transferable alpha contamination levels in the area above the established action limits of 5,000 dpm/100 cm².** The surface contamination levels found on the floor, piping, and inside the flanges ranged from 12,488 dpm/100 cm² to 99,112 dpm/100cm².

Procedure NFS-GH-03, "Radiation Work Permits," stated in part that, "The permit will be terminated upon completion of all required monitoring and surveys, provided that the results are within limits. The RWP cannot be terminated until the monitoring results are within the required limits." The **failure** to properly terminate a posted RWP area was a violation of NRC requirements and will be tracked as the third of three examples of VIO 70-143/2005-007-01.

The inspectors determined that a contributing cause to the violation described above was the use of a general RWP for an infrequently performed task. In making this determination, the inspectors reviewed RWP 05-41-064 and interviewed the RT who terminated the area. The inspectors noted that RWP 05-41-064 was a general RWP used for common maintenance such as valve replacements or leak repairs. This general RWP did not contain specific descriptions of authorized work, only general radiological precautions. The work performed in this situation was an infrequently performed task, in that it consisted of removal of enclosure overflow piping and cutting it up for disposal. Furthermore, there were no precautions in the general RWP for leaving a contaminated system open to generally accessible areas. Accordingly, since the work authorized was not described on the RWP, the RT did a survey where he had observed work taking place earlier, and did not survey the location of the open piping and visible residues because he was unaware work had taken place in this area. Consequently, the **general RWP did not provide the necessary information to ensure safe working conditions for this particular maintenance task.**

Prior to August 18, 2005, the licensee **failed** to require Radiation Technicians (RTs) to read and sign off on two applicable Health and Safety procedures: NFS-GH-42, "Establishing and Posting Radiologically Controlled Areas," and NFS-GH-03, "Radiation Work Permits."

70-143/2005-07-02 VIO Failure to collect a required urine sample

Procedure NFS-GH-08, "Collecting Urine Specimens," Section 5.5.1 stated in part that "If a urine sample is not received within seven days, the employee will be issued a "Do Not Admit Without Urine Sample" red tag. The red tags will be delivered to the Entry/Exit Control Point to be placed on the employee's badge

slot. The (R) shall not admit the employee to the plant (R) until a urine specimen is presented.

Contrary to the above, from August 8 to August 17, 2005, an employee did not submit a urine sample per procedural timeliness requirements, and concerning that employee's access to the (R) Complex, plant staff failed to issue the required red tag and prohibit the employee's access.

Closed:

70-143/2005-01/02 IFI Control of Temporary Fixtures

This issue, related to nuclear criticality safety (NCS) controls, concerned the licensee's use of temporary equipment without specification of controls over diameter, length, or connector information. During inspection 70-143/2005-01-02, the inspector noted that a temporary procedure did not specify the diameter, length, or connector information of the temporary fixture and questioned whether the hose had been adequately evaluated and approved from a criticality safety standpoint. In response to the inspector's question, a licensee NCS engineer had evaluated the temporary fixture as being safe, tagged it as being approved, and the licensee agreed to evaluate information, which should be included in a temporary procedure when authorizing use of temporary fixtures. During this inspection, the inspectors noted that prior to using temporary equipment in areas where special nuclear material was processed, the licensee evaluated the use of the temporary equipment against the existing NCS Evaluations to ensure that no new accident sequences were created by the use of such equipment. The inspectors also verified that the use of temporary equipment having the potential to create new accident sequences was not permitted until a NCS analysis was completed to demonstrate the safety basis, and new controls identified in the analysis were implemented through procedures. This item is closed.

70-143/2005-07-04 URI **(Redacted) (paragraph 6) (Note: All of paragraph 6, Physical Protection (TI 2600/006), to include conclusion, is redacted)**

70-143/2005-04-03 IFI **High airborne condition and elevated exposure**

This issue related to an incident of high airborne activity conditions and elevated exposures caused by poor maintenance practices. The inspectors reviewed ALARA goals records to determine if the incident had any significant impact on those goals. Based on the doses assigned during the incident, there were no significant increases in any individual exposure or the licensee's ALARA goals, and NRC limits were not exceeded. This item was closed.

70-143/2005-03-04 IFI **Isotopic analysis from an elevated stack sample at stack (Redacted) (Paragraph 5g)**

Closed IFI 70-143/2005-03-04: An elevated stack sample at **Stack 704**. This issue related to an elevated stack sample above the licensee's action limits from the (R). The inspectors reviewed the results of the isotopic analysis of the elevated stack sample. The inspectors determined there were no stack releases and/or significant dose to the public. **The inspectors noted that as a result of this issue, the licensee revised Procedure NFS-HS-B-18, Attachment E, in order to provide a more efficient technique for analyzing stack samples.** This item was closed.

Inspector Observations:

The annual threshold dose limit for 2005 was set at 0.5 rem for internal exposures, and was set at 1.0 for external exposures for all areas except the (R).

Two fires occurred, one of which was reportable. A longstanding deficiency in equipment condition contributed to one event.

On July 8, a fire occurred in the (R), when the (R) developed an electrical fault. Equipment damage was limited to heater body, and no spread of uranium or other contamination occurred. Three problems involving this issue:

- Heater design included an over-temperature sensor, but this was not properly connected to the controller to provide protection. The licensee **planned** to utilize this safety feature when installing a new heater.
- Local breaker supplying the heater controller apparently opened on fault, but failed to interrupt electrical power due to contacts subsequently re-closing or being welded shut.
- Fire alarm status panel incorrectly indicated that the source of the fire alarm was a "protectawire" signal from the (R) process. System was identified as source of fire because the (R) enclosure loss of air sweep alarm was wired into the protectawire system.

On July 9, a fire occurred in the (R). The licensee reported the event to the NRC and also notified the senior resident inspector, who responded to the fire location. The inspector noted that the fire had quickly self-extinguished and although some equipment damage occurred, **including significant deformation of the PVC ventilation piping from the process**, no containment breach or spread of contamination occurred. The fire alarm was not sounded due to confusion between the scene of the fire and the alarm station operator who received a verbal report from the scene. Therefore, the **fire brigade did not respond to the scene.**

The inspectors also noted one aspect of system operation, which was a longstanding deficiency in the approved safety devices. The event demonstrated that this aspect of system operations also increased the probability of a fire in the enclosure. System remained shutdown at the end of the report period.

The exposures, as of June 30, 2005, had slightly increased due to some workers handling high levels of feed material for the downblending areas, and also poor maintenance practices resulting in elevated exposures from high airborne activity.

The inspectors reviewed selected entries from the Problem Identification, Resolution and Corrective Action System (PIRCS), including corrective actions for previously identified events. 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. An example was violation 70-143/2005-07-03, described in paragraph 5.d of this report. NRC inspectors identified the issue to licensee management and, although the issue was investigated and corrective actions were evaluated, the issue was not documented in PIRCS until NRC inspectors requested additional updates on resolution and proposed corrective actions. **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.**

Conclusion: The plant was operated safely and generally in accordance with the license. **The effectiveness of the corrective action system was diluted by the licensee's hesitation to make entries on identified issues.**

The inspectors reviewed recent events and observed modifications in progress in the BPF facility in order to ensure compliance with license conditions.

SPILL - On July 25, the (R) process was in operation when hot solution overflowed from the (R) into the enclosure overflow line and onto the floor. The hot solution caused the clear lines to sag and deform. The licensee shutdown the (R) process until evaluation of the event could be completed. The licensee found that the event was caused by poor level control in the (R). Design of the enclosure overflows did not foresee the possibility that solution at an elevated temperature would overflow (R). The licensee evaluated an improved level indication and control system, evaluated different material for the overflow lines, and began installation of several other design modifications. **The system was still shutdown at the end of this inspection period. (Note: No Event Report can be found on this Spill).**

The licensee also shutdown other BPF processes in order to implement process improvements.

The inspectors observed modifications made to the (R) process, which included changes (4 lines redacted). The inspectors reviewed proposed changes to the piping and instrumentation design, observed work in progress in the facility, and inspected proposed changes to items relied on for safety. The inspectors noted that the addition of the nitrogen purge line required the addition of several IROFS, in order to prevent pressurization of the enclosure in case of an upset. The inspectors noted no issues with proposed changes to IROFS. The process was still shutdown at the conclusion of the inspection period.

Conclusions: The BPF processes were shutdown for installation of process improvements. Inspections of modifications in progress and changes to the safety basis were ongoing at the end of the report period.

10/31/05

NRC Inspection Report 70-143/2005-08 and Notice of Violation, **Two (2) Severity Level IV**, August 21 through October 1, 2005, **ML081480305**

Open

70-143/2005-08-01 VIO Failure to maintain configuration control

NFS-ENG-001, Engineering Project Design Control, Section 7.1.4, External Design Interface, states "Design information transmittal records are used to identify the status of design information or documents provided. Where it is necessary to transmit design information orally or by other informal means, the transmittal shall be confirmed by a written record." Additionally, Section 10 Change Control, states "Control of design changes shall be maintained through the completion of an Engineering Change Notice.

Contrary to above, prior to September 8, 2005, the licensee failed to document transmittal of design information and failed to maintain blended low enriched uranium preparation facility design changes through the completion of an Engineering Change Notice.

The inspector assessed the licensee's effectiveness and acceptability of modifications to the BPF facility processes and observed process startup. Numerous equipment difficulties hampered operations.

The inspector reviewed licensee actions and causal determination for an upset condition/overflow from the (R) system on September 8. Review identified a violation of NFS design procedures associated with the documentation for (R) system modifications performed by subcontractors. The design (R) was intended to prevent turbulence (R). However, the licensee had identified that the (R) had the unintended effect of contributing to or causing upsets from the (R) system, and had either contributed to or caused the September 8 overflow. Due to occurrence of the overflow, the licensee inspected the (R) and found that the subcontractor had failed to removed the (R).

Facility design modifications should be strictly controlled to ensure that changes to the facility are performed such that those changes do not compromise the facility design safety basis or allow unanalyzed changes to be incorporated without the proper reviews and approvals. The licensee failed to provide written documentation after issuance of verbal work instructions to a subcontractor and did not provide the requisite engineering changes were in fact acceptable and completed as required. Failure to maintain configuration control of facility design modifications in accordance with ENGR-001 was a violation of NRC requirements.

70-143/2005-08-02 VIO Failure to implement the lockout/tagout procedure

Procedure NFS-GH-36, Lockout/Tagout, Rev. 4, Feb. 26, 2003, requires that the authorized employee(s) place the lock(s) and tag(s) on the single energy isolation point prior to performing work on the equipment, when the work requires lockout/tagout.

Contrary to above, on Sep. 12, 2005, an **authorized employee failed to place the locks and tags on the single energy isolation point, prior to performing work on the equipment.** Work order 98388 was approved to perform the maintenance task on a pump (R) and required a lockout/tagout.

70-143/2005-08-03 URI Adequacy of design basis (R) system IROFS

On Sep. 9, 2005, while observing activities in the (R), the inspector questioned the as-built configuration of the enclosure overflow lines, which were IROFS designed to ensure that no more than a one-inch depth of solution could accumulate in the enclosures. Each enclosure was built with two overflow lines, and these had recently been modified from clear poly-vinyl chloride to stainless steel construction. Other overflow piping throughout the plant had this cross piece positioned well below the bottom of the enclosure to assure free drainage. The licensee concluded that the overflow should be modified (R) operations until this was completed. Licensee was still evaluating the extent of condition for this issue at the end of the inspection period.

The inspector noted that the nuclear criticality safety evaluation for the (R) process required that the drain line must be designed so that the height of the slab in the bottom of the enclosure cannot exceed (R). The setpoint determination documented flow capacity of the drains and stated the drains (R), which implied that the drain must be below the enclosure. The setpoint determination included a sketch with no dimensions, which showed the drain cross piece below the bottom of the enclosure. However, the inspector noted that the design drawings and setpoint evaluations of the overflows did not explicitly specify any required elevation for the upper cross piece, relative to the bottom of the

enclosure. Issue will remain open pending further review of the setpoint evaluation.

Closed:

70-143/2005-01-01 VIO Failure to conduct downblending operations
in accordance with approved temporary procedure

Licensee determined that the root cause was that the procedure was inadequate, as no frequency for performing the activities was specified and the actions were not required to be recorded. Licensee revised procedure.

70-143/2005-02-01 VIO Control of Danger Tagged Components

Licensee determined that the root cause was a misunderstanding on the part of plant personnel regarding lockout/tagout requirement for operational system isolation. Training package developed and distributed.

70-143/2005-02-02 VIO Failure to Lock Shut Discard Control Valve

Licensee determined that the failure was due to an oversight by operator. Personnel were reinstructed on event and importance of procedural compliance. Procedure revised. "In-hand" runsheet developed for (R) discard operation.

70-143/2004-02-02 IFI (Redacted)

Licensee's extensive review of the issues that caused reliability concerns regarding the system and their corrective actions have been adequately addressed

70-143/2004-03-02 VIO Failure to Conduct a Detailed Criticality Safety
Analysis

Inspector found threshold had been adequately lowered to prevent reoccurrence of the initiating event.

70-143/2004-04-02 AV Inadequate Engineered Control

Letter to licensee from the NRC dated October 6, 2004, closed this issue with no enforcement action by use of enforcement discretion

70-143/2004-08-04 VIO Failure to Follow an SRE Test Procedure

Inspector reviewed corrective actions stated by licensee in their response to the violation, which involved training of supervisors on the proper technique in performing the SRE test procedures.

70-143/2004-10-03 VIO Failure to maintain configuration control of temporary equipment

Inspector reviewed corrective actions stated by the licensee in their response to the violation which involved modifications to the configuration control and work request procedures. Inspector reviewed modifications to procedures and found them to be adequate to prevent recurrence through the addition of a pre-operational walk down just prior to the startup of the equipment.

Observations

Event #41197 – Wet Off-Gas (WOG) Line Calculation Was not Performed

Inspector reviewed licensee's actions to address WOG lines for raffinate column (R) were not properly sized. Licensee modified the inputs to the system in order to prevent the WOG lines from being overwhelmed, which could create a criticality issue due to backflow.

Event #41839 – Small Fire in Waste (Calciner) Furnace

Inspector reviewed licensee's actions to address brief flame in enclosure (R) occurred. Inspector reviewed licensee's modifications to calcining procedure, which disallowed the calcining of (R). Inspector also reviewed equipment modifications to off-gas system designed to prevent a fire from reaching the ventilations system.

Licensee audits noted a significant number of corrective actions were overdue.

Inspectors noted **examples of poor contamination control within radiologically controlled areas. Areas noted as "above administrative control limits" were in generally accessible areas.** One situation involved a spread of contamination outside of a maintenance area involving equipment replacement. The other area was in the (R), in the natural and low enriched uranium handling area, and no obvious cause was evident. **Observations were evidence of poor work practices.**

11/28/05 NRC Inspection Report 70-143/2005-207, Nov. 7 through 10, 2005, (Criticality Inspection), **ML081490102**

Open Item Followup (All closed)

70-143/2004-207-01 VIO Tracks Licensee's failure to comply with the unfavorable geometry bag handling requirements of NFS-HS-CL-27

During inspection 70-143/2004-207, inspector had identified an open plastic bag not meeting the handling requirements of NFS-HS-CL-27 in the (R) of the Oxide Conversion Building. Corrective action include re-instruction on the use and

control of unfavorable geometry bags in OCB. Inspector verified that training had been completed.

70-143/2004-207-06 VIO Tracks licensee's failure to demonstrate that the caustic discard solution concentration was less than (R)

During inspection 70-143/2004-207, inspector had determined that double contingency protection had been lost as a result of the licensee's attempted release of liquid waste effluent from the caustic discard (R) to unfavorable geometry without the demonstration that the U235 concentration was (R) prior to transfer. Inspector verified that corrective actions identified in the licensee's March 10, 2005 reply to Notice of Violation had been completed. Corrective actions included revisions to operating procedures to improve the implementation of NCS requirements and repair of faulty (R) instrument taps to improve functionality of the caustic discard (R) level indicators.

70-143/2005-203-01 VIO Failure to establish double contingency for the backflow of solution into the (R) dilution process ventilation system

This item concerned the licensee's failure to establish double contingency for the (R) dilution process ventilation system. During inspection 70-143/2005-203, the inspector had determined that the NCS analysis for the (R) dilution process ventilation system credited the performance of an uninstalled (R) to prevent the accumulation of a critical mass in the unfavorable geometry portions of the ventilation system.

Inspector verified the corrective actions identified in the licensee's June 21, 2005 reply to the Notice of Violation had been completed. Inspector noted that the corrective actions included:

1. Modifying the design of the (R) dilution process ventilation system to provide passive engineered controls to prevent uranium (R) solution from entering unfavorable geometry ductwork
2. Revising the NCSE for the BLEU Preparation Facility ventilation system to demonstrate the criticality safety of the new design.
3. Revising licensee procedure NFS-HS-A-58, "Nuclear Criticality Safety Evaluation" to ensure the consideration, review, and revision as appropriate of other NCSEs which may be impacted by changes made to a process-specific NCSE, and
4. Revision of the NCSE/Analysis Writer's Guide to include NCS design considerations for ventilation systems. Inspector reviewed the revised NCSE and

verified the installation of the modified design of the (R) dilution process ventilation system

Inspector noted that the event was directly attributable to an inadequate configuration change process involving weaknesses in both the licensee's procedure for development and approval of NCSEs, and the licensee's NCSE writer's guide that permitted a configuration change to be approved without assurance that double contingency would still be maintained for the process ventilation system.

70-143/2005-203-02 URI Failure to recognize a potential NCS violation during review of an internal event

During inspection 70-143/2005-203, inspector questioned why the licensee had not taken prompt corrective action in response to an event precursor to prevent occurrence of a more significant event (**line redacted**). Inspector determined that licensee recognized importance of timely precursor detection and was committed to emphasizing this philosophy plant-wide, including management oversight of operator responses to repetitive false alarms. Inspector noted that licensee management treated false alarms as actual safety system actuations and was concerned that operators were not fully attentive to recognizing precursor conditions. Inspector determined that level of management oversight being applied to recognition of event precursors was adequate to prevent occurrence of more risk-significant process upsets.

70-143/2005-203-03 URI Investigation and identification of potential NCS control failures resulting in (R) solution accumulation in the BLEU (R) process off-gas system

This item concerned the licensee's investigation and identification of potential NCS control failures resulting in (R) solution accumulation in the BLEU (R) off-gas system. During inspection 70-143/2005-203, the **licensee's investigation into the event had not been completed, and the full extent with which established NCS controls had been compromised could not be determined by the end of the inspection.** Inspector reviewed results of licensee's investigation into the event and determined that no other credited NCS controls had failed.

12/08/05 **NOTE:** NRC Letter to NFS: Confirms conversation between B. Marie Moore of your staff and Dan Rich of this office concerning a management meeting which has been scheduled for December 20, 2005, at 1:00 p.m. at the Region II Office in Atlanta, GA. **The purpose of the meeting is to discuss safety (R) improvements. Meeting will be closed to public.** (Letter signed by David A. Ayres, Chief, Fuel Facility Inspection Branch 1, Division of Fuel Facility Inspection, Region II), **ML081360257**

12/16/05

NRC Inspection Report 70-143/2005-10 and Notice of Violation, **Four (4) Severity Level IV Violations, Two (2) Non-cited Violations, one (1) Apparent Violation**), October 2, 2005 through November 12, 2005, ML081480307

Open:

70-143/2005-10-1 IFI Replacement of IROFS (Item Relied on for Safety)

The inspector reviewed the status of down blending IROFS (R) was an engineered control, which was designed to (R), added to any blend. The device was a (R) but the licensee was never able to achieve accurate measurements with the device.

The first blend, on December 16, 2004, and each blend since, has been completed with a Letter of Authorization (LOA), which required certain administrative control measures designed to compensate for the non-functional engineered control. The administrative measures included a volumetric check on the prior to blending, a volumetric check on the (R) during blending, and lock-out of valves and pumps to ensure no HEU solution was added to the (R) during a blend. Violation 70-143/2005-01-01 was cited to document non-compliance with the LOA, when some of the checks were not recorded and one was not performed. Although the engineered control never functioned properly, and thus was never an effective control, the inspector questioned whether the temporary compensatory measures were an equivalent replacement to the engineered control, and also questioned whether the licensee's process complied with 10 CFR 70.72; 10 CFR 70.72 requires changes to the facility to be evaluated for the following:

Impact of the change on safety and health or control of licensed material; and impacts or modifications to the integrated safety analysis, integrated safety analysis summary, or other safety program information, developed in accordance with 70.62. The changes were issued in accordance with licensee procedure, which allows compensatory measures approved by the safety committee to be substituted for IROFS.

However, the inspector questioned whether the licensee's process met the intent of the above requirements for change analysis, in that the impact of the changes to the Integrated Safety Analysis (ISA) and the ISA summary were not evaluated, and the compensatory measures were not risk indexed.

The inspector reviewed the status of IROFS (R). These IROFS were engineered controls designed (R). The control device was a float switch and had not proved reliable. (R) had failed several weeks prior to this inspection, and (R) failed during the inspection period. The licensee designed compensatory measures, and in the case of the BPF, formalized these measures as IROFS (R). These IROFS

were risk indexed with the same reliability as the engineered control and consist of the following checks: (Redacted). If the check fails (R) operation cannot continue with (R). IROFS (R) were conditional use only; the safety basis describes the IROFS to be used only if IROFS (R) are bypassed. Bypassing was accomplished (R) and allows system operation. **Bypassing was permitted by NFS procedure in case the float switch was not functioning, and required a supervisor's permission. It was difficult to determine the position (R). The position was not obvious, no record was kept of the bypass, and there was no formal means of deducing whether the IROFS was bypassed or not.**

A related topic was IROFS (R) which had the same function as (R), but in the (R) process. **This engineered control was also a float switch and had also failed.** The inspector found that in this case, the licensee had incorporated compensatory measures in the operating procedure. The compensatory measures were not designated as IROFS, and were not documented in the design basis. The compensatory measures allowed continued operation with similar administrative controls as described above.

Inspector questioned whether an administrative IROFS was an equivalent replacement to an engineered control. Also, in this case, the inspector noted that the engineered control functioned (R). The administrative control provided a time cushion (R). **Therefore, the point of control of the administrative measure was closer to allowing an upset. Additionally, the automatic process controls to maintain (R) interface levels in the (R) system functioned poorly, and the system was normally run in manual control, which placed an additional burden on the operator.** In spite of the differences in control, the administrative control and the engineered control are assigned the same effectiveness index for risk reduction.

Inspector also questioned whether a conditional use IROFS, described in procedures and the design basis, but only used upon failure of another IROFS, met the 10 CFR 70.62 management measures requirements of maintaining IROFS available and reliable. Additionally, the licensee had no formal means of indication to the operator, which IROFS was in effect. **When a procedure prescribes use of a safety control only upon failure of another safety control, and no formal means is established to indicate or document the status of which safety control is being used, it raises a question of whether an IROFS is available and reliable.** Likewise, there is no description in 10 CFR 70.62 of IROFS, which are typically not used. This item will be tracked as IFI 70-143/2005-10-01, pending further NRC evaluation.

Conclusion. Inspector reviewed use of temporary compensatory measures and conditional use IROFS and reviewed equivalency of replacement and other safety program aspects. The issue will be tracked as an inspection follow-up item (IFI 70-143/2005-10-011) for further NRC review.

70-143/2005-10-02 AV Failure to Meet Criticality Safety Performance Criteria (two examples)

NFS Procedure HS-A-79, Section 6, baseline design criteria, required that designs must be developed and implemented in accordance with management measures, to provide adequate assurance that IROFS will be reliable and available to perform their function when needed.

Two examples of failure to provide adequate assurance that IROFS will be reliable and available to perform their function when needed was an apparent violation of NRC requirements (AV 70-143/2005-10-02). URI 70-143/2005-08-03 is closed.

Inspector noted that NCSE 54T-05-0030, Section 4.1.4.2.1 identified the drains as two independent passive engineered controls, each with an effectiveness of protection index of (R). Inspector also noted that NCSE 54T-05-0030 assigned a likelihood index of (R) for the initiating event which indicates it would be an expected event. Although no actual consequences occurred, since the IROFS mentioned were the only IROFS in an accident sequence leading to a criticality, and since those IROFS were subject to a common-cause failure, the potential consequences of this issue are severe.

Conclusions. Two examples were identified of inadequate design basis for process enclosure drains, and the issue was tracked as an apparent violation.

70-143/2005-10-05 VIO Failure to verify SNM concentration in waste

NFS BPF Standard Operating Procedure (SOP) 40 Rev. 8, Section 10, Step 6.6, Caustic Discard Phase, Items Relied on For Safety (IROFS) Note 1 states, "Liquid waste effluent shall not be released from the to unfavorable geometry tanks until the U-235 concentration in the effluent has been confirmed by way of dual samples and analyses to be less than - and Step 6.7.1 states " Once stops, close the block & bleed valve and then notify Supervision to lock."

Contrary to the above, on October 28, 2005 the licensee failed to close and lock the block and bleed valves, and subsequently released approximately (R) of **liquid waste effluent from (R)** to unfavorable geometry tanks without confirmation of the U-235 concentration.

A violation was noted for failure to verify U-235 concentration levels in (R) liquid waste effluent prior to transfer from favorable to unfavorable geometry storage (VIO 70-143/2005-10-05). The significance of this item was highlighted by the fact that lessons learned from several previous similar violations were not incorporated in the procedure for this new process. Specifically, there was 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.

70-143/2005-10-08 VIO Failure to Comply with Radiation Work Permit (RWP) procedures

A violation was identified with four (4) examples of failure to comply with radiation work permit (RWP) instructions (VIO 70-143/2005-10-06). Procedure NFS-GH-42, Establishing and Posting Radiologically Controlled Areas, Rev. 4, Step 5.9.4.3 states: "These areas shall be posted as restricted areas and may require additional posting in accordance with this procedure. They shall also be barricaded to control access." Step 5.10.2.1 states: "RWP AREA" banner tape is used to mark the boundaries of the RWP areas as required within the applicable RWP. Compliance with the specific dimensional/geographical area delineated on the RWP is required."

Contrary to the above, the licensee failed to properly implement procedures and controls for work activities associated with RWPs as follows:

1. On October 18, 2005, RWP #05-07-041 did not specify the nature and location of the work being conducted, in that equipment disassembly and component replacement activities were being performed in the area when the RWP only specified cleaning activities.
2. October 25, 2005, personnel did not comply with RWP requirements, in that they were working inside an RWP area but not equipped with the personal protective equipment required by RWP #05-41-082.
3. On October 28, 2005, the upper walk deck in the process area, which was part of the work area controlled by RWP #11116, was not posted with RWP banner tape, as required by Procedure NFS-GH-42.
4. On November 2, 2005, an RWP area was found to be terminated prior to the monitoring results being verified to be within required limits, in that process piping and flanges were found to be contaminated above the action limits of 5000 disintegrations per minute per 100 square centimeters.

70-143/2005-10-07 IFI RMS-3 Criticality Alarm Unit Failure

NRC Event 42047, Criticality Alarm System Failure. An Eberline RMS-3 radiation monitor display unit reset internal scaling factors and alarm values to factory values. This failure was not detected until a monthly test was conducted. The **licensee claimed** the unit would still function due to redundant circuitry, which provides a rate based criticality alarm. **No test or certification information was available for inspectors to review to verify this claim.** The licensee had redundant coverage of the area due to other criticality alarm system detector pairs. Due to the uncertainty of how this failure occurred, the licensee committed to perform a weekly verification of alarm system function until the

issue is resolved. The item will be tracked as IFI 70-143/2005-010-07, pending licensee identification of the cause of failure and corrective actions.

70-143/2005-10-08 URI (Redacted)

Opened/Closed

70-143/2005-10-03 NCV Unattended Process Operations

Two Non-Cited Violation(s) was/were discussed involving the following requirement(s) and Corrective Action(s):

Section 2.7 of the license application requires the licensee to follow operational procedures. Standard Operating Procedure (SOP) 409 required the presence of operators in order to operate equipment within safety guidelines and to respond to abnormal conditions and process upsets.

Contrary to the above, on October 31, 2005, the licensee found that the processes had been operated for approximately one hour with no personnel present. This non-repetitive, licensee-identified and corrected violation is being treated as a noncited violation (NCV), consistent with Section VI.A.8 of the NRC Enforcement Policy (NCV 70-143/2005-010-03), Unattended Process Operation. Corrective actions included implementing a more formal shift turnover process, requiring supervisors to turnover prior to the arrival of hourly workers, and assigning supervisors specific process area responsibilities

70-143/2005-10-04 NCV Criticality Station Limit Violation

The station limit posting for the (R) promulgated in NFS procedure HS-CL-13-03, limited (R) in the (R) drums.

On November 6, 2005, the licensee violated this requirement by storing drums (R). 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 (NCV 70-143/2005-010-04), Failure to Follow Criticality Station Limits. Corrective actions included removal of the extra drums and development of training which included the basis for the safety limits and postings, and the adherence to site safety procedures.

Closed

70-143/2004-12-02 VIO Failure to complete training on procedural changes

70-143/2005-03-03 VIO Control of Process Waste Valve Position

Issue concerned a **poorly controlled modification of a process enclosure drain, such that the drain may not have functioned due to lack of control of the elevation of the drain.** Inspector noted that beyond piping diameter, the **design basis for the drain did not specify critical dimensions of the (R) drain.**

Inspector further reviewed the design basis for the enclosure drain system, and questioned whether enclosure vacuum was accounted for. Licensee evaluated the issue and found that **vacuum was not accounted for in the design basis.** Licensee found that enclosure drains in the BPF would function adequately under normal vacuum conditions, but they would have to be modified to allow for any increase in system vacuum above the normal range of values. **Licensee shut-down operations in the BPF and modified the drains to meet the worst possible conditions for process vacuum, which was determined (R).** Licensee evaluated (R) and determined existing glovebox drain configuration was adequate for normal and credible abnormal vacuum. The difference in the maximum possible vacuum between the two areas was the method of analysis.

Although no actual consequences occurred, since the IROFS mentioned were the only IROFS in an accident sequence leading to a criticality, and since those IROFS were subject to a common cause failure, the **potential consequences of this issue are severe.**

2006

01/23/06 NRC Inspection Report 70-143/2005-011, Nov. 13, 2005 through Dec. 24, 2005, **Three (3) Severity IV violations treated as Non-cited Violations (NCVs)**
ML081480308

Closed:

70-143/2005-011-01 NCV Failure to perform required test

NFS procedure SOP 401, part 8-3, Section 8.3.4 required a leak test of certain components (R). On Nov. 17, the inspectors identified that the licensee failed to leak test these components when last required. Licensee exhibited identified circumstances and foot cause of event and was granted identification credit. Failure to perform a leak test was a violation of NRC requirements.

70-143/2005-011-02 NCV Failure to post Radiation Work Permit (RWP)

NFS procedure GH-03, states supervisors have primary responsibility for RWP compliance, including at the RWP entrance. On Dec. 10, the licensee identified

that a job requiring an RWP, cleaning the (R) scrubber, had been started without a RWP being posted. Failure to post the RWP at the job site was a violation of NRC requirements.

70-143/2005-011-03 NCV Failure to close an unattended container

NFS procedure CL-26, section 4.6.3 requires all containers to be closed while unattended. On Nov. 17 a (R) was left open and unattended (R). Failure to close an unattended container was a violation of NRC requirements.

Open:

70-143/2005-011-04 URI Overweight Thorium Shipment

On Dec. 8, the licensee reported a lost shipment of thorium (Th) (R) (NRC Event 42191). Shipment was subsequently found and licensee retracted report. However, licensee identified that the (R) exceeded the allowed 15 pound weight for the 10 CRR 40.22 general license documented on the shipping papers. Since the shipment was ultimately bound (R), the licensee claimed an oversight, that the shipping papers should have cited 10 CFR 100.22, which uses a (R) limit.

70-143/2005-011-05 IFI Potential over-pressurized (Redacted)

Licensee identified a criticality safety issue, in that a source of potential over-pressure in the product (R) were not analyzed to ensure that no backflow into unfavorable geometry utilities could take place. Although the (R) were vented, a source of nitrogen was piped to the (R) **and the effect of this pressure source was not previously considered**. As temporary corrective action, the licensee isolated this pressure source from the (R) using lockout/tagout. Also, an analysis was initiated to determine the potential safety issues.

Reported Events Reviewed:

NRC Event 42131 – On Nov. 9, NFS reported a violation of an environmental item relied on for safety in that (R) of uranium had been added to a waste tank, while the limit was (R). This limit was based on environmental effects of a release. The site drainage system was modified since the original limit was calculated, and the licensee had analyzed the dilution resulting from the modifications and calculated the new limit to be (R). **The licensee implemented the new limit on Nov. 10.** The drainage modification had been made prior to the (R) limit being exceeded. Therefore, this failure constitutes a violation of **minor significance** and is not subject to formal enforcement.

01/26/06

Confirmation of Closed Pre-decisional Enforcement Conference, **ML081500553**, (NRC Inspection Report 70-143/2005-010, Nuclear Fuel Services, Inc., Inspection

Oct. 2, 2005 through Nov. 12, 2005 (dated Dec. 16, 2005). See **ML081480307**.
(Note: 5 days before the 9-gallon (37-liter) spill of HEU)

Meeting scheduled for March 1, 2006. Purpose of meeting is to discuss **apparent violation associated with the failure to consider how credible abnormal process conditions could degrade or defeat the function of glovebox drains (R)**. An additional issue associated with the apparent violation involves the failure to report the glovebox vulnerability to the NRC under 10 CFR 70, Appendix A. The issue was not reported for approximately three weeks.

02/03/06

Inspection Report No. 70-143/2005-208 and Notice of Violation, **Two (2) Severity Level IV**, Dec. 12 through 16, 2005, **ML081490103**

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 normal conditions.

(R) **Concentration in WWTF Settled Solids.** As of Dec. 16, 2005, the licensee relied on a safety limit of (R) for the concentration of (R) material in waste water solution in unsafe geometry WWTF tanks without discussing or justify in the limit in criticality analysis for the tanks to demonstrate subcriticality for normal and credible abnormal conditions. Licensee failure to adequately justify in NCS analysis the safety limit on (R) concentration in WWTF tanks is a violation.

70-143/2005-208-03 VIO Failure to establish an appropriate concentration safety limit for non-uniform aqueous solution in WWTF tanks

As of Dec. 16, 2005, the licensee relied on a safety limit of (R), a calculated single parameter limit from Table 1 of the consensus standard ANSUI/ANS-8.1, for the concentration of (R) material in a nonuniform aqueous solution stored in unsafe geometry WWTF tanks. Failure to establish an appropriate concentration safety limit for WWTF tank is a violation.

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."

Footnote: Nuclear Science and Engineering: 81, 371 (1982), *Subcritical Limits for Uranium-235 Systems*, "...a margin as small as 0.01 was occasionally considered acceptable, even though with no method was the margin as great as 0.02."

70-143/2005-010-01 IFI Tracks NRC review of equivalence of substituted IROFS

Inspector reviewed the licensee process to objectively evaluate and document IROFS substitutions, which were made as a compensatory measure for the malfunctioning mass totalizer in the (R) system. The inspectors noted that the substituted IROFS consisted of locking the (R) and double-checking the batch. Inspectors noted that neither control was entirely equivalent to the function of the mass totalizer in measuring (R) material as it moved into the (R) tank. Inspectors noted that the substituted IROFS were claimed together as a single IROFS in the same accident sequence with an equivalent probability of failure.

70-143/2005-010-07 IFI Tracks licensee review, corrective actions and compensatory measures associated with the failure of the RMS-3 criticality alarm monitor

The RMS-3 monitor was observed to be inoperable due to incorrect calibration values which had been reset by the control system. The inspectors noted that the licensee was taking credit for the compensatory measure of discontinuing use of tracking software, which was believed to be responsible for resetting the calibration values. Inspectors also noted that the licensee has a long-term corrective action pending to change the monitor default settings, which would alleviate concern about resetting the values.

70-143/2004-207-05 IFI Tracks license actions to ensure that keff values for credible abnormal conditions do not exceed 0.95 limit

Note: The licensee **denied** the violation, and the NRC is reviewing the denial. Item remains open.

Observations and Findings:

In-Line Monitor: Licensee performs downblending by (R). Licensee uses an in-line monitor on the (R) line as an NCS control on downblending to prevent exceeding the concentration limit in the downblending tank. The second NCS control is a mass totalizer measuring the amount of (R) added. The in-line monitor prevents the solution in the (R) from exceeding the concentration limit by shutting the HEU transfer line valve when the concentration limit is reached. During a recent downblend (R) the in-line monitor was found to be inoperable for about (R).

Settling in Waste Tanks: Licensee technicians performed laboratory analysis of settling in WWTF tanks and determined that the settled solids approached the maximum assumed concentration of (R) discussed in the licensee settling study.

03/01/06

Predecisional Enforcement Conference, ML082500237. Two issues:

Prior to Sept. 9, 2005, **licensee failed to develop and implement a design for the (R) enclosure overflow system, which provided adequate assurance that IROFS would be reliable and available to perform their function when needed in that drains for the glove boxes would not perform their intended safety function.**

From Oct. 22, 2005 through Nov. 10, 2005, **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 70.61.**

03/01/06

NRC Inspection Report 70-143/2006-001 and Notice of Violation, **Two Non-Cited Violation and one Notice of Violation** (2 of 4 examples noted were identified by the NRC, **Severity Level IV**), Dec. 25, 2005 through Feb. 4, 2006, **ML081490104.**

Open/Closed:

70-143/2006-001-01 NCV Failure to comply with criticality safety posting

NFS procedure HS-CL-13-07 limits net container mass of containers in storage in the (R) area for criticality safety purposes. On Dec. 16, 2005, the licensee identified that a container was stored in the area, which exceeded the posted mass limit. This issue was documented as PIRCS 6825. Standard Operating Procedure (SOP) 409, Section 22, requires two operators verify the container meets the posted limits prior to storage. Failure to comply with storage area mass limits was a violation of NRC requirements. The licensee determined the excessive mass in the container was bounded by the area safety analysis.

70-143/2006-001-02 NCV Failure to correctly adjust the setpoint for the in-line monitor

License Application Section 2.12 requires management measures to ensure that items relied on for safety (IROFS) are available and reliable to perform their function when needed, as specified in 10 CFR 70.62(d). NRC Event #42244, identified on January 6, 2006, involved the failure to adjust the setpoint of the in-line monitor for the discard system to the required value stated in the nuclear criticality safety evaluation (NSCE). This was a management measures failure in the area of configuration control. The licensee reported the event because without the in-line monitor, 10 CFR 61 performance criteria could not be met. Failure to implement and maintain an IROFS as necessary was a violation of NRC requirements.

Open:

70-143/2006-001-03 NOV Radiological Controls for Evacuation

A violation was noted with four examples of failure to follow radiological protection requirements, two of which were identified by the inspectors (VIO 70-143/2006-001-03). The issue is repetitive, in that corrective actions for violation 70-143/2005-10-06 should have prevented a recurrence of personnel failing to wear, required personnel protective equipment. The issues were documented as PIRCS events 6895, 6992, 7127, 7185. **PIRCS #6895 was notable because the employee confused the black and yellow RWP boundary posting with an industrial safety boundary.** Although this type of boundary is commonly used in the (R), black is not a standard color for a radiation boundary.

70-143/2006-001-04 IFI Lack of radiation controls for excavation near Waste Water Treatment Facility

No radiation controls were established for excavation work adjacent to the Waste Water Treatment Facility (WWTF). This area 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. On January 5, 2006, contractor personnel dug through the fresh fill with power equipment, into the earth, which had been previously controlled as a radiologically controlled area. In order to research licensee procedures and control for excavation this item will be tracked as Inspection Followup Item (IFI) 70-143/2006-001-04.

Deficiencies were noted in entering and resolving radiation protection (RP) issues in the problem identification, resolution, and corrective action system (PIRCS). Until the date of the inspector's exit meeting for this report, no PIRCS entry was made for the RP violation noted in this report, which occurred on January 11, 2006. Likewise, a PIRCS entry for the control of excavation noted in this report as IFI 70-143/2006-001-04 was not made until day of the exit meeting. Also, the licensee identified an RP violation which occurred on January 19, but then **erroneously documented in Apparent Cause Investigation 4531 that no violation occurred**

Closed:

70-143/2005-008-01 NOV Failure to maintain configuration control

70-143/2005-011-05 IFI Potential Over-Pressurization (R)

This IFI was a criticality safety concern, in that the nitrogen purge capability on the (R) was not included in the system setpoint analysis for an over-pressure condition which could cause backflow into utilities. The inspectors reviewed the licensee's revised setpoint analysis and concluded there was not a safety issue.