

From: [Barbara O'Neal](#)
To: [Docket, Hearing](#); [Paul Bollwerk](#)
Subject: [External_Sender] Re-sending Limited Appearance Statement, Docket 70-143-LA, ASLBP No. 23-976-01-LA-BD02, Jan. 23, 2023
Date: Monday, January 30, 2023 1:53:59 AM
Attachments: [O'Neal Ltr to ALSBP 24Jan2023.pdf](#)
[NFS Releases and Stacks Exceeding Limits \(8 pages\).pdf](#)
[NFS Violations 1974-2023 \(360 pages\).pdf](#)

Message: My previous letter sent to Hearing Docket is at ML23027A039. I am resending the letter as a pdf document, and including the two enclosures also as pdf. The reason is because the paper copy I sent by Priority Mail, which was supposed to arrive on Thursday, Jan. 26, appears to be stuck somewhere in Washington, D.C. I'm not sure if it will ever arrive. The local Postmaster, here in Johnson City, TN, is attempting to find the package.

Thank you for the opportunity to present this information for the Limited Appearance Statements. While Enclosure 2 is quite lengthy, I believe it will help you to further understand my concerns. The information is from NRC publicly available documents. I have worked on it for years.

If you have questions, feel free to contact me at my home 423-928-0400 or mobile 423-735-9538, or this email. .

/s/

Barbara O'Neal

296 Princeton Gardens
Johnson City, TN 37601

January 23, 2023

Office of the Secretary
Attn: Rulemakings and Adjudications Staff
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Reference: **Nuclear Fuel Services, Inc. License Amendment Request, Docket No. 70-143-LA, ASLBP No. 23-976-01-LA-BD02, and ASLBP Memorandum January 23, 2023**

Thank you for the opportunity to submit a limited appearance statement in order to make the Atomic Safety and Licensing Board aware of my concerns at issue in this proceeding. Please accept this letter and enclosures as my *public comment* to the above case.

I was born and raised in Erwin, TN, and am now 78 years old. After 35 years working for Dept. of Defense, I retired and came back to Erwin in 2004 to take care of my Mother and build my dream home on property that had been in my family for over 100 years.

BUT, I would soon learn that my dream home was not be enjoyed, because of safety issues at two nearby nuclear facilities – Studsvik (now Erwin Resin Solutions, part of Energy Solutions) and Nuclear Fuel Services, Inc. (NFS) (now part of BWXT), both of which are co-located together on NFS property inside the City Limits of Erwin (a small Appalachian town of approximately 5,000 people).

I quickly learned through a TN Dept. of Environment Public Notice in The Erwin Record (1996), that Studsvik had been presented to people of Erwin as an “Environmental Restoration Facility,” when in fact, it was bringing in radioactive resins from all over the U.S. and reprocessing them. There was no mention of radioactive resins in the Public Notice. Studsvik wanted to build another incinerator, which the community rejected by signing petitions.

Then, I learned about the horrific safety issues at Nuclear Fuel Services (NFS), when they had a spill of high-enriched uranium and a near criticality in 2006 that made news around the world; 46 newspapers carried the story. It was then that I really started paying attention and found out that the Nuclear Regulatory Commission (NRC) had kept everything hidden about NFS from the public for three years, supposedly as a result of 9/11. I saw the letters from Congress encouraging the NRC to release the information on NFS to the public. It took a year for this information to be released. By that time, I had become more proficient in the use of the NRC’s public database, ADAMS.

I began reading, printing, and studying the documents as they were released, and became more shocked as I read. These three years of documents was just the tip of the iceberg. It would get worse, much worse. I learned that the NFS President had problems with alcohol, and later that his Deputy was convicted of child pornography, and that their company doctor received Confirmatory Orders for falsifying records. In late 2008, the company was sold to BWXT. Perhaps things would get better, but they didn't. Keeping in mind, it was BWXT that owned NFS' twin, NUMEC, in Apollo, PA, and they did not have a good reputation.

I would soon learn that it was business as usual at NFS – production over safety. I had already started accumulating quite a file, by year, and continued. People in Erwin complained about lots of cancer in the area, and a local doctor said there were lots of people with thyroid issues in Erwin. While the National Academies of Science proposed a cancer study, with NFS as one of the nuclear facilities, it was eventually cancelled. NRC said it was too expensive. I say, it is more likely than not that **the NRC did not want the truth to be known about this plant.**

NFS is a 65-year-old nuclear fuel facility that began in 1957. It has NEVER had a site-specific EIS. In the 1978 EIA (Environmental Impact Appraisal), on page 4-3, Table 4.6, footnote c, it states **“A 30-year lifetime is assumed for the plant.”**

During these 65 years, according to an expert environmental scientist, NFS has contaminated a major river – the Nolichucky – for 95 river miles all the way to Douglas Lake. And, the Nolichucky is a major source of drinking water for the people of Jonesborough and Greeneville, TN.

It is my understanding that NFS' primary mission is to produce fuel for Navy submarines. Supposedly, they are the sole source. As someone who worked for Dept. of Defense for 35 years, it is hard for me to accept the fact that Naval Reactors would put all their eggs in one basket. What if something happens to NFS – a natural disaster, or otherwise, then what? I would be much more comfortable seeing Navy fuel made in a government-owned facility like Oak Ridge, rather than a privately-owned company. Plus, recently, NFS has had lots of Physical Security violations, and the most recent violations involved two MC&A (Material Control & Accountability) violations. I believe both Physical Security and MC&A violations are serious.

Just peruse, if you will, through the attached two enclosures – NFS Releases and Stack Exceedances and Violations History. I think you will agree that NFS should not be granted a license amendment to SNM-124 to produce the same thing they are producing at Y-12 at Oak Ridge. Plus, as I understand it, they are going to be using a dangerous and arcane process that Oak Ridge will no longer use when they get their new facility up and running.

Ladies and gentlemen, it does not pass the common-sense test. The eight new accident scenarios addressed in the NFS Environmental Report are not something you or I would ever want to see happen to my hometown: **Nuclear Criticality, Uranium Hexafluoride Release, uranium solution release, major fires, natural phenomena, security emergencies, and in addition to all that, two new chemicals will be associated with this process: Anhydrous Hydrogen Fluoride (AHF) Release and Anhydrous Ammonia Release.**

If NFS' primary mission is to make Navy fuel, then that is what they should do, and do it well. They should not try to emulate an old and dangerous process done at Oak Ridge. They do not have the acreage. They have a total of 82 acres. However, the Protected Area is much smaller – approximately 18 acres. Actually, their closest civilian neighbor could throw a rock and hit them.

Over the years, in the Biannual Effluent Monitoring Reports, the Total Effective Dose Equivalent of the MEOI (Maximally Exposed Offsite Individual) varies from 200-550 meters. That's close! Also, over the years, I have noticed that the Organ Doses and Total Effective Dose Equivalent (TEDE) at the MEOI Location have increased. For example, there are now 25 organs listed that receive effects from NFS effluents, the latest two were added in 2017 – Extra Thoracic and Heart Wall.

After nine years and many sleepless nights worrying that if I was away from home and something happened at NFS, I would not be able to get home, because no matter what route I took, I had to pass by NFS and Erwin Resin Solutions. So, I reluctantly sold my dream home and moved 15 miles away to Johnson City – which is not really far enough away if something catastrophic happens at NFS. It is interesting to note, however, that one of the neighbors at my new location happened to be a recent former President of NFS! Over the years, I don't believe any of the executives or even the resident inspectors at NFS have ever chosen to live in Erwin.

The people of Erwin are hard-working country people. They do not understand what is at stake here, but some of us do. I have watched NFS for decades and I personally worked many, many hours and years compiling the 8-page NFS Releases and Stacks Exceeding Limits (1962-1998) at Enclosure 1 (and this is not inclusive; just the worst of the worst), and the 360-page (Known) Violations List, 1974-2023 at Enclosure 2. I believe this information and the sampling done by an environmental expert more than validate the contentions in the subject case.

At some point, I request that this information be added to ADAMS for future reference and historical purposes.

Respectfully submitted,

Barbara A. O'Neal

2 Enclosures:

Enclosure 1: NFS Releases and Stacks Exceeding Limits 1962-1998, 8 pages

Enclosure 2: NFS (Known) Violations History, 1974-2023, 360 pages

Quote from former NRC Commissioner in an AARM Meeting on May 30, 2007, ML071570135

“NFS is as safe as it's ever going to be.”

NFS Releases and Stacks Exceeding Limits (as of 02/15/2015)

1962 to 1998

(Source: NRC Legacy Documents released 2015)

<u>Date</u>	<u>Releases/Exceeding Limits</u>	<u>Reference</u>
05/25/1962	15 kg HEU (UF6) released in 5 minutes Overheated cylinder ruptured	ML062020791 NUREG-1140 1/1/1988; Aug 1991
03/20/1964	1 kg UF6 released in 2 hours Overpressure burst tube	ML062020791
03/02/1970	(Air) 0.3% of 10 CFR 20 unrestricted area limit for enriched uranium (PU?)	ML14297A294

(Water) Martin's Creek – **67% of unrestricted area thorium limit during last half of 1968 and about 18% during first half of 1969.**

Strontium 90 was about 9% of the 10 CFR 20 restricted area limit. Strontium 90 in sediment samples from Banner Spring Creek (now known as Banner Spring Branch). Probable source of Strontium 90 – contaminated shipment of scrap. Findings transmitted to Tennessee State Health Dept. (Tennessee is an Agreement State) which has jurisdiction over the source and byproduct materials used at this site.

(Soil & Vegetation) – Samples from site perimeter and distances Of 1000 ft., one mile and five miles from the site. **Activity of perimeter samples was about ten times higher than any sample taken at the more distance location. In 1969, licensee expanded restricted area to about double its previous site so that areas showing higher activity levels were in restricted area.**

(Drinking Water) – Drinking water supplies for most of the City of Erwin showed concentration levels at or below the Minimum Detection limits for gross alpha, beta, and gamma activity. **Analyses were also made of gross alpha, beta, and gamma in samples of outflow from Banner Spring. The Clinchfield Railroad utilizes this spring as its fresh water supply.** There was no evidence of contamination of these water supplies by plant operations.

External Radiation Dose – Highest dose measured at unrestricted area boundary was on east side of plan and was 2,380 mrad from January 9 to March 11, 1969. (Source: Waste storage drums located within the restricted area). **Licensee was cited for creating excessive levels of radiation in an unrestricted area.**

(NFS Releases and Stacks Exceeding Limits)

- 03/24/1972 Letter from S.H. Smiley, Director, Division of Materials Licensing, Atomic Energy Commission to NFS and other nuclear fuel facilities, stating that "At present there is considerable variation among fuel processors and fabricators in the methods for collecting and measuring the effluent data necessary to assess environmental impact." ML080800400
- 01/1978 Environmental Impact Appraisal of the Nuclear Fuel Services, Inc. Erwin Plant, Erwin, Tennessee ML14339A518
- "The NFS Erwin plant does not routinely monitor its stacks for release of gaseous effluents.** The applicant states that measurements are made periodically (no time period given) and are made following process or control equipment modifications. However, no measurements were made for period from 1973 to present." (1978). (Paragraph 5.2.1, Page 5-3).
- "Currently, there is no monitoring program for the Nolichucky River.** Except for the one-time sampling conducted in April 1977 (see Table 4.13), the most recent baseline water quality data on the Nolichucky River were obtained in May of 1973." (Paragraph 5.2.2.2, Page 5-4).
- "There is not now, nor has there ever been, a groundwater monitoring program at Erwin."** (Paragraph 5.2.3, Page 5-5).
- "There is not now, nor has there been in the past, a program for monitoring aquatic biota."** (Paragraph 5.2.4.2, Page 5-6).
- 07/26/1978 NRC Letter to Senator Jim Sasser, U.S. Senate. Jonesboro residents concerned about their water supply. On May 25, 1978, representatives of NRC regional office in Atlanta met with Mayor and Alderman of City of Jonesboro to discuss the issue raised in an article from Atlanta-Journal Constitution. Recently, **the State of Tennessee has initiated an epidemiological study of the Unicoi County area with the Atlanta, Georgia HEW Communicable Disease Center.** ML14269A112
- (Enclosure 1, page 1, states that on January 27, 1978, NRC Office Of Nuclear Safety and Safeguards (NMSS) renewed the NFS license (License No. SNM-124) and independently prepared an **Environmental Impact Appraisal (EIA) dated January 1978**, on the NFS facility operations).
- (See Enclosure 1, page 4, "little green bottom stream" emptying into Martins Creek).

(NFS Releases and Stacks Exceeding Limits)

08/07/1979	3 kg of UF6 released (Accidental venting of cylinder to stack)	ML062020791
10/30/1980	Uranium 234 concentration from scrubber stack of Building 233, exceeded the U-234 (insoluble) concentration specified in 10 CFR 20, Appendix B, Table 1, for seven consecutive days on Sept. 29, 1980.	ML14288A417
12/09/ 1980	Since the (Redacted) restart on Nov. 21, stack concentrations have risen , but only on two occasions has the daily activity exceeded 1×10^{-10} $\mu\text{Ci/ml}$.	ML14307B032
01/30/1981	During the period from June to November, there were seven weeks during which stacks 287 and 278 exceeded reporting levels. (Two weeks were due to cross contamination within the laboratory)	ML14307B031
06/12/1981	On May 20, 1981 Building 233 was shut down and the ventilation lines and scrubber were cleaned out. Limiting orifice was placed in scrubber to improve efficiency of demisting section. The elevated stack concentrations appear to be related to type of material being run. When this type of material is processed again, precautions will be taken in order to maintain stack concentrations below the reporting limit.	ML14308A018
07/15/1981	Concentration from Building 233 stack was in excess of reporting limit for 18 days during month of June. It should be noted that concentrations for June are a factor of 10 lower than the concentrations for May. Additionally, in accordance with Condition 60, Amendment No. 5 of SNM-124, we report that the 7-day stack concentrations for Stack No. 36, Building 234 exceeded 50% of the concentration of U-233 (insoluble) as specified in 10 CFR 20, Appendix B, Table II. The 7-day average for week ending July 2, 1981 was 3.9×10^{-12} $\mu\text{Ci/ml}$.	ML14288A419
08/13/1981	Building 233 stack was in excess of reporting limit for four days during moth of July. It should be noted that on July 17 routine backwashing of scrubber demister was discontinued. The (redacted) stack exceeded the reporting limit on July 19 and remained above the limit for the rest of the month. Investigation found a few discrepancies in equipment operation and sampling areas. Correction of these items however did not resulting decreasing the stack concentrations. On August 5 the stack and blower were disassembled and cleaned. This corrected the problem.	ML14308A019

(NFS Releases and Stacks Exceeding Limits)

10/11/1981	0.05 to 0.1 kg HEU (UF6) released via main scrubber stack	ML062020791
10/14/ 1981	Building 233 stack was in <u>excess</u> of the reporting limit for <u>six days</u> during the month. Possible cause of the elevated concentrations was duct cleaning action from the (redacted) ducting clean out performed on Sept. 22.	ML14308A021
11/13/1981	Building 233 stack concentrations were in <u>excess</u> of Condition 61 reporting limit for <u>eight days</u> during the month. Apparent cause of these off-normal concentrations was the (redacted) of materials which had not been previously (redacted). Although (redacted) of the materials was terminated on Oct. 11, several additional days were required to clean out the system. Building 302/303 stack concentrations were in <u>excess</u> of the Condition 61 reporting limit for <u>eight days</u>. This, of course, was due to the October 11 UF6 release which was reported to you on October 12 , and which has been the subject of sustained and detailed investigation.	ML14308A022
02/15/1982	Concentrations from Building 302 stack. The (redacted) Stack concentrations were in <u>excess</u> of the Condition 61 reporting limit for the last days of the month. Apparent cause was entrainment of scrubber solution into stack. Previously “planned” major repairs on the (redacted) ventilation system were started on Feb. 8, 1982.	ML14308A023
03/15/1982	Building 233 stack concentrations were in <u>excess</u> of the Condition 61 reporting limit for <u>six days</u> during the month. The elevated concentrations occurred during cleanout of the (redacted) and (redacted). The cleanouts resulted in loading of the (redacted) duct roughing filters and a buildup of (redacted) in the filter housing box.	ML14308A024
08/13/1982	Building 233 stack concentrations were in <u>excess</u> of the Condition 61 reporting limit for <u>seventeen days</u> during the month. Cause was deteriorated filter housing and use of over-sized filter frames.	ML14308A026
11/17/1982	Building 302 stack concentrations were in <u>excess</u> of Condition 61 reporting limits for <u>five days</u> during the month. (Elevated concentrations may have been erroneous due to large hole in sampling probe). Building 130 stack were in <u>excess</u> of reporting limit for <u>fourteen days</u> during the month. (A filter will be installed on the scrubber water line prior to restarting operations in this building).	ML14307B030

(NFS Releases and Stacks Exceeding Limits)

03/15/1983	Building 233 stack was in <u>excess</u> of the reporting limit for <u>eleven days</u> during the month. (Investigation could not identify causes).	ML14307B027
04/14/1983	Building 233 stack was in <u>excess</u> of the reporting limit for the first <u>three days</u> of the month. The Building 233 stack was shut down on March 12, 1983. New process ventilation system for Building 233 was started up on March 25, 1983. Building 302 (redacted) stack concentrations were in <u>excess</u> of the reporting limit for <u>nine days</u> during the month. Higher than normal temperatures resulted in damage to stack sampling equipment. The recirculating scrubber water pump was changed out on April 13, 1983 in effort to reduce stack discharge temperature.	ML14307B026
05/13/1983	Building 302 (redacted) stack concentrations were in <u>excess</u> of reporting limit for <u>25 days</u> during the month. System was shut down and completely disassembled. HEPA filter on vacuum cleaning system had a hole and was replaced. Piping to venture scrubber was found to be blocked and was cleaned. Scrubber pump impeller and housing were found to be damaged and were replaced. Scrubber solution filtering system was changed to provide a larger filter for more surface area. Building 130 stack concentrations <u>exceeded</u> the reporting limit for <u>six days</u> during the month. Cause was undetermined. Building processes were shut down and <i>plans are</i> to disassemble and inspect scrubber system prior to startup.	ML14307B025
06/13/1983	Incinerator Exhaust Fire, NRC Inspection Report (IR) 70-143/83-26, Nov 17, 1983 (See reference to fire in enclosed AIT Report on the 1996 Incinerator Fire, page 15)	
06/14/1983	All process ventilation from high enriched operations, Buildings 233, 302 & 303 is now being released through a common vent, hereafter referred to as <u>Stack #416, the new main stack</u>.	ML14307B024
07/13/1983	Building 302 (redacted) Stack was the only stack that <u>exceeded</u> the reporting limit for the <u>month of June</u>. The (redacted) was shut down on June 30, 1983 and reconnected to the main ventilation system on July 7, 1983.	ML14307B023
04/24/1984	On March 31, 1984, the <u>seven-day average airborne radioactivity concentration released from the main stack exceeded the action limit of 1×10^{-10} μCi/ml.</u> Ventilation system was shutdown and cleaned on April 10, 1984.	ML14288A424

(NFS Releases and Stacks Exceeding Limits)

03/04/1986	Total plant discharge 57,800 ft. ³ /min. (Note: Oak Ridge Associated Universities (ORAU) report Entitled “Radiological Monitoring of Stack Effluents – Nuclear Fuel Services, Incorporated, Erwin, Tennessee, January 22, 1986)	ML14288A430
09/18/1986	Congressional Hearings (Excerpts & NRC Region II Perception – 10 pages attached)	
08/29/1988	Note: NFS does not consider U-236 to be a “principal radionuclide” as specified in 10 CFR 70.59(a)(1) and with this report will discontinue reporting this isotope.	ML14260A298
08/31/1990	“Isotopic data has not been received for our June sewer and surface runoff monitoring samples. Consequently, for these two sources, the isotopic ratios applied to determine June’s activity contributions were estimated by averaging the January through May isotopic ratios.” (NFS to NRC)	ML14251A300
03/01/1991	“Samples used for isotopic analyses of the October discharge from our Waste Water Treatment Facility were lost at the offsite laboratory and will not be available. Consequently, the October isotopic values were based on an average of those months having gross alpha values within October’s error band (113-769 pCi/2).” (NFS to NRC)	ML14260A301
09/09/1991	“May wastewater effluent monitoring data for Isotopic U were estimated for our original effluent monitoring report (21G-91-0143) by averaging January through April plus June isotopic ratios. This was necessary because the specified isotopic data had not been received from our contract laboratory. It has also been determined that a programming error was made in determining mixed specific activity values for uranium isotopes in the gaseous effluents. ” (NFS to NRC)	ML14287A248
02/28/1992	“Isotopic data has not been received for December effluent monitoring samples. Consequently, for these source terms, the isotopic ratios applied to determine December’s activity contributions were estimated by averaging the July through November isotopic ratios.” (NFS to NRC)	ML14248A458
08/28/1992	“Isotopic data has not been received for some of the liquid effluent monitoring samples. Consequently, for these source terms, the isotopic ratios applied to determine the respective activity contributions were estimated by averaging the available appropriate isotopic ratios.” (NFS to NRC)	ML14287A249

(NFS Releases and Stacks Exceeding Limits)

11/04/1992	Letter from NRC to Honorable Jim Sasser, U.S. Senate addressing concerns of William G. Cooper regarding the grounds at NFS being “hot” and Mr. Cooper’s concerns about the NFS handling the Russian uranium, and the cancer rate in Erwin.	ML14296A288
03/01/1993	“ Isotopic data had not been received for some of the liquid effluent monitoring samples. Consequently, for these source terms, the isotopic ratios applied to determine the respective activity contributions were estimated by averaging the available appropriate isotopic ratios.” (NFS to NRC)	ML14248A459
08/27/1993	“ Isotopic data had not been received for some of the liquid effluent monitoring samples. Consequently, for these source terms, the isotopic ratios applied to determine the respective activity contributions were estimated by averaging the available appropriate isotopic ratios.” (NFS to NRC)	ML14248A460
(04/02/1996)	Incinerator Fire, NRC Inspection Report 70-143/96-05, May 21, 1996 (copy enclosed)	
02/27/1998	Multiple errors in calculating radioactive effluent releases	ML14248A617
08/28/1998	Multiple errors in calculating radioactive effluent releases	ML14248A618
09/28/1998	Letter from NFS to NRC	ML14248A619

Discussion of Air Effluents for first six months of 1998:
“Regarding air effluents, NFS reported in Reference 2 that **concentrations released by Stack #416 were 77.6 times (on a sum of ratios basis for the mixture of nuclides) the effluent concentrations limits (ECLs) in 10 CFR Part 20, Appendix B, Table 2, Column 1.** Because the ECLs actually apply at the site unrestricted area boundary, **the sum of ratios calculated in this manner does not account for atmospheric dispersion effects** and is therefore conservatively biased. **Dose assessment results and supporting data are included as Attachment 1 to this letter.**

The primary contribution to doses was from Stack #416, which accounted for about 98% of the total alpha activity released by the facility during the period.

The majority of the activity was released during uranium recovery operations with trapping materials from Portsmouth, Ohio gaseous diffusion facility.

NFS began processing trapping materials **without HEPA filtration of air effluents** because information provided with the material did not indicate the presence of radioactivity at significantly high levels to warrant their use. However, on **June 1, 1998, significant increases in radioactive effluents from Stack #416 were observed.** On June 3, 1998, the Environmental Safety Manager requested HEPA filters be brought on-line for the HEURF. Filters were brought on line June 9, 1998. Much of the activity released during the first six months of 1998 occurred in the interim period between June 1 to 9, 1998.”

Discussion of Liquid Effluents for first six months of 1998:

‘Regarding liquid effluents, NFS reported radioactivity concentrations in liquid effluents from its waste water treatment facility (WWTF) to be at **1.05 (sum of ratios) times the annual limits in 10 CFR Part 20, Appendix B, Table 2, Column 2.** This was a significant increase over the last semiannual reporting period. The increase was caused primarily by processing activities in HEURF.

During February 1998, NFS released wastewater containing Tc-99 at approximately 0.37 times its limit. The elevated levels were not expected. **Other radiological contaminants (primarily uranium isotopes) existed in February releases at about 0.44 times their limits resulting in a total sum of ratios for the mixture of 0.85.**

During March and April 1998, NFS was performing HEU recovery activities on U-aluminum material. This process generated liquid wastes with uranium isotopes that were difficult to remove using the routine wastewater treatment process regardless of the effort involved in re-treating batches. Consequently, **the total sum of ratios for March and April were 1.01 and 1.03 respectively.**

Finally, **in May and June of 1998, NFS began processing materials known as Trapping Materials** (Reference 3). These materials contained an unexpectedly high concentration of Tc-99. **During May and June, average releases from the WWTF contained Tc-99 at 0.71 and 0.66 times the concentration limit, respectively.** Other contaminants (primarily uranium isotopes) comprised a sum of ratios of about 0.40. NFS responded to the presence of Tc-99 in June by developing a process to effectively remove Tc-99 from wastewater batches. **Concentrations of Tc-99 above 10,000,000 pCi/liter began entering the WWTF in June** and were effectively reduced to less than about 10,000 pCi/liter in July.”

Nuclear Fuel Services, Inc (NFS)
Erwin, Tennessee
(Known) Violations/Noncompliances/Deviations/Weaknesses/Inspector Observations
1974-2023
(as of January 2023; research continues)

Source: Nuclear Regulatory Commission publicly available documents

(Note: Blue color indicates addition of FOIA response 04/12, which contains duplication)

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.

1978 (NRC)

09/12/78 **Items of Noncompliance were noted: Failure to maintain 100 linear ft/minute encl air flow & failure to calibrate air samplers, IE Inspec Rept #70-0143/78-20 pm 780807-11, (Accession #7811090299; Fiche: 02729:329-027 29:338), 10 pages.**

10/06/78 One item of **noncompliance** was observed in the area of **Access Controls**. Rept withheld (ref 10CFR2.790), IE Inspec Rept #70-0143/78-24 on 780828-30, (Accession #7811200055; Fiche: 94215:316-942 15:316), **1 page**. (Also under Accession #7810310111; Fiche: 94093:310-940 93:317), **8 pages**.

10/31/78 **Items of noncompliance were noted in following areas: Failure to survey controlled areas for the total alpha contamination, IE Inspec Rept #70-0143/78-23 on 780828-30, (Accession #7811100069; Fiche: 94044:344-940 44:350), 7 pages.**

11/04/78 **Details withheld from public**, IE Inspec Rept 70-143/78-22 on 780907-781007, (Accession #7811210221, Fiche: 94486: 324-944 86:324), 1 page.

- 11/15/78 **Noncompliance noted.** **SNM (Special Nuclear Material) protection**, IE Insp Rept 70-143/78-25 on 781010-12 & 1017-19, (Accession #7901090027; Fiche: 02714:312-027 14:312), 1 page.
- 11/17/78 **Noncompliance noted: Failure to calibr nondestruction measurement sys used for burial boxes w/standards over the range (78-26-01).** Details withheld (ref 10CFR2.790), Insp Rept 70-143/78-26 on 781017-19, (Accession #7901090418; Fiche: 02715:075-027 15:075), 1 page. **(Note: Duplication; See Accession #7812210457; no fiche address).**
- 12/15/78 Areas inspected: **measurement biases & process system cleanout as related to inventory differences.** Details withheld from disclosure, IE Inspec Rept 70-143/78-31 on 780918-781121, (Accession #7812280029; Fiche: 94131:055-941 31:055), 1 page.
- 12/29/78 **Noncompliance noted: Failure to adequately survey airborne uranium in work areas & failure to make adequate lapel vs stationary air sample comparisons, IE Insp Rept 70-143/78-30 on 781211-15, (Accession #7902070005; Fiche: 03238:344-032 38:360), 16 pages.**

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.
- 01/19/79 **Noncompliance noted: Failure to enter shipments & receipts on NRC-741 matl transaction rept,** IE Insp Rept 70-143/78-34, (Accession #7903120444; Fiche: 03178:164-031 78:164), 1 page.
- 01/25/79 **Noncompliance noted.** Details withheld (ref 10CFR2.790), IE Insp Rept 70-143/79-02 on 790109-11, (Accession #7903160267; Fiche: 03354:293-033 54:293), 1 page.
- 02/01/79 **Major areas inspected: licensee coordination w/offsite support groups, emergency facilities, equipment & procedures, determination of radioactive release, IE Insp Rept 70-143/79-01 on 790108-12, (Accession #7903130101; Fiche: 034912:176-034 91:189), 14 pages.**
- 02/06/79 **Noncompliance noted. Failure to provide filter differential pressure gauge & failure to perform quarterly radionuclide analyses of composites of sewer & storm sewer samples, IE Insp Rept 70-143/79-03 on 790115-19, (Accession #7903160284; Fiche: 03359:335-033 59:343), 8 pages.**

- 02/16/79 **Noncompliance noted. Failure to make initial calibr for three nondestructive assay sys using four stds**, IE Insp Rept summary 70-0143/79-05 on 790123-25, (Accession #7903300480; Fiche: 03282:119-032 82:119), 1 page.
- 03/07/79 **Noncompliance noted: Failure to calculate bias associated w/measurement of process holdup & stack & laundry discharges, IE Insp Rept 70-0143/79-07 on 790110-0209**, (Accession #7905020439, Fiche: 03488:275-034 88:275), 1 page.
- 03/30/79 **Noncompliance noted: Failure of operators to sign chemical bldg. SOP log**, IE Insp Rept 70-0143/79-04 on 790123-26, (Accession #7906040184; Fiche: 02260:111-022 60:115), 5 pages.
- 04/09/79 **Noncompliance noted: Failure to submit rept within 30 days of taking physical inventory on 790109 & failure to measure stds over range. Details withheld**, IE Insp Rept 70-0143/79-11 on 790326-30, (Accession # 7908240164; Fiche: 00780:057-007 80:057), 1 page.
- 04/18/79 **Noncompliance noted. Failure to reflect correct quantity of SNM (Special Nuclear Material) for containers on perpetual inventory records.** Details withheld (ref 10CFR2.790). IE Insp Rept 70-143/79-13 on 790405-06, (Accession #7909280102; Fiche: 01051:290-010 51:290), 1 page.
- 05/11/79 **Noncompliance noted: Failure to remeasure, at time of physical inventory, three containers of low enriched SNM (Special Nuclear Material) which were not tampersafed.** Details withheld (ref 10CFR2.790), IE Insp Rept 70-0143/79-18 on 790402-30, (Accession #7909270333; Fiche: 01046:076-010 46:076), 1 page.
- 05/17/79 **Noncompliance noted: Failure to perform weekly tests of criticality monitoring system.** IE Insp Rept 70-0143/79-17 on 790508-10, (Accession #7907230652; Fiche: 00467:340-004 67:343), 4 pages.
- 06/19/79 **Noncompliance noted: wire used w/Type E seals is not equivalent to min std.** Disposal of seals in manner to prevent re-use is not per reg guide, IE Insp Rept 70-0143/79-21 on 790501-31, (Accession #7909170278; Fiche: 00952:144-009 52:144), 1 page.
- 07/13/79 **Noncompliance noted: Failure to conform to specific posted limits at one work station**, IE Insp Rept 70-0143/79-30 on 790703-08, (Accession #7908210148; Fiche: 00841:190-008 41:193).
- 07/13/79 **Noncompliance noted: Failure to provide intial calibr data for radiometric method.** Details withheld (ref 10CFR2.790), Insp Rept 70-143/79-23 on 790618-22, (Accession #7909280030, Fiche: 01038:355-010 38:355), 1 page.

- 07/26/79 Major areas inspected: NRC surveillance logs & concerns, **followup on U (Uranium) spill & followup on concerns of workers**, IE Insp Rept 70-0143/79-31 on 790719-21, (Accession #7908300568; Fiche: 02031:192-020 31:196), 5 pages.
- 08/22/79 **Noncompliance noted: Failure to use appropriate statistical methods to evaluate measurement errors.** Details withheld (ref 10CFR2.790), IE Insp Rept 70-0143/79-32 on 790717-20, (Accession #7910050108; Fiche: 01109:270-011 09:270), 1 page
- 08/22/79 **Noncompliance noted: Failure to maintain required spacing for interacting units,** IE Insp Rept 70-0143/79-35 on 790806-08, (Accession #7910030232; Fiche: 01087:074-010 87:077), 4 pages.
- 08/31/79 **Noncompliance noted: Failure to follow liquid & waste disposal procedure for discharge tank.** Details withheld (ref 10CFR2.790), Insp Rept 70-0143/79-26 on 790709-13 & 0730-0802, (Accession #7910180276, Fiche: 01178:021-011 78:021), 1 page.
- 10/02/79 **Noncompliance noted: Failure to establish NDA (nondestructive assay) procedures.** Details withheld (ref 10CFR2.790), IE Insp Repts 70-0143/79-36 & 70-0143/79-37 on 790910-14, (Accession #8004090244; Fiche: 04542:327-045 42:327), 1 page
- 10/03/79 **Noncompliance noted: Failure to update measurement variances,** IE Insp Rept 70-0143/79-36 pm 790820-23, (Accession #7911160025; Fiche: 01341:205-013 41:205), 1 page.
- 10/10/79 **Noncompliance noted: Detection Aids.** Details withheld (ref 10CFR2.790), IE Insp Rept 70-0143/79-45 on 790911-14, (Accession #7910260114, Fiche: 01218:242-012 18:242), 1 page.
- 10/23/79 **Noncompliance noted. Failure to report immediately loss of SNM (Special Nuclear Material) through ventilation stack of U (Uranium) hexafluoride conversion operation.** Details withheld, (ref 10CFR2.790), IE Insp Rept 70-0143/79-42 on 790808-0914, (Accession #8001070292; Fiche: 01696:264-016 96:264), 1 page.
- 10/31/79 **Noncompliance noted: Failure to report stack, laundry & sanitary sewer losses for May, June & July 1979.** Details withheld (ref 10CFR2.790), IE Insp Rept 70-0143/79-39 on 790910-14, (Accession #7912260181; Fiche: 01616:344-016 16:345), 2 pages.
- 11/27/79 **Noncompliance noted: Failure to adequately survey stack effluents, make dilution of dispersion calculations & establish adequate contamination**

control procedures, IE Insp Rept 70-0143/79-40 on 790917-27, 1002-06 & 09-12, (Accession #8002110297; Fiche: 01964:345-019 65:001), 20 pages.
(NOTE: May also be found under Accession #8002190258; Fiche: 04015:249-040 15:268).

12/13/79 Major areas inspected: **reported inventory difference in excess of regulatory requirements**, IE Inpt Rept 70-0143/79-43 on 790918-1130, (Accession #8002010371; Fiche: 20397:079-203 97:177), 1 page

1980

01/03/80 **Noncompliance noted: person not employed by licensee was improperly escorted in protected area.** Details withheld (ref 10CFR2.790, IE Insp Rept 70-0143/79-46 on 791126-30, (Accession #8004040047, Fiche: 04441:225-044 41:225), 1 page.

01/23/80 **Noncompliance noted: Failure to measure all SNM (Special Nuclear Material) at time of physical inventory & failure to maintain identity & quality records.** Details withheld (ref 10CFR2.790), IE Insp Rept 70-0143/79-44 on 790918-1130, (Accession #8004070059; Fiche: 04524:081-045 24:081), 1 page.

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.

04/14/80 **Noncompliance noted: Failure to transfer SNM (Special Nuclear Material) in accordance w/terms & conditions of recipient radioactive matl license & to adequately survey package prior to shipment & transfer,** IE Insp Rept 70-0143/80-04 on 800221, (Accession #8007070019, Fiche: 5665:022-056 65:026), 5 pages.

04/28/80 **Noncompliance noted: Failure to follow procedures.** Details withheld (ref 10CFR2.790), IE Insp Rept 70-0143/80-08 on 800311-14, (Accession #8007010125; Fiche: 05591:077-055 91:077), 1 page.

05/14/80 **Noncompliance noted: Failure to notify NRC of change made to matl control & accounting program within 2 months of change.** Details withheld (ref 10CFR2.790), IE Insp Rept 70-0143/80-14 on 800422-25, (Accession #8007140073; Fiche: 05842:270-058 42:270), 1 page.

06/23/80 **Noncompliance noted: Failure to adequately survey airborne U in work areas, failure to decontaminate uncontrolled area immediately & failure to make rept to mgt,** IE Insp Rept 70-0143/80-13 on 800321, 0421-25, (Accession #8009240646; Fiche: 06604:227-066 04:234), 8 pages.

- 06/24/80 **Noncompliance noted:** Corrective action on previous item of noncompliance dealing w/item control. Details withheld (ref FOIA Exemption 4), IE Insp Rept 70-0143/80-20 on 800617-19, (Accession #8009100914; Fiche: 06519:189-065 19:189), 1 page.
- 07/03/80 **Noncompliance noted:** Failure to annually recertify one new std in each NDA (nondestructive assay) series & failure to make process & engineering studies. Details withheld (ref 10CFR2.790), IE Insp Rept 70-0143/80-19 on 800616-19, (Accession #8007180316; Fiche: 05892:281-058 92:281), 1 page. (Note: See below. Two different entries, same inspection report, different Accession # & Fiche address).
- 07/07/80 **Noncompliance noted:** Failure to annually recertify one new std in each NDA (Nondestructive Analysis/Assay) series & failure to make process & engineering studies. Details partially withheld (ref FOIA Exemption 4), IE Insp Rept 70-0143/80-19 on 800616-19, (Accession #8104010068; Fiche: 08066:035-080 66:053), 19 pages.
- 07/17/80 **Noncompliance noted:** Failure to determine systematic weighing errors & failure to evaluate measurement control data. Details withheld (ref 10CFR2.790), IE Insp Rept 70-0143/80-21 on 800616-20, (Accession #8009120133; Fiche: 06543:263-065 43:263), 1 page; (Duplicate: See Accession # 8104010087; Fiche: 08066:057-080 66:066), 10 pages.
- 08/29/80 **Noncompliance noted:** Health & safety procedure not followed which resulted in a fire in auxiliary cleaning room. Portions withheld (ref 10CFR2.790), IE Insp Rept 70-0143/80-25 on 800624-0804, (Accession #8011130405; Fiche: 06957:006-069 57:010), 5 pages.
- 09/12/80 **Noncompliance noted:** fire hydrants were not located within 250 ft of Warehouse 310 & equipment in fire hydrant hose houses does not meet NFPA criteria, IE Insp Rept 70-0143/80-24 on 800818-22, (Accession #8012240141; Fiche: 07536:070-075 36:078), 9 pages. (NOTE: Mixed Hazardous Waste is stored in Warehouse 310).
- 10/09/80 IE Mgt Meeting Rept 70-0143/80-30 on 800918. Major areas discussed: ID exceeding LEID (limit of error ID), stack sampling, stack discharge concentrations, environ sampling, contamination control & emergency plans, (Accession #8012100686; Fiche: 94590:177-945 90:180), 4 pages.
- 10/21/80 Major areas inspected: Confirmatory measurements & radiation surveys of contaminated adjacent railroad, IE Insp Rept 70-0143/80-31 on 800827-29 & 0914-15, (Accession #8011200519, Fiche: 07020:148-070 20:160), 13 pages.

- 10/24/80 **Noncompliance noted: Containers not tamper-safe.** Details withheld (ref 10CFR2.790), IE Insp Rept 70-0143/80-29 on 800811-0912, (Accession #8101060295; Fiche: 07392:026-073 92:026), 1 page.
- 12/30/80 **Noncompliance noted: High enriched U (Uranium) NDA (nondestructive assay) stds not recertified for CY79.** Details withheld (ref 10CFR2.790), IE Insp Rept 70-0143/80-34 on 801006-10, (Accession #8105050865, Fiche: 08458:308-084 58:308), 1 page.

1981

- 01/28/81 **Noncompliance noted: Failure to representatively sample process ventilation sys & to follow health & safety procedures,** IE Insp Rept 70-0143/80-33 on 801006-10, (Accession #8103240301; Fiche: 07983:166-079 83:170), 5 pages.
- 02/10/81 **Noncompliance noted: Failure to audit emergency plan within specified time period & to conduct drills w/off site agencies. Site meterological tower not recalibr.,** IE Insp Rept 70-0143/80-39 on 801208-11, (Accession #8103260341; Fiche: 08042:048-080 42:052), 4 pages.
- 03/24/81 **Noncompliance noted: out of control notices not issued & corrective actions not taken when range control limits were exceeded.** Details withheld (ref 10CFR2.790), IE Insp Rept 70-0143/81-03 on 810127-30 & 0203-05, (Accession #8105050850; Fiche: 08458:303-084 58:303), 1 page.
- 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.
- 04/27/81 **Noncompliance noted: Failure to make proper bias corrections to measurements.** Details withheld (ref 10CFR2.790), IE Insp Rept 70-0143/81-02 on 800908-12, 810126-29 & 0202-05, (Accession #8106010757; Fiche: 08661:091-086 61:091), 1 page.
- 04/28/81 **Noncompliance noted: Failure to investigate & document results when 0.05 control level exceeded for Scale B22-500.** Details withheld (ref 10CFR2.790), IE Insp Rept 70-0143/81-06 on 810324-26, (Accession #8106010799; Fiche: 08661:096-086 61:096), 1 page.
- 06/16/81 **Noncompliance noted: Failure to follow procedures on procuring HEPA filters,** IE Insp Rept 70-0143/81-16 on 810602-05, (Accession #8108040458; Fiche: 09249:242-092 49:246), 5 pages.

- 11/06/81 **Noncompliance noted. Inoperable stack monitoring sys, inadequate or lack of procedures & inadequate evaluation of release, IE Insp Rept 70-0143/81-27 on 811019-23, (Accession # 8201270638; Fiche: 11718:048-117 18:060), 13 pages.**
- 11/20/81 **Noncompliance noted. Failure to conduct operations per instruction for storing cylinders, IE Insp Rept 70-0143/81-32 on 811103-06, (Accession #8202050298; Fiche: 11835:017-118 35:021), 5 pages.**
- 12/01/81 **Noncompliance noted: Use of insoluble enriched U (Uranium) under conditions resulting in inhalation by individual & failure to evaluate effect of ventilation sys on airborne U (Uranium), IE Insp Rept 70-0143/81-31 on 810326-27 & 1022-23, (Accession #8204140338; Fiche: 12662:017-126 62:025), 9 pages.**

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.
- 02/10/82 **Noncompliance noted. Failure to establish procedure to implement License Conditon 65 re health safety, IE Insp Rept 70-0143/81-36 on 811202-04, (Accession #8205140552; Fiche: 13086:349-130 86:357), 9 pages.**
- 03/05/82 **Noncompliance noted: Weekly average concentrations of airborne U (Uranium) exceeded 25% of 10CFR20, App B, Table 1, Column 1 requirements, IE Insp Rept 70-0143/82-05 on 820201-05, (Accession #8205280421; Fiche: 13283:335-132 83:343), 9 pages.**
- 04/16/82 **Noncompliance noted. Failure to audit annually requalify operator in Matl Balance Area 5.** Withheld (ref 10CFR 2.790), IE Insp Rept 70-0143/82-10 on 820302-05, (Accession #8207260482; Fiche: 95746:078-957 46:083), 6 pages
- 06/10/82 **Noncompliance noted. Failure to conduct audit of matl control & accounting sys.** Details withheld (ref 10CFR2.790), IE Safeguards Insp Rept 70-0143/82-21 on 820517-21, (Accession #8208030685; Fiche: 14162:131-141 62:131), 1 page.

- 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.
- 07/01/82 **Noncompliance noted: 820530 accidental loss of high enriched U (Uranium) solution not reported per procedural requirements, IE Insp Rept 70-0143/82-24 on 820601-11 & 16-18, (Accession #8211170039; Fiche: 16142:097-161 42:189), 5 pages.**
- 07/21/82 **Noncompliance noted. Violation in area of matl control & accountability.** Withheld (ref 10CFR2.790), IE Insp Rept 70-0143/82-23 on 820607-08, (Accession #8210150492; Fiche: 95866:006-958 66:017), 6 pages.
- 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.
- 08/19/82 **Noncompliance noted: Failure to drain sinks & drinking fountains located in high enriched U (Uranium) areas into collection tanks. Withheld (ref 10CFR2.790), IE Safeguards Insp Rept 70-0143/82-31 on 820706-0805, (Accession #8210150436; Fiche: 95867:025-958 67:034), 10 pages.**
- 08/24/82 **Noncompliance noted. Failure to review & audit safeguard contingency plan. Details withheld (ref 10CFR73.21), IE Safeguards Insp Rept 70-0143/82-29 on 820802-06, (Accession #8210150380; Fiche: 15704:275-157 04:276), 2 pages.**
- 09/20/82 **Noncompliance noted: Failure to follow posted operating procedures for storage & lab areas, IE Insp Rept 70-0143/82-30 on 820907-10, (Accession #8211150242, Fiche: 16055:099-160 55:102), 4 pages**
- 11/01/82 **Noncompliance noted. Failure to notify authorities re 821003 explosion in calciner at highly enriched U (Uranium) scrap recovery facility, IE Insp Rept 70-0143/82-37 on 821004-08, (Accession #8301040761; Fiche: 16645:101-166 45:108), 8 pages.**
- 11/23/82 Follow up of **U (Uranium) leak in Bldg 303**, IE Insp Rept 70-0143/82-47 on 821108-10, (Accession #8301040772; Fiche: 16645:205-166 45:209), 5 pages.
- 11/29/82 **Noncompliance noted: Failure to follow posted safety limits at two in-storage racks in Bldg 302-3, IE Insp Rept 70-0143/82-45 on 821115-19, (Accession #8302150069; Fiche: 17147:137-171 47:140), 4 pages.**
- 12/10/82 **Noncompliance noted: Failure to maintain fire doors on hexanol process control rooms in operable condition at all times, IE Safeguards Insp Rept 70-**

0143/82-48 on 821101-1203, (Accession #8303210643; Fiche: 17636:308-176 36:313), 6 pages.

1983

- 03/09/83 **Noncompliance noted: Failure to follow procedure for sampling 6,000 gallon monitor tanks.** Withheld (ref 10CFR2.790), IE Safeguards Insp Rept 70-0143/83-08 on 830208-11, (Accession #8306150295; Fiche 96235:125-962 35:131), 7 pages.
- 03/31/83 **Noncompliance noted:** proportional detectors performance tests unacceptable per Procedure NFS-HS-A4, IE Insp Rept 70-0143/83-14 on 830307-11, (Accession #8307140428; Fiche: 19521:164-195 21:168), 5 pages.
- 04/23/83 **Non-cited Violations noted.** Major areas inspected: radwaste mgt, environ protection, transportation activities & plutonium facilities & waste ponds decommissioning activities, Insp Rept 70-0143/93-08 on 930322-26, (Accession # 9305030216; Fiche: 74820:272-748 20:288), 17 pages.
- 04/25/83 **Noncompliance noted:** Plastic bags containing 2-liter bottle stds not tamper safed & items not checked for intact tamper indicating devices. Withheld (ref 10CFR2.790), Proprietary IE Safeguards Insp Rept 70-0143/83-16 on 830303-0401, (Accession #8308090570; Fiche: 96277:301-962 77:310), 10 pages.
- 04/25/83 **Noncompliance noted: use of SNM (Special Nuclear Material) values exceeding range of nondestructive assay stds for two 55-gallon drums & one wooden box of scrap/waste items.** Withheld (ref 10CFR2.790), IE Safeguards Insp Rept 70-0143/83-10 on 830314-18, (Accession #8308090552; Fiche: 96277:282-962 77:294), 13 pages.
- 05/19/83 **Noncompliance noted: contrary to licensee procedure, personnel crossed yellow barricade lines into control areas & out again w/o donning shoecovers,** IE Insp Rept 70-0143/83-17 on 830418-22, (Accession #8310040340; Fiche: 20620:353-206 20:362), 10 pages.
- 06/28/83 **Noncompliance noted:** Withheld (ref 10CFR2.790), Proprietary IE Safeguards Insp Rept 70-0143/83-22 on 830531-0603, (Accession #8310050490; Fiche: 96338:311-963 38:318), 8 pages.
- 07/12/83 **Noncompliance noted. Failure to maintain air flow from areas of low contamination potential to areas of increasing relative potential for radioactive contamination,** Safety & Safeguards Insp Rept 70-0143/83-23 on 830502-27, (Accession #8409250147; Fiche: 26646:299-266 46:299), 1 page.
- 07/12/83 **Noncompliance noted: Failure to perform measurements of stds associated**

w/spectrophotometric method for low enriched U (Uranium) discards twice per wk. Withheld (ref 10CFR2.790), Proprietary IE Safeguards Insp Rept 70-0143/83-25 on 830621-24, (Accession #8310050569; Fiche: 96338:274-963 38:279), 6 pages.

- 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.
- 08/09/83 **Noncompliance noted: Failure to provide reviewed & approved procedure for air particle site measurements & waste shipment in violation of DOT regulations**, IE Insp Rept 70-0143/83-28 on 830627-30, (Accession #8310250352; Fiche 20898:062-208 98:069), 8 pages.
- 08/11/83 **Noncompliance noted: Failure to maintain vault occupancy requirements**. Withheld (ref 10CFR2.790), Proprietary IE Safeguards Insp Rept 70-0143/83-27 on 830606-0701, (Accession #8308230111; Fiche: 96292:173-962 92:179), 7 pages.
- 08/11/83 **Noncompliance noted: Failure to keep emergency exits to matl access areas locked**. Details withheld (ref 10CFR2.790), IE Safeguards Insp Rept 70-0143/83-31 on 830705-22, (Accession #8308240148; Fiche: 20137:189-201 37:194), 6 pages.
- 08/16/83 **Noncompliance noted:** Certain emergency equipment & supplies in Section 6.1 of emergency plan found missing from emergency shelter, IE Insp Rept 70-0143/83-29 on 830711-14, (Accession #8312160151; Fiche: 21541:238-215 41:243), 6 pages.
- 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.
- 08/22/83 **IE Enforcement Conference Rept 70-0143/83-33 on 830729. Items discussed: Violation of transportation regulation involving delivery to Chem-Nuclear Sys, Inc. Barnwell site of two radwaste drums punctured by metal objects, (Accession #8309090365; Fiche: 20310:354-203 10:357), 4 pages.**
- 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

- 09/21/83 **Noncompliance noted: Failure to follow procedures to insure independence of sampling to obtain error data.** Withheld (ref 10CFR2.790), IE Safeguards Insp Rept 70-0143/83-36 on 830809-12, (Accession #8311180225; 96396:079-963 96:083), 5 pages.
- 10/04/83 **Violation noted: Failure to follow procedure for calculating limit of error (LEID).** Withheld (ref 10CFR2.790), Proprietary IE Safeguards Insp Rept 70-0143/83-38 on 830906-09, (Accession #8401250308; Fiche: 96463:200-964 63:203), 4 pages.
- 11/22/83 **Noncompliance noted. Failure to establish & maintain statistical control sys designed to monitor accountability measurements.** Withheld (ref 10CFR2.790), Proprietary IE Safeguards Insp Rept 70-0143/83-41 on 831003-07 & 31-1104, (Accession #8403290318; Fiche: 96499:012-964 99:020), 9 pages.
- 11/30/83 **Noncompliance noted: Failure to verify integrity of tampersafing, IE Safeguards Insp Rept 70-0143/83-39 on 830815-0909, (Accession #8312050280; Fiche: 21376:124-213 76:132), 9 pages.**
- 11/30/83 **Violation noted: Failure to calibr low enriched U (Uranium) NDA (nondestructive assay) measurements sys over range of accountability measurements performed.** Withheld (ref 10CFR2.790), IE Safeguards Insp Rept 70-0143/83-43, (Accession #8401240376; Fiche: 96462:064-964 62:070), 7 pages.
- 12/20/83 **Noncompliance noted: Container of waste transported to burial facility w/excessive amount of liquid.** Withheld (ref 10CFR2.790), Proprietary IE Insp Rept 70-0143/83-47 on 831003-1202, (Accession #8403160182; Fiche: 96494:179-964 94:188), 10 pages.

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.**
- 02/24/84 Major areas discussed: **nuclear criticality safety violations** identified by resident & regional inspectors, **IE Enforcement Conference Rept 70-0143/84-06** on 840216, (Accession #8403160386; Fiche: 22659:360-226 59:362), 3 pages. (Also see Accession #8403160389; Fiche: 22659:159-226 59:161, 3 pages).
- 03/09/84 **Violation noted: Failure to book measured values for receipt of UF6.** Withheld (ref 10CFR2.790), Proprietary IE Safeguards Insp Rept 70-0143/84-07 on 840227-0302, (Accession #8405080334; Fiche: 96518:205-965 18:210), 6 pages.
- 04/04/84 **Noncompliance noted: Failure to determine random sampling & analytical errors from sufficient number of replicate measurements.** Details withheld (ref 10CFR2.790 & 73.21), Insp Rept 70-0143/84-11 on 840320-23, (Accession #8410020086; Note: No Fiche Address), 1 page.
- 05/08/84 **Violation noted: Licensee Failure to maintain & follow procedures for proper container handling for SNM (Special Nuclear Material),** IE Insp Rept 70-143/84-04 on 840103-0207, 0213-15 & 0221-0302, (Accession #8407300460; Fiche: 25814:276-258 14:284), 9 pages.
- 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.**
- 06/13/84 **Violation noted. Failure to initial equipment cleanout checklist per procedure.** Withheld (ref 10CFR2.790), Insp Rept 70-0143/84-18 on 840525-30, (Accession #8408280074; Fiche: 96576:030-965 76:035), 6 pages.
- 06/15/84 **Violation noted. Failure to transport package of radioactive matl to burial site in strong, tight container,** Insp Rept 70-0143/84-20 on 840529-0601, (Accession #8408270423; Fiche: 26256:341-262 56:347), 6 pages.
- 06/15/84 **Violation noted: Degraded matl access area barriers.** Details withheld (ref 10CFR95), Physical Security Insp Rept 70-0143/84-21 on 840520-24, (Accession #8506210050, Fiche: 31056:124-310 56:124), 1 page.
- 06/15/84 **Enforcement Conference Report** 70-0143/84-23 on 840613. Major areas discussed: findings from Insp Rept 70-0143/84-21 & corrective actions described

in 840525 ltr. Details withheld (ref 10CFR95), (Accession #8409040142; Fiche: 26354:309-263 54:309), 1 page.

- 06/18/84 **Violation noted: Failure to establish sys to verify program integrity for tampersafing devices.** Withheld (10CFR2.790 & 10CFR 73.21), Proprietary Insp Rept 79-0143/84-19 on 840529-0601, (Accession #8408280304; Fiche: 96576:014-965 76:025), 12 pages.
- 06/22/84 **Violation noted: Failure to post notice of violation re: radiological working conditions & proposed imposition of civil penalty & response to NRC.** Details withheld (ref 10CFR2.790 & 73.21), IE Insp Rept 70-0143/84-17 on 840504-0608, (Accession #8408130383; Fiche: 26010:174-260 10:174), 1 page.
- 07/13/84 **Violations noted: Failure to initial equipment cleanout checklist per procedure.** Withheld (ref 10CFR2.790), Insp Rept 70-0143/84-18 on 840525-30, (Accession #8408280074; Fiche: 96576:030-965 76:035), 6 pages.
- 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.
- 08/20/84 **Violation noted: Failure to submit 30-day written rept re contamination of groundwater monitoring well,** Insp Rept 70-0143/84-25 on 840709-13 & 24, (Accession #8502060088; Fiche: 28784:136-287 84:144), 9 pages.
- 09/26/84 **Violation noted: Failure to administer activities for nuclear, radiation & industrial safety by staff organization,** Insp Rept 70-0143/84-33 on 840820-24, (Accession #8503210074; Fiche: 29478:142-294 78:148), 7 pages.
- 10/11/84 **Violation noted: Failure to perform control std measurements proportional to range of values of process measurements.** Withheld (ref 10CFR2.790), (Accession #8504150534, Fiche: 96707:095-967 07:104), 10 pages.
- 10/16/84 **Deviation noted: Failure to maintain fire doors in operable condition,** Insp Rept 70-0143/84-35 on 840904-28, (Accession #8503200485; Fiche: 29451:344-294 51:349), 6 pages.
- 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.

- 11/27/84 **Violation noted: Failure to adequately investigate & determine source of U (Uranium) bearing solids in ventilation sys, Insp Rept 70-0143/84-41 on 841005-18, (Accession #8507160847; Fiche: 31601:034-316 01:079), 46 pages.**
- 12/04/84 & 12/19/84 **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.
- 12/06/84 **Violation noted: Failure to conduct engineering analyses & evaluations for significant changes made to two liquid discard measurement sys.** Withheld (ref 10CFR2.790 & 73.21), Insp Rept 70-0143/84-42 on 841105-09, (Accession #8504170202; Fiche: 96707:191-967 07:195), 5 pages.
- 84/85 **Notice of Violations were issued in Inspection Report Numbers 70-143/84-39 and 70-143/85-08 for failures to perform adequate airborne radioactive material surveys and failure to adequately demonstrate the representativeness of the work station fixed air samplers.** (Reference: Inspection Report 70-143/85-34, for September 23-27 and October 3, 1985, dated Dec. 3, 1985, Report Details, Page 6).

1985

- 01/15/85 **Violation noted: Safeguarding natl security info regulatory requirements violated.** Details withheld (ref 10CFR95), Insp Rept 70-0143/84-45 on 841217-21, (Accession #8501230219; Fiche: 28515:348-285 15:348), 1 page
- 01/17/85 **Deviation noted: Failure to inventory & properly account for all tamperproofing devices in storage.** Withheld (ref 10CFR2.790(d) & 73.21), Proprietary Insp Rept 70-0143/84-43 on 841126-30, (Accession #8507250197; Fiche: 96777:253-967 77:257), 5 pages.

- 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)
- 03/08/85 **Violation identified** in area of lock & key control. Details withheld (ref 10CFR2.790 & 73.21), Insp Rept 70-0143/85-06 on 850219-22, (Accession #8503190505, Fiche: 29407:128-294 07:128), 1 page.
- 03/15/85 **Violation noted: Failure to conduct operations in accordance w/approved or adequate procedures & failure to perform adequate evaluations of employee exposures,** Insp Rept 70-0143/84-39 on 841015-20, 1105-09, 1205-19 & 850107-17, (Accession #8504160478; Fiche: 29821:065-298 21:085), 21 pages.
- 03/20/85 **Violations identified: Failure to follow procedures for storage of SNM (Special Nuclear Material) & inadequate operating procedures.** Details withheld (ref 10CFR2.790 & 73.21), Insp Rept 70-0143/85-05 on 850204-0308, (Accession #8504010186; Fiche: 29569:154-295 69:154), 1 page.
- 03/22/85 **Violation & deviation noted: Failure to maintain calibr & maint records & failure to complete preliminary investigation re: liquid waste treatment pond decommissioning,** Insp Rept 70-0143/85-07 on 850304-08, (Accession #8507220429; Fiche: 31700:130-317 00:144), 15 pages.
- 03/28/85 Five (5) violations were identified, Inspection Report 70-143/84-39, March 28, 1985. Report time frame: October 15 through 20, November 5 through 9, December 5 through 19, 1984.

This special unannounced inspection involved 183 inspector hours on site in the areas of **six instances of potential exposures of individuals to excessive concentrations of radioactive material in air, evaluations of individual exposures to concentrations of radioactive material in air,** and observation of non-routine activities in progress.

Five violation were identified: Failure to conduct operations in accordance with either approved or adequate procedures (multiple examples) which resulted in the

unnecessary exposure of individuals to concentrations of radioactive material in air, of which one was apparently in excess of the regulatory (10CFR20.103 (a)(1) limits; failure to perform adequate evaluations of employee exposures and of concentrations of radioactivity in air (multiple examples); failure to establish or to adhere to radiation work permits (multiple examples); failure to adhere to health and safety procedures (multiple examples) and failure to survey tools prior to release from a controlled area.

Adherence to Radiation Work Permits and Health and Safety Procedures:

Inspector informed the licensee that the following were considered examples of an apparent violation of License Condition 15 (70-143/84-39-03):

Failure of the three contractors on January 10, 1985, to wear respirators as required by the RWP (Radiation Work Permit) while working in the ceiling area of the high enriched scrap recover building.

Failure to establish a barrier on two sides of the Freon decon unit in the high enriched scrap recovery building as required by the RWP on January 10, 1985.

Failure to establish a barrier as required by the RWP on January 11, 1985, for work on the high enriched scrap recovery building feedstock furnace and specified gloveboxes to preclude access to the work area from the SNM (Special Nuclear Material) storage unit.

Failure to establish an RWP on January 11, 1985, prior to cleaning the furnace return chute in the high enriched scrap recovery building.

Failure of a licensee employee on January 14, 1985, to wear a cap and respirator as required by the RWP for cleaning a room in the scrap recovery building.

Failure to establish a barrier as specified by the RWP on January 15, 1985, for work in Area 3, Building 303.

Failure to establish an RWP on January 17, 1985, for decontamination of the Building 302 cylinder storage area and ceiling.

Inspector informed the licensee that the following were examples of an apparent Violation of License Condition 14(b) (70-143/84-39-04):

Failure of one of the two licensee employees on January 10, 1985, to sign the RWP for cleaning the filters in the Freon decontamination unit.

Failure of the licensee employee on January 11, 1985, to sign the RWP for inspecting the internals of the Freon decontamination unit.

Airborne Radioactivity Surveys:

Inspector informed the licensee that the following were considered additional examples of an apparent violation of 10CFR20.201(b), (70-143/84-39-02):

Failure to perform air monitoring on January 9, and on two occasions on January 10, 1985, for contractors working in the ceiling area of the high enriched scrap recovery building.

Failure to adequately position the air monitor on January 10, 1985, for the work on the Freon decontamination unit.

Failure to adequately position the air monitor on January 11, 1985, for the work on the Freon decontamination unit.

Failure to perform air monitoring on January 15, 1985, for the work on a piece of equipment in Area 3 of Building 303.

Failure to perform air monitoring on January 16, 1985, for the decontamination of the cylinder storage area and ceiling in Building 302.

Failure to perform air monitoring on January 17, 1985, while exchanging a valve in Area 3 of Building 303.

Equipment Release from Controlled Areas:

Inspector informed the licensee that **failure to perform a contamination survey on the tools prior to removing them from a controlled area was an apparent violation of License Condition 27, (70-143/84-39-05).**

- 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**
- 05/15/85 **STRIKE BY THE OIL, CHEMICAL, AND ATOMIC WORKERS UNION**
- 06/18/85 Comparison of analytical results associated w/confirmatory survey of railroad property adjacent to site, Addendum to Insp Rept 70-0143/85-07, (Accession #8507110376; Fiche: 31441:209-314 41:209), 1 page.
- 07/05/85 **Violation noted. Failure to control contamination within license limits & perform adequate evaluations of employee exposures to airborne radioactivity, Insp Rept 70-0143/85-08 on 850311-29, (Accession #8508070578; Fiche 32034:299-320 34:315), 17 pages.**

10/03/85 Special Inspection conducted on Oct. 3, 1985, (Reference, Inspection Report No. 70-143/85-34, dated Dec. 3, 1985, Report Details, Page 9):

Health and Safety Staffing - Inspector noticed that there were indications that delays were being experienced in the area of the licensee's improvement program due to **health and safety personnel being assigned to shift work.**

Criticality Safety (88015) - Improved performance from May-Sep 1985 with one minor discrepancy detected, **compared to January 1984 through April 1985 when the licensee averaged six discrepancies per month.**

Operations Review (88020) – Inspector reviewed the Material Control Superintendents Audits for the month of September 1985 to assess the **ability of the non-bargaining unit employees to operate the process. As a result of this review, the inspector determined that the licensee had had numerous problems with plugging in the conversion line. (This is addressed in detail in Inspection Report Number 70-143/85-37). Also, on four occasions, valve misalignment due to operator error had caused material to flow to locations where cleanup by the licensee was necessary. The inspector informed licensee management that they should assess the situation to determine whether additional training or procedural improvements were necessary.**

10/09/85 **Violations noted. Failure to measure airborne radioactivity in Bldg 302 incinerator & scanning areas & failure to record wind direction data required by radiological contingency plan, Insp Rept 70-0143/85-28 on 850817-0920, (Accession #8511040141; Fiche: 33307:239-333 07:245), 7 pages.**

10/10/85 **Violation noted. Failure to maintain current knowledge of identity, quantity & location of item of low enriched U (Uranium).** Withheld (ref 10CFR2.790 & 73.21), Proprietary Insp Rept 70-0143/85-27 on 850708-0816, (Accession #8511010514; Fiche: 96835:123-968 35:136), 14 pages.

10/16/85 **Three violations** were identified: **Failure** to maintain current knowledge of identity, quantity, and location of an item of low enriched uranium; **failure** to conduct a low enriched uranium inventory according to written inventory instructions, and **failure to follow a health and safety procedure**, NRC Inspection Report No. 70-143/85-27, July 8 – August 16, 1985 on Oct. 16, 1985. (Note: This report also contains 5 employee allegations).

10/16/85 **Two violations** (Severity Level IV) were identified: Failure to measure airborne radioactivity in Bldg 302 incinerator and scanning areas, and failure to record wind direction required by the Radiological Contingency Plan, NRC Inspection Report No. 70-143/85-28, August 17 – September 20, 1985 on Oct. 16, 1985.

Notice of Violation Details:

10CFR20.103(a)(3) required the licensee to use suitable measurements of concentrations of radioactive materials in air for detecting and evaluating airborne radioactivity in restricted areas.

Contrary to the above, the licensee did not make suitable measurements of concentrations of radioactive materials in air in that on August 26, 27, and 28 and for a portion of the time on August 29, 1985, no measurements were made in the incinerator and scanning rooms annexed to Building 302. These rooms were restricted areas and were operating and occupied.

License Condition 29 requires the licensee to maintain the response measures of the Radiological Contingency Plan (RCP) and to maintain implementing procedures.

Section 5.2.6 of the RCP requires, in response to offsite releases or radioactive material, offsite dose estimates using implementing procedure NFS-HS-E-9, "Dose Projection of Radiological Emergency."

Section 6.5.4 of the RCP states that wind speed and direction data are maintained on readout instruments in Building 340 and are used to **assess the dispersion of releases** as discussed in Procedure NFS-HS-E-9.

Contrary to the above, the licensee did not maintain the response measures of the Radiological Contingency Plan in that no wind direction data were maintained on the readout instruments in Building 340 for approximately 30% of the time during the period August 16 – September 17, 1985, and, therefore, no offsite dose estimates could have been made according to Procedure NFS-HS-E-9 if a release with potential offsite effect had occurred.

- 10/17/85 **Violations noted: Failure to establish & follow procedures, post radioactive mats area & have QC (Quality Control) program to ensure compliance with 10 CFR6.55 & 10CFR61.56, Insp Rept 70-0143/85-31 on 850909-13, (Accession #8511130323; Fiche: 33437:311-334 37:315), 5 pages.**
- 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).
- 12/02/85 **Violations noted: Failure to adequately perform or document radiological surveys to release forklift & failure to perform daily lunchroom total alpha contamination surveys, Insp Rept 70-0143/85-34 on 850923-27 & 1003, (Accession #8512100118; Fiche: 33823:109-338 23:118), 10 pages.**

12/03/85 **Two Severity Level IV Violations** noted, Inspection Report 70-143/85-34, Sept. 23-27, 1985:

(1) License Condition 27 required that in addition to the specific test, measurement, and survey requirements in the license, the licensee perform other tests, measurements or surveys as may be necessary to comply with actions points and limits in the license. Records of such tests, measurements, or surveys shall be maintained.

Contrary to the above, surveys were not adequately performed or documented in that:

On May 15, 1985, **initial and subsequent surveys performed to release a forklift from the plant site did not include surveys of all surfaces having a potential for contamination in that only the vehicle tires and forks were surveyed.**

The licensee failed to maintain a record of the initial contamination and direct radiation survey performed on May 15, 1985, to release a forklift from the plant site.

(2) License Condition 23 (e) required that the lunchroom be surveyed for both transferable and total alpha surface contamination at least daily.

(Note: 6,000 dpm direct reading on the milk machine radiator was above the decontamination action limit given in Table 421-2 of the licensee's application).

Contrary to the above, **on June 15, 16, and 17, 1985, the licensee failed to perform total alpha contamination surveys in the Building 305 lunchroom.**

12/10/85 **Violation noted: Failure to measure airborne radioactivity. Withheld (ref 10CFR2.790(d)), Proprietary Insp Rept 70-0143/85-37 on 850923-1011, (Accession #8512240345; Fiche: 96864:005-968 64:014), 10 pages.**

1986

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

01/13/86 **Violation noted: Failure to document corrective actions for out-of-control data points.** Details withheld (ref 10CFR2.790 & 73.21), Proprietary details of Insp Rept 70-0143/85-44 on 851209-12, (Accession #8602060125; Fiche: 34490:105-344 90:105), 1 pages. (See also Accession #8602060130; Fiche: 96892:157-968 92:163), 7 pages

03/12/86 **Violations & deviation noted: Failure to perform operation per procedure, failure to follow health & safety procedure & failure to routinely sample**

solution, Insp Rept 70-0143/86-03 on 860106-0207, (Accession #8604020577; Fiche: 35359:327-353 59:335), 9 pages.

- 03/17/86 Major areas inspected: **circumstances surrounding 860122 event which resulted in elevated airborne radioactivity levels in work areas**, Insp Rept 70-0143/86-02 on 860128-30, (Accession #8603250202; Fiche: 35193:046-351 93:048), 3 pages.
- 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.
- 04/08/86 **Violation noted. Inadequate procedures for sampling, preparation & analysis of effluent radioactivity & environ samples**, Insp Rept 70-0143/86-04 on 860121-24, (Accession #8604210082; Fiche: 35642:007-356 42:018), 12 pages.
- 04/08/86 **Violation noted: Failure to ship radwaste in strong, tight packages**, Insp Rept 70-0143/86-13 on 860310-14, (Accession #8604210307; Fiche: 35666:008-356 66:016), 9 pages.
- 04/10/86 Inspection Report 70-143/86-12, February 10 – March 7, 1986, dated April 10, 1986. (**Note: Strike was still in progress during this inspection. Licensee continued to operate the facility on a reduced scale during the inspection period using non-striking employees. Operations were limited to high enriched uranium fuel processing and scrap recovery. Personnel conducting the operations worked 12-hour shifts per day.**)

Management and Organization Controls (88005R)

On March 5, 1986, the licensee announced a realignment of both corporate and plant management. The Vice President of Manufacturing and Engineering was removed from the management chain because of his pending retirement in April 1986. The corporate Manager of Manufacturing and Safeguards consequently would report directly to the company President. This manager also assumed the responsibility of engineering and human resources. Human resources had been reporting to the corporate Finance Manager. The announcement included temporary assignment of the Manager of Manufacturing and Safeguards to the plant site.

Radioactive Waste Management (88035R) – Page 3

The licensee experienced difficulties with the effluent treatment system in the high enriched scrap recover facility during the inspection period. On February 20, 1986, **when the afterburner in the system failed, the licensee detected apparent damage to ducting downstream**. The ducting appeared to be sagging and

indicated heat damage. However, when the insulation was removed, no damage to the ducting was found. The insulation had been sagging, not the ducting. The insulation was replaced and the afterburner was restarted.

Another incident occurred on March 6, 1986 when the venturi scrubber overflowed with solution and caused a partial loss of vacuum on the process enclosures. A minimum vacuum of 0.5 inches of water is required on process enclosures. When the vacuum fell below this minimum, the operating personnel were placed in respirators. The water level was reduced and the vacuum was restored in approximately two and one-half hours. No cause of overflowing was found.

Follow up on Allegations (92706) – Pages 4-6

Employee allegation (2860102002) was substantiated, except that the burning material reportedly did not fall onto the floor, but no violation of regulatory requirements were identified

Allegation: During the week of February 23, 1986, incinerator trash fell out of the incinerator in **Building 302** and burned openly on the floor.

The inspector could find no evidence of such an occurrence during the week of February 23, 1986. However, such an incident did occur on December 24, 1985. An operator was adding non-contaminated warehouse trash to the incinerator through a smaller door in the incinerator main door. **A load of contaminated material had been previously burned, and the incinerator was still hot and contained ash, but no fire was in progress.** Non-contaminated trash was periodically disposed of in this way because no additional radioactive material would be added to the incinerator and criticality control would not be affected.

In this instance, the operator was apparently adding the trash when the incinerator was quite hot and tried to add a bundle that was too large for the opening. The bundle was caught in the opening and because of the heat ignited before the operator could force it through. The burning trash filled the area with smoke before the operator, with the assistance of a foreman, pushed it into the incinerator.

A high-volume air sample was collected. Because it exceeded the maximum permissible concentration (MPC) specified in 10 CFR 20 Appendix B (1.0E-10 microCuries per milliliter) the area was restricted and full face respirators required. The initial activity of twice MPC declined to 25 percent of MPC within one hour and the area was released. Stationary air samplers in the area indicated concentrations from 34 to 49 percent of MPC. Urine samples were collected from all personnel in the area. Only the activity in the operator's urine exceeded the plant action limit for work restriction. His exposure was estimated at 42 MPC hours.

(NOTE: This incident involved “air”, which would not be measured in “milliliters.” Milliliters would be a measurement for water!)

Employee Allegation (2860102001) was substantiated, but no violations of regulatory requirements were identified.

Allegation: During the week of February 23, 1986, a quantity of finished fuel was dropped onto the floor in the processing area, scooped up, and sampled. The sample was rejected by the lab because of impurities.

The inspector was notified of the incident when it occurred. The material was spilled by a process engineer who was attempting to examine fuel that was to be processed at a work station where he had set up the necessary equipment for the operations staff. The material was cleaned up and properly accounted for. Air sampling and contamination surveys were performed. The results were normal and below limits. **The material was rejected because of impurities.**

Follow-up on Previous Inspection Items (92701)

(Open) IFI 86-03-02: Corrective actions to prevent recurrence of **spill of processing solution in Building 304 which occurred on February 3, 1986.**

The licensee completed their investigation during the inspection period and determined corrective actions which included the following:

- **Reactivation of the bulk supply system to eliminate the use of 55-gallon drums for refilling the treatment system.**
- **Proceeding with the project for pumping the waste solution to the incinerator rather than using 55-gallon drums which required filling outside of the diked containment area.**
- **Modification and sealing of the diked containment area.**
- **Revision of the operating procedure for clarification and completeness.**
- **Installation of automatic shutoff system on the storage tanks and on the flexible hoses.**
- **Development of a flammable liquid spill containment and cleanup procedure for the processing areas.**

05/22/86

Deviation noted: **Failure** to remove flexible transfer hose from organic liquid treatment sys when hose not in use, per commitment, Insp Rept 70-0143/86-21, on 860407-0502, (Accession #8606100674; Fiche: 36407:270-364 07:278), 8 pages.

- 06/02/86 Major areas inspected: **loss of operability of security equipment & security force allegation of impropriety**, Partially withheld Insp Rept 70-0143/86-27 on 860513-14 (ref 10CFR95), (Accession #8606100365; Fiche: 36383:112-363 83:112), 1 page. (Note: No violation given).
- 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; changed to 25 years on Nov. 21, 2011, see ML11333A264).
- 06/12/86 **Sanitized version** of details of Insp Rept 70-0143/86-28 on 860527-30, (Accession #8707160133; Fiche: 41737:011-417 37:020), 4 pages.
- 06/13/86 **Violation noted. Failure to calibr low vol air particulate monitors quarterly as required**, Insp Rept 70-0143/86-26 on 860505-30, (Accession #8607080334; Fiche: 36928:274-369 28:281), 8 pages.
- 06/16/86 **Violations noted. Failure to notify NRC re: 851211 security event & inadequate procedures for vehicle searches** , Partially withheld Special Insp Rept 70-0143/85-46 on 851213-14 & 19 & 860102-03 & 09, (Accession #860623074; Fiche: 36638:360-366 38:360), 1 page.
- 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.
- 06/18/86 **Violation noted: Failure to perform adequate personnel contamination surveys**, Insp Rept 70-0143/86-25 on 860417-18 & 23-25, (Accession #8706220492; Fiche: 41422:277-414 22:282), 6 pages.
- 06/20/86 **Violation noted: Failure to survey tools removed from controlled area**, Insp Rept 70-0143/86-30 on 860604-06, (Accession #8607290019; Fiche: 37274:104-372 74:110), 7 pages.
- 07/03/86 **Corrected table re comparison of NRC & NFS analyses of soil samples** to Insp Rept 70-0143/86-23, (Accession #8607210100, Fiche: 37099:358-370 99:358), 1 page.

- 07/15/86 Major areas inspected: **followup of employee concerns & allegations. Some allegations substantiated**, Insp Rept 70-0143/86-29 on 860519-23, (Accession #8608110453; Fiche: 37443:209-374 43:218), 10 pages.
- 08/22/86 **Violation noted. Failure to decontaminate plant surfaces before painting**, Safety & Safeguards Insp Rept 70-0143/86-36 on 860707-0815, (Accession #8609080328; Fiche: 37749:236-377 49:244), 9 pages.
- 09/10/86 **Violation noted. Failure to comply w/specific training & exercise requirements of radiological contingency plan**, Insp Rept 70-0143/86-38 on 860819-22 & 26-27, (Accession #8610060924; Fiche: 38109:225-381 09:228), 4 pages.
- 09/11/86 **Violation noted. 1985 groundwater monitoring rept did not rept correct quantities of radionuclides in groundwater samples for March**, Insp Rept 70-0143/86-40 on 860827-28, (Accession #8610010418; Fiche: 38058:180-380 58:184), 5 pages.
- 10/30/86 **Violations noted: Failure to close shipping container for transport & failure to perform high vol air samples in areas where loss of offsite power occurred**, Insp Rept 70-0143/86-45 on 860923-25, (Accession #8611260436; Fiche: 38726:230-387 26:234), 5 pages.
- 11/14/86 **Violations noted: Failure to establish, maintain & follow written matl control & accounting procedures**. Withheld (ref 10CFR2.790), Proprietary Insp Rept 70-143/86-41 on 860818-0930, (Accession # 8612090836; Fiche: 97043:251-970 43:261), 11 pages.
- 12/02/86 **Violation noted: Failure to maintain min flow rates on low vol air particulate monitors in Bldgs 302 & 303. Deviation noted: Failure to complete corrective actions for incinerator fire**, Insp Rept 70-0143/86-47 on 861001-1107, (Accession #8612160297; Fiche: 39018:065-390 18:072), 8 pages.
- 12/10/86 **Violations noted: Failure to qualify & document one operator who routinely sampled mats for SNM accountability**. Withheld (ref 10CFR2.790 and 73.21), Proprietary Insp Rept 70-0143/86-48 on 861020-24, (Accession #8612230169; Fiche: 97049:249-970 49:254), 6 pages.
- 12/12/86 **Violations noted: Failure to perform adequate contamination surveys & to train contractor personnel adequately**, Insp Rept 70-0143/86-51 on 861117-21, (Accession #8701020069; Fiche: 39145:230-391 45:236), 7 pages.

1987

- 02/05/87 **Violations noted: Failure to properly mark classified documents, files & binders & failure to change safe combination within 1 yr.,** Insp Rept 70-0143/87-04 on 870105-07, (Accession #8702180490; Fiche: 39664:164-396 64:168), 5 pages.
- 02/11/87 Major areas inspected: operational safety assessment, including potential operation hazards. **Four weaknesses & 76 improvement items identified.** (Note: but no violations), Partially withheld Insp Rept 70-0143/86-55 on 861208-12 (ref 10CFR2.790 & 73.21), (Accession #8702190170; Fiche: 39683:262-396 83:263), 1 page.
- 04/02/87 **Violation noted: Failure to prepare & submit NRC Form 790,** “Classification Record,” per 10CFR95.57(c), Partially withheld Insp Rept 70-0143/87-12 on 870316-20, (Accession #8704220168; Fiche: 40633:117-406 33:117), 1 page.
- 04/16/87 **Violations noted: Failure to provide & follow adequate measurement procedures & failure to measure SNM (Special Nuclear Material) w/properly calibr measurement sys. Withheld (ref 10CFR2.790 & 73.21), Proprietary Insp Rept 70-0143/87-09 on 870223-27 & 0309-13,** (Accession #8704290439; Fiche: 97104:334-971 04:348), 15 pages .
- 05/12/87 **Violations noted. Failure to adequately survey potentially contaminated matl prior to offsite release & failure to label radioactive matl & post storage area,** Insp Rept 70-0143/87-17 on 870420-24, (Accession #8706010394, Fiche: 41123:249-411 23:260), 12 pages.
- 06/22/87 **One violation noted in area of nuclear criticality safety.** Major areas inspected: licensee action on previous insp findings, facility mgt, matl control & accounting & physical protection, Insp Rept 70-0143/87-24 on 870504-29, (Accession #8706300737; Fiche: 41500:258-415 00:263), 6 pages.
- 07/27/87 **Violation noted.** Major areas inspected: previously identified followup items, enforcement matters, performance improvement program items status, radiation protection & control of radioactive matl, Insp Rept 70-0143/87-26 on 870706-10, (Accession #8708050032; Fiche: 42045:272-420 45:278), 7 pages.
- 08/27/87 **Violations noted.** Major areas inspected: licensee action on previous insp findings, facility operations, nuclear criticality safety, radiation protection & radwaste mgt, Insp Rept 70-0143/87-25 on 870601-0702, (Accession #8708270294; Fiche: 42384:198-423 84:203), 6 pages
- 08/28/87 **Violations noted.** Major areas inspected: physical security program, including physical barriers, compensatory measures, access controls, assessment aids & alarm stations, Partially withheld Physical Security Insp Rept 70-0143/87-28 on 870727-31, (Accession #8709080326; Fiche: 42530:294-425 30:295), 2 pages.

- 10/02/87 **Violations noted.** Major areas inspected: review of previously identified followup items & enforcement matters, performance improvement program item status & radiation protection programs, Insp Rept 70-0143/87-33 on 870914-18, (Accession #8710090275; Fiche: 43000:185-430 00:193), 9 pages.
- 10/28/87 **Two violations noted.** Major areas inspected: facility operations, nuclear criticality safety, radiation protection, radwaste mgt, matl control & accounting & physical protection, Insp Rept 70-0143/87-35 on 870908-1002, (Accession #8711090119; Fiche: 43314:334-433 14:337), 4 pages.
- 10/30/87 **Violations noted.** Major areas inspected: **physical security event on 871002 & program for protection of unclassified safeguards info**, Partially withheld Insp Rept 70-0143/87-37 on 871005-07 (ref 10CFR2.790 & 73.21), (Accession #8711090360; Fiche: 43313:277-433 13:277), 1 page.
- 11/03/87 **Violation noted.** Major areas inspected: facility organization & mgt controls. Withheld (ref 10CFR2.790), Proprietary Insp Rept 70-0143/87-36 on 871013-16, (Accession #8711160063; Fiche: 97181:276-971 81:280), 5 pages.

1988

- 01/07/88 **Violation noted: Failure to perform adequate personnel contamination surveys.** Major areas inspected: review of previous enforcement matters & status of performance improvement program, Insp Rept 70-0143/87-42 on 871214-18, (Accession #8801190256; Fiche: 44045:016-440 45:023), 8 pages.
- 06/08/88 **Violations noted.** Major areas inspected: security audit, records, barriers, detection aids, access controls, alarm stations, assessment & classified documents, Partially withheld Insp Rept 70-0143/88-17 on 880523-27 (ref 10CFR95), (Accession #8806150500; Fiche: 45838:017-458 38:017), 1 page.
- 09/07/88 **Two program weaknesses noted.** Major areas inspected: measurement control and statistics, Partially withheld Insp Rept 70-0143/88-16 on 880503-0811 (ref 10CFR95), (Accession #8809200157; Fiche: 46918:050-469 18:050), 1 page.
- 11/07/88 **Violations noted.** Major areas inspected: **emergency facilities & equipment, training, performance of drills & offsite agency support**, Emergency Preparedness Program Insp Rept 70-0143/88-30 on 880919-23, (Accession #8811150434; Fiche: 47552:354-475 52:361), 8 pages

1989

- 01/11/89 **Violation noted.** Major areas inspected: facility operations, maint & mods, nuclear criticality safety, radiation protection, matl control & accounting & physical protection, Insp Rept 70-0143/88-38 on 881121-1230, (Accession # 8901300119; Fiche: 48298: 176-482 98:180), 5 pages.
- 03/09/89 **Violation noted.** Major areas inspected: records & repts & storage & interval control. Withheld (ref 10CFR2.790(d) & 73.21, Proprietary Insp Rept 70-0143/89-05 on 890130-0202, (Accession #8903300136; Fiche: 97455:107-974 55:113), 7 pages.
- 05/17/89 **Violations noted.** Major areas inspected: security plan & procedures, mgt effectiveness, security organization, security program audit, records & repts & testing & maint., Partially withheld Insp Rept 70-0143/89-10 on 890320-23, (Accession #8905310117; Fiche: 49966:161-499 66:161), 1 page.
- 05/24/89 **Violations noted.** Major areas inspected: radiation protection program, radwaste mgt, transportation of radioactive matls & status of Pu (Plutonium) decommissioning project, Insp Rept 70-0143/89-11 on 890424-28, (Accession # 890616149, Fiche: 50187:331-501 87:337), 7 pages.

1990

- 03/09/90 **Violations noted:** Major areas inspected: mgt effectiveness, security organization, records & repts, testing maint & matl access area barriers, Partially Withheld Insp Rept, 70-0143/90-04 on 900205-09 (ref 10CFR95), (Accession #9004020103; Fiche: 53239:207-532 39:207), 1 page.
- 06/06/90 **Violations noted.** Major areas inspected: licensee emergency preparedness program maintained in a state of operational readiness, Insp Rept 70-0143/90-11 on 900514-18, (Accession #9006210422; Fiche: 54274:313-542 74:320), 8 pages.
- 06/12/90 **Violation noted. Major areas inspected: radiation protection, internal exposure control, external exposure control, ALARA, contamination control & PU (Plutonium) decommissioning project, Insp Rept 70-0143/90-12 on 900514-18, (Accession #9006290039, Fiche: 54367:045-543 67:054), 10 pages.**
- 06/19/90 **Violations noted.** Major areas inspected: mgt effectiveness, testing & maint, tactical response drills & new core insp program for fuel facilities, Partially withheld Insp Rept 70-0143/90-13 on 900521-25, (Accession #9006260150; Fiche: 54310:073-543 10:073), 1 page.
- 07/11/90 **Violations noted:** Major areas inspected: facility operations, nuclear criticality safety, radiation protection, matl control & accountability & physical protection,

Insp Rept 70-0143/90-09 on 900423-26, 0529-0601 & 22, (Accession #9007260073; Fiche: 54704:353-547 04:361), 9 pages.

- 10/16/90 **Violations noted.** Major areas inspected: lighting, assessment aids, access control of personnel, packages & vehicles, Partially withheld Insp Rept 70-0143/90-22 on 900909-14, (Accession #9010310235; Fiche: 55636:210-556 36:210), 1 page.
- 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?)
- 12/18/90 **Violation noted.** Major areas inspected: NCS program activities including plutonium decommissioning activities, licensee NCS program audits, followup on previously identified problem w/monitoring sys, Insp Rept 70-0143/90-28 on 901113-16, (Accession #9101110187; Fiche: 56336:207-563 36:213), 7 pages.
- 12/19/90 **Violations noted.** Major areas inspected: mgt effectiveness, security organization, security program audit, records & repts & protected & matl access area barriers, Partially withheld Insp Rept 70-0143/90-25 on 901105-09, (Accession #9101040041; Fiche: 56246:327-562 46:327), 1 page.

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.
- 01/14/91 **Violations noted.** Major areas inspected: Onsite review of NCS program activities **following incident involving transfer of liquid containing high concentration of U (Uranium) to unsafe geometry tank,** Insp Rept 70-0143/90-30 on 901201-18, (Accession #9102060026; Fiche: 56586:032-565 86:048), 17 pages.
- 02/15/91 **Violations noted.** Major areas inspected: Pu (Plutonium) facilities & waste pond decommissioning, **spill of contaminated water within decontamination and vol reduction facility & yard incinerator,** Insp Rept 70-0143/91-03 on 910114-18, (Accession #9103050043; Fiche: 56864:330-568 64:342), 2 pages.

- 04/17/91 **Non-cited violations noted.** Major areas inspected: personnel training & qualification, item monitoring, accounting & internal control, Partially withheld MC&A safeguards Insp Rept 70-0143/91-203 on 910318-22 (ref 10CFR2.790), (Accession #9104290066; Fiche: 57548:002-575 48:002), 1 page.
- 05/14/91 **Violations noted, but not cited.** Major areas inspected: **maint of key emergency equipment & emergency control ctr, fire protection, program changes since May 1990 insp & emergency response training**, Insp Rept 70-0143/91-12 on 910414-19, (Accession #9105210211; Fiche: 57785:155-577 85:164), 10 pages.
- 05/15/91 **Violations noted.** Major areas inspected: PU (Plutonium) facilities & waste pond decommissioning, **spill of contaminated water within decontamination & vol reduction facility & yard incinerator**, Insp Rept 70-0143/91-03 on 910114-18, (Accession #9103050043; Fiche: 56864:330-568 64:342), 2 pages.
- 05/22/91 **Violations noted.** Major areas inspected: onsite review of safety program including mgt organization & controls, nuclear criticality safety, operations review & radiation protection, Insp Rept 70-0143/91-13 on 910422-26, (Accession #9106060262; Fiche: 58003:092-580 03:103), 12 pages.
- 06/10/91 **Violations noted.** Major areas inspected: **Plutonium facilities decommissioning including Bldg 110 underground lab tank** & waste ponds decommissioning, Insp Rept 70-0143/91-15 on 910520-24, (Accessions #9106270144, Fiche: 58223:309-582 23:320), 12 pages.
- 08/14/91 **Violation noted, but not cited.** Major areas inspected: PU (Plutonium) facilities decommissioning including Bldg. 110 underground lab tank & excavation site of high enriched fuel recovery facility, Insp Rept 70-0143/91-22 on 910701 & 15-19, (Accession #9108280146; Fiche: 58896:128-588 96:141), 14 pages.
- 08/23/91 **Violation noted, but not cited.** Major areas inspected: exam of radiation protection procedures, instruments, equipment, internal exposure control, respiratory protection, posting & labeling, Insp Rept 70-0143/91-23 on 910722-26, (Accession #9109160031; Fiche: 59097:003-590 97:019), 17 pages.
- 10/07/91 Major areas inspected: Plutonium facility & waste pond decommissioning & **releases to sanitary sewer**, Insp Rept 70-0143/91-26 on 910911-13, (Accession #9111200052; Fiche: 59766:260-597 66:264), 5 pages
- 10/29/91 **Violations noted.** Major areas inspected: Facility operations, ponds decommissioning, decommissioning & **vol reduction facility operations & radiation work permit mgt.**, Insp Rept 70-0143/91-25 on 910730-0927, (Accession #9111200177; Fiche: 59769:142-597 69:157), 16 pages.

11/27/91 **Non-cited Violation noted.** Major areas inspected: Plutonium facilities decommissioning, waste ponds decommissioning, radwast mgt, including **radioactive liquid effluents and environ protection**, Insp Rept 70-0143/91-29 on 911021-25 & 30-31, (Accession #9112120015; Fiche: 59961:343-599 61:356), 14 pages.

12/20/91 **Violation noted.** Major areas inspected: facility operations, physical protection & nuclear criticality safety, (Insp Rept 70-0143/91-31 on 911026-1204, (Accession # 9201140183; Fiche: 60266:278-602 66:284, 5), 7 pages.

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
1990 (first half)	220

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:

Sample #	Isotope	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

- 01/10/92 **Violations noted.** Major areas inspected: PU (Plutonium) facilities & waste pond Decommissioning, radiation protection, waste mgt & transportation of radioactive matls, Insp Rept 70-0143/91-32 on 911118-22 & 1202 & 31, (Accession #9201280220; Fiche: 60384:032-603 84:055), 24 pages.
- 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/readig-rm/doc-collections/enforcement/actions/) <http://www.nrc.gov/readig-rm/doc-collections/enforcement/actions/>.
- 02/14/92 **Violations noted.** Major areas inspected: mgt effectiveness, security organization, security audit program & personnel training & qualification, Partially withheld Insp Rept 70-0143/92-01 on 920113-17 (ref 10CFR95), (Accession #9202250027; Fiche: 60668:061-606 68:061), 1 page.
- 03/23/92 **Violations noted, but not cited.** Major areas inspected: PU (Plutonium) facilities decommissioning, waste ponds, radwaste mgt & environ protection, Insp Rept 70-0143/92-03 on 920108 & 0203-07, 14 & 21, (Accession #9204140104; Fiche: 61309:065-613 09:081), 17 pages.
- 05/01/92 **Violations noted.** Major areas inspected: PU (Plutonium) facilities decommissioning, waste ponds decommissioning, radiation protection, radwaste mgt & transportation of radioactive matls, Insp Rept 70-0143/92-08 on 920406-10, (Accession #9205270089; Fiche: 61762:258-617 62:285), 28 pages.
- 05/31/92 **Violation noted.** Major areas inspected: facility operations, material control & accountability, security, nuclear criticality safety & close out of previously identified items, Insp Rept 70-0143/92-10 on 920331-0501, (Accession #9206150098; Fiche: 61983:137-619 83:144), 8 pages.
- 06/30/92 **Violations noted.** Major areas inspected: **emergency preparedness including maint of selected emergency & fire protection equipment**, Insp Rept 70-0143/92-14 on 920518-22, (Accession #9207140147; Fiche: 62311:338-623 11:347), 10 pages.
- 08/06/92 **Violations noted.** Major areas inspected: metal & explosive detectors, interior alarms, intrusion detection sys & material access barriers, Partially withheld Insp Rept 70-0143/92-17 on 920606-10 (ref 10CFR95), (Accession #9208130258; Fiche: 62792:180-627 92:181), 2 pages
- 08/28/92 **Violations noted.** Major areas inspected: facility operations, nuclear criticality safety, pond remediation activities & security activities, Insp Rept 70-0143/92-18

on 920630-0803, (Accession #9209220192; Fiche: 63187:037-631 87:045), 9 pages.

- 10/09/92 **Major areas inspected: cause & circumstances associated w/explosion & fire in dissolver tray sys of high enriched U (Uranium) recovery facility, Insp Rept 70-0143/92-26 on 920910-18, Accession #9211020087; Fiche: 63712:174-637 12:219), 46 pages. (NOTE: No violations given; this is a large report).**
- 11/17/92 **Non-cited Violation noted:** Major areas inspected: item monitoring, process monitoring, measurement sys & control & physical inventories, Partially withheld Insp Rept 70-0143/92-204 on 921026-30 (ref 10CFR2.790), (Accession #9211250218; Fiche: 64005:218-640 05:218), 1 page. (See also Accession #9211250222, Fiche: 98430:173-984 30:177), 5 pages.
- 11/18/92 **Violations noted.** Major areas inspected: organization & staffing, training & qualifications, **external & internal exposure controls**, administrative controls & controls of radioactive material, Insp Rept 70-0143/92-28 on 921019-23, (Accession #9212040224; Fiche: 64155:309-641 55:328), 20 pages.
- 11/25/92 **Violations noted.** Major areas inspected: facility operations & maint activities, matl control & accountability, security, nuclear criticality safety & decommissioning activities, Insp Rept 70-0143/92-27 on 921003-1117, (Accession #9212140017, Fiche: 64176:012-641 76:031), 20 pages.
- 11/26/92 **Followup on contaminated sludge in City of Erwin Publicly Owned Treatment Works & previously identified items, Insp Rept 70-0143/92-30 on 921105-06. (Accession #9212280229; Fiche: 64356:300-643 56:305), 6 pages.**

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/>**

- 02/02/93 **Violations noted.** Major areas inspected: facility operations, maint activities, nuclear criticality safety, decommissioning activities & followup on events, Insp Rept 70-0143/92-33 on 921208-930104, (Accession #9302160102; Fiche: 64813:189-648 13:199), 11 pages.
- 02/02/93 **Violations noted.** Major areas inspected: Physical security requirements at Category 1 fuel facilities, mgt effectiveness, security records & repts & badge control, Partially withheld Insp Rept 70-0143/93-01 on 930104-08 (ref 10CFR95), (Accession #9302100113; Fiche: 64773:010-647 73:010), 1 page.
- 02/12/93 **Violation noted.** Major areas inspected: assessment of controls utilized by licensee to assure that transfer of U (Uranium) bearing solutions from geometry vessels to unfavorable geometry vessels were adequate, Insp Rept 70-0143/93-05 on 930125-29, (Accession #9303020064; Fiche: 74008:351-740 08:357), 7 pages.
- 03/11/93 Proprietary details of Insp Rept 70-0143/93-201 on 930222-25 withheld per 10CFR2.790(d), (Accession #9303230267; Fiche: 98482:160-984 82:164), 5 pages. **(See below; these two entries are related):**
- 03/11/93 **One violation noted.** Major areas inspected: MC&A mgt structure & personnel training & qualification, item monitoring, measurement sys & control & accounting & internal control, **Coversheet** to Insp Rept 70-0143/93-201 on 930222-25, (Accession #9303230097; Fiche: 74361:163-743 61:163), 1 page.
- 03/19/93 **Violations noted.** Major areas inspected: **review of HP (Human Performance) activities including organization, training & qualifications, internal exposure control, respiratory protection & RWP program**, Insp Rept 70-0143/93-03 on 930111-0219, (Accession #9303300156; Fiche: 74387:299-743 87:332), 34 pages.
- 04/23/93 **Non-cited Violations noted.** Major areas inspected: radwaste mgt, environ protection, transportation activities & plutonium facilities & waste ponds decommissioning, Insp Rept 70-0143/93-08 on 930322-26, (Accession #9305030216; Fiche: 74820:272-748 29:288), 17 pages.
- 04/29/93 **Violations noted.** Major areas inspected: facility operations & maint activities, nuclear criticality safety & decommissioning activities, Insp Rept 70-0143/93-09 on 9302227-0402, (Accession #9306040319; Fiche: 75136:286-751 36:295), 10 pages.
- 06/02/93 **Non-cited Violation noted.** Major areas inspected: facility operations & maint activities, nuclear criticality safety & decommissioning activities, Insp Rept 70-143/93-10 on 930403-0503, (Accession #9306220031; Fiche: 75413:071-754 13:078), 8 pages.

- 06/24/93 **Violation noted but not cited.** Major areas inspected: facility operations & maint activities, nuclear criticality safety & decommissioning activities, Insp Rept 70-0143/93-13 on 930504-0604, (Accession #9307120073; Fiche: 75617:024-756 17:034), 11 pages.
- 07/22/93 **Violations noted.** Major areas inspected: facility operations & maint activities, nuclear criticality safety & decommissioning activities & followup on events, Insp Rept 70-0143/93-14 on 930605-0706, (Accession #9308050048; Fiche: 75971:323-759 71:330), 8 pages.
- 08/31/93 **Violations noted.** Major areas inspected: radioactive liquid & gaseous waste mgt, transportation activities of radioactive waste & plutonium facilities, Insp Rept 70-0143/93-16 on 930729-0806, (Accession #9309130133; Fiche: 76429:199-764 29:211), 13 pages.
- 09/29/93 **Violations noted.** Major areas inspected: radiation protection program, involving review of HP (Human Performance) activities, including organization & staffing, training & qualifications & audits & appraisals, Insp rept 70-0143/93-20 on 930830-0902, (Accession #9310120176; Fiche: 76758:266-767 58:286), 21 pages.
- 10/01/93 **Violations noted.** Major areas inspected: facility operations, maint activities, nuclear criticality safety, decommissioning activities, fire protection & fire response capabilities, Insp Rept 70-0143/93-17 on 930807-0903, (Accession #9310130003; Fiche: 76731:005-767 31:017), 13 pages.
- 12/20/93 **Violations noted:** Major areas inspected: PU (Plutonium) facilities & waste ponds decommissioning activities & transportation activities of radioactive waste, Insp Rept 70-0143/93-25 on 931115-18, (Accession #9401040220; Fiche: 77657:067-776 57:079), 13 pages.

1994

- 03/17/94 **Non-cited Violation identified.** Major areas inspected: Plutonium facilities decommissioning, waste ponds & “Pond 4” decommissioning activities and ground water monitoring, Insp Rept 70-0143/94-02 on 940214-18, (Accession #9403280136; Fiche: 78651:300-786 51:311), 12 pages.
- 05/25/94 **Violations noted.** Major areas inspected: facility preparation & item listing associated w/physical inventory & **activities associated w/export shipments**, Cover Sheet of Insp Rept 70-0143/94-201 on 940422, 25 & 26, (Accession #9405310188; Fiche: 79596:336-795 96:336), 1 page.

07/29/94 **Non-cited Violation identified.** Major areas inspected: **environ monitoring, air sampling**, status of decommissioning projects for Bldg 110 & Pond 4 area decommissioning activities, Insp Rept 70-0143/94-06 on 940523-0701. (Accession # 9408090057; Fiche: 80474:287-804 74:301), 15 pages.

09/02/94 **Violations noted.** Major areas inspected: onsite review of corrective actions taken in response to previous insp findings & review of licensee actions in response to selected conditions, Insp Rept 70-0143/94-09 on 940718-22 & 0801-05, (Accession #9409160208; Fiche: 80907:107-809 07:135), 29 pages.

1995

03/31/95 **Violations noted.** Major areas inspected: corrective actions taken in response to previous insp findings, Insp Rept 70-0143/95-02 on 950213-17 & 0314-15, (Accession #9504140012; Fiche: 83526:321-835 26:347), 27 pages.

07/25/95 NRC Inspection Report 70-143/95-04 and **Notice of Violation, June 26-30, 1995, Severity Level IV.** (Cross ref: Insp Rept 70-0143/95-04 on 950626-30, Accession #9508020061, Fiche: 84877:252-848 77:256), 5 pages.

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.** (Cross ref: Insp Rept 70-0143/95-05 on 950724-28, Accession #9509070199; Fiche: 85321:278-853 21:284), 7 pages.

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 equipment or in a controlled area with a RWP
70-143/95-05-04 NCV

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 label air samplers in accordance with procedure NFS-HS-GH-29 Proper Use and Handling of Label 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
- 05/16/96 Major areas inspected: **review of facts & circumstances that led to fire in ventilation ducting of 300 Complex on 960402**, Insp Rept 70-0143/96-05 on 960403-11, (Accession #9605280072; Fiche: 88355:174-883 55:246), 73 pages.
- 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.
- 07/02/96 Major areas inspected: examined matl control & accounting activities re: receipt of UN (Uranyl Nitrate) solution from **DOE Rocky Flats Environ Technology Site**, Insp details withheld, Insp Rept 70-0143/96-202 on 960606-07, (Accession #9607080012; Fiche: 88909:315-889 09:315), 1 page.
- 07/30/96 **Violations noted**. Major areas inspected: observation & evaluation of licensee biennial emergency response exercise, EPP, transportation of radioactive matl,

mgt controls, procedures, QA & controls, Insp Rept 70-0143/96-10 on 960708-12, (Accession #9608120061; Fiche: 89306:311-893 06:329), 19 pages.

- 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**).
- 12/24/96 **Violations noted.** Major areas inspected: **radiation protection, environ protection & waste mgt**, Insp Rept 70-0143/96-14 on 961104-07, (Accession #9701140340; Fiche: 91422:247-914 22:268), 20 pages.

1997

- 04/04/97 **Violations noted.** Major areas inspected: radiation protection, transportation, & waste mgt, Insp Rept 70-0143/97-02 on 970303-07, (Accession #9704160199; Fiche: 92505:243-925 05:264), 22 pages.
- 07/24/97 **Violations noted.** Details withheld, Partially withheld Insp Rept 70-0143/97-201 on 970623-27 (ref 10CFR2.790), (Accession #9707280025; Fiche: 93963:358-939 63:358), 1 page.
- 10/07/97 **Violations & deviations noted.** Major areas inspected: safety operations, safeguards, radiological controls & facility support, Insp Rept 70-0143/97-06 on 970721-25 & 970804-08, (Accession #9710230110; Fiche: A0854:077-A08 54:124), 48 pages.
- 10/29/97 **Violations noted.** Major areas inspected: safety operations fire protection, plant security, radiological controls & facility support, Insp Rept 70-0143/97-10 on 970817-0927, (Accession #9711200025; Fiche: A1182:029-A11 82:045), 17 pages.
- 11/20/97 **Violations noted.** Major areas inspected: matl control & accounting (MC&A) mgt structure, personnel training & qualification. Withheld per 10CFR2.790, Proprietary details of Insp Rept 70-0143/97-202 on 971020-24, (Accession #9711280124; Fiche: 99750:044-997 50:052), 8 pages. See also (Accession #9711280122, Fiche: A1294:253-A12 94:253).

12/04/97 **Violations noted.** Major areas inspected: chemical & nuclear criticality safety operations, FP, plant security, radiological controls & facility support, (Insp Rept 70-0143/97-11 on 970928-1108, (Accession #9712110261; Fiche: A1376:278-A13 76:289), 12 pages.

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**.

03/20/98 **Violations noted.** Major areas inspected: health physics, security, safeguards & determination of operational readiness of licensee safety extract & process U/aluminum scrap matl, Insp Rept 70-0143/97-12 on 971109-1220, (Accession #9803310159; Fiche: A2827:007-A28 27:057), 51 pages.

04/03/98 **Violation noted.** Major areas inspected: criticality safety, operations, fire protection, safeguards, radiological controls, environmental & maint surveillance, Insp Rept 70-0143/98-01 on 980201-0314, (Accession #9804210336; Fiche: A3106:246-A31 06:266), 21 pages.

04/28/98 **Violations noted.** Major areas inspected: implementation of fire protection program commitments re safe plant operations, Insp Rept 70-0143/98-203 on 980302-06, (Accession #9805040294; Fiche: A3288:016-A32 88:033), 18 pages.

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**.

06/02/98 **Violations noted.** Major areas inspected: **adequacy of criticality safety documentation for tray dissolution process, incident investigation** & reporting & internal audits & inspections, Insp Rept 70-0143/98-201 on 980126-30 & 0325-0401; (Accession #9806080347; Fiche: A3698:009-A36 98:025), 17 pages.

- 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.
- 08/21/98 **Violations noted**. Major areas inspected: Summary of integrated insp efforts that included both routine insp activities & special team insp of licensee proposed **down-blending operation**, Insp Rept 70-0143/98-02 on 980315-0718, (Accession #9810070059, Fiche: A5359:007-A53 59:072), 56 pages
- 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.

- 09/25/98 **Violations noted.** Major areas inspected: physical security, matl control & accounting, fire protection, maint & radiation protection, Insp Rept 70-0143/98-03 on 980719-0829, (Accession #9810300124; Fiche: A5663:304-A56 63:322), 19 pages.
- 10/16/98 **Violations noted.** Major areas inspected: **unannounced chemical & criticality safety insp** at Nuclear Fuel Svcs, Inc., Insp Rept 70-0143/98-205 on 980928-1002, (Accession #9810220111; Fiche: A5637:156-A56 37:173), 18 pages.
- 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. ¾" 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.
- 12/11/98 **Violations noted.** Major areas inspected: facility operations, maint & surveillance & waste radiation protection. Specialized insps in areas of physical protection & waste mgt, Insp rept 70-0143/98-05 on 981011-1121, (Accession #9812240124; Fiche: A6342:208-A63 42:228), 19 pages.
- 12/18/98 **Violations noted.** Major areas inspected: implementation of fire protection commitments re: safe plant operations, Insp Rept 70-0143/98-206 on 981102-06, (Accession #9812280074, Fiche: A6461:278-A64 61:290), 13 pages.

1999

- 04/16/99 **Violations noted.** Major areas inspected: plant operations, fire protection, mgt organization & control, physical protection, radiological controls, maint & surveillance, Insp rept 70-0143/99-03 on 990214-0327, (Accession #9904270163; Fiche: A7820:290-A78 20:312), 20 pages.
- 06/30/99 **Violations noted.** Major areas inspected: operations, maintenance & surveillance, radiation protection & environmental protection & transportation,

Insp Rept 70-0143/99-04 on 990328-0522, (Accession #9907140201; Fiche: A8578:066-A85 78:082), 17 pages.

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.

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

08/12/99 **Violations noted.** Major areas inspected: activities conducted by SRO during normal & off normal shifts, fire protection, emergency program, maint & surveillance & radiation protection, Insp Rept 70-0143/99-07 on 990523-0717, (Accession #9908230106; Fiche: A9011:348-A90 11:361), 14 pages.

10/01/99 **Violations noted.** Major areas inspected: plant operations, criticality safety, fire protection, mgt organization & control, physical protection, radiological controls & maint & surveillance, Insp Rept 70-0143/99-08 on 990718-0828, (Accession #9910130287; Fiche: A9488:225-A94 88:239), 13 pages

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.

12/20/99 **Violations noted.** Major areas inspected: activities conducted by Senior Resident Inspector during normal & off-normal shifts in areas of facility operations, Inspection Report 70-0143/99-11 conducted on 991010-1120, (Accession # ML003671152- Non-Public), 23 pages.

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.

10/13/00 **Non-cited Violation noted.** Inspection on September 11-15, 2000 related to core procedures and programs, interviews with personnel and observations of activities in progress, IR 07000143/2000-204, Accession # ML003760496 (**Non-public**), 14 pages.

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

10/20/00 **Notice of Violation Enclosed.** Areas Inspected are MC&A Procedures, Records, Interviews with Facility Personnel & Observations of Facility Activities, IR 07000143/2000-2005, Accession # ML003761930 (**Non-public**), 21 pages.

12/07/00 **Violations noted.** Inspection on September 25-29, 2000 related to facility walk-downs, selective examination of procedures and record and examination of safety equipment, IR 07000143/2000-206, Accession # ML003775447 (**Non-public**), 17 pages.

2001

04/27/01 **Violation Noted.** Inspection on Feb. 5-9, 2001 related to the adequacy of licensee controls used to control the risk of theft, diversion, or loss of SSNM (Special Nuclear Material), IR 07000143/2001-201, Accession # ML011220362 (**Non-public**), 24 pages.

04/27/01 **Violation Noted.** Inspection on 03/19-23/2001, IR 07000143/2001-203, Accession # ML011200580, (**Non-public**), 19 pages.

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

02/15/02 **Notice of Violation.** IR 07000143/2002-001 on December 9, 2001 through January 19, 2002, Accession #ML020510059, (**Non-public**), 12 pages.

06/24/02 **Notice of Violation.** Inspection consisted of areas of facility operations, maintenance and surveillance, and radiation protection, IR 07000143/2002-005 on 5/02/2002, Accession # ML021760131 (**Non-public**), 26 pages.

09/09/02 NRC Inspection Report 70-143/2002-205 and **Notice of Violation, Severity Level IV**, Aug 12-15, 2002, Accession #ML022520323 (**Non-public**), 14 pages.

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.

10/03/02 **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**, IR 07000143/02-007, Accession #ML022900758, **(Non-public)**, 30 pages.

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**, IR 07000143-02-008, Operations & Radiological Protection, Accession #ML023180775, **(Non-public)**, 21 pages.

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

- 01/07/03 **Violation noted**, IR 07000143-02-009 on 10/13-11/23/02, Accession #ML030080401, (**Non-public**), 12 pages.
- 02/27/03 **Notice of Violation**, Inspection Report 07000143-02-011 on 02/27/03, Accession #ML030590126, (**Non-public**), 20 pages
- 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

12/29/03 **Notice of Violation, IR 07000143-03-009 on 10/19/2003 – 11/29/2003, Accession #ML040050096, (Non-public), 27 pages.**

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**. (Cross ref: [IR 07000143-03-010](#); [Accession #ML040270198](#), 22 pages)

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** (Cross ref: IR 07000143-04-001, Accession #ML040550256), 16 pages.

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** (Cross ref: [IR 07000143-04-201](#), Accession #[ML040710176](#), (**Non-public**), 13 pages.

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** (Cross ref: [IR07000143-04-002](#), [Accession #ML040990708](#)), 12 pages.

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** (Cross ref: 07000143-04-003, Accession #ML041400116, (Non-public), 36 pages

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 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** (Cross ref: IR07000143-04-004, Accession # **ML041810682**, (**Non-public**), 31 pages.

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.**

07/26/04 **Notice of Violation and Violations Identified**, IR 07000143-04-203 on 06/21-25/2004, Accession #ML041910512 and ML041910433), (**Non-public**), 13 pages & 2 pages.

08/02/04 NRC Inspection Report No. 70-143/2004-05, March 29, 2004 through June 18, 2004, ML081290542 (Cross ref: IR 07000143-04-005 on 04/29 through 06/18/2004, ML042160421), 33 pages.

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** (Cross ref: IR 07000143-04-204 on 5/30/2004 – 07/10/2004, ML042250099), 18 pages.

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. However, the FOIA/PA-2012-0151, dated April 2, 2012, contains 22 pages of Inspection Report Indexes from Dec. 1998 to Dec. 2004 (See ML12094A128). According to the NRC PDR Librarian, these reports are all considered “Non-Public,” which indicates that they were being withheld prior to 2004.

08/27/04 NRC Inspection Report No. 70-143/2004-204, (Criticality Inspection), July 26, 2004 through July 30, 2004, **ML081440202 and ML08140201**. (Cross ref: 07000143-04-204 on 07/26/2004 – 07/30/2004, Accession #ML042390493), 9 pages. See also Accession #ML042390486, 3 pages.

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.** (Cross ref: 07000143-04-008 on 07/11/2004 – 08/21/2004, Accession #ML042650512), (Non-public), 38 pages.

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 reperformed 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 (Cross ref: IR 07000143-04-11, Accession #ML042930128), 27 pages. See also IR 07000143-04-205, 09/13/2004 – 09/17/2004 (MC&A Inspection), #ML042920192, 10 pages. See also IR 07000143-04-011 on 08/16/2004 – 0820/2004 & 08/30/2004 – 09/03/2004, #ML042930136), 7 pages

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. (Cross ref: 07000143-04-009 on 08/22 – 10/02/2004, #ML043090097), (Non-public), 25 pages.

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**. (Cross ref: IR 07000143-04-206, Accession #ML043290372, 13 pages, and IR 07000143-04-010, Accession #ML043520421, 37 pages).

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**). (Cross reference, [ML043520421](#)) (**Non-public**), 37 pages

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 ML081440507).

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 (Redacted)

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 (Redacted)**

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 (Redacted) 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 Valve

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/I, with the highest reading being 8.6 pCi/I. Sample results for gross beta were similarly very low. The action level per license application table 5.1 was 300 pCi/I gross alpha and 6000 pCi/I 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/I gross alpha, and 8.32 pCi/I 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 (Redacted)

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 – **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 non-cited 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

70-143/2005-08-03 URI Adequacy of Design Basis of (R) System IROFS

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 k_{eff} 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.

Reviewed:

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

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

03/09/06 NRC Inspection Report 70-143/2006-006 and Notice of Violations, Mar.13 through Mar. 17, 2006. **March 6, 2006, Spill of 37 liters (9 gallons) of high-enriched uranium.**

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

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

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

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

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

Failure to ensure that process systems not approved for use were isolated from active SNM-bearing systems and failure to implement facility change process requirements of 10 CFR 70.72 (Paragraph 5).

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

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

03/18/06 **Confirmatory Action Letter. Spill of 37 liters (9 gallons) of High Enriched uranyl nitrate, ML073060169. Note: This document was not available to the public in 2006.**

03/28/06 License Performance Review, Jan. 23, 2005 and ending Feb. 4, 2006, **ML072490009. NRC found areas needing improvement in four of the five performance areas**, including problems identified in the previous LPR period associated with implementing the criticality safety analytical process, implementing the safeguards program, and management oversight of operations. To date, your efforts have not resulted in consistent conduct of licensed activities in accordance with regulatory requirements.

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

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

70-143/2005-205-05 VIO Failure to prohibit use of a positive bias in calculating upper safety limits (USLs); the

method approved in the license assumes any positive values of bias to be equated to zero

- 70-143/2005-208-01 VIO **Failure** to discuss the actual safety limit based on a neutron multiplication factor of 0.98, where the license limited the neutron multiplication factor in such cases to 0.95
- 70-143/2005-203-01 VIO **Failure** to implement/establish a criticality safety control identified in the safety analysis for the uranium-aluminum (U-Al) hydrogen dilution ventilations system.
- 70-143/2005-208-03 VIO **Failure** to establish an appropriate concentration safety limit for a non-uniform aqueous solution in the waste water treatment facility (WWTF).

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

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

b. Management oversight of operations and operational changes

- 70-143/2005-001-01 VIO **Failure** to conduct down-blending operations in accordance with an approved temporary procedure due to the lack of awareness of disabled safety system.
- 70-143/2005-002-01 VIO **Failure** to remove danger isolation tags prior to system operation of testing on the high-enriched uranium (HEU) storage columns in the 333 building.
- 70-143/2005-003-01 NCV **Failure** to store special nuclear material (SNM) in its authorized location due to confusion over identical storage racks.
- 70-143/2005-003-02 NCV **Failure** to rework U-Al process caustic waste solution according to procedure led to a transfer to the ventilation system (Event Number (EN) 41651)

- 70-143/2005-004-01 URI Licensee employee transferred raffinate solvent extraction waste into a solvent extraction boil-down condensate storage area using a temporary hose, which was not covered by approved, written procedures.
- 70-143/2005-008-02 VIO **Failure** to place the lock and tag on the single energy isolation point, prior to performing work on the equipment was a violation of procedures.
- 70-143/2005-010-03 NCV **Failure** to have personnel present in the building during the operation of the Uranium-Metal (U-M) dissolvers for approximately one hour, contrary to procedural requirements.
- 70-143/2005-010-04 NCV **Failure** to comply with criticality safety postings, which restricted the number of drums stored in the QC vault.
- 70-143/2005-011-01 NCV **Failure** to leak-test the Area 800 components when required by the operating procedure.
- 70-143/2005-011-03 NCV **Failure** to close an open container when it was left unattended.
- 70-143/2006-001-01 NCV **Failure** to comply with criticality safety instructions.

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

c. Formality and discipline in implementing the RP program:

- 70-143/2005-002-04 VIO **Failure** to control work in contaminated areas within the Blended Low Enriched Uranium (BLEU) Preparation Facility (BPF) with written procedures.
- 70-143/2005-007-01 VIO **Failures (two examples)** to properly control and release radiation work permit (RWP) areas, involving missing boundary tape in controlling an area and no final surveys before releasing an area.
- 70-143/2005-007-02 VIO **Failure** to ensure an employee's urine sample

was collected within the required time frame and, accordingly, to deny that employee access to the BLEU protected area.

70-143/2005-007-03 VIO **Failure** of plant staff to don full-face respirators or evacuate according to procedure.

70-143/2005-010-06 VIO **Failures (four)** to comply with RWP instructions involving inadequate RWPs, incorrect personal protective equipment (PPE), improper posting of an area, and poor final close out surveys.

70-143/2005-011-02 NCV **Failure** to post the RWP at the job site.

70-143/2006-001-03 VIO **Failures (four)** to follow RSP requirements involving the failing to wear PPE.

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

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

IR 71-0249/2005-201 VIO **Failure** to perform audits of the Transportation QA program during the last three years addressing all applicable criteria of Subpart H of 10 CFR Part 71, using appropriately trained personnel not having direct responsibilities in the areas audited (Severity Level IV Violation).

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

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

IR 71-0249/2005-201 VIO **Failure** to adequately evaluate and qualify Century Industries for design, testing and

**fabrication activities performed under
PO0303038655 (Severity Level IV Violation).**

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

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

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

Operational experience from similar past events not utilized:

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

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

NRC- and licensee-identified issues were not entered into the corrective action program until requested by inspectors. The inspectors noted several issues, which had been identified by NRC inspectors and discussed with licensee management which were not entered into PIRCS until inspectors made repeated inquiries. On each separate issue, inspectors had to either make repeated requests for information or point out to senior management that no entry was yet made in PIRCS (IR 2005-007).

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

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

70-143/2005-010-02 AV The design basis of the U-AI enclosure drain safety system was inadequate, in that enclosure vacuum was not considered (EA 2006-018).

70-143/2005-001-03 VIO Failure of the safety related equipment program

logic controller to be capable of performing the criticality safety purpose for which it was specified.

70-143/2005-008-01 NCV Failure to analyze required environmental effluent samples in the BLEU complex sewer.

70-143/2005-008-01 VIO Failure to maintain configuration control due to lack of use of engineering change notices.

70-143/2006-001-02 NCV Failure to correctly set the 333 Building solvent extraction condensate inline monitor to a non-conservative value.

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

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

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

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

g. Reliability of the Criticality Alarm System:

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

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

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

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

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

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

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

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

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

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

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

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

Note:

Original report dated April 17, 2006 (ML081490105) stated on Page 1 of Letter “Violation B is being cited because **licensee investigations were not completed and corrective actions were not identified as of the time of the date of the exit meeting for this report.**”

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

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

Open:

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

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

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

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

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

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

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

Closed:

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

70-143/2005-002-04 VIO **Failure** to control work by an operating or Radiation Work Permit (RWP) procedure in a posted contaminated area (R)

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

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

04/21/06

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

This action is based on a Severity Level III problem associated with **two violations**. The **first violation** involved the failure develop and implement a design for **the uranium-aluminum enclosure overflow system** which provided

that Items Relied on for Safety (IROFS) would be reliable and available to perform their function when needed. The **second violation** involved the failure to report a condition that resulted in the facility being in a state that was not analyzed, and which resulted in failure to meet the performance requirements or 10 CFR 70.61.

04/21/06 NRC Inspection Report 70-143/2005-010, Oct. 2, 2005 through Nov. 12, 2005, Notice of Violation (NOV), **Severity Level III Problem, and Proposed Imposition of Civil Penalty - \$32,500, (EA-06-018), Event Report 42133, ML081500190**. Severity Level III Problem and \$32,500 Civil Penalty was issued on October 24, 2005 (EA-05-093). **Licensee has been subject of escalated enforcement action within the last 2 years.**

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

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

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

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

05/01/06 NRC Inspection Report 70-143/2006-203, Criticality Inspection, April 3 through 7, 2006, ML081490351. (**Note:** Inspection Report addressed to **Kerry Schutt, President and General Manager**)

Discussed:

70-143/2005-208-01 VIO Failure to discuss the actual safety limit relied on in wastewater treatment tanks to demonstrate

subcriticality for normal and credible abnormal conditions

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

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

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

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

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

Closed:

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

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

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

Purpose of inspection was to independently assess and verify the information you provided and actions taken in the letter dated March 24, 2006 in response to the NRC's Confirmatory Action Letter No. 02-06-003 (dated March 18, 2006),

regarding the justification for continued operation of Naval Fuel Operations (NFO)

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

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

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

Other observations:

NFO Configuration Review:

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

Design Guidance Review:

Inspectors reviewed the licensee's available design guidance for engineers. The inspector found the guidance to be vague or non-existent in many areas. The bulk of the guidance simply gave reference to pertinent standards that should be

consulted for material of construction and piping dimensions. **No guidance was found on how to properly design a system to prevent backflow into a process vessel. Also no guidance was found on how to properly account for process upset conditions.** The licensee had no specific requirements for design guidance to the engineering function, however the inspectors communicated this observed weakness to the licensee.

Licensee Audit and Corrective Action Program Review:

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

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

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

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

05/23/06 NRC Inspection Report 70-143/2006-003 and Notice of Violation, **Severity Level IV**, Mar. 19, 2006 through Apr. 29, 2006, **ML073060269**. (**Note:** Inspector reviewed **changes in senior management roles**, responsibilities and functions that will become **effective on May 1, 2008**. The Chief Executive Officer assumed the responsibilities of the president and plant manager with the former president being named as Executive Vice President for Site Services).

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

Open:

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

During a tour of the solvent extraction room on April 11, 1006, the resident inspector found a two-liter bottle setting under the stairs leading to the second story of the building (Bldg 333). The bottle contained what appeared to be cheesecloth and did not have a cap as required by procedure for unattended containers. **Failure** to ensure than an unattended container was properly sealed/closed, in accordance with procedure NFS-HS-CL-26, was cited as a violation of NRC requirements.

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

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

Closed:

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

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

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

review applicable IROFS. In addition, **new IROFS limits were revised** and implemented to establish consistent limits.

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

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

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

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

The SIT determined that the event's immediate safety consequences were very significant in that operators were unaware that their actions could result in transfer of high-enriched uranium (HEU) to the filter enclosure. In addition, identification after the event of an **unsafe accumulation point (elevator pit)** in the BLEU Preparation Facility (BPF) floor, raised significant safety concerns because solution leaks are a credible abnormal condition in the BPF, and the BPF floor is identified as an item relied on for safety to maintain solution leaks in a safe slab configuration. There were no controls in place to prevent a solution leak from entering the elevator pit. The SIT specifically noted that the Problem Identification and Resolution Correction System, Configuration Management, and Change Control Programs failed to prevent the event. **These issues are indicative of inadequate internal processes and ineffective management oversight.**

Opened:

70-143/2006-06-01 APV Failure to notify the NRC in accordance with 10

CFR 70, Appendix A, (a)(4)(ii) reporting requirements

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

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

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

(BPF) operations remained shutdown following the March 6, 2006 spill event. Decommissioning stopped due to the strike.

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

Opened:

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

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

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

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

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

The inspectors noted that the inoperable detector had been in an alarm state since May 31, 2006. In addition, the inspectors noted that no compensatory measures were taken during the time period in which there was only one functioning alarm in the area. Failure to have dual CAAS detector coverage is a Violation.

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

Inspectors also noted that during the same electrical storm that disabled one of the WWTF Victoreen detectors, the audible alarm system for the BLEU complex CAAS was also disabled. This CAAS failure was not noted because the lightning strike had disabled both the alarm and the diagnostic panel that should have indicated alarm failure. Because the licensee was preoccupied with other effects of the lightning storm, the alarm failure was not noticed for several days. The

licensee has since instituted a new requirements to perform a “lamp test” on the diagnostic panel every shift to ensure that it is still working properly.

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

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

Closed:

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

Discussed:

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

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

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

70-143/2005-205-05 IFI **Failure to prohibit use of positive bias in calculating upper safety limit (USL) values for HEU operations**

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

- 70-143/2005-205-08 IFI** Tracks the licensee's determination of the appropriate bounds of the defined AOA in the validation reports covering HEU operations (HEU operation validations 54T-04-0043) and WRS-97-001)
- 70-143/2005-205-09 IFI** Tracks the licensee's resolution of inconsistencies between the validation reports and the procedure, and correcting the methods used to verify adequacy of the margin (HEU operation validations 54T-04-0043 and WRS-97-001)
- IFIs 02 thru 09 (above)** With the exception of 2005-205-07, licensee did not have any documentation that it had completed work on these IFIs

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

Open:

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

Closed:

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

The inspector reviewed the licensee's **use of uranium hexafluoride (UF6) cylinders on site**. The use of UF6 cylinders was limited to small sample size cylinders (less than 7 kilograms of material) for research purposes. The UF6 cylinders present in the facility are kept in storage and once used, are disposed of. Therefore, the application of the information notices regarding UF6 cylinders did not apply. Also, the use of the cylinders (in which the most recent case was several years ago) was noted to be adequate.

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

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

Rainwater was observed leaking through the roof and into the operating area in the BLEU Preparation Facility (BPF). Licensee management indicated roof leak

repair attempts had been unsuccessful in the past, but that an engineering plan was under development to correct the problem. (**Note: This leaky roof was still being discussed in the NFS Safety Culture update to the NRC in March 2009 in Atlanta).**)

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

Procedure Discrepancies:

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

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

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

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

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

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

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

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

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

The team identified a concern with regard to corrective actions associated with Commitment ID 2220, one of the eight corrective actions associated with PR 5164. The corrective action completion status was shown as 100%. The

associated corrective action was to make changes in several steps of procedure NFS-PUR-A-054 and to then issue the changes in Revision 3 to the document. **The team identified that Revision 3 was never issued even though the corrective action indicated 100% completion.** In actuality, a new procurement procedure had been issued that addressed the issues that would have been contained in Revision 3 to NFS-PUR-A-054.

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

Document Control

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

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

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

be entered into the vital record systems for microfilming as instructed by the area manager/director.

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

Other Issues:

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

10/02/06 NRC Inspection Report 70-143/2006-010, July 23-2006 through Sept. 2, 2006, **ML073040515**.

Open:

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

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

Inspectors also evaluated the licensee's semi-annual testing of the UPS and diesel generator performed on August 26. Although the diesel generator had successfully passed all its associated weekly and monthly testing since the new Building 306 UPS had been placed in service on January 14, based on discussions with the licensee, some tests did indicate difficulty in the diesel generator loading sequence. This **anomaly** was never identified in the Problem Identification, Resolution, and Correction System (PIRCS). **License Condition 6.3 requires**

emergency power for the criticality alarm system. Further, the **emergency generators shall be tested for operability on a weekly basis.** Since the operability of the diesel generator could have been affected by the installed jumper for a period in excess of six months, this issue will be tracked as an Unresolved Item.

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

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

Closed:

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

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

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

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

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

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

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

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

Two detectors are required only for initial installation in each area of the facility: This is an incorrect interpretation of 10 CFR 70.24(a)(1). The regulation states that areas that contain quantities of special nuclear material exceeding the values stated require at least dual detector coverage and does not differentiate between initial installation and continued facility operation. By placing a detector in an "alarm" state for continued operation over an extended period of time does not meet the intent of the regulation to maintain two-detector coverage of the area.

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

The basis for the Notice is your decision to place a detector in an "alarm" state for continued operation over an extended period of time without taking compensatory measures or replacing the inoperable detector. As specified in Section 3.2.4.3 of your license (SNM-124), "Criticality Detection and Evacuation Alarm System," the evacuation alarm system will meet the guidance established

in ANSI/ANS 8.3-1986, "Criticality Accident Alarm System." Section 6.5, "Corrective Action," of the standard states that when tests reveal inadequate performance, corrective action shall be taken without unnecessary delay. **Placing the detector in alarm status on May 31, 2006, after resetting it without success and not completing repairs on the detector until July 15, 2006, without implementing compensatory measures, neither met the requirement of 10 CFR 70.24(a)(1) nor your commitment to the ANSI/ANS standard.**

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

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

Inspector Findings:

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

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

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

Follow-up of Previously Identified Issues:

Reviewed:

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

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

Closed:

70-143/2004-011-01	IFI	Evaluation of Portable HEPA filters
70-143/2005-007-01	VIO	Failure to review and follow RWP procedures; three examples
70-243/2005-008-02	VIO	Failure to implement the LOTO (Lock-out/Tag-out) procedure
70-143/2006-010-02	IFI	Spill in Building 302
70-143/2005-010-05	VIO	Failure to verify SNM concentration in waste
70-143/2005-010-06	VIO	Failure to comply with RWP procedures
70-143/2005-010-07	IFI	RMS-3 Criticality Alarm unit failure
70-143/2006-001-03	VIO	Failure to follow radiological protection clothing requirements
70-143/2006-003-01	VIO	Failure to implement criticality safety procedures
70-143/2006-003-0	VIO	Violation A was failure to develop and implement a design for the uranium aluminum enclosure overflow system that would be reliable and available to perform their function when needed. Violation B was a failure to report a condition that resulted in the facility not being able to meet the requirements of 10 CFR 70-61. This item was opened as a tracking mechanism for closure of a previously identified and closed Apparent Violation (EA-06-018)
70-143/2006-010-02	IFI	Spill in Building 302

11/16/06 NRC Inspection Report 70-143/2006-207, Oct. 23 through 27, 2006, **ML081490355**. (**Note: BLEU Preparation Facility (BPF) was starting to operate for the first time since March 2006, when operations were shut down due to an event in the BPF (R) process.**)

Observations and Findings:

After discussions, **licensee recognized the weakness in not having all the corrective actions from NCS audits being placed into PIRCS.** Inspectors

determined that the items entered into PIRCS since the last inspection were associated with incorrectly putting laboratory samples on a shelf between operations and the laboratory.

Open:

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

Discussed:

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

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

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

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

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

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

70-143/2005-205-09 IFI Tracks the licensee's resolution of inconsistencies

between the validation reports and the procedure, and correcting the methods used to verify adequacy of the margin (HEU operation validations 54T-04-0043 and WRS-97-001).

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

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

Closed:

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

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

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

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

Configuration Management and Control

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

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

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

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

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

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

12/01/06

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

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

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

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

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

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

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

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

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

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

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

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

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

b. Engineering design, verification, and configuration control:

The use of a **less-than-adequate configuration management system** that **failed** to ensure that the safety impact of the partially installed and unisolated change was addressed per requirements of 10 CFR 70.72 is identified as an apparent violation (APV 2006-006-06).

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

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

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

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

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

12/21/ 06 NRC Inspection Report, 70-143/2006-014 and **Notice of Violation, Severity Level IV, Oct. 15, 2006 through Nov. 25, 2006, ML073050171. (Note: “Newly installed” area LA), and (BLEU Preparation Facility (BPF) resumed operations on October 23, 2006, following an extended shutdown as a result of the March 6, 2006 spill event; From Oct. 23, 2006 to Oct. 27, 2006, inspectors performed a round-the-clock inspection of the BPF restart process).**

Open:

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

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

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

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

Closed:

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

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

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

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

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

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

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

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

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

2007

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

Open:

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

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

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

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

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

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

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

01/28/07 NRC Inspection Report 70-143/2007-009 and Notice of Violation, Dec. 3 through Dec. 31, 2007. **Two (2) Severity Level IV Violations and One (1) Non-cited Violation (NCV), ML080290105.**

Open:

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

On Dec. 3, 2007, an operations supervisor directed the discharge of waste material from Area 800 to the waste treatment tanks that did not meet certain discharge criteria. Plant procedure required waste to be directed to certain types of containers for further sampling if the waste did not meet certain criteria. After

discussions with operations personnel, the supervisor recognized his error and entered issue into the corrective action system as PIRCS #11823. The non-repetitive, licensee identified and corrected violation for failure to follow procedure is being treated as a non-cited violation (NCV).

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

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

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

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

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

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

02/06/07

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

02/21/07

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

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

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

Confirmatory Order Effective Immediately For Program Improvements.

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

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

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

03/12/07 NRC Inspection Report 70-143/2007-001 and Notice of Violation, **Severity Level IV**, Jan. 1, 2007 through Feb. 10, 2007, **ML081500186**.

Open:

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

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

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

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

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

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

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

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

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

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

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

Reviewed:

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

The issue related to a violation involving visiting personnel and licensee escorts' failure to remove shoe covers and step across the line/barrier as required by the licensee internal procedures. The inspectors reviewed the licensee's response dated May 23, 2006, and verified on site, if corrective actions had been taken. In the response, the licensee stated the following: (1) Access to the emergency exit locations for visitors had been discontinued; (2) Identification of better locations for accommodating visitors; (3) Incorporation of lessons learned into annual radiation worker refresher training; and (4) Development of a formal procedure to address how to accommodate facility tours into the protective area. All corrective actions were verified except for the formal procedure communicating instructions on how to plan facility tours. A draft procedure had been developed but not formalized. This item will remain open until the procedure has been formalized and implemented.

Closed:

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

The issue was related to work that was performed without radiation controls during excavation work adjacent to the Waste Water Treatment Facility (WWTF). In the past when previously excavated, this area had been controlled as a Radiologically Controlled Area and filled with fresh gravel. The area was subsequently released under NFS-GH-15, "Covering Plant Surfaces." On January 5, 2006, a contractor was observed excavating in the same area that had been

previously controlled as a radiologically controlled area without notifying the health and safety staff. **The licensee performed an internal investigation that showed poor planning and communications had occurred between the contractor and the licensee's Health and Safety staff.** In addition, a breakdown of internal communication had occurred between the project coordinator and the health and safety staff regarding the status of the project. After a review of survey records, the inspectors determined that the contractor had not re-excavated down to the contaminated area. The licensee corrective actions included revising an internal procedure, NFS SOP 392, "Work Request Procedure, Rev. 15." The changes included better instruction concerning communications and planning between contractors providing services on site and the licensee's Health and Safety staff. This item is closed.

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

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

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

The licensee failed to follow plant fire protection procedure, NFS-HS-E-04, by not activating a plant fire alarm when required and inadvertently actuating the halon system (R). The licensee did not accurately maintain fire protection procedure, NFS-HS-E-04, to reflect the current plant configuration, and **did not develop a fire protection procedure for performing a potentially hazardous evolution in resetting the halon system following an actuation.** Failure to follow fire protection procedures was a violation of NRC requirements (VIO 70-143/2007-001-01). This violation will close unresolved item (URI) 70-143/2006-022-01, "Inadvertent Halon Discharge

04/23/07 NRC Inspection Report 70-143/2007-002, Feb. 11 through Mar. 24, 2007, **ML073060098. (Note: Confirmatory Action Letter No. 02-06-003, dated March 18, 2006 is now considered closed).**

Open:

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

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

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

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

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

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

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

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

04/27/07 NRC Inspection Report 70-143/2007-202, March 26-30, 2007, Criticality Inspection, **ML081500187**

Open:

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

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

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

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

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

Discussed:

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

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

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

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

Closed:

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

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

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

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

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

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

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

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

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

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

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

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

70-143/2005-205-08 IFI Tracks the licensee's determination of the appropriate bounds of the defined **AOA** in the validation reports covering HEU operations

(HEU operation validations 54T-04-0043 and WRS-97-001).

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

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

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

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

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

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

During a previous inspection, inspectors investigated an event, which had taken place at the facility involving an electrical storm. The inspectors noted that the electrical storm had disabled one of two Victoreen detectors and the audible alarm system for the BLEU complex criticality accident alarm system. During this inspection, the licensee communicated to the inspectors that the design review of its lightning protection system is ongoing. The design review includes: collection of all licensee drawings on lightning protection, conformation of field installation to conformance to drawings, and review of alternate lightning protection. The design review of the lightning protection system is **expected to be completed by June 2007**. This item remains open.

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

During a previous inspection, the inspectors questioned whether the creation of additional sequences should have resulted in an amendment under 10 CFR 70.72.

During this inspection, the licensee provided documentation clarifying its position. The inspectors reviewed the licensee's position and determined that this **item should remain open pending guidance from NRC on 10 CFR 70.72.**

05/21/07 NRC Inspection Report 70-143/2007-203, May 7-11, 2007, Criticality Safety Inspection, **ML081500188**

Open Item Follow up:

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

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

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

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

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

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

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

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

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

The inspector reviewed open item. This item tracked the licensee's review of its lightning protection system. During a previous inspection, the inspector reviewed an event, which had taken place at the facility involving an electrical storm. The inspector noted that the electrical storm had disabled one of two Victoreen criticality detectors and the horns for the BLEU complex criticality accident alarm system (CAAS). This CAAS failure was not noted because the lightning strike had disabled both the alarm and the diagnostic panel that should have indicated alarm failure.

Because the licensee was preoccupied with other effects of the lightning storm, the alarm failure was not noticed for several days. The licensee has since instituted a new requirement to perform a "lamp test" on the diagnostic panel every shift to ensure that it is still working properly. During a subsequent inspection, the licensee stated that it is conducting a comprehensive review of the design of the lightning protection system, to determine compliance with applicable code (National Fire Protection Association 780), and to determine what

enhancements can be made beyond the minimal features needed to meet the code. Open Item IFI 70-143/2006-205-02 is closed.

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

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

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

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

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

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

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

Licensee management **committed to provide a licensee amendment** that would

incorporate Safety Condition S-9 into the licensee and clarify the meaning of "published experimental data." The licensee plans to write the amendment to eliminate the need for Safety Condition S-9. This item is closed.

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

“NFS is as safe as it’s ever going to be” (NRC Commissioner McGaffigan)

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

Open:

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

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

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

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

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

Closed:

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

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

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

Opened & Closed:

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

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

Open:

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

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

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

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

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

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

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

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

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

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

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

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

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

07/23/07 [Platts Inside the NRC. "NRC Order and related documents on NFS near-miss accident released. Platts, Volume 29/Number 15/July 23, 2007, ML080320265.](#)

08/27/07 NRC Inspection Report 70-143/2007-005 and Notice of Violation, **Severity Level IV Violation**, [June 17, 2007 through July 28, 2007, ML073060138](#)
(Note: Inspectors observed an annual force on force drill conducted from July 10 to July 12, 2007. **This drill was also observed by Commissioner Jaczko on July 11).**

Open:

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

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

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

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

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

Closed:

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

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

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

Observations and Findings: Inspectors identified a **weakness** in the documentation of IROFS in 54T-07-0015. In the NCSE, the licensee had identified three enclosures that have (R) spacer barrier installed in the inside of the enclosure to keep material away from the wall of the enclosure (R) spacer barrier was intended to be documented as an IROFS for all three enclosures, but was only documented for one of the enclosures. All three spacer barriers were verified and implemented as if there were IROFS.

Closed:

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

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

Discussed:

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

Open Item Follow up:

70-143/2005-205-02, 2005-205-04, and 2005-205-08	IFI	These items track licensee commitments to clarify facility validation. The inspectors discussed the licensee's actions to address the various validation-related issues.
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The **licensee expects** that with the issuance of American Nuclear Standards Institute/American Nuclear Society (ANSI/ANS) 8.24, "Validation of Neutron Transport Methods for Nuclear Criticality Safety Calculations," and the NRC's Fuel Cycle Safety and Safeguards Interim Staff Guidance-10, "Justification for

Minimum Margin of Subcriticality for Safety," that they are now in a position to have these validation reports updated by the end of the year. **When** the validation reports are updated to address the commitments they will be reviewed as part of the normal inspection and will no longer be tracked as IFIs. These items are closed.

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

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

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

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

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

During this inspection, the licensee provided documentation clarifying the licensee position on the URI. The inspectors reviewed the position paper, BPF ISA and the NCSE for the process. The inspectors determined that in this case, splitting the downblending accident sequence into two sequences did not create a new accident sequence because the original sequence bounded any means of transferring additional solution. The inspectors also noted that the criticality controls did not change. This item is closed.

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

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

10/05/07 NRC Inspection Report 70-143/2007-006 and Notice of Violation, **Two (2) Severity Level IV**, July 29, 2007 through September 8, 2007, **ML072780519**

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

Open:

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

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

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

During a tour of Area 800, the inspectors reviewed a set of work instructions (WIs) regarding a particular process in use on unit J. WIs are strictly defined in NFS procedure NFS-TS-001, "Preparation and Issuance of Work Instructions and Letters of Authorization (LOA)," Rev. 3 as instructions written to address specific occurrences, processing parameters, and other processing requirements for material or systems. LOAs are simply temporary procedures and have expiration dates. In all cases, WIs will be predefined within a governing SOP or LOA. WIs do not receive the same level of review that a procedure or LOA receives. In this case, the WI was simply written by the process engineer and delivered directly (via an operations supervisor) to operators in the field for immediate implementation. The inspectors reviewed this particular WI that was associated with a specific lot/batch of material and described under LOA 2054N-004.

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

Therefore, as a procedure (or LOA) change, this WI should have received from criticality safety, radiation safety, industrial safety, and environmental protection review, according to Section 2.7.2 of the facility license. Additionally, the license requires prior safety committee review of a procedure change, as well as adequate

operator training, prior to placing the procedure change into effect. Improper implementation of procedural instructions without the requisite reviews and training is a violation (VIO) of NRC requirements.

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

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

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

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

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

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

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

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

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

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

Closed:

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

Waste transfer without procedural authorization. This issue concerned the transfer of waste solution into a storage area without procedural authorization. As a corrective action, the licensee took action with the individual involved in the issue. The licensee conducted training sessions related to procedure compliance and the use of trained and qualified personnel. The **licensee eliminated standing letter of authorizations that allowed the use of flexible hoses**. The licensee implemented hard piping for all credible situations requiring use of flexible hoses in BPF. This item is considered closed. (EA 06-141).

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

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

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

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

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

Open:

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

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

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

The inspectors determined that less than full reflection conditions were required to be modeled with a tight fitting layer around the fissile unit. Licensee NCS staff stated their belief during the inspection that tight fitting reflector conditions were not required for less than full reflection models. Inspectors noted that license requirements regarding reflection were complex and would require further review relative to the licensee models.

Discussed:

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

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

commitments regarding calculation of effective neutron multiplication factor (k_{eff}) and the use of positive bias.

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

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

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

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

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

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

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

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

12/28/07

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

Open:

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

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

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

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

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

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

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

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

Approximately 20 minutes after the alarm sounded, the inspectors noticed an individual (operations supervisor) arriving at the assembly area. Upon being

questioned, this individual stated that he was late because he delayed evacuating in order to shut down the process. This is a violation of NFD-HS-E-02 which requires all personnel within the protected area to immediately evaluate to the main assembly area.

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

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

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

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

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

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

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

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

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

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

Follow up on Previously Identified Issues:

Closed:

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

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

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

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

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

During a previous NRC inspection, the inspectors had identified that the licensee had not been applying their guidance for collecting quality control samples consistently between radiological and chemical samples. During this inspection, the inspectors were able to verify that licensee Procedure NFS-DC-027 had been modified to more clearly address radiological quality control sampling. The licensee was also properly implementing the procedure in their decommissioning activities. This item is now closed.

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

During the follow-up from the last inspection, the licensee had not completed the Corrective action to provide a formal procedure communicating instructions on how to plan facility tours. Operating procedure NFS-GH-91, Revision 26, was

revised to include instructions on how to establish temporary access points for controlled areas of facility tours.

Observations:

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

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

2008

01/07/08 Letter and Motion to Quash the December 3, 2007 NRC Office of Investigations Subpoena Issued to **Daryl M. Shapiro, Esq.** (16 pages). Note: See Pages 8 & 9, (3) Mr. Shapiro's Role As Investigator Does Not Waive Either Protection. The Commission held "that the fact that licensee officers could have themselves undertaken an investigation of the allegations and drafted a response to the NRC does not eclipse the special role and training that an attorney might bring to bear in "sifting through the facts" for the legally relevant, **particularly given that at the time (the licensee) was the subject of at least two federal investigations into alleged serious regulatory and criminal violations.**" **ML080150036**

01/30/2008 NFS License Performance Review, July 29, 2007 through December 31, 2007 **ML080300451. "NRC noted an upward trend in the number of procedural violations – including eight violations in a five-month period. This increase in violations appears to be an indicator of declining regulatory performance in this area."**

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

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

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

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

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

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

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

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

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

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

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

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

- The request to increase its possession limit for high-enriched uranium (TAC L32637)

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

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

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

- 03/27/08 NRC Investigation No. 2-2006-17, In the Matter of Daryl M. Shapiro, CLI-08-06 Memorandum and Order (10 pages). Docketed 03/27/08; served 03/27/08. **ML080870303.**
- 04/07/08 Update of Nuclear Fuel Services, Inc. NFS did not meet the criteria established in SECY-02-0216 for discussion at this year's AARM. However, NFS was discussed at last year's AARM meeting and Region II and NMSS recommend that the status of the NFS improvement actions be discussed this year due to the unique aspects of NRC oversight of the facility. **In particular, the establishment of a Safety Culture and Configuration Management Improvement Oversight Panel that is evaluating NFS implementation of the February 21, 2007 Confirmatory Order.**
- NFS' current performance, as indicated by the number of violations identified since mid-2007 has not significantly improved since the last licensee performance review (LPR). The violations continue to indicate that NFS needs to improve its management oversight to ensure adherence to operational, radiological protection, and engineering procedures. This area for improvement is longstanding as indicated by two of the previous three LPRs.** **ML080580192.**
- 04/02/08 NNSA and NRC Public Meeting in Erwin to discuss DOE/EIS 0240-SA1 Supplemental Analysis, regarding **1 in 71 Latent Cancer Fatality** for the MEOI near NFS. **ML081130391**
- 04/22/08 NFS presented the results of the Independent Third Party Safety Culture Assessment to the NRC, **ML081000509**
- 04/24/08 NRC Inspection Report 70-143/2008-202 and Notice of Violation, **Severity Level IV, March 31, 2008 through April 4, 2008, Criticality Safety Inspection, ML081070390.**

Open:

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

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

When the licensee relies upon computer calculations to demonstrate that an operation is subcritical, Section 4.2.3.2 of the license requires that the NCSE must

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

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

The inspectors also noted that the NCSE for the BPF Centrifuge Bowl Cleaning Station contained a study in which a single centrifuge bowl was modeled with full water reflection and varying amounts of optimally moderated SNM. The study indicated that k_{eff} is less than 0.90 if there is 6 kg or less of optimally moderated uranium oxide (UO₂) in the bowl, and that k_{eff} exceeds 0.90 if there is 12 kg or more of optimally moderated UO₂ in the bowl. The inspectors noted that when the bowl was completely filled (more than 40 kg) with optimally moderated UO₂ that k_{eff} is less than 0.95. The licensee's NCS staff stated that a centrifuge bowl was not expected to accumulate more material than that equivalent to 6 kg of UO₂, but there was not a specified control that limited the mass of material in the bowl. The inspectors determined that this study was not sufficient to demonstrate that k_{eff} for the centrifuge bowl transfer operation was less than 0.90 since no mass controls had been established.

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

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

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

Closed:

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

During this inspection, the inspectors noted several NCSEs where the licensee uses gapped reflector models for SNM handled in reflector controlled areas. The inspectors noted that these gapped reflectors models have less than a one-inch-thick, tight-fitting reflector completely surrounding the fissile system. One **example was shown in inspection report 70-143/2007-207**. The inspectors also noted other examples where the tight-fitting reflector was intended to bound only one person's hands on a much larger unit. The inspectors discussed this modeling practice with the licensee and stated that it is less conservative than what is typically observed in other licensee's NCSEs. The inspectors did not identify any examples in the NCSEs reviewed during this inspection where the use of gapped reflector models would pose a significant safety problem. The inspectors determined that the license application does not clearly prohibit the use of gapped reflection. **The licensee stated that it intends to clarify its commitments in the license application regarding reflector modeling during the next license renewal.** This item is closed.

70-143/2005-208-02 IFI Tracks licensee actions to amend Safety condition S-9 of the license to eliminate references to American Nuclear Standards Institute/American

Nuclear Society series standards and clarify the meaning of “published experimental data.”

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

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

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

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

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

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

Closed:

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

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

determined that all flexible piping in the OCB had been labeled as approved by NCS and NFS-HS-CL-27 had been updated. This item is closed.

05/05/08 NRC Inspection Report 70-143/2008-001 and Notice of Violations, **Two (2) Severity Level IV** Violations, January 1, 2008-April 5, 2008, ML081270020

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

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

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

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

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

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

Open/Closed:

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

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

Closed:

70-143/2006-06-01 APV **Failure** to notify the NRC in accordance with 10 CFR 70, Appendix A, (a)(4)(ii) reporting requirements (Paragraph 6).

70-143/2006-06-02 APV **Failure** to verify proper installation of the tray dissolver filter enclosure drains prior to use of the

		system with fissile material (Paragraph 6).
70-143/2006-06-03	APV	Failure to meet the performance requirements of 10 CFR 70.61(d) for accident sequences related to handling fissile material in the tray dissolver system (Paragraph 6).
70-143/2006-06-04	APV	Failure to meet the performance requirements of 10 CFR 70.61(d) for accident sequences related to fissile solution accumulation on the solvent extraction room floor (Paragraph 6).
70-143/2006-06-05	APV	Failure to assume that fissile solution could be misdirected from the solvent extraction feed transfer line in NCS analysis for the tray dissolver system (Paragraph 6).
70-143/2006-06-06	APV	Failure to ensure that process systems not approved for use were isolated from active SNM bearing systems and failure to implement facility change process requirements of 10 CFR 70.72 (Paragraph 6).
70-143/2006-06-07	APV	Failure to use a valid procedure to conduct licensed activities (Paragraph 6).
70-143/2006-06-08	APV	Failure to report the events concerning the yellow solution in the 2M05 enclosure in accordance with the requirements of Section 5.1 of NFS-GH-65 (Paragraph 6).
70-143/2007-008-01	VIO	Failure to follow radiological control procedures (Paragraph 6).
70-143/2007-008-02	VIO	Inadvertent Criticality Alarm (Paragraph 6).
70-143/2007-008-03	VIO	BPF spill resulting in personnel contamination (Paragraph 6).
70-143/2007-008-04	VIO	Inadequate contamination surveys (Paragraph 6).
70-143/2007-009-02	VIO	Failure to follow radiological procedures (Paragraph 6).

05/22/08

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

06/04/08

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

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

We maintain two resident inspectors at NFS and we also extended the amount of core inspections hours that we implement at NFS. Normally, we implement 2,500 hours. In 2007, we actually implemented over 3,500 hours of inspection effort at NFS. NFS's current performance, which is based primarily on the violations identified over the last year indicates that adherence to operational radiological protection and engineering procedures is an area that warrants additional NFS management oversight. This area of improvement is particularly noteworthy because it's a longstanding area needing improvement at NFS and was identified in two of the three previous license performance reviews.

The NRC received the Independent Safety Culture Assessment on May 15, 2008. The assessment identified 41 findings; 21 were characterized as "most significant," with nine major themes, several of which NFS did not identify in its parallel safety culture study. Those nine areas are organizational values, standards and expectations; the communication of those values, standards and

expectations; human performance; ownership and accountability; resources enhancing the effectiveness of programs and processes; tolerance of degraded condition; continuous improvement and benchmarking.

08/04/08 NRC Inspection Report 70-143/2008-002 and Notice of **Severity Level IV** Violation, April 6 –July 5, 2008, **ML082180089 and ML082960665**

Open:

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

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

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

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

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

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

Closed:

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

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

Other Observations:

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

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

09/08/08 Licensee Performance Review (LPR) of Licensed Activities for Nuclear Fuel Services (NFS), Inc, Docket Number 70-143, **ML082520608.**

Program Areas Needing Improvement:

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

Failure to adequately demonstrate subcritical margin for routine and expected abnormal conditions associated with the centrifuge bowl cleaning station. Specifically, transfer of bowls from the centrifuge station to the bowl cleaning

station was not adequately controlled to assure subcritical margin as described in the nuclear criticality evaluation (Violation 70-143/2008-202-01)

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

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

Open:

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

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

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

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

Closed:

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

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

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

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

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

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

10/30/08

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

Open:

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

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

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

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

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

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

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

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

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

Other Observations and Findings:

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

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

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

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

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

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

Open/Closed:

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

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

Closed:

Follow-up on Previously Identified Issues

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

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

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

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

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

The inspectors reviewed the corrective actions regarding the activities involving the testing of the 306 diesel generator system without approved procedures. The licensee committed to requiring special work instructions to be approved by the engineer's supervisor. The inspectors verified that the special work instructions were approved prior the most recent generator maintenance activities. The inspectors also verified that the lock-out/tag-out procedure was properly modified to insure NFS employees would always have a lock in place and are last to remove a lock upon completion of work.

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

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

extinguishers, and safety practices to prevent inadvertent operation of the remaining Halon system.

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

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

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

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

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

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

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

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

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

Open:

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

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

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

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

2009

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

Open:

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

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

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

Closed:

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

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

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

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

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

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

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

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

(4) On March 9, 2006, an NFS security guard and his supervisor detected alcohol

on the senior executive's breath, and the security guard believed the senior executive appeared and acted impaired, but neither the guard nor the supervisor took any action to remove or initiate removal of the senior executive for cause testing.

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

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

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

In May 2006, in apparent violation of 10 CFR 26.27, "Management sanctions and actions to be imposed," subparagraph (b) (1), and the NFS Fitness for Duty Program, Procedure No. NFS-HR-08-001, Section L. 2. "Impaired Workers," NFS **failed** to determine the senior executive's fitness to safely and competently perform his duties and responsibilities before returning him to duty. The contract professional retained by NFS to perform a determination of the senior executive's fitness to return to duty could not make the required determination because pertinent information had not been supplied to and considered by the contractor, who subsequently NFS that the senior executive was fit to return to duty. As a result, NFS failed to make the determination required by 10 CFR 26.27 (b) (1) and Procedure No. NFS-HR-08-001 that the senior executive was fit to safely and competently perform his responsibilities.

The information not supplied or considered was that: the smell of alcohol was detected on the senior executive not only March 9, 2006, but also on March 7 and 8, 2006; the senior executive consumed alcohol on March 9, 2006 less than 5 hours

before a scheduled working tour; the meeting in which the senior executive was "hot-headed" was an important meeting with regulators of NFS, NRC and the U.S. Department of Energy; the senior executive made inappropriate comments of a sexual nature to a female employee on March 9, 2006; **and the senior executive had been convicted in 1979 of driving under the influence of alcohol, for which his license was suspended and for which he was fined.**

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

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

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

In lieu of a pre-decisional enforcement conference, you may also request Alternate Dispute Resolution (ADR) with the NRC in an attempt to resolve this issue. **"The technique that the NRC has decided to employ is mediation."**

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

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

considered for escalated enforcement action in accordance with the NRC Enforcement Policy.

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

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

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

The decision to hold a pre-decisional enforcement conference does not mean the NRC has determined that a violation occurred or that enforcement action will be taken. This conference is being held to obtain information to assist the NRC in making an enforcement decision. This may include information to determine whether violations occurred, information to determine the significance of the violations, information related to the identification of the violations, and information related to any corrective actions that were taken or planned.

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

be considered in assessing any civil penalty for the apparent violation.

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

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

Open:

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

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

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

Operating Procedure (SOP) 401, Section 37, "Tank XX-WF-03/WF-04," Revision 6, Section 6.3 directed the operator to open valve WF-50. However, the operator mistakenly opened WF-51 and tank WF-03 was transferred instead. The operator subsequently noted the error and secured the transfer. Approximately 3 to 5 inches of the tank contents were transferred. The licensee entered the issue into the Problem Identification, Resolution, and Correction System (PIRCS) as PIRCS item 15829. The Criticality Safety Engineer was notified of the issue and the tanks contents were sampled. Sample results indicated the contents were within acceptable limits. This issue was reported to the Headquarters Operations Officer (HOO) on October 17 as Event Notification (EN) 44579 due to the licensee failing to meet the performance criteria of 70.61.

On December 4, 2008, BPF operations transferred special nuclear material (SNM) from the 3-day column to the mix and measure column. Following

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

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

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

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

The inspectors noted however, that it was somewhat common knowledge among numerous operators that the level probe was faulty. Other crews had recently performed the same procedure but manually filled the tank since the level probe operation was questionable. Procedure NFS-GH-65, “Problem Identification,” Revision 4, requires all employees who have knowledge of an event to report it in the PIRCS as soon as reasonably possible. This procedure defines an event to include equipment difficulties. **This equipment difficulty was not entered into the corrective action system and thus the information was never relayed to the operating crew on the evening shift of December 22.**

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

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

There were three contractor personnel already inside the controlled area in the process of dressing out to meet the specified SWP personal protective equipment

(PPE) requirements. **When the inspectors pointed this out to the RT (Radiation Tech), he acknowledged the issue, but then turned around and walked off.** Failure to comply with the radiological access requirements was a violation of NRC requirements.

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

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

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

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

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

When the issue was brought to the licensee's attention, the licensee agreed that the confirmation of the material of construction of the pipes currently installed should be verified and stored as part of the records for the IROFS. An unresolved item (URI) (URI 70-143/2008-004-05) has been opened to track the licensee's verification of the current material of construction of the pipes designated as IROFS.

Closed:

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

As stated in the NRC letter to NFS dated January 12, 2008, upon further review of the circumstances surrounding this issue, the NRC determined that **two apparent**

violations (AVs) had occurred.

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

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

Follow up on Events:

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

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

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

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

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

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

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

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

Observations:

Weakness in timely submissions of reviews.

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

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

Special work permit dated four days after conducting work.

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

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

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

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

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

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

Oversight of Licensee Actions Regarding February 2007 Confirmatory Order

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

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

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

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

inspection. The planned inspections represent an additional fifty percent above the inspection normal core inspection resources budgeted for the facility.

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

Pending Escalated Enforcement Actions:

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

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

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

New Ownership:

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

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

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

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

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

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

occurrence of the event so that the event was highly unlikely. Therefore, NFS was required to designate additional controls as IROFS to ensure compliance with the performance requirements.

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

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

Background: (Warehouse 310 Issue)

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

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

Discussion

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

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

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

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

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

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

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

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

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

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

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

Conclusions

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

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

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

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

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

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

associated with the event.

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

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

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

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

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

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

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

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

Open:

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

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

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

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

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

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

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

Discussed:

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

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

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

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

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

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

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

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

The component is utilized as an IROFS in area F of Building 302. The failure was noted during routine SRE testing where the subject IROFS (level switch) failed to fulfill its safety function in securing a pump in the presence of a low fluid level. The licensee determined that the issue fell within the 24-hour reporting requirements for failing to meet the performance criteria of 10 CFR 70.61 as required by 10 CFR

Part 70 App A (b) (2)) and notified the HOO on March 3, 2008, at 3:32 p.m. **Based on a review of the ISA, the failure resulted in a high consequence event failing to meet the highly unlikely category.** The system was shutdown at the time of the failure. The inspectors concluded that the licensee corrective actions were appropriate

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

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

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

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

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

chemical) while the lethal hazard is present. NUREG-0090, Vol. 31.

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

Update on Actions Taken to Prevent Recurrence:

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

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

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

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

Open:

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

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

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

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

07/06/09 NRC Inspection Report 70-143/2009-010, April 27-29, 2009, **ML091880007**. **PIRCS** (Problem Identification, Resolution and Correction System)

Inspection

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

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

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

Identification of Issues

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

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

Additionally, the team reviewed the monthly self-assessment status report for the corrective action program, and determined this document to be essentially a trend report, tracking performance indicators such as numbers of PIRCS initiated by month, as well as timeliness of problem resolution. The report accurately identified trends and documented areas needing improvement, such as

effectiveness of corrective actions. However, the team noted that no PIRCS were initiated as a result of the conclusions in the monthly report.

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

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

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

The team also identified that the applicability of extent of condition reviews were not formally evaluated as part of the PIRCS evaluation process. Extent of condition was occasionally considered during evaluation of PIRCS, but the

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

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

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

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

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

PIRCS 15943 was initiated following a failure of IROFS FIRE6-1 during routine testing. The cause of the failure was the malfunction of a SRE air solenoid valve. This valve was fitted with a speed control device equipped with a screw-needle valve to control the rate that air was bled from the valve. The licensee investigation determined that the adjustment screw was fully closed

preventing any air from being bled from the valve, therefore preventing the valve from performing its design function. The screw was readjusted which allowed the SRE valve to operate as intended. However, the actual cause of how the adjustment screw became fully closed was not determined. The licensee did not document whether an extent of condition evaluation was performed to assess other similar model valves in this or other comparable IROFS.

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

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

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

PIRCS 9148 was initiated as a result of a spill following changing of a filter in a glove box. PIRCS 17369 and 18348 were initiated as a result of spills encountered during subsequent change-outs of the same filter. The reoccurrence of the problem led the team to conclude that the true root cause had not been found and therefore the corrective actions were ineffective.

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

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

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

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

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

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

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

The team identified one example where an effectiveness review was not timely. **In PIRCS 721**, initiated due to a **scale not having an SRE tag attached**, an effectiveness review was assigned to corrective action 378. The corrective action was to include SRE training in all clerk and supervisor job requirements. The corrective action was completed in June 2003, but the effectiveness review never completed. Upon questioning, it was determined the job requirements subsequently changed, and so the effectiveness review was not performed.

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

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

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

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

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

Conclusions

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

Despite the lack of a formal operating experience program at NFS, the team determined the licensee was evaluating external operating experience in the form of NRC generic communications and vendor bulletins. **Licensee staff proactively search the communications located on the NRC public website for issues potentially applicable to NFS. The operating experience coordinator indicated that Part 21 issues were being evaluated at the site; however, the team could not find any documentation to confirm that such evaluations were being performed.** The Part 21 issues sampled by the team were not applicable to the plant.

The team determined that lessons learned identified as a result of PIRCS investigations were not being formally tracked, nor were they being communicated to the licensee staff. This resulted in recommendations not being implemented in a timely manner and problem recurrence. Capturing these lessons learned as internal operating experience and communicating these lessons to all staff would increase the probability of preventing recurring problems.

The team identified the following examples where the lack of corrective actions associated with lessons learned resulted in recurring problems. These issues did not constitute violations of regulatory requirements:

PIRCS 9786 was initiated due to foreign material being found while processing a product. The lesson learned was that gasket material on the vessel in question requires periodic replacement. The same condition occurred approximately five weeks later. The licensee changed vendors and initiated use of a new gasket material nearly two years after identification of the lesson learned following a reoccurrence of the issue. The inadequate initial corrective actions stemmed from the licensee's apparent cause investigation, which determined this issue to be a "tolerable failure."

PIRCS 10918 was initiated due to errors found in checkweigh sheets. The lesson learned from the apparent cause investigation was that checksheets should be issued one at a time, but there was no corrective action associated with that conclusion. Five weeks later, **PIRCS 11293** was initiated as a result of multiple checksheets being issued that still contained errors. The conclusion of the PIRCS screener was "Lessons learned is not intended to be a procedure." The PIRCS was closed out without any subsequent corrective actions. Subsequently, Quality Control's normal practice was modified to issue checksheets one at a time, which incorporated the lesson learned.

Conclusion. The licensee's lessons learned evaluations, which at times had identified effective corrective actions to prevent reoccurrence, were not formally evaluated and tracked.

The team also reviewed a number of MBWA (management by walking around) observation forms. The licensee credits MBWA observations as part of their self-assessment program. The forms documented management observations in areas of safety, facilities condition, personnel work practices, maintenance, radiological protection, security, and conduct of operations.

Many of the observation forms reviewed identified issues that needed improvement or were determined to be unacceptable in several areas, but there was no amplifying information provided. Some forms documented areas needing improvement for which an entry into PIRCS was required by procedure, such as pipes, vessels, and roofs leaks, but no entries in the CAP could be found.

Additionally, many forms identified recommendations for improvement, but the team found no mechanism for translating these recommendations into actions, such as a PIRCS entry.

The team also determined that functional area managers, such as those for the CAP and configuration management, were unaware of the requirement to maintain self-assessment action lists for long term corrective actions, as described

in NFS-GH-945. The team determined this to be contrary to the procedure in that long term corrective actions from self-assessments were being tracked through other means.

07/22/09 NRC Inspection Report 70-143/2009-009 (**Operational Readiness Review**) for new **Commercial Development Line (processing UF6)**, **ML092050562**.

08/10/09 NRC Inspection Report 70-143/2009-205, Criticality Safety Inspection, July 13-17, 2009, **ML092120606**

Discussed:

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

During a previous inspection, an Unresolved Item (**URI 70-143/2007-207-01**) had been closed based on the licensee's commitment to submit an amendment request. However, **IFI 70-143/2009-202-01** was subsequently opened because the licensee withdrew its amendment request. During the current inspection, NFS provided the inspectors with a revision to the section of the license renewal application dealing with reflection control, **submitted on June 30, 2009**.

The inspectors discussed the revised language with the licensee and determined that it appeared to be an accurate representation of the licensee's current technical practices. **The adequacy of the proposed revision will be reviewed in the license renewal process. The licensee stated that it still intends to submit an amendment request so that the issue can be resolved sooner than completion of license renewal, and therefore the IFI will remain open until submission of the amendment request.**

Closed:

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

The inspectors had left the item open pending review to verify correct implementation of these requirements. During the current inspection, the inspectors reviewed the NCSEs revised since the new version of NFS-HS-A-58 took effect. One NCSE, 54T-09-0032, "Nuclear Criticality Safety Evaluation for Waste Water Treatment Facility," Rev. 4, dated May 2009, had accident sequences **crediting repeated failures of the same IROFS**. The inspectors noted that the NCSE Table 4-1, entitled "Risk Index Assignment,"

specifically indicated where controls were credited more than once in the same sequence.

The inspectors reviewed the three sequences and determined that the licensee did include additional justification for why the repeated failures were independent. In one case, it would require a large number of failures before criticality would be possible. In all three cases, the licensee stated that the failures would occur on different days and most likely be different individuals. The licensee explained that the wastewater tanks take at least several shifts to fill and empty, and that there are several operators on each shift. (The controls involve draining the tanks and performing a visual or nondestructive assay inspection before a new batch can be introduced.) In addition, each sequence would still meet the highly unlikely requirement without crediting multiple failures, so the repeated failures were just defense-in-depth. After discussion with the licensee, the inspectors concluded in each case the sequence met the criteria for independence specified in Attachment III to NFSHS-A-68.

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

During a previous inspection, the inspectors noted that the AREVA Erwin oxide conversion facility CAS operation and testing procedure requires that the alarm panel be observed at times when the horns are switched out of automatic. During the previous inspection, licensee staff explained that the objective of the panel monitoring was to note if the CAS went into alarm and switch the horns back to automatic in order to cause a facility evacuation.

During the previous inspection, the inspectors observed that an alarm condition would be indicated by a red light on the panel and that the procedure did not describe how an alarm condition would manifest itself or how the observer could cause an alarm signal. The licensee committed to revise the CAS operation and testing procedure to describe manual alarm activation.

During the current inspection, the inspectors observed that the licensee had revised the CAS operation and testing procedure to inform operators that local alarms are received at the panel when the horns are switched off and that the procedure includes direction to operators on identification of criticality events.

08/12/09 NRC Inspection Report 70-143/2009-002 and Notice of Violation, **Severity Level IV**, April 5, 2009 through June 30, 2009, **ML092240064**.

Open:

70-143/2009-002-01 VIO Improper Securing of IROFS (Items Relied on for Safety) During System Operation

On April 27, 2009, while conducting a daily tour in processing area 800, the inspectors noted an audible alarm indicating a loss of exhaust ventilation for the area. The operator quickly responded to the alarm panel and noted that exhaust fan B801 was not running and attempted to restart the blower; however, the fan would not restart. The operator then began to implement Standard Operating Procedure (SOP) 401, Sec 8, "Area 800." Step 8.19 of this procedure addresses a low differential pressure across fan B801, which indicates a fan failure. This exhaust fan is used to safely remove combustible gases from the process in area 800. The operator then attempted another restart of the fan but again the fan would not run.

Concurrently, the operator also noted a loss of the room exhaust fan B802 as indicated by an alarm. Both fans are considered IROFS. After the loss of both fans, the operator secured combustible gas to the system as required by Step 8.19.2 and notified supervision.

Following an initial investigation by supervision, it was discovered that maintenance personnel were on the building roof performing preventative maintenance on fans B801 and B802. After completion of maintenance, the fans were restarted and the licensee began an investigation of the event.

Problem Identification Resolution and Correction System (PIRCS) item #18418 for this event implemented a small team root cause investigation. During this investigation, the licensee noted that in addition to violating SOP 401 by securing the fans (credited as IROFS for an analyzed accident sequence) during system operation, the maintenance personnel performing the work failed to utilize locks/tags while working on the fans contrary to procedure NFS-GH-36, "Lockout/Tagout," Revision 7.

The inspectors evaluated the significance of the loss of ventilation during operations. Exhaust blowers B801 and B802 are identified in the Integrated Safety Assessment (ISA) as IROFS.

The associated high consequence accident sequences involve the prevention of a buildup of combustible gases in Area 800. Given the failure of the IROFS, the resulting risk index indicated the performance criteria of 10CFR70.61 were still being met. The risk was minimized due to the existence of combustible gas detectors as well as the operator's prompt isolation of the combustible gas to the system.

However, the associated risk to operation was increased and the improper securing of the fans was considered a more than minor violation. Improperly securing exhaust ventilation fans contrary to procedure as well as the failure to follow lockout/tagout procedures constitutes a violation of NRC requirements.

Closed:

70-143/2008-004-02 URI Review Method for Making Changes to Active Safety Work Permits

The inspectors reviewed the August 2008 Health Physics Audit of the Safety Work Permit Program. The audit reviewed each of the changes made to a SWP and revealed that only a small number of the changes were significant. The inspectors reviewed the revised SWP procedure and observed that the procedure included the definition of a significant change. A significant change to an SWP constituted an upgrade to stricter PPE requirements, implementation of companion permits (such as confined space permits), or an unexpected change in radiological conditions. A significant change will terminate the SWP and a new SWP will be created by authorized personnel. The program review and procedural changes were adequate to close the unresolved item.

70-143/2008-004-02 VIO **Failure** to Follow Posted Safety Work Permit Requirements

The inspectors discussed the violation and subsequent corrective actions with the licensee management. The inspectors reviewed the revisions to the procedure and Radiation Technician Job Coverage Responsibility lesson plan as referenced by the Reply to Notice of Violation sent on March 5, 2009. The revision determined that the work site is not “active” under a SWP until the SWP is officially posted. Once the SWP is posted, all requirements of the permit are in force. The inspectors interviewed plant personnel and determined that they understood the change in the procedures. The corrective actions were adequate to close the violation.

Other:

Plant Tour: The inspectors performed periodic tours of the outlying facility areas during the inspection period and determined that equipment and systems were operated safely and in compliance with the license. **The focus of these tours centered around the evaluation of potential missile hazards and missile protection features**, combustible material storage and fire loading, hazardous chemical storage, adequate storage of compressed gas containers, potential degradation of plant security features, and potential fire hazards.

The inspectors performed a detailed review of Safety Work Permit (SWP) #13144 which involved **decontamination activities associated with a spill** in glove box 3C08 in Building 333.

The inspectors **noted a weakness** while observing the surveillance in that three-way communications were not used when verifying by radio that an operator in an adjacent area had properly aligned valves and switches in support of a test. The

licensee stated its intent to assess the need to implement three-way communications while conducting safety-related activities.

08/14/09 License Performance Review for Nuclear Fuel Services, Inc. (NFS), Docket Number 70-143, SNM-124, July 6, 2008 through April 5, 2009, ML092260139. (**Three (3) Severity Level IV violations** previously identified in Inspection Reports)

The licensee mistakenly opened a valve that allowed the transfer of solution to the waste treatment facility, by-passing the IROFS requiring sampling prior to discharge. In addition, on two other occasions, operators failed to close a valve following and prior to transfers of material. Both these actions resulted in an overflow of material that resulted in the use of the glove box drains. The glove box drains are IROFS, and NRC's expectation is that IROFS are not routinely challenged by process upsets. (**VIO 70-143/2008-004-01**)

The licensee failed to inspect fire dampers identified as IROFS for two inspection periods. The requirement to inspect the fire dampers was specified in the fire protection procedures; however, due to a communication error, the maintenance department's procedures were not updated to include the inspection of the fire dampers. (**VIO 70-143/2008-003-02**)

The licensee's safety program failed to ensure the effectiveness of the combustible control program inspections identified as an IROFS for the 310 Warehouse. Licensee procedures addressed inspection requirements associated with combustible loading limits for the 310 Warehouse, however, procedural controls were not adequate to prevent repeated occurrences of excessive combustible loading. (**VIO 70-143/2009-008-02**)

10/19/09 **NRC Event Report Number 45446. (Accident occurred on Oct. 13, but was not reported until Oct. 19).** (See **NRC AIT Report**, 70-143/2009-011, dated March 19, 2010 for details). (**It appears that NFS receives "special" treatment thanks to an NRC policy of a five-day lag time between an event and its posting to the Event Notifications**)

On Oct. 13, 2009, NFS began using the Bowl Cleaning system to dissolve U-Al (Uranium-Aluminum) fines (very small particles of U-Al) rather than adding them to the normal dissolver column. The fines were loaded into strainers and placed directly into the bowl to be dissolved with nitric acid. After the dissolution process began, the operator noticed that the temperature of the system was increasing and that NOx (**in the form of a brown cloud**) was beginning to form inside the Bowl Cleaning station containment vessels. System was shutdown. The NOx detector designated as an IROFS (Item Relied on for Safety) alarmed and the facility was evacuated.

On Oct. 19, 2009, based on the revised NO_x generation rate, it was determined that insufficient IROFS were in place and that the performance criteria of 10 CFR 70.61 were not met.

Radiological hazard: High-Enriched Uranium, approximately 1,000g; isotope: U-235 quantity approximately 710g. **Chemical hazard:** NO_x (Nitrogen Compound) gas, approximately 1.85 lbs.

Potential worker and public exposure

10/22/09 NRC Augments Inspection at Nuclear Fuel Services. NRC News Release, Office of Public Affairs, Region II, Atlanta.

The NRC has formed an Augmented Inspection Team to further review the circumstances associated with an Oct. 13 incident at Nuclear Fuel Services facility in Erwin, Tenn.

That incident involved unexpected levels of heat and **nitrogen compound gas** fumes during the dissolution of scrap material from Department of Energy projects containing low levels of uranium. (**Note: Uranium was high-enriched**).

“This particular incident did not involve nuclear criticality issues, but it shows the need for NFS management to improve some aspects of their operational and decision-making processes,” said NRC Region II Administrator Luis Reyes. “Upgrading our inspection to an AIT underscores our commitments to evaluate these issues thoroughly and ensure they are being properly addressed.”

11/12/09 NRC Inspection Report 70-143/2009-003 and Notice of Violation, **Severity Level IV, July 1, 2009 to September 30, 2009, ML093160774.**

A violation was identified for the failure to implement a safety program that would ensure IROFS FIRE-15 and 28 would perform its intended function when needed to comply with the performance requirements. An unresolved item (URI) was opened to review licensee’s analysis that demonstrates compliance with 10 CFR 70.61 during 105 Laboratory roof replacement activities. A second unresolved item (URI) was opened to review licensee’s analysis that demonstrates compliance with 10 CFR 70.61 without crediting the building 105 laboratory sprinkler system as an IROFS.

Open:

70-143/2009-003-01 VIO Failure to implement a safety program required by 10 CFR 70.62

From **November 19, 2007 to September 4, 2008, the licensee had not implemented a safety program that would ensure IROFS FIRE-15 and IROFS Fire-28 would perform their intended function when needed to comply with the performance requirements.**

Specifically, the licensee did not identify that IROFS FIRE-15 was going to be impaired during the 105 Laboratory roof replacement activities and failed to implement IROFS FIRE-28 as soon as IROFS FIRE-15 was impaired to ensure that an adequate safety margin was maintained.

This represented a failure of the safety program to adequately ensure the reliability of IROFS FIRE-15 and 28 to limit likelihood, and consequently the risk, of a high consequence accident scenario.

The failure to implement a safety program in accordance with 10 CFR 70.62 is a violation of NRC requirements.

70-143/2009-003-02 URI Analysis of Fire in Building 105

The inspectors noted that the fire safety consequence analysis of the ISA stated, in part, that **even a small fire had the potential to exceed the high consequence threshold for both occupational and environmental chemical consequences, and the intermediate consequence threshold for a radiological consequence.**

The inspectors determined that from November 19, 2007 to September 4, 2008, the licensee did not have sufficient IROFS in place to reduce the likelihood of occurrence of a high consequence event as required by 10 CFR 70.61(b) performance requirements.

At the time of the inspection the licensee did not have sufficient information to demonstrate that they were meeting 10 CFR 70.61 performance requirements. An unresolved item (URI) was opened pending the review of the licensee's analysis.

70-143/2009-03-03 URI Implementation of recommendations of Fire Hazard Analysis

In addition, the inspectors noted an inconsistency in the 105 Laboratory ISA related to the potential consequences that could result from a fire in the 105 Laboratory. The Fire Safety Consequence Analysis section stated, in part, that even a small fire could result in a high consequence event.

However, later in that section, the ISA stated that consequences from a fire were low. These assessments were based on the **Fire Hazard Analysis (FHA) for the 105 Laboratory, prepared on September 3, 2004.** The FHA considered the entire laboratory as a single fire area.

However, the FHA assumed that the potential of a fire to spread to adjacent laboratory work areas was highly unlikely due to the intervening masonry block walls and sprinkler protection, which is credited as IROFS FIRE-15. As a result, the sizes of the modeled fires were significantly smaller compared to a fire involving the entire laboratory, which could result in a high consequence event.

The inspectors noted that the expectation that the fire was not going to spread beyond the area of origin was based on the implementation of several recommendations to improve and correct deficiencies identified with the installed sprinkler system.

The FHA made the recommendation to extend sprinkler coverage to the unprotected areas of the 105 Laboratory. In addition, the FHA made recommendations in the areas of obstructions to water discharge pattern, excessive sprinkler spacing and area of coverage, need for installation of additional sprinklers, replacement of painted sprinkler heads, and the need for testing a sample of the existing wax-coated sprinklers to verify operability.

The inspectors walked down IROFS FIRE-15 and noted that the licensee had not implemented any of the FHA recommendations. Therefore, IROFS FIRE-15 did not meet the requirements specified in the FHA to support the conclusion of meeting the performance requirements.

Since the licensee did not implement the FHA recommendations, the inspectors determined that the licensee could not credit the sprinkler system as an IROFS to ensure that a fire would result in a low consequence event. **The inspectors noted that the licensee had been operating the 105 Laboratory in this condition for over five years.**

At the time of the inspection, the licensee did not have sufficient information to demonstrate that it was meeting the performance requirements in 10 CFR 70.61 with IROFS FIRE-15 not meeting the FHA requirements. An unresolved item (URI) was opened pending the review of the licensee's analysis.

Discussed:

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

The inspectors reviewed the corrective actions taken to address this violation. While the initial corrective actions were complete, the inspectors observed that tanks WD-01 and -02 had similar discharge piping configuration as WF-03 and -04. This item will remain open for further NRC review of the licensee's extent of condition analysis.

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

The inspectors reviewed the licensee's progress in verifying that pipe material, credited as an IROFS, had been properly verified. The inspectors reviewed the licensee's updated procedure for the verification of IROFS piping (NFS-GH-939, "Piping Integrity Plan, Revision 3). The inspectors noted that the procedure was adequate to meet the intent of the IROFS requirements.

The licensee had not completed the verifications of all of the IROFS piping of the facility at the time of this inspection. Therefore, this item will remain open until the verification is complete. Thus far, no pipe designated as an IROFS was determined to be composed of the incorrect material.

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

The verification and validation of software used for decommissioning was discussed; however, the license was not ready to close the item. The licensee will be ready to review the issue after the first Final Status Survey report is completed and submitted to the NRC.

70-143/2005-003-04 IFI Elevated isotopic analysis on a stack sample above the licensee's action limit. This item was closed in Inspection Report 2005-007.

The inspectors re-evaluated the methodology used to calculate the dose to the maximally exposed individual (MEI), the resultant dose to the MEI, and the corrective actions taken to prevent recurrence. The inspectors determined that the licensee used approved methodology and an off-site laboratory accredited by the National Environmental Laboratory Accreditation Program to aid in determining the dose to the MEI. The dose value was below the 10 CFR 20.1301 limits of 100 mrem in a year and 2 mrem in any one hour. The inspectors determined that the mechanical corrective actions taken to prevent recurrence had been installed and were functional. The inspectors had no new concerns.

Follow up on Event Report 45179:

The inspectors reviewed Event Notification (EN) 45179 (Nuclear Material Event Database # 090573), which involved a degradation of the public address (PA) system.

June 30, 2009, an individual located in a subcontractor trailer in the protected area noted that PA announcements related to fire alarm testing could not be clearly heard.

Degradation of the PA system was suspected and the issue was entered into the corrective action system as PIRCS #19511. Subsequent investigation revealed that the cause of the degradation was due to damaged speaker wire caused by the installation of a new fire suppression system in the 310 Warehouse.

Specifically, a technician had recently drilled a hole to install a support bracket and inadvertently drilled into the affected speaker wire as it was not encased in conduit. This event was reported to the NRC Headquarters Operations Officer (HOO) on July 1, 2009. The event was reported pursuant to 10 CFR 70.50 (b)(2) as equipment that failed to function as designed when the equipment is required to prevent exposure to radiation exceeding regulatory limits.

Because the PA system is part of the criticality alarm system (CAS), the CAS system for the 310 Warehouse and the contractor trailer was inoperable due to the degraded PA system. The PA system was repaired and fully tested and returned to service on July 3.

The inspectors reviewed the 30-day written response to the event dated July 30, 2009. Long term corrective actions include the addition of new design requirements to ensure PA speaker wiring is installed within conduit or approved mounting brackets. EN 45179

Follow-up on Previously Identified Issues:

Closed:

70-143/2006-014-02 VIO **Failure** to follow Lockout/Tagout procedure.

The inspectors reviewed the corrective actions taken to address this particular violation, e.g., Lockout/Tagout procedure training. The inspectors had no additional concerns.

70-143/2006-002-02 URI **Failure** to control electrical schematic diagrams under configuration control.

The inspectors discussed with the licensee how they controlled electrical schematic diagrams. The inspectors noted that electrical diagrams were included in the configuration management program database and they linked to the respective equipment number, including safety related equipment. The inspectors also noted that changes to electrical diagrams were handled through the change control process, which required a detailed review of the change. The inspectors determined that the licensee was controlling electrical diagrams in accordance with license requirements.

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

The inspectors reviewed the licensee's corrective actions involving a process engineer that had written a Work Instruction that did not follow the requirements for writing a standard operating procedure or letter of authorization. The inspectors reviewed the revised procedure that governed the issuance of Work

Instructions and reviewed several Work Instructions that were in use in the facility. No issues were noted with these documents.

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

The inspectors reviewed the licensee's corrective actions involving the failure to properly apply and document the Tollgate process for the BPF U-metal project. The inspectors reviewed the application of the Tollgate process on the modification of the 800 Area. The inspectors noted that the project engineers had properly applied and documented each of the Tollgate process milestone reviews. The inspectors' interviews with several project engineers demonstrated adequate knowledge and application of the Tollgate process.

70-143/2007-004-03 IFI Verify Corrective Actions to Emergency Information Message (EIM).

The EIM form (Attachment E to Procedure NFS-HS-03) was modified to include a requirement that the assistant ECD update the EIM and attach a copy of the offsite protective action recommendations (Attachment F to Procedure NFS-HS-03) for transmittal to offsite authorities. **The licensee continues to evaluate the procedure used for offsite dose projections (NFS-HS-E-09) based on site physical and operational changes.** The inspectors concluded that the corrective actions were adequate.

70-143/2007-004-04 IFI **Verify corrective actions to resolve the onsite and offsite contamination.**

The inspectors observed the licensee performing contamination surveys of personnel and equipment during the simulated response. A contamination control zone was established and maintained throughout the exercise. Examples were noted where response personnel removed gloves in areas potentially contaminated to perform life-saving actions, such as taking vital signs, but were later checked for contamination prior to leaving the area. The inspectors concluded that based on the response, the training provided to both onsite and offsite personnel regarding contamination control was adequate.

11/14/09 **NRC Event Report Number 45497. Fire in Process Glove box.**

On Nov. 14, 2009, at approximately 0730 there was a heated high-pressure release from the 5A/5B UF6 cylinder in the CDL (Commercial Development Line) facility, Sublimation Station 3. At the time of the upset, the operators were in the process of preparing the cylinder for sublimation. They had just satisfactorily performed the valve leak checks and were performing the cylinder pressure test. The cylinder was not being heated.

The upset occurred when the cylinder valve was opened to vent the cylinder to column 1D01. The release ruptured the connective Teflon tubing that was enclosed in braided stainless steel. When flame was observed the operator actuated the CO2 release valve and extinguished the flame. Damage appears to be: Braided Teflon tubing, singed area on lexan cover of the enclosure and possible leak on the inlet and outlet side of the eductor.

11/24/09

NRC Issues Confirmatory Orders to Nuclear Fuel Services and its Contract Physician, NRC News Release, Office of Public Affairs, Region II, Atlanta

The NRC has issued **four (4) Confirmatory Orders** requiring Nuclear Fuel Services and the company's contract physician to correct deficiencies stemming from a former senior company executive's violation of the NRC's fitness for duty requirements and the failure to administer required hearing tests to security officers.

The orders related to the fitness for duty issue require the Erwin, Tenn. Based nuclear fuel fabrication facility to modify its fitness for duty procedures and training and establish avenues for the reporting of substance abuse-related concerns, including the creation of a corporate ethics hotline and policies allowing for anonymous reporting.

An extensive NRC investigation and review found that a senior executive at NFS consumed alcohol less than five hours before a scheduled working tour of the facility in **2006, an apparent violation of federal regulations**. The NRC determined that the company failed to immediately relieve the executive of his duties and also failed to administer testing to determine his fitness for duty. Additional apparent violations were identified related to the company's review of the matter and the executive's return to work. That executive is no longer employed by NFS and the company was acquired by the Babcock and Wilcox Co. in early 2009.

The company's contract physician provided incomplete information to a contract professional retained by NFS to determine whether the senior executive was fit for duty. The NRC found that this lack of information caused NFS to make a less than fully-informed decision about the executive's status before he was returned to duty.

The contract physician also provided inaccurate information to NFS about the executive having entered a substance abuse rehabilitation program when he had not done so.

The order noted that NFS has completed "disciplinary action and organizational change with respect to the senior executive."

Two separate and unrelated orders require NFS and its contract physician to review processes, establish appropriate standards and take other corrective actions after a process error led to two security officers not being given required hearing tests. The contract physician certified that guards were medically qualified for duty despite not having taken the hearing test, but the officers were tested later and passed.

The Confirmatory Order document the commitments NFS and the physician have made to the NRC, and those detailed were agreed upon as a result of the NRC's Alternative Dispute Resolution process. The ADR process uses a neutral mediator with no decision-making authority to assist the NRC and its license holders in resolving differences regarding enforcement actions.

The NRC will not issue any violation or take any other enforcement action related to these issues. However, the NRC staff will evaluate the commitments during future inspections.

12/31/09 All processes suspended at Nuclear Fuel Services, Inc. (Event Report 45601)

2010

01/07/10 NRC Issues Confirmatory Action Letter to Nuclear Fuel Services, NRC News Release, Region II, Atlanta

The Nuclear Regulatory Commission today sent a letter to Nuclear Fuel Services detailing the company's commitments for actions to assure the agency that NFS can safely operate the plant. The company has agreed to suspend production at its Erwin, Tenn. Facility until the items are completed.

The NRC's Confirmatory Action Letter (CAL) is designed to address issues that contributed to recent events at the facility, including an Oct. 13 incident being reviewed by an NRC augmented inspection team. The letter is being issued to detail and confirm NFS's agreement to take certain actions in response to shortcomings identified by the inspection team.

Although NFS can continue work in other areas such as construction and transportation, the company has agreed that the process lines at the facility will remain out of service until the NRC is satisfied that the issues have been addressed. The NRC will verify through further inspections that the items in the letter have been successfully completed before production is resumed.

"This letter clearly lays out the NRC's expectations for both short and long-term actions that NFS will take to address the concerns our inspectors have identified," said NRC Region II Administrator Luis Reyes. "We believe suspending operations is appropriate given the current situation, and the lines will not restart until NFS meets its commitments."

Issuance of a confirmatory action letter does not preclude the NRC from taking other actions for any violations of NRC requirements that may be identified. (emphasis added)

01/08/10 NRC Inspection Report 70-143/2009-207, Dec. 7-10, 2009, Criticality Safety Inspection, **ML093620101**

Observations and Findings:

With regard to specific NCSEs, the inspectors questioned why the NCSE for Sublimation Stations 1 & 2 was revised twice within a week, and determined that these revisions were for unrelated changes made as part of initial start-up of this new operation.

Inspectors noted that in several NCSEs, the licensee took credit for initiating and enabling events such as the rate of buildup on a HEPA filter, the amount of material that would be released from a UF6 cylinder during a leak, etc. For some of these initiating and enabling events, the basis was not apparent from a review of the NCSE and associated documentation.

In addition, the inspectors reviewed new operations that had not yet been field verified, such as the design of portable favorable geometry columns for reagent addition to the BPF solvent extraction process, and the design of the saw for size reduction of MTR fuel. The inspectors determined, based on the established controls, that these operations would also be conducted safely and in accordance with regulatory requirements.

During a walkdown of Area 800 the inspectors identified some 2 liter contains and 1 liter contains that were stored in the corner of the area. The containers had some type of liquid in them but not all of them were marked with the contents of the container and some of the containers were not marked "No SNM Allowed." NFS-HS-CL-04 states in part, "Favorable containers that are not being used to contain SNM are permitted provided they are labeled as to their contents and with the words "No SNM Allowed."

The area supervisor and NCS staff walked down the area and identified that the containers contained the chemical that is used in Area 800. They also identified two containers that did not have the appropriate contents label and "No SNM Allow" label. The containers were subsequently marked with the appropriate labels and a problem report was generated (PIRCS #22422).

The inspectors determined that the operations in the area do not generate SNM solutions and that none of the containers that were being stored in the area contained SNM. The inspectors considered the risk significance of this **failure to follow procedure NFS-HS-CL-04 to be minor** because of the operations

in the area and that no SNM was in the containers. **This failure constitutes a violation of minor significance and is not subject to formal enforcement.**

Open:

70-143/2009-207-01 IFI Tracks licensee’s demonstration of applicability of, and compliance with, License Application Section

Inspectors noted, in their review of the revised BPF U-Aluminum Dissolution NCSE, that the licensee stated it was no longer required to perform inspections of borosilicate glass columns in this area, allowing the columns to be reclassified as configuration controlled equipment (CCE) rather than safety-related equipment. Inspectors reviewed the memorandum that justified this, dated February 6, 2009.

The BPF processes still place reliance on the borosilicate glass, but no longer require an annual inspection of the glass thickness based on examinations of inspection data taken from 2006 to 2009, consisting of 220 tests with 3520 individual glass thickness measurements (taken at many different axial and radial locations along and around each column).

Inspectors reviewed this data and the licensee’s evaluation thereof, and concluded that the data did adequately demonstrate there was no measurable thinning of the glass over this time, justifying their reclassification as CCE.

However, the inspectors noted that Section 4.2.1.9 of the License Application, “Fixed Neutron Absorbers,” states: The use of a neutron absorber as a criticality controlled parameter is acceptable if the following criteria are met...

Procedures are established to verify the presence and continuing effectiveness of fixed neutron absorbers before use and periodically thereafter.

Controls are exercised to maintain the continued presence and the intended distribution and concentration of fixed neutron absorbers.

The inspectors questioned how these requirements would be met if the required glass thickness inspections were discontinued. The licensee stated that it believed it was allowed to discontinue the inspections, but that there was no documented basis for doing so.

The licensee had issued Problem Identification, Resolution, and Corrective System (PIRCS) 7419 on May 25, 2006, with an action to “generate basis documents for glass columns to address fixed neutron absorber requirements in license.” **Subsequent to this, the due date had been extended several times, from**

May 1, 2007, to October 1, 2007, to October 1, 2009, and finally to October 1, 2010.

The licensee stated that it was uncertain whether Section 4.2.1.9 even applied to the glass columns, noting that: (1) the most significant effect (in terms of system reactivity) of glass thinning was increasing fissile dimensions, not reducing neutron absorption; and (2) there was considerable margin in both glass thickness and boron loading, such that only ~50% of the boron was needed to maintain k_{eff} below the upper subcritical limit.

The licensee also stated that, as part of license renewal, it had submitted changes to Section 4.2.1.9 of the license application, which state that controls are to be exercised to maintain the continued effectiveness of absorbers “as necessary.” However, this is not the version of the application currently in effect.

Inspectors determined that the stated specifications for the borosilicate glass (i.e., in the U-Aluminum Dissolution NCSE) include NCS limits on the B₂O₃ content and 10B enrichment, as well as the glass thickness. Therefore, it appears that reliance is being placed on both the inner diameter and the material properties of the glass columns, even if only partial credit for boron is needed to demonstrate subcriticality, which would mean that this section of the application does apply.

Inspectors determined, however, that the **failure to do inspections has at most minor safety significance, because of the large margin inherent in facility calculations, and because the licensee’s inspection data convincingly demonstrate the lack of any measurable thinning of the glass over time.** In fact, there is not foreseeable credible mechanism that could reduce the glass thickness by the 50% required to exceed the upper subcritical limit.

Therefore, there is no safety concern with the discontinuation of glass column inspections (as long as current chemical conditions in this area are maintained). The licensee has committed that it would complete its evaluation of the applicability of License Application Section 4.2.1.9, and justifies how it is meeting the license requirements, by June 30, 2010.

Demonstration of applicability of, and compliance with, License Application Section 4.2.1.9 will be tracked as **IFI 70-143/2009-207-01**.

Closed:

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

This concerned the licensee’s planned submission of an amendment request to clarify license requirements regarding modeling of reflection in criticality

calculations, as it had committed to do in a previous inspection. The licensee subsequently submitted an amendment request, but later withdrew it. In a previous inspection, the licensee had stated its intention to resubmit with more justification by the end of 2009. Following the inspection, on **December 15, 2009, the licensee resubmitted its amendment request**, which will be reviewed by licensing staff. This issue is now closed.

01/20/10 **NRC Event Report Number 45642. Potentially Overpressurized UF6 Cylinders**

UF6 cylinders are in storage. The cylinders consist of 1s/2s, hoke tubes, and 5A cylinders. The UF6 is contained in the cylinders, which are in DOT shipping containers (20PF1 and 6M containers).

Calculations were performed that indicated that the theoretical pressure in some of the cylinders exceeds the service pressure (200 psi) and some exceed the hydrostatic test pressure (400 psi).

DOE literature indicates that the burst pressure for a 5A cylinder is (approximately) 8,000 psi. The age of the cylinders is 1950s (to) 1980s. The potential pressure in the cylinders is estimated to be by liberation of fluorine gas in the cylinders. Access to the areas has been restricted. The cylinders potentially contain fluorine gas.

(Note: Cylinders have been stored at NFS, inside City Limits of Erwin, since 1999. In the March 2010 NRC AIT Report, NFS said they did not know the cylinders contained F₂ (Fluorine Gas), which is lethal).

02/12/10 NRC Inspection Report 70-143/2009-004 and Notice of Violation, **Severity Level IV, Oct. 1, 2009 through Dec. 31, 2009, ML100430924**. Includes NMED Nos. 090788, 090838; NRC Event Nos. 45446, 45497, 45601.

70-143/2009-004-01 VIO Inadequate design of a system containing SNM

Plant operations activities were generally performed safely and in accordance with approved procedures with the following exceptions: On Oct. 13, an over temperature event occurred in the Uranium Aluminum bowl cleaning station. This event resulted in establishment of an Augmented Inspection Team and the results of which will be documented in report 70-143/2009-011. On Nov. 14, a fire occurred in a sublimation station of the Commercial Development Line, which damaged equipment and resulted in the shutdown of the line.

A violation of 10 CFR 70.72(a)(1) was identified for the failure to adequately address the material compatibility of uranium hexafluoride vent hose materials with F₂ gas that may be present in the storage cylinders.

A change was made to the facility to install uranium hexafluoride sublimation stations. The impacts from fluorine oxidation of components that controlled licensed material, namely the flexible hose piping with passed special nuclear material from a uranium hexafluoride cylinder to the sublimation station, were not addressed prior to implementing the change and placing the system in service. This event was self-revealing following a small glove box fire on Nov. 14, 2009, when a hose containing uranium hexafluoride was damaged by a rapid oxidation reaction with fluorine gas.

Licensee established a full root cause team, which enlisted the assistance of National Nuclear Security Administration (NNSA) experts in UF₆ processing. The cylinder contained approximately 11.4 kilograms of uranium (U) at ~97% enrichment and was believed to have originated from the K-25 plant (Oak Ridge, TN) circa the early 1960's. Documentation was poor due to the age of the cylinder.

Details of the UF₆ accident:

This cylinder was the second large cylinder to be processed in the CD line. The first cylinder was processed with no upsets. However, the operators had noted a large amount of heel material remaining in the cylinder following sublimation.

The cause of the fire was later determined to be from residual fluorine (F₂) gas residing in the top of the cylinder. Fluorine is considered a strong oxidizer that rapidly reacts with organic material. The root cause team noted that the hose may have been kinked and thus caused potential cracking of the internal Teflon lining. The F₂ gas could then react with the internal fiber braid lining that surrounded the Teflon. This braiding likely became a source of fuel for the fire. No ignition source would be required to start this type of fire.

The F₂ gas is created from the radiolytic decomposition of UF₆. This well understood phenomenon is caused by the high specific activity (SA), i.e. curies/gm, of high enriched uranium (HEU). In fact, the SA for HEU is approximately 100 times greater than natural uranium (due to the relatively higher amount of U-234). The U-234 is naturally occurring in uranium and increases along with U-235 during the enrichment process. The U-234 has a very short half-life when compared to U-235 and U-238.

This short half-life results in a similarly higher specific activity. This higher activity greatly affects the resulting specific activity of the HEU and thus, on a per gram basis, the HEU has a much higher specific activity than natural uranium. This conclusion was supported by the large amount of heel material (UF₅) found remaining following processing of the first 5A cylinder.

Based on discussions with other NFS personnel who have had experience processing these cylinders in the past, the piping connecting to the vent lines of

these cylinders was not a stainless steel braided, Teflon-lined hose but instead a solid metal (for example, Copper or Monel) tube that would not react with F2 gas. **This historical knowledge had not been passed on to the engineers that designed the sublimation system.**

The NNSA consultants also noted that chlorine tri-fluoride (ClF₃) had been used as a chemical additive in the past. This chemical is also highly reactive, potentially explosive, and was noted as a potential cause for the fire.

However, NNSA also speculated that the reaction in this event would most likely have been more violent if ClF₃ was the source. Thus, the licensee concluded that the oxidizing agent was more likely to be F₂ gas.

Additionally, the licensee found that a potential precursor event may have occurred the day before this event (on November 13). The larger UF₆ cylinders (5A/5B) have a vent valve for the cylinder as well as a vent valve for the dip tube. The dip tube is a pipe that travels to the bottom of the cylinder and is used for purging purposes. In this instance, the operator was preparing the same cylinder that was later involved in the event.

While opening the vent valve on the dip tube, the operator noted a small burning ember that floated past the stainless steel portion of the dip tube vent hose to a portion of the hose that was opaque. The ember hit the inside of the opaque hose and then extinguished itself. The occurrence was immediately entered into the corrective program.

The corrective actions however were not thorough or comprehensive. The opaque hose was replaced (changed to a stainless steel, instead of polymer, construction). The inspectors concluded that a more in-depth examination of the event may have led the licensee to recognize the F₂ gas phenomenon before the fire occurred.

The inspectors confirmed that a glove box fire was analyzed in the fire hazards analysis (FHA) for the CD line. However, no credit was given for the CO₂ system in the ISA. The CO₂ was to be used to put UF₆ into a solid form in the event it vaporized in the glove box. The CO₂, however, was mentioned in the FHA.

The licensee's approach to a fire in a sublimation station was not to attempt extinguishment. **Instead, the operator was expected to see the fire, flee the area, and then sound the alarm.** Using this approach, no exposure to the operator would occur. **Thus, the accident sequence of a fire in a single glove box was not specifically analyzed in the ISA.** The licensee only analyzed larger fires that damage several glove boxes and subsequently breaches the building. The licensee demonstrated compliance with NRC regulation (specifically, 10 CFR 70.61) by limiting the amount of cylinders stored in the processing area.

Procedures limit the number of cylinders in the area to a maximum of three. For a large fire in the CD line, this constraint would limit UF₆ exposure at the site boundary to below regulatory requirements.

10 CFR 70.72 (a)(2) requires that prior to implementing any facility change, the impact of the change on the control of licensed material shall be addressed.

Prior to implementing the change allowing the operation of the CD line, the licensee failed to address the impact of radiolytic buildup of F₂ gas in the UF₆ cylinders would have on the components that control SNM.

The licensee's failure was of low safety significance because the accident was adequately bounded by the ISA and the IROFS in place ensured that the performance requirements were met. **This failure is a violation of NRC requirements and will be tracked as VIO 70-143/2009-004-01.**

Following the event, the licensee shutdown all sublimation activities in the CD line until root cause(s) could be determined.

The inspectors noted that regarding the fire that occurred on November 14 in the CD line glove box, a previous PIRCS entry from the day before dealt with a related anomaly within this glove box. However, the corrective actions were not thorough or comprehensive, and the **evaluation failed to probe deep enough into the issue such that the follow-on event was not prevented or mitigated.**

Uranium-Aluminum (UAl) Over Temperature Event

On October 13, 2009, the UAl system in BPF experienced an upset condition when UAl fines were added directly to the UAl bowl cleaning station (as part of a newly approved process change to the facility) and then mixed with nitric acid. The resultant chemical reaction generated an excessive amount of heat and nitrogen oxide and/or nitrogen dioxide (NO_x) gases.

The upper-level building NO_x gas alarm was received and all personnel evacuated building 333. **After dissipation of the NO_x gas via the building scrubber system**, personnel re-entered the area to assess the system condition. The wet off-gas (WOG) overflow lines (transparent polyvinyl chloride) were noted to have deformed slightly due to the heat of reaction. Additionally, NO_x gases were noted in the overflow column.

By design, the overflow column is vented to the plant off-gas (POG) system via a siphon break. **The POG system is directly connected to the building scrubber system, which processes the effluent gasses to allow release to the environment below regulatory limits (?).**

On October 19, the NRC dispatched a special inspection team (SIT) to the site. Following a more detailed review of the event, the licensee reported this event to the Headquarters Operations Officer (HOO) pursuant to 10 CFR 70, Appendix A (b)(1) as a potentially unanalyzed condition (Event Notification (EN) No. 45446). Following the report to the HOO and a reevaluation of the event by the NRC, the SIT was upgraded to an Augmented Inspection Team (AIT) on October 26.

This event will be discussed in detail in the AIT inspection report 70-143/2009-011. The licensee shut down the UAI system for the remainder of the inspection period while a root cause team reviewed the event, developed causal factors, conducted an extent of condition review, and conducted an extent of cause review.

The inspectors reviewed EN (Event Number) No. 45601 involving a press release issued on December 31, 2009. This press release dealt with a suspension in productions operations following the normal holiday period, which ended Dec. 28. **The decision to keep the facility shut down was made by the licensee after discussion with NRC about a steadily declining trend in facility performance. The EN (Event Notification) was issued to comply with 10 CFR 70, Appendix A, which requires a report to the HOO concurrent with any press release that deals with a situation related to the health and safety of the public or the environment.**

03/02/10 NRC Public Meeting, Erwin, TN. Discussion of AIT Report (not yet released). Another public meeting promised prior to restart. **Meeting did not happen.**

03/19/10 NRC (Region II) Augmented Inspection Team (AIT) Report 70-143/2009-011, (completed on Jan. 7, 2010), contained eight (8) Unresolved Issues (URIs), **ML100780127**, 55 pages.

70-143/2009-011-01 URI Failure to properly classify Enterprise Change Requests (ECRs).

The Change Control Board (CCB) review represents management's review of the Enterprise Change Requests (ECRs). Urgent ECRs can be "expedited" and potentially by-pass the CCB review more quickly. (Report details, Page 3)

70-143/2009-011-02 URI Failure of CCB to identify deficiencies in the ECRs.

The CCB's review of ECR 20091919, which authorized the processing of fines directly to the Bowl Cleaning Station (BCS), failed to identify that the design requirements and design basis were affected by the direct addition of fines into the BCS without first processing the material in the UAI dissolvers. (Report details, Pages 3 & 4)

70-143/2009-011-03 URI Failure to perform adequate technical reviews.

The technical reviews failed to identify that processing UAl fines directly in the UAl BCS, without processing the material through the caustic dissolution and centrifuge steps, was not analyzed in the ISA as part of the UAl design basis. (Report details, Page 4)

70-143/2009-011-04 URI Failure perform safety reviews to assure that the facility ISA was not adversely affected by the change, operational safety was not compromised, and that assumptions and commitments were maintained.

The safety reviews failed to consider the impact on NO_x generation rates due to the greater surface area of the UAl fines and failed to note that direct input of material into the BCS inherently adversely affects the ISA as the ISA assumed only material first processed in caustic dissolution is placed in the BCS. (Report details, Page 4)

70-143/2009-011-05 URI Failure to properly implement change review documentation in accordance with 10 CFR 70.72

The failure to have a written evaluation that provided the bases for the determination that the changes did not require prior NRC approval. (Report details, Page 8)

70-143/2009-011-06 URI Failure to meet performance requirements of 10 CFR 70.61(b) (Insufficient IROFS)

The operations that occurred on Oct. 13, 2009 in the BCS failed to meet the performance requirements of 10 CFR 70.61 (b) due to insufficient IROFS being available. (Report details, Page 18).

70-143/2009-011-07 URI Failure to maintain process safety information pertaining to the performance and technology of BUA-43 (IROFS) by 10 CFR 70.62(b).

The team reviewed the technical basis for IROFS BUA-43 indicated that the licensee had not adequately quantified the effectiveness of this IROFS. The licensee failed to present adequate calculations that indicated that sufficient addition of the chemical reagent would prevent the release of excess NO_x. (Report details, Page 18)

70-143/2009-011-08 URI Failure to identify engineered or administrative

controls as IROFS required by 10 CFR 70.61(e).

The licensee's failure to identify engineered or administrative controls as IROFS for several accident scenarios in fuel manufacturing, Uranium oxide, UAl, and the CDL processes involving NOx generation. (Report details, Page 19)

- 03/23/10 **NFS Authorization to Resume Operation of Navy Fuel Process Line Operation**
- 04/22/10 Public Meeting to Discuss Restart
(Once again, forced overtime (16-hour) shifts was mentioned by the NRC).
- 05/26/10 NRC Inspection Report 70-143/2010-007, Notification of Pre-decisional Enforcement Conference regarding **Five (5) Apparent Violations** associated with the process upset condition that occurred in the bowl cleaning station of Oct. 13, 2009, **ML100780127**.

70-143/2009-011-06 AV Failure to meet Title 10 of the Code of Federal Regulations (10 CFR) 70.61(b).

This regulation requires, in part, that the risk of each credible high consequence event be limited and that engineered or administrative controls shall be applied as necessary to reduce the likelihood of occurrence.

NRC determined that, prior to Oct. 13, 2009, **NFS failed** to comply with the following procedures:

On Oct. 13, 2009, Nuclear Fuel Services, Inc. (NFS) operated the bowl cleaning station without sufficient engineered or administrative controls to comply with 10 CFR 70.61(b) **because only one item relied on for safety (IROFS), BPF-43 (NOx detection), had been designated to prevent or mitigate a high consequence accident scenario/sequence.**

70-143/2009-011-01, AV Multiple failures to follow procedures for configuration management
02, 03, and 04

70-143/2009-011-05 AV Failure to meet the requirements of 10 CFR 70.72, which requires licensee to maintain records of written evaluations that provide the bases for the determination that a change to its facility does not require prior NRC approval.

The inspectors determined that an inadequate 10 CFR 70.72 review was conducted based on reviews of the Safety and Regulatory Review Routing Forms used for the ECRs 20092008 and 20091919 that led to the upset event of Oct. 13, 2009.

70-143/2009-011-07 AV Failure to maintain process safety information required by 10 CFR 70.62(b).

This regulation requires, in part, that licensees maintain process safety information pertaining to the performance and technology of the process to enable the performance and maintenance of the integrated safety analysis. Prior to Dec. 11, 2009, NFS failed to maintain process safety information that would have provided reasonable assurance that IROFS BUA-43 (chemical addition) could perform its intended design function as described in the integrated safety analysis.

70-143/2009-011-08 AV Failure to identify Engineered or Administrative Controls as IROFS required by 10 CFR 70.61(e)

This regulation requires, in part, that the licensee designate engineered or administrative controls as IROFS if they are required to meet the performance requirements of 10 CFR 70.61 (b). Prior to Dec. 11, 2009, NFS failed to identify engineered or administrative controls as IROFS for several accident scenarios involving excessive nitrogen compound gas generation in the fuel manufacturing, uranium metal/oxide, uranium aluminum, and commercial developments lines in order to meet the performance requirements of 10 CFR 70.61(b).

At this pre-decisional enforcement conference, NRC requests that NFS present their perspective on why their corrective actions from the Safety Culture Improvement Initiative did not effectively address these performance areas and what actions you are taking as a result.

06/02/10

NRC Restart Readiness Assessment Team Report No. 70-143/2010-005, Feb. 22, 2010 through March 22, 2010; presented orally in public meeting on April 22, 2010; **however, this written report was not released until June 2, 2010, (ML101530164).**

Concerns involved the adequacy of Nuclear Fuel Services' (NFS') management oversight of facility process changes, perceived production pressures, lack of questioning attitude by workers and management, and poor communications

70-143/2009-011-08 URI Failure to identify engineered or administrative controls as IROFS required by 10 CFR 70.61(e)

The AIT noted that the licensee could not provide an adequate technical basis for IROFS BUA-43. The team noted that, as a result of the AIT review, the licensee created new IROFS in the BPF U-A1 system in place of BUA-43 in order to comply with 10 CFR 70.61. **However, NFS chose to leave BUA-43 in place as a defense in depth measure though no credit for it is assumed in the ISA. Therefore it is not risk indexed as required by NFS' ISA program.**

The team observed that the licensee's ISA program did not consider all initial conditions and assumptions used as inputs to safety calculations to be IROFS. The availability and reliability of IROFS to perform their intended safety function are ensured through the use of specific management measures directed by 10 CFR 70.62(d). **A vulnerability could exist because, without appropriate management measures assigned, the results of those safety calculations could be changed in a non-conservative manner by a deviation from any of the stated initial conditions or assumptions. The practice of not including management measures for initial conditions and assumptions will be also reviewed as part of URI 70-143/2009-011-08.**

Actions Prior to Restart of Operations:

1. The restriction NFS management put in place following the Bowl Cleaning Station incident prohibiting the processing of granular metallic "fines" in the Uranium-Aluminum process will be institutionalized.

Restriction on processing granular metallic fines did not fully meet facility management expectations for clarity and recognition – the U-Al Dissolution procedure did not include a picture of the fines. **And, changes were not initially captured in the procedures as "Commitments," making it vulnerable to change in the future.**

2. NFS will institutionalize improvements to the change control process (CCP), which was delineated in a temporary procedure. Training on the process will be provided to appropriate operations, technical, oversight and management staff.

Regarding process changes, the **new definition of an urgent change was not implemented as intended.** When the licensee revised the plant-wide change process procedure, the word "would" was changed to "could," which was less restrictive and subject to greater mis-interpretation, therefore, could result in future non-conservative decision-making when utilizing the urgent change provision. This was contrary to the intention of the licensee's corrective action.

3. The incident investigation, including detailed causal analysis of the Bowl Cleaning Station incident will be completed.

Team noted that the Root Cause Analysis (RCA) Team did not conduct a detailed internal operation experience (OE) review, specifically search the PIRCS database for past change process problems to determine if they had similarities to this event. **TapRoot team leader indicated that the database was too complex and not conducive to performing effective searches. He also indicated that root cause personnel were not trained on conducting PIRCS database searches.**

Licensee's TapRoot investigation identified three causal factors (CFs), two contributing causes (CCs) and three lessons learned (LL) associated with the Oct. 13, 2009 bowl cleaning station event:

- CF#1: **Failure** to implement the plant-wide project management control procedure NFS-TS 009, "Configuration Management of Process Change," **originally issued in 2007**, which led to an inadequate review of the chemical process change associated with the procedure revision to process granular aluminum fines in the BCS.
- CF#2: **Inadequate review** of the process change by the Integrated Safety Analyst (ISA) Team Leader which led to the failure to request a review by the chemical analyst.
- CF#3: **Inadequate technical basis documentation** to support the process change which led to the failure to understand its impact.
- CC#1: **Workload, production pressure, and competing priorities** contributed to the development, approval, and implementation of a major process change without appropriate attention to detail.
- CC#2: The option to process aluminum fines in the BCS was implemented to **prevent generating what was perceived to be a large number of waste containers**.
- LL#1: Investigate reports of problems with the electronic procedure change software resulting in unexpected changes to the word processing documents.
- LL#2: Routing mark-up copies of the procedure as part of the process change package would facilitate a more thorough review and reduce errors.
- LL#3: Significant process changes should not be implemented on an off-shift without ensuring adequate technical support.

However, as previously discussed in the NRC AIT Report 70-143/2009-011, **The licensee's causal factors and contributing causes did not focus on the lack of management oversight or the lack of questioning attitude** that was demonstrated by the licensee's staff and management through the review and approval of the ECR (Enterprise Change Request) that allowed the processing of granular fines in the Bowl Cleaning Station.

To address these **Safety Culture aspects of the event**, the licensee performed a **separate Safety Culture Implication Review (SCIR) investigation**. SCIR identified several safety culture components that contributed to the performance issues, including: **decision-making, accountability, operating experience, resources, work control, work practices, continuous learning environment, organizational change management, and safety policies**. Team concluded that

the SCIR effectively identified safety culture weaknesses that were not addressed by the original RCA associated with the licensee's TapRooT investigation.

4. The near-term corrective actions needed to address the causal factors identified by the investigation of the BCS incident will be determined and implemented.

Team noted **following weaknesses or comments in several PIRCS** (Problem Identification, Resolution, and Correction System):

PIRCS #C10680 (Review of potential adverse work environment of personnel in Process Engineering department):

The team noted that the original due date for the completion of this corrective action was January 15, 2010, prior to restart of the facility. However, the assigned due date was changed to May 1, 2010, which changed the completion priority to a post-restart action. The only documentation regarding the change in PIRCS #C10680 was a note that the due date was changed at the request of the Vice President of Operations.

The team noted that this was one of several **corrective action commitment details or due dates that were changed without thorough documentation or evidence of initial CARB (Corrective Action Review Board) reviews**. The licensee initiated PIRCS #C11978 to address this and similar issues.

PIRCS #010616 (Develop and implement a project management program to be executed for new projects or changes to current processes):

The licensee's TapRooT investigation noted that a Quality Assurance (QA) Audit in 2008 identified the lack of procedural guidance for providing the technical basis of process changes (PIRCS #P15957). The proposed corrective action for this QA issue, documented in PIRCS #C7816, was to create such a document. As a result, a draft engineering department "How-To-Guide" was created titled "Preparation of Technical Basis Documentation for ECRs." **This guide was never approved and issued.**

The TapRooT investigation stated that "this issue will also be addressed by the corrective actions for CF#1." Based on review of PIRCS #010616, as well as the other corrective actions associated with CF#1, the **team found no documented evidence that this issue was formally addressed.**

The corrective actions associated with PIRCS #010616 involved enhancements to the facility process change program (via revision of NFS-CM-004 and the implementation of NFS-TS-009) which included requirements for conducting and documenting technical basis reviews. While detailed technical basis review guidance was provided in these procedures, the **team noted that the**

draft How-To-Guide contained content and information beyond what had been implemented in the procedures or in the associated training.

Following discussions with the licensee on this issue, PIRCS #15957 was updated by QA personnel indicating that the **original actions were ineffective and should be corrected**. PIRCS #012046 was initiated to address this problem. The licensee indicated that a review of the technical basis preparation guidance contained in the draft How-To Guide would be conducted against the guidance currently contained in NFS-CM-004 to determine if NFS-CM-004 should be enhanced.

PIRCS #011172 (Conduct a review of procedures, policies, etc, for instances of institutionalized priorities over safety or production pressures):

The licensee's review of the sampled facility procedures and policies identified several actions. For example, it was identified that a more detailed review of the practices associated with SOP-392, "Work Request Procedure" was needed. In addition, **it was identified that Process Engineers should be instructed to consider production over safety during their routine procedure walk downs and reviews. However, the team noted that specific PIRCS corrective action items were not created to ensure that these actions would be implemented.** To address this issue, the licensee initiated PIRCS #C11972.

PIRCS #C11113 was associated with a SCIR corrective action to conduct peer-checks of ISA Team Leader decisions that process changes do not require ISA technical reviews.

The PIRCS document stated that "instead of requiring a peer-check, Screening Guidelines have been provided in Attachment A of NFS-GH-A-67 to clearly identify under what circumstances no technical ISA review is required."

The team noted that there was no explanation or basis documented for this decision or whether the CARB had agreed with this decision. In that there was already a corrective action developed from the SCIR investigation to develop these same Screening Guidelines (via PIRCS #C11114, described above), the change to the action of PIRCS #C11113, effectively deleted the action.

The team interviewed one of the SCIR team members who indicated that they had intentionally included both actions due to the importance of eliminating the error-likely situation and single point failure from occurring (i.e., making the same error that occurred in the BCS event).

This SCIR team member stated that he was unaware of the decision to revise PIRCS #C11113. The team discussed the concerns with management who subsequently revealed that the decision to revise the action of PIRCS #C11113 was made at the recommendation of the newly appointed Director of Safety and Regulatory based on his experience at another fuel facility.

In lieu of the peer-check, it was decided that the Screening Guidelines associated with PIRCS #C1 1114, alone would provide adequate actions to address the problem. The team concluded that this was another example where corrective actions were revised without clear documentation of the basis for the changes and without CARB involvement in the initial decision-making.

5. The extent of condition reviews of process area safety basis conducted after the BCS incident will be expanded to include the BPF-U-ox Dissolution Process.

The original extent of condition analysis performed by the licensee following the BCS event utilized what the licensee described as a “vertical slice.” NFS chose to perform the extent of condition review by selecting and analyzing only those systems that might be subject to a variability of material.

In this original extent of condition, the licensee addressed the potential for variability of material composition and how this condition could affect other plant processes. **However, this initial analysis did not identify that the U-ox system was vulnerable to material variability.** Based on the ALT’s review, it was noted that different types of oxides could be introduced into the U-ox system.

The licensee expanded the extent of condition review to include the U-ox dissolution process. The team reviewed the revised extent of condition analysis described in NFS Investigation PIRCS #110389 and noted that it was very detailed and evaluated many of the vulnerabilities of the U-ox system. **However, it failed to specifically address the failure mode associated with material variability.** This deficiency was brought to the attention of licensee management.

6. An extent of cause analysis for each causal factor will be completed and specific interim corrective actions will be identified and implemented as appropriate.

There was only a limited attempt to determine the actual extent of each cause within the organization. Licensee acknowledged this approach as a potential vulnerability for future investigations and appropriately captured the concern in PIRCS #P22890.

7. Each facility accident scenario involving nitrogen compound gas (NOx) generation will be re-evaluated to ensure appropriate IROFS have been identified and implemented to provide adequate protection and that management measures for those IROFS are sufficient to ensure these IROFS are available and reliable to perform their intended safety function when needed.

Note: In the Event Report for the Bowl Cleaning Station incident, NFS used the words “**nitrous**” oxide in a description of the gas generated.

This same incorrect information was also used in subsequent NFS news releases and therefore transmitted by the media – even describing it as “laughing gas” in an Associated Press article. Members of the public addressed this error at the NRC Public Meeting on Oct. 29, 2009, and again in subsequent meetings, conversations, and emails. **Yet, after all of the attention given to using the correct description “nitrogen compound gas,” as late as May 20, 2010, NFS continued to use “nitrous” oxide in their releases to the media. And, at the AARM Meeting on May 27, 2010, Victor McCree, Region II Deputy Administrator, perpetuated this incorrect information, “nitrous oxide,” in his presentation to the NRC Commissioners about NFS!**

NFS chose to leave BUA-43 in place as a defense in depth measure though no credit for it is assumed in the ISA. Therefore it is not risk indexed as required by NFS’ ISA program. The practice of putting non-risk-indexed IROFS for low consequence events was not specifically addressed in NFS’ ISA program documents.

During a review of the newly created IROFS for NO_x scenarios, the team noted that NFS developed management measures to ensure their effectiveness. However, **the licensee did not address the effectiveness of the management measures associated with these IROFS.**

Team observed that the licensee’s ISA program did not consider all initial conditions and assumptions used as inputs to safety calculations to be IROFS. The availability and reliability of IROFS to perform their intended safety function are ensured through the use of specific management measures directed by 10 CFR 70.62(d).

A vulnerability could exist because, without appropriate management measures assigned, the results of those safety calculations could be changed in a non-conservative manner by a deviation from any of the stated initial conditions or assumptions. **The practice of not including management measures for initial conditions and assumptions will be also reviewed as part of URI 70-143/2009-011-08.**

8. Following completion of restart actions. NFS will have an independent review conducted to verify implementation of the restart actions. Personnel participating in these reviews will have no responsibility for the conduct or oversight of NFS operations.

NFS assembled six individuals to conduct the independent review. The on-site portion of the team’s assessment was limited to just four days. It appeared to have adequate breadth, but review of issues may have **lacked depth due to the short amount of time spent at NFS. In many cases the assessment consisted of reviewing the supporting documentation supplied by NFS and did not include independent sampling. The lack of depth was illustrated by the types**

of observations that the NRC evaluation team had that were not identified by the NFS Independent Review Team.

9. NFS will allow sufficient time for NRC to perform inspections of restart actions. The NRC will be provided with a two-week notice prior to the time NFS management would like for the NRC team to arrive at the NFS site.

On February 9, 2010, David L. Kudsin, President NFS, issued a letter to Luis A. Reyes, NRC Region II Administrator, stating that the IRT had completed their review of restart actions required by the CAL. The letter noted that the IRT concluded that NFS had satisfactorily completed the list of “Actions Prior to Restart of Operations” for the Naval product line and the BLEU Preparation Facility.

10. Implement a Senior Engineering Watch (SEW), to provide additional technical coverage on the process floor. The SEW will have the sole duty of providing independent technical oversight of process operations to promote the identification, adjudication and resolution of potential safety concerns. The SEW will functionally report to the Vice President of Operations. NES will maintain this watch for a minimum period of 6-months after restart of all operations.

Team determined that the on shift activities of the SEW were appropriate to the level of activity taking place within the facility. However, the team noted that the decreased amount of activity taking place at the licensee’s facility during the inspection period limited the number of opportunities for direct observation of SEW activities. SEW needs to be assessed during and after licensee’s restart activities.

11. Implement an initiative to increase management presence and engagement on the process floor that will better enable open and timely communication of potential safety concerns. This initiative will be structured around a series of daily meetings held by management with processing personnel.

Team conducted seventeen (17) interviews with licensee personnel various departments and experience levels, to assess their knowledge of the initiative, gather their insights on the level of management presence at daily meetings and assess their ability to openly communicate with licensee management.

Team identified that several employees did not have a firm understanding of the Employee Concerns Program (ECP). Team also identified that **some employees were not aware of their ability to directly contact the NRC in order to raise safety concerns.** The team conveyed these issues to the licensee. The licensee initiated PIRCS # P23575 in response. **Team also noted that training on the**

ECP and methods to raise safety concerns were part of the licensee's upcoming preparations for restart.

12. Develop updated programmatic guidance to provide specific criteria to invoke Corrective Action Review Board (CARB) review of investigations, corrective actions and effectiveness reviews to help ensure appropriately broad investigations and effective corrective actions.

Stakeholders for most agenda items were not present to provide amplifying information or answer questions. This negatively impacted the effectiveness of the CARB.

The majority of items reviewed were rejected due to lack of provided documentation. This problem could have been remedied prior to the convening and negatively impacted the effectiveness of the CARB.

The effectiveness of the meeting was negatively impacted when it was abruptly ended due to licensee scheduling conflicts.

The team conveyed these issues to the licensee and noted that they were being reviewed for incorporation into an ongoing effort the licensee is undertaking to improve their CAP.

- The meeting lacked an expectation of formal communications when assigning ownership of problems, investigations, and corrective actions.
- To an observer, ownership of problems, investigation, and corrective actions were not evident.
- The group facilitator has the potential to affect the rigor with which PIRCS entries are evaluated during the meeting. Some facilitators negatively impacted the rigor of evaluations.
- Some items used during the PRG meeting, such as investigation assignment guidelines and risk definition tables, were not proceduralized.
- The effectiveness of the meeting was negatively impacted multiple times when it was abruptly ended due to licensee scheduling conflicts.

13. Revise and implement the procedure that requires processes, process parameters and process inputs be clearly defined prior to implementation. This program is designed to prevent changes such as a change in the composition and physical characteristics of the feed material that may result in abnormal occurrences during processing.

Team noted the primary changes were to set safety and regulatory compliance as a priority ahead of quality and cost, and to clarify the documentation upon which

the changes are evaluated. These changes are labeled as “Commitments,” to prevent changes in subsequent revisions. This corrective action was approved by the CARB on March 3, 2010, **but concurrence on the procedure and its final implementation had not yet been completed prior to the end of the inspection.**

Team also reviewed the commitment the licensee has made to review all new business opportunities or potential changes to existing HEU contracts through NFS-TS-009. Finally, the team noted the **final approval and release of each new or changed material will be from the President of NFS.**

The engineers and operators voiced concern regarding the volume of reviews and approvals for minor procedural changes and work requests.

14. Conduct an independent review of NFS’ investigation processes. This review will be conducted by a subject matter expert (SME) to establish a plan to implement enhancements necessary to ensure adequate breadth and depth of investigations.

Team noted that the licensee has a current contract with Certrec Corp. for ongoing CAP (Corrective Action Program) support as this program, which includes investigations, is improved. Team identified following items:

- The licensee’s procedures did not contain training requirements for personnel who would normally conduct ACEs (Apparent Consequence Evaluations).
- The licensee’s procedures did not contain any specific guidance or requirements for the conduct of ACEs.
- The licensee’s SOW (Statement of Work) with the Certrec Corp. did not contain specific language requesting a review or assistance with enhancing the licensee’s ACE process. It appeared to be understood by both parties that this was indeed part of the Certrec Corp. effort.

15. Revise the procedure that provides guidance for preparation of set-point analysis documentation to enhance the basis of evaluation, specifically to provide guidelines for justifying the basis for critical parameters.

Licensee **has committed to “evaluate the ISA program”**, including benchmarking against similar programs associated with other facilities by Dec. 31, 2010, and implement any necessary enhancements. These actions will be entered and tracked in the Corrective Action Program.

MANAGEMENT ISSUES

1. Management Oversight of Facility Process Changes

Based on that review, it was determined that, **except for the weakness in properly incorporating the more restrictive definition of an urgent facility change**, the licensee had effectively institutionalized the enhancements from the interim guidance.

A change that is determined to have an impact of the safety and regulatory basis must be approved in writing by the Vice President of Operations, Director of Safety and Regulatory, Director of Fuel and Operation, and Director of Applied Technology, prior to commissioning the change.

A minor weakness was identified regarding the clarity of the criteria in NFS-CM-004 for initiating the enhanced technical basis reviews associated with the conduct of NFS-TS-009.

- Some concerns were expressed over the clarity of the guidance regarding when enhanced technical basis reviews associated with NFS-TS-009 were necessary.
- Some concerns were expressed over the excessive amount of time needed to prepare ECRs which meet the expectations for COB reviews; however each indicated that management had reinforced the need for quality and safety over production impact.
- Some concerns were expressed that the corrective action program was being inundated with low threshold issues that were taking their time away from more significant priorities.

2. Perceived Production Pressures

Production pressure, or the prioritization of production over safety, was cited as an NRC concern in the NFS CAL of January 7, 2010. In order to evaluate the licensee's response to this concern, the team conducted interviews with plant personnel and reviewed documented actions by the licensee.

Eight interviews specifically addressing production pressure were conducted with site personnel, including upper-level management, process engineering, first-line supervisors, and hourly operators. Selected personnel were from across all three production lines (Navy Fuel, BPF, and CDL).

Thirteen (13) separate actions were documented by the licensee to address perceived production pressure.

Many of the interviews confirmed that production pressures were present among the staff and within the upper management prior to the BCS event. However, management's current expectation that safety is the top priority was well documented in a number of separate communication efforts, including large group presentations, small group discussions, and the conduct of Operations standard.

One widely held concern was that these communications took place during the shutdown period, and that during operations the philosophy might revert back to a production over safety mentality.

The licensee completed an organizational realignment such that responsibilities for Operations and Project Management are separated. The staff perceives the separation of these two competing interests as an important barrier to preventing production pressures. Prior to the separation, the Operations division was tasked with both operating the facility safely, and fulfilling contractual obligations, which were closely tied to financial goals. With the creation of the Project Management division, fulfillment of contractual obligations is no longer an Operations division responsibility and production over safety questions, raised by Operations, would presumably move up to the President. The separation of the operations and project management functions is viewed as a positive step in reducing production pressure.

3. Evaluate NFS' actions and progress toward fostering a questioning attitude by workers and management

The team interviewed seventeen NFS employees to evaluate the effectiveness of the licensee's efforts to cultivate a questioning attitude in their employees. The team selected five hourly workers, three engineers, four first line supervisors and five senior managers. Within each group, the team ensured a diverse range of experience by selecting employees with little or no NFS work experience to those employees who exceeded thirty years of NFS work experience. The selection was primarily concentrated on staff from the Navy Fuel line.

The team also interviewed staff working on all three shifts. In addition, the team reviewed the materials presented at both the All Hands meeting as well as the small group meetings. The team reviewed a select group of revised procedures to verify the promotion of questioning attitude before proceeding when uncertain about a process or procedure.

The majority of staff interviewed felt they had always had the ability to raise questions but there may have been more production pressure in the past. The team noted that, while there is a current emphasis placed on lowering the threshold for uncertainty and encouraging a questioning attitude, **many interviewed were unsure if it would continue at the same level once operational and shared that concern with the team.**

The team noted that this emphasis is an ongoing process and that cultivation of a questioning attitude may take a while to permeate the organization.

4. Communications

The team also observed the licensee's communication processes in several situations, including a variety of meeting types as well as verbal and written exchanges between licensee managers, supervisors, hourly employees, and contract personnel.

The team determined that NFS-SO-09-006 addressed certain aspects of communication within the licensee's organization. **It did not, however, provide specific guidance regarding management expectations for the different methods of communications used within the licensee's organization.**

The team noted that most employees interviewed conveyed a strong sense of optimism that the licensee's organization was on the right path, however, **they were skeptical of whether the changes will persist over the long term. The team noted that this is an ongoing process that will need to be monitored.**

READINESS TO RESTART NAVY FUEL

To evaluate whether the issues identified by the NRC in late 2009, which led to the issuance of the Confirmatory Action Letter, have been sufficiently addressed, the staff further evaluated the Navy Fuel line in the areas of procedures, maintenance, corrective actions and investigations.

2. Maintenance

The team found that a formally structured evaluation that included specific criterion for review of all outstanding work and the associated rationale for deciding which items were to be completed **had not been conducted** at the time of the inspection.

The licensee's informal lists of items considered by engineering, operations, and management necessary to be completed were not consolidated into any one database or list, nor designated by work request identification numbers versus by general topic areas. In addition, since the restart had been delayed, further work related items were being added; however, tracking of these additional items were not in all cases updated on the recovery plan lists, nor were the additional work request packages located on the operating floor marked as "Restart" as previous work packages had been.

The team independently reviewed in detail the status of 12 of the 26 open Major work requests, 17 of the 46 open Minor 2 work requests, and 16 of the 94 open Minor 1 work requests associated with the Navy Fuel line. Based on this review, the team found that most Major and Minor 2 work requests were adequately identified for restart; **although the licensee's decision-making process was poorly documented** as mentioned previously.

However, the team found that the licensee had focused little effort in evaluating open Minor 1 work requests, especially those that were initiated prior to NFS shutdown of the Navy Fuel line in late 2009. As a result, the team identified several Minor 1 work requests that either **should have been identified as restart items but were not**, or needed additional licensee review to confirm whether they were acceptable for post-restart completion. **The most notable item identified by the team included the calibration of important plant equipment associated with work request number M141767**. This work request was not identified by the licensee's screening as necessary for restart when it should have been.

The team discussed the implementation status of outstanding Navy Fuel line modifications with managers in the process engineering department and conducted field walk downs of the operating area where the modifications were being implemented. **The team was told that most modifications had been completed to the point where post-modification testing was the next stage in the process.**

However, from a review of the work request packages that were posted at the job locations, the team noted that **none of the modifications selected had been inspected by the process engineers responsible for the modifications**. This inspection ensures that the field modification work was performed in accordance with the work requests and to identify any rework that might be necessary due to work installation errors or problems. This phase of the modification process has to be completed before any post-modification testing can be conducted. **The team noted that many of the modifications had been waiting for these engineering inspections between one and two weeks.**

4. Investigations

The licensee had an event on February 19, 2010, which caused an inadvertent criticality alarm and evacuation (PIRCS #P23389). (Note: No Event Report can be found on this event).

07/29/2010 NRC Inspection Report No. 70-143/2010-002, April 1, 2010 to June 30, 2010, and **Notice of Violation**, Severity Level IV, (ML102220146)

Opened:

70-143/2010-002-02 VIO **Failure** to establish an inspection program for sprinkler systems designated as IROFS

Prior to May 28, 2010, the **licensee failed to establish a safety program** that would ensure that an engineered IROFS would be available and reliable to perform its intended function when needed, to comply with the performance requirements.

Specifically, the licensee's inspection, testing, and maintenance program did not have requirements for inspecting the wet-pipe sprinkler systems designated as IROFS as required by NFPA 25. The affected IROFS included FIRE-9, FIRE-10, FIRE-12, FIRE-15 and FIRE-32. The inspectors determined that due to the lack of inspection the licensee did not identify that the sprinklers designated as IROFS were in a degraded condition. The degraded condition consisted of the following: 1) inadequate sprinkler coverage per fire area, 2) inadequate distance between sprinklers, 3) inadequate distance between sprinkler heads and the adjacent wall, and 4) excessive area of protection per sprinkler.

70-143/2010-002-03 URI Evaluation of combustible loading of Tube Cleaning Room due to tar roof and resulting consequence evaluation

The inspectors noted that one open Fire Hazard Analysis (FHA) recommended removing a highly-combustible tar mezzanine roof cover in the Tub Cleaning Room (TCR). The inspectors noted that the licensee determined **that a fire in the TCR could result in a chemical intermediate consequence event to the public.** The licensee credited control of combustibles, IROFS FIRE-2, as a sole IROFS for this accident sequence.

70-143/2010-002-04 URI Evaluation of analysis supporting "unlikely" probability of fire in solvent extraction area.

The inspectors identified a fire accident sequence in the BPF SX system that could result in an intermediate consequence event as defined in 10 CFR 70.61. The licensee credited the ignition characteristics (flash point) of the solvent as an enabling event to reduce the likelihood of solvent ignition. The licensee based this likelihood on a solvent ignition sensitivity test performed on April 4, 2002. However, the licensee did not have a documented test plan that described the conditions under which the test was performed, or whether the ignition sources used were representative of all potential ignition sources that could be present in the solvent extraction process area. The inspectors determined that an enabling event frequency of -2 was not appropriate because the licensee did not have the technical basis to support the assigned enabling event frequency.

Opened & Closed:

70-143/2010-002-01 NCV **Failure to Comply with Criticality Safety Procedures.**

On May 26, an NFS engineer noted that contaminated trash item used to clean up Area 200 was placed in a large volume waste bag. This is contrary to procedure NFS NFSHS-CL-10, "Nuclear Criticality Safety – Fuel Manufacturing Facility," Rev. 24. This procedure requires that trash essentially be stored in 2 liter bottles to ensure a favorable geometry. The trash item was accidentally rolled

into the workers glove and then placed in an unfavorable geometry waste bag. The glove was ultimately retrieved and disposed of in accordance with NFS-HS-CL-10. NFS entered the issue into the corrective action program (CAP) as Problem Identification, Resolution and Correction System (PIRCS) item #24817. Failure to follow criticality safety procedures is a violation of NRC requirements. This non-repetitive, licensee-identified and corrected violation is being treated as a non-cited violation (NCV), consistent with Section VI.A.8 of the NRC Enforcement Policy

Closed:

70-143/2007-004-02 IFI **Incorrectly Designed Check Valve for Application.**

This IFI was opened due to an apparent lack of an adequate evaluation associated with the discovery of an installed check valve in Building 302 that did not meet the specified design requirements. Specifically, the installed check valve had a cracking pressure lower than specified in the design documents. The valve was replaced with the correct valve under Work Request #115193.

70-143/2008-002-01 VIO **Failure To Perform Plant Modifications In Accordance With 10CFR70.72.**

The licensee failed to document the technical basis for three plant modifications. The inspectors noted a general lack of rigor and in some cases a total lack of a written technical basis for plant modifications.

70-143/2009-003-02 URI **Analysis of Fire in Building 105**

Licensee committed to bring the Building 105 sprinkler system into compliance with NFPA 13 (2010 edition). The licensee stated that the sprinkler upgrade project would be completed on December 2010.

70-143/2009-003-03 URI Implementation of Recommendations of Fire Hazard Analysis. (Paragraph 5.c) (see above)

09/02/2010 **Notice of Violation, Exercise of Enforcement Discretion, and Proposed Imposition of Civil Penalty - \$140,000** (NRC Inspection Report 70-143/2010-10), (ML102450223).

Potential for a high occupational consequence when processing this material required the presence of additional items relied on for safety. Five violations of NRC requirements occurred. Potential safety significance to the workers was high due to the possibility of an acute chemical exposure to NO_x gas released inside the facility. **NFS' previous enforcement history in these areas, and other escalated enforcement in the past several years is especially poor and well documented.**

Violations Assessed a Civil Penalty:

On October 13, 2009, the licensee failed to apply engineered controls, administrative controls, or both, to the extent needed to reduce the likelihood of occurrence of the event so that, upon implementation of such controls, the event is highly unlikely or its consequences are less severe. Specifically, the licensee failed to implement sufficient items relied on for safety to prevent or mitigate the production of nitrogen compound gas generation, which could have led to a high consequence event.

Prior to October 13, 2009, the licensee failed to follow Procedure NFS-CM-004, when assigning Enterprise Change Requests (ECRs) 20092008 and 20091919 as urgent. Specifically, these ECRs were assigned as urgent, but did not address failures which were adversely impacting personnel safety or significantly impacting operations. Instead, the ECRs involved the implementation of a method to process fines material.

Prior to October 13, 2009, the licensee failed to follow Procedure NFS-CM-005. Specifically, CCB's review of ECRs 20092008 and 20091919 authorized the processing of fines directly in the bowl cleaning station. CCB's review failed to identify, however, that the design requirements and design basis were affected by the direct addition of fines into the bowl cleaning station without first processing the material in the uranium-aluminum dissolvers.

Prior to October 13, 2009, the licensee failed to follow Procedure NFS-GH-901, involving the technical reviews as documented in ECRs 20092008 and 20091919. Specifically, the licensee failed to identify that processing uranium aluminum fines directly in the bowl cleaning station, without processing the material through the caustic dissolution and centrifuge steps, was not analyzed in the integrated safety analysis as a part of the uranium-aluminum design basis.

Prior to October 13, 2009, the licensee failed to maintain records of written evaluations that provided the bases for the determination that a change to its facility did not require prior NRC approval. Specifically, the inspectors determined that an inadequate 10 CFR 70.72 review was conducted based on reviews of the Safety and Regulatory Review Routing Forms used for the change requests that led to the October 13, 2009 event.

This is a Severity Level III Problem; Civil Penalty - \$ 140,000

Violations Not Assessed a Civil Penalty:

Prior to December 11, 2009, NFS failed to maintain process safety information that would have provided reasonable assurance that a chemical addition item relied on for safety (BUA-43) could perform its intended design function as described in the integrated safety analysis.

This is a Severity Level IV Violation

Prior to December 11, 2009, **NFS failed** to identify engineered or administrative controls as items relied on for safety for several accident scenarios involving excessive nitrogen compound gas generation in the fuel manufacturing, uranium-metal/oxide, uranium-aluminum, and commercial development lines in order to meet the performance requirements of 10 CFR 70.61(b).

This is a Severity Level IV violation

2011

01/06/2011 Inspection Report No. 70-143/2010-206, December 6-9, 2010, **Minor Violation noted. (ML103570020)**

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

“Minor violation was identified during review of NCS (Nuclear Criticality Safety) evaluation auditor training and qualifications. Inspectors identified one individual who had performed several NCS safety evaluation audits who did not have the necessary management signoffs as required in plant procedure NFS-HS-A-49. The inspectors concluded that the issue was of minor safety significance as the individual no longer works for the company and did take all of the required NCS safety evaluation audit training. Although this issue must be corrected, it constitutes a violation of **minor significance** and is not subject to enforcement action in accordance with Section 2.2.2 of the Enforcement Policy.”

Items Opened:

70-143/2010-206-01 IFI Tracks the **licensee’s commitment to provide a schedule during the next NCS inspection for the completion of its specific NCSEs that cover Reagents and Utilities**

Inspectors observed in the audit NCS-2010-30 that the licensee had observed in previous audits that the facility has two general NCSEs that cover Reagents and Utilities in the facility. These are two general NCSEs that the licensee is working to split up into more specific analyses. Due to time constraints the licensee is unable to do all of the specific NCSEs at one time. **The licensee has decided to perform the specific NCSEs as they fit into its schedule.** The inspectors determined that, because of the way the licensee has determined to revise its general NCSEs in pieces, until all of the specific NCSEs are completed, there are two NCSEs covering some areas. The specific NCSEs contain the new and

revised controls. The inspectors determined that the licensee has controls in place and so there is not a safety concern from revising the NCSEs this way, **but this is not good practice.**

Other observations and findings:

The inspectors reviewed the revised NCSE for the BPF U-Aluminum dissolution process. The NCSE was revised in response to an **event on September 27, 2010, in which a larger amount of caustic build-up was discovered outside the bowl (on the inside of the centrifuge jacket and underside of the centrifuge lid) than had been analyzed.** This resulted in reportable Event #46284 and internal PIRCS #26883. The licensee determined by sampling and nondestructive assay (NDA) that there was an **elevated mass on each of the four area centrifuges,** but the maximum buildup was 46 g 235U, much less than a minimum critical mass.

The licensee had also determined that the **apparent causes of the unanticipated buildup were: (1) running the centrifuges at high speed without any solution flow; and (2) a redesign of the centrifuge drains that allowed greater air flow across the outer surface of the centrifuge bowl.** The revised NCSE included calculations that showed that a bounding amount of uranium-bearing material on the inside of the centrifuge jacket would remain subcritical. The licensee also modified the drains back to a design with a water seal, and instituted new controls limiting the amount of time the centrifuge could be operated without solution being added and requiring periodic shutdown and inspection. The inspectors reviewed the new calculations, additional controls, and drain modifications and concluded they appeared adequate to prevent recurrence.

The inspectors also reviewed and walked down a new NCSE for the Reliable Fuel Supply (RFS) calciner, and reviewed modifications to the CDL process ventilation system NCSE to address backflow of scrubber solution into enclosures and revised risk indexing so that a single missed NDA scan would not result in failure to meet the performance requirements.

One of the internal events (PIRCS #27276) involved an **employee concern about evacuating in inclement weather,** and the other (PIRCS #27039) involved a routine hardware failure. The inspectors also reviewed the most recent sealed source inventory, indicating initial and current measured activity levels (as of August 1, 2010), and calibration reports for the **four detectors that failed calibration tests this year.**

01/28/2011 Inspection Report No. 70-143/2010-004, October 1, 2010 to December 31, 2010, (ML110280474).

Items Opened:

70-143/2010-004-01 IFI **Negative Values Used in Semi-Annual Effluent Reports**

NFS has three distinct liquid effluents: the main sanitary sewer, the BLEU sewer, and the waste water treatment facility (WWTF). The WWTF discharges to the Nolichucky River while the main sewer and the BLEU sewer discharge to the Erwin utilities treatment station. Gaseous effluents are discharged through various plant stacks, each with a separate sample station. All the stacks discharge to the environment.

During the review of liquid effluents, the inspectors noted that the licensee reported several nuclides as negative values with respect to, quantity released in curies, quantity released in grams, and the fraction of Effluent Concentration Value (ECV). For each radioactive measurement of the liquid effluent, the background activity was subtracted from the measured activity of the sample to get a “net activity.” The licensee stated that this was to ensure that the contribution to public dose was from the effluent and not from a background component.

The inspectors questioned the licensee whether utilizing this methodology was conservative for reporting purposes when calculating the ECV for each nuclide. 10 CFR 20 Appendix B, requires that if the radio-nuclide concentrations are known, then the ECV ratios are calculated by dividing the amount “present” by the concentration limit established in Appendix B. Specifically, the inspectors questioned whether it was appropriate to establish a negative value as the “present” value used in the ECV calculation.

70-143/2010-004-02 URI **Technical Basis Document for Plant Stack Isotopic Ratios Not Updated**

The inspectors accompanied a radiation technician collecting samples from stacks on the NFS facility rooftop. All gaseous effluents are processed before being directed to a plant stack. The **NFS site contains 24 individual stacks** and each stack contains a sampler that continuously samples for gaseous effluent activity. These samples provide the input data for the radiological gaseous effluents that are reported to the NRC pursuant to 10 CFR 70.59. The inspectors closely observed the techniques used during the collection of these samples, particularly in how the samples were removed, handled, and transferred, and how the system was realigned following sample collection. The inspectors also evaluated sample counting activities with the same level of scrutiny. The inspectors noted that radiation technicians used a Tenelec counter to count the samples.

The inspectors also reviewed the technical basis document “Isotopic Ratios for Gaseous Effluents,” Rev. 7. This document provides the basis for the

isotopic ratios applied to the gross activity release from NFS' stacks. The inspectors noted that this document had not been revised since Dec. 12, 2006. The basis document states that the document should be reevaluated whenever any assumption or parameter used to calculate the ratios changes significantly. **The inspectors noted that no update to the basis document was made following the startup of Building 301.** NFS did provide the inspectors the isotopic ratios for the Building 301 stack 774. However, the ratios were never formally documented within the basis document. **Additionally, newly processed materials since 2006 should have necessitated the development of an update to the basis document. The lack of updates to the basis document will be followed up in a future inspection and will be tracked as an Unresolved Item.**

The inspectors accompanied an environmental engineer gathering samples from air samplers located at various locations outside of the owner area in the general vicinity of the site. **The inspectors noted that a sampler belonging to the state, located near the NFS sampler located on Little Mountain, appeared to be non-functioning.** NFS brought this to the attention of the state representative.

The inspectors reviewed the electronic calibration database associated with radiation instruments. Calibration records for portable survey meters were adequately maintained. The inspectors noted that some calibration records indicated a response **outside the acceptable range for the highest range of the instrument.** Upon questioning licensee personnel regarding this condition, the reading was attributed to a specific **alpha source.** This issue was brought to the attention of licensee management. **The source was subsequently removed from service and the issue entered into the corrective action program.**

Inspectors noticed that compressed gas cylinders were secured to the outside of Building 220 using yellow plastic blockades which had the word "CAUTION" written in magenta colors. This presentation **inappropriately conveyed** that the location was a radiological area when it was not. In response to the inspectors' observations, the licensee took prompt action to remove the magenta lettering while leaving the yellow plastic blockades in place for industrial safety purposes. In addition, **the top floor of the Waste Water Treatment Facility had two out-of-service tanks each labeled "INTERNALLY CONTAMINATED WITH Tc-99" on ordinary white paper. As a result of this NRC observation, the licensee replaced these two signs with the appropriate radiological postings.**

03/07/2011 License Performance Review, January 7, 2010 to December 31, 2010,
(ML110660633)

The NRC staff identified **two areas needing continued focus** on the part of NFS management:

(1) **SAFETY OPERATIONS.** While NFS demonstrated improved performance during the course of the review period, inspection findings issued in 2010 demonstrate that the corrective actions to address the underlying causes **have not**

been fully effective and sustainable. In addition, **a number of commitments identified in the Confirmatory Action Letter remain incomplete.** These issues include the:

- readiness of the uranium hexafluoride processing line to restart
- thoroughness with which NFS conducts causal evaluations, and
- process for incorporating the results of these evaluations into operational decisions.

This area is **comprised of nuclear criticality safety (NCS), fire protection, and plant operations.**

During the Licensee Performance Review (LPR) period, the following findings were issued in the area of Safety Operations:

70-143/2009-011, EA-10-086-IB; **Severity Level (SL) III Violation with three examples.** The licensee failed to following procedures (EA-10-086-IB):\

Contrary to procedure NFS-CM-004, “NFS Change Control Process”, enterprise change requests (ECRs) regarding a method to process fines material were inappropriately classified as urgent. The procedure requires that urgent ECRs be limited to issues adversely impacting personnel safety or operations. As a result, the ECRs were inappropriately expedited through the review process.

Contrary to procedure NFS-CM-005, “NFS Change Controls Board (CCB)”, the CCB’s review of ECRs 20092008 and 20091919 failed to identify that the **design requirements and design basis** were affected by the direct addition of fines into the bowl cleaning station without first processing the material in the Uranium-Aluminum dissolvers.

Contrary to procedure NFS-GH-901, “Configuration Management Program,” the technical reviews failed to identify that processing uranium-aluminum fines directly in the bowl cleaning station **was not analyzed in the integrated safety analysis as a part of the Uranium-Aluminum design basis.**

VIO 70-143/2009-011, EA-10-086-IA; SL III violation. The **licensee failed** to apply controls to the extent needed to reduce the likelihood of occurrence of the event so that, upon implementation of such controls, the event would be highly unlikely or its consequences would be less severe. Specifically, the **licensee failed to implement sufficient items relied on for safety (IROFS) to prevent or mitigate the production of nitrogen compound gas generation, which could have led to a high consequence event.**

VIO 70-143/2009-011, EA-10-086-IC; SL III violation. The **licensee failed** to maintain records of written evaluations that provided the bases for the determination that a change to its facility did not require prior NRC approval.

Specifically, the inspectors determined that an inadequate review as required by Title 10, *Code of Federal Regulations*, Part 70.72 was conducted based on reviews of the Safety and Regulatory Review Routing Forms used for the change requests that led to the October 13, 2009 event.

VIO 70-143/2010-003-02; SL IV violation. The **licensee failed** to follow plant procedures by not securing or suspending BPF HEU operations prior to **performing the functional test on plant air valve 7A01.**

VIO 70-143/2009-011, EA-10-086-IIA; SL IV violation. The **licensee failed** to maintain process safety information that would have provided reasonable assurance that a chemical addition IROFS (BUA-43) could perform its intended design function as described in the integrated safety analysis.

VIO 70-143/2009-011, EA-10-086-IIB; SL IV violation. The **licensee failed** to identify engineered or administrative controls as IROFS' for several accident scenarios involving excessive nitrogen compound gas generation in the fuel manufacturing, uranium-metal/oxide, uranium-aluminum, and commercial development lines in order to meet the performance requirements of 10 CFR 70.61(b).

VIO 70-143/2010-002-02, SL IV violation. The **licensee failed** to establish management measures that would ensure that an engineered IROFS would be available and reliable to perform its intended function. Specifically, the **licensee's inspection, testing, and maintenance program did not identify sprinklers designated as IROFS were in a degraded condition.**

(2) **FACILITY SUPPORT.** In November 2010, NRC issued a **Confirmatory Order (ML103210213)** in response to **NFS providing the NRC with inaccurate information and the lack of demonstrable progress in the area of safety culture** as evidenced by the events that led to the Confirmatory Action Letter. These issues **indicated that additional effort by NFS management is needed to improve management oversight of facility operations.**

This area is comprised of maintenance and surveillance, training, emergency preparedness, management organization and controls, and permanent plant modifications.

During the LPR period, there were **two examples of ineffective management measures and oversight to effectively support safe facility operations, including the overall importance of safety in relation to production activities.** These examples include:

Confirmatory Action Letter (CAL) No. 2-2010-001, was issued to confirm commitments made regarding actions to resolve safety concerns before restarting specific processes. This CAL was based on the results of the Augmented

Inspection (Inspection Report No. 70-143/2009-011) and a review of NFS' overall safety performance. The NRC identified a number of concerns regarding NFS' ability to provide reasonable assurance that it was able to safely operate the Erwin facility. These concerns involve **the adequacy of NFS' management oversight of facility process changes, perceived production pressures, lack of questioning attitude by workers and management and poor communications.**

In addition, **the NRC identified concerns with the decisions made by NFS management, in both October and November 2009, to restart the Uranium Aluminum process lines without fully understanding the causes of the events and correcting the underlying problems that caused them.**

Confirmatory Order EA-10-076 was issued to the licensee as the result of the licensee **having provided information on two occasions to the NRC that was not complete and accurate in all material respects.**

On the **first occasion**, NFS submitted a Reply to a Notice of Violation to the NRC that stated that all fire dampers in procedure NFS-GH-22 were inspected in September of 2008, and passed the inspection. **However, 12 of the fire dampers had not been inspected.** NFS's submittal of inaccurate information was due, in part, to the actions of a former NFS employee tasked with drafting the written reply to the Notice of Violation.

On the **second occasion**, the NRC attempted to verify the corrective actions as documented in NFS's November 25, 2008 Reply to Notice of Violation. In support of the verification, **the former NFS employee created and provided a document to the NRC inspector that indicated that all but one of the fire dampers had been fully inspected during 2008, when in fact, more than one of the dampers had not been fully inspected.**

03/07/2011 Inspection Report No. 70-143/2010-2, October 25-28 and January 24-28, 2011, (ML110660449)

The inspectors concluded that NFS had not completed a sufficiently thorough evaluation of the deficiencies regarding the root cause investigation conducted for the bowl cleaning station incident in 2009 (CAL Item 1) or the decision making process that resulted in the restart decision that occurred on November 30, 2009 for the Uranium-Aluminum system (CAL Item 2).

The inspectors concluded that the evaluation performed by NFS was narrowly focused on specific deficiencies of procedures and training and missed the opportunity to identify latent organizational weaknesses that enabled this condition to manifest itself. While significant corrective actions regarding investigations and restart decision-making processes were implemented by NFS, the corrective actions did not fulfill NFS' commitments to conduct an

evaluation to identify all the potential causal factors that led to the decisions that eventually resulted in the bowl cleaning station incident.

Without an adequate and thorough root cause evaluation that identifies and addresses the causes regarding the **non-conservative organizational philosophies and decision-making processes NFS used in late 2009**, the inspectors could not conclude that the corrective actions created and completed to date addressed all of the potential causal factors.

Therefore, an evaluation that adequately evaluates the latent organizational weaknesses still remains to be completed by NFS to adequately address CAL Items 1 and 2. The licensee management acknowledged the deficiencies and stated that it will inform the NRC once the new evaluation is complete so that NRC can perform an additional inspection to verify its adequacy.

04/05/2011 NRC Inspection Report No. 70-143/2011-006, February 14-25; info gathering January 24-26, 2011, (ML110950103)

Inspection was conducted to assess the effectiveness of the NFS corrective action program, to make an assessment of the current environment for raising safety concerns and to gather information regarding activities to address the findings identified in the 2009/2010 Independent Safety Culture Assessment (SCuBA2).

While many of the findings were being directly addressed, **inspectors did not find a clear nexus between the findings of the SCuBA2 and the actions underway or planned to address all of these findings as required by the Confirmatory Order issued November 16, 2010.**

The inspection consisted of reviews of Problem Identification Resolution and Correction System (PIRCS) entries, reviews of audits, walk-downs of process areas and interviews with plant personnel, both individually and in groups. The inspectors also reviewed licensee activities to address the findings of the 2009/2010 Independent Safety Culture Assessment Report, issued June 21, 2010, and the Safety Culture Improvement Plan (Revision 2).

The corrective action program was found to be integrated into NFS activities. However, some departments maintained selected issues outside of PIRCS oversight. These “consent agenda” items that were not tracked by corrective action program metrics and thus were not included in trending information. Due to departmental programs operating outside of PIRCS, the inspectors believed the categorization and processing of consent agenda issues constituted missed opportunities for more consistent, thorough, and cross-cutting impact reviews to be performed.

NFS continues to have challenges in completing formal investigations and determining extent of condition or generic implications.

A backlog of corrective actions for low- risk significant issues had developed and could indicate **a resource limitation**.

A work controls process that included formalizing work procedures and scheduling work had been started; however, some employees expressed doubt as to the efficiency of the process.

While most staff told the inspectors that they would use PIRCS for issue resolution, **some individuals expressed a reluctance to use this process**. However, licensee personnel stated that they were aware of other methods for raising issues, such as informing supervisors or using the employee concerns program.

An Ombudsman program had been established to provide a confidential avenue for individuals to seek conflict resolution. The inspectors found that **understanding of this program by facility staff was inconsistent**.

The majority of the individuals interviewed felt comfortable reporting safety concerns to management. Despite this, **some individuals expressed to the inspectors that stop work authority may not be supported by management if exercised**.

General Investigation I-11419 was initiated to investigate **why the loss of ventilation alarm could not be heard in the Fuel Manufacturing Facility** during a preventative maintenance functional test. The investigation determined that the alarm breaker was inadvertently opened during preparations for another maintenance activity. The licensee determined that the **breakers were small and extremely close together making it very easy to inadvertently flip an adjacent breaker to the off position**. NFS' investigation identified one corrective action, which was to review the incident with maintenance personnel involved with testing the loss of ventilation alarm to inform them of the potential for errors.

Further investigation by the inspectors revealed that the **licensee missed an opportunity to identify that the Buildings 301 and 333 loss of ventilation alarms were not part of the NFS preventive maintenance program**. The licensee also missed an opportunity to identify that, for Building 301, Building 333, and the Fuel Manufacturing Facility, the **loss of ventilation alarm components were not calibrated**.

In addition, the **licensee did not perform a generic implications review to ensure that similar equipment in other plant locations prone to the same problem were adequately protected**. This issue will be discussed in inspection report 70-143/2011-003.

PIRCS 28429 was initiated to address a **problem on January 21, 2011, involving uranium tetrafluoride (UF4) dissolution in the Commercial Development Line (CDL) column dissolvers. A priority level of “low” was assigned for the occurrence.** The problem description stated that the process was stopped due to the generation of nitrogen oxide compound (NOx) vapor in the glovebox. Also, there was a problem with the clarity check due to the observation of solids. **This was the first time the licensee had started this process with UF4 and the material was not dissolving as quickly as calculated by the lab analysts.** An apparent cause investigation (I-12470) was assigned to evaluate the situation but was narrowly scoped to the technical UF4 dissolution problem.

PIRCS 28533 was initiated for the problem above on **January 31, 2011**, after a subsequent licensee management review. The event evaluation scope was broader than that of the January 21 occurrence. **A priority level of “moderate” was assigned and the event was classified as a near miss by the licensee.** The PIRCS screening notes stated that processing was allowed to proceed without the work instructions matching the parameters provided by the lab because the process engineer considered the parameters in the work instruction to be more conservative. In addition, the **configuration management process was not implemented to prevent the issue.** For these reasons, NFS upgraded the evaluation to a small team root cause investigation (I-12498).

PIRCS 28626 was initiated to address an event on **February 8, 2011**, for the **failure to add hydrogen peroxide before the addition of UF4** in the CDL column dissolvers. The requirement to add hydrogen peroxide before addition of material is credited as IROFS CDC-26. The licensee identified that the operating procedure and run-sheet were improperly used.

The Safety Culture Improvement Plan (SCIP) did not directly address corrective actions for all the “findings” as listed in the SCuBA2 report or how NFS would assess or measure the effectiveness of their progress.

Inspectors noted areas that the SCuBA2 report identified as needing improvement that were not addressed in the SCIP. **For example, the SCuBA2 report documented that procedure quality and non-compliance were repeat issues from the 2007/2008 report.** These issues were identified as Areas for Improvement (AFIs) and as observations in the areas of resources, work practices, and work control. **However, the SCIP did not address actions to improve procedure quality issues or non-compliance behaviors.**

Inspectors observed that under the section “Actions in Progress,” there was a description of “Introduction of a Procedures Group and Development of a Procedure Writer’s Guide.” **Interviews with an NFS SCIP subject matter expert and a SCIP Champion indicated that this initiative was canceled and would be removed from the next SCIP revision. Since the SCIP was silent on actions required to address these SCuBA2 findings and did not specifically**

state how or when findings other than high priority findings would be addressed, it appeared that the SCIP, as written, did not address all the findings listed in the SCuBA2 report.

04/29/2011 NRC Integrated Inspection Report No. 70-143/2011-002, and **Notice of Violation**, January 1, 2011 through March 31, 2011, (ML111190234).

Items Opened and Discussed:

70-143/2011-002-01 **NCV Failure** to Add Hydrogen Peroxide to Building 301 Column Dissolvers During Dissolution Process

On January 21, NFS began processing uranium tetrafluoride (UF₄) in the building 301 column dissolvers. Prior to this current UF₄ processing effort, these dissolvers were processing uranyl nitrate crystals.

On February 8, during a routine management walk down, a senior NFS manager questioned the operators regarding the sequence of steps associated with the addition of hydrogen peroxide (H₂O₂) to the column dissolvers. The H₂O₂ is added to suppress the generation of nitrogen compound gases (NO_x). The addition of H₂O₂ is one of the IROFS for this process.

The senior manager noted that the H₂O₂ was not added prior to the second material addition of UF₄ to the column dissolver as required by the licensee's procedures. Procedure SOP 409, Section 51, "Column Dissolver and Filtration," step 6.1.9 requires the **addition of H₂O₂ prior to the addition of SNM which is performed in step 6.1.10. Step 6.1.9 is clearly marked as an IROFS.** The senior manager quickly informed the operators of the procedural error. The issue was entered into the licensee's corrective action program (CAP) as PIRCS #28626. NFS performed an apparent cause investigation in order to understand all the causal factors leading to the error. The inspectors noted that the first material addition occurred with the proper amount of H₂O₂. Calculations revealed that at the time of discovery, there was sufficient H₂O₂ in the dissolvers to suppress NO_x formation and that **the IROFS was operable but degraded.**

Failure to follow plant procedures pertaining to IROFS is a violation of NRC requirements. This non-repetitive licensee-identified and corrected violation is being characterized as a Non-Cited Violation (NCV), consistent with Section 2.3.2 of the NRC Enforcement Policy and will be tracked as NCV 70-143/2011-002-01 (Failure to Add Hydrogen Peroxide to Building 301 Column Dissolvers During Dissolution Process).

70-143/2011-002-02 **NOV Failure** to Perform Required Personal Monitoring Upon Exit From the Radiologically Controlled Area

During an NRC inspection conducted on March 8 and 9, 2011, a **Severity Level IV Violation** of NRC requirements was identified.

On March 8, 2011 licensee personnel exiting the RCA **failed** to perform a full survey. Specifically, several individuals failed to monitor their hands when exiting the RCA (Radiologically Controlled Area).

Items that had been taken into the RCA were not thoroughly surveyed prior to being released from that controlled area. Specifically, two instances were observed where individuals failed to monitor hand-carried items before removing those items from the RCA.

Follow up on Previously Identified Issues:

70-143/2010-004-01 IFI Use of Negative Effluent Concentration Values in the Sum of Fractions Portion of the Semi-Annual Effluent Reports

(Note: The use of negative effluent concentration values was brought to the NRC’s attention by a member of the public in a public meeting).

The inspectors noted that NFS changed their process for developing this report in that negative values for radioactivity measurements were set to a value of ‘0’ and not recorded as negative values. This change was compatible with the December 2010 revision of Regulatory Guide 4.16, “Monitoring and Reporting Radioactive Materials in Liquid and Gaseous Effluents from Nuclear Fuel Cycle Facilities”

70-143/2010-004-02 URI Lack of Updates to the Isotopic Ratio Technical Basis Document Used to Assess Stack Effluent Releases.

NFS issued Revision 8 to the basis document on January 25, 2011. The inspectors reviewed the document and determined that the revision addressed, among other issues, the building 301 stack and formally documented the measured isotopic ratios. NFS also established a validation frequency for the basis document.

70-143/2007-008-05 IFI Use of Unverified and Unvalidated Third Party Software for Analysis of Sampling Results

(Note: The date of this inspector follow-up item is 2007—5 years ago)

The inspectors reviewed NFS work plan DC-WP-001, “Decommissioning Environmental Department MACTEC Subsurface Soil Characterization Software Verification and Validation Work Plan.” The inspectors also reviewed the verification and validation of the third-party software used with sampling results. **This review included a check of calculations for accuracy, functionality and release failure criteria.** The inspectors had no further questions.

05/02/2011 Inspection Report No. 70-143/2011-202, April 4-8, 2011, (ML111170241).

Open Item Review:

70-143/2010-206-01 IFI This item concerns the **commitment** to provide a schedule during this NCS inspection for the completion of specific NCSEs (Nuclear Criticality Safety Evaluations) that cover Reagents and Utilities.

These are two general NCSEs that the licensee is working to split up into more specific analyses. During this inspection the licensee gave a schedule to have the remaining four NCSEs for Area A, B, C, and GHJ, completed by June 30, 2012. The NCSEs are tracked in PIRCS by the licensee under the following four identification numbers all dated April 7, 2011; 15185, 15186, 15187, and 15188. This **schedule** closes this IFI. The licensee's commitment to update NCSEs for Area A, B, C, and GHJ by **June 30, 2012**, will be tracked as **IFI 70-143/2011-202-02**.

05/27/2011 **NFS' fifth (5) consecutive appearance before the NRC Commissioners at the annual Agency Action Review Meeting (AARM).**

Commission Chairman Gregory Jaczko said "This is certainly one of our most important meetings that the Commission holds every year. It provides us the opportunity to publicly review licensee safety performance over the previous year and to focus on the most significant challenges that licensees experienced. The issues we will be discussing today are at the heart of our public health and safety mission."

Victor McCree, Region II Administrator: "Mr. Chairman, Commissioners. I want to begin with a brief background discussion of the performance of Nuclear Fuel Services, NFS. I'll then provide an overview of NFS's more recent and current performance. And finally, I'll describe the actions that we plan to take, looking forward.

In late 2009, NFS experienced an unexpected chemical reaction in the uranium-aluminum line of 1 the Blended Low-Enriched Uranium, or BLEU, Preparation Facility. They also experienced the next month, that would be in November 2009, a glove box fire in the commercial development line.

These events, and insights from the subsequent NRC reactive inspections, prompted us to conduct an interim performance assessment in December of 2009. **This assessment resulted in the identification of the following concerns: inadequate NFS management oversight of facility process changes; perceived production pressures; an apparent lack of a questioning attitude**

on the part of workers and management; poor communications on the part of NFS staff; a lack of significant progress in improving safety culture on site; weaknesses in design control in configuration management processes; and NFS's inability to perform thorough introspective evaluations and then apply the results of those in their decision making.

Based on this interim performance assessment and subsequent dialogue with NFS management, the NRC issued a confirmatory action letter in January 2010 that documented NFS's commitment to maintain suspended operations of the main process lines and implement corrective actions for the underlying causes of the issues I just described. NFS's performance is being discussed at this Commission meeting because it met the Agency Action Review Meeting's screening criteria of multiple and repetitive program issues that warranted additional NRC oversight.

To verify NFS's commitments in the confirmatory action letter, we conducted a series of inspections to assess NFS's corrective actions, readiness to sequentially restart each process line. All process lines were subjected to an NRC restart readiness inspection in 2010. And we formally authorized four of the five processes to restart. NFS has since successfully restarted each of the four processes.

The uranium hexafluoride line, which is the last process line that would be restarted, was inspected earlier this month. We're still evaluating the issues, but I expect to make a decision soon regarding authorization to restart this process.

In the area of safety culture, NFS issued a second independent safety culture assessment report in June of last year. This report, which was required by the Confirmatory Order of February 2007, stated, and I quote, "That only nominal progress in improving the safety culture at NFS since 2007."

Finally, in November 2010 we issued a second Confirmatory Order to NFS to document their commitments and response to violations associated with the willful falsification of fire damper inspections, and a lack of progress in the area of safety culture. In addition to implementing corrective actions for the specific fire protection violations, the order requires NFS to develop and implement a safety culture improvement plan to address the findings identified in this second safety culture assessment, requires NFS to perform an integrated, the safety culture assessment to an accepted nuclear industry standard by **June 2013 and at least every 24 months thereafter**. It also requires NFS to assess its current corrective action program against the program requirements of the ASME NQA1 standard, and amend its license by **July of this year** to incorporate a corrective action program that reflects the results of this assessment.

As for the staff's review of NFS's current performance, we conducted a

licensee performance review in February of this year to assess NFS's performance during calendar year 2010. The results of the LPR showed that NFS conducted its activities in a way that protected the health and safety of the public and the environment. The LPR results noted progress in several areas, however continued, **sustained performance remains to be demonstrated**. There are several examples of that I'd like to share with you.

First of all, NFS has made improvements in the area of management, oversight, and decision making through the increased presence of managers and leadership, including in the production areas. NFS has also created a conduct of operations procedure to guide and institutionalize the restart decision-making processes following process upsets.

However, NFS has not yet demonstrated the ability to leverage the results of root cause analyses and implement corrective actions for human performance and organizational factors that have contributed to past performance efficiencies.

With regard to safety culture, NFS has demonstrated a greater questioning attitude when challenged by process and or equipment problems as well as a greater willingness to stop work in the face of uncertainty. However, based on our inspections, some employees continued to demonstrate lapses in safety, focus, and judgment.

NFS has enhanced its corrective action program, procedural requirements for root cause evaluations, and given additional training to individuals who would be assigned to carry out root cause evaluations. **However, while the corrective action program has been largely integrated into NFS's activities, some departments apply different thresholds for entering issues into the corrective action program, which they refer to as a "problem identification and resolution system control" program.**

NFS has also instituted a new work control program to improve maintenance activity prioritization and the organization of work. However, based on our inspection, **some plant employees expressed doubt that the work control process will relieve schedule pressures.**

In addition, NFS modified its engineering and design control process to improve the guidance itself and to provide additional detail for establishing the technical basis for modifications. However, because this process was only recently changed and has not been used to implement the modification of any major system processes, it's insufficient -- it's too early for us to judge whether that change will be effective.

Based on our current assessment of NFS's performance, additional regional initiative inspections are planned and some have already been

conducted beyond the core inspection program, to ensure that NFS continues to operate safely and to confirm that NFS's efforts to correct the underlying concerns demonstrated in the events of 2009. To this end, we've performed a problem identification resolution inspection, which we completed in February of this year. This inspection also included an assessment of NFS's implementation of its safety culture improvement plan and the quality of the safety conscious work environment on site.

The inspection concluded that NFS's corrective action program is actively being upgraded and employees and contractors consider the safety environment to be improved. However, **NFS still has work to do in this area to improve the consistency of the program's ability to resolve issues and to convince staff that the effectiveness of new initiatives, such as the work control group and the senior engineering watch are effective.**

As part of our Confirmatory Order follow up, just last week, we started an inspection to verify the adequacy of NFS's actions in response to the remaining areas, specifically the use of root cause analyses and operational decision making. This inspection is still ongoing and we'll close on that issue soon.

As I mentioned, we conducted a restart readiness review of the uranium hexafluoride process last week and I expect a decision on that soon as well.

Later this year, we will conduct a Confirmatory Order follow up inspection to assess NFS's corrective actions for the fire damper falsification issue that I mentioned earlier, as well as the corrective actions to achieve and sustain progress in improving the facility's safety culture.

We also plan to conduct a design verification inspection to assess the effectiveness of NFS's process to evaluate proposed temporary and permanent changes in plant design. This inspection, which is planned to take place either later this year or early next year, will use a multidisciplinary team to evaluate the safety significant systems' fictional performance for one or more process lines.

Finally, we envision the need for additional problem identification and resolution, safety conscious work environment, as well as safety culture assessments and inspections of the amended corrective action program against the requirements of ASME NQA1.”

In closing, Chairman Jaczko said “I want to close with more of a hypothetical question. And we’ve had a lot of comments about how many times you’ve been here, NFS has been here. How many times consecutively do you think is too

much for a facility to come to appear in front of us before we should shut down a facility?”

NFS President Joe Henry response: “And while I was invited back this year, you had already decided that I was operating safely and securely. You just wanted to see if I could sustain it. I think when you get to the point where consecutively you’ve decided we’re not operating safely and securely, then you have to consider that.”

06/29/2011 **NRC Report to Congress on Abnormal Occurrences, Fiscal Year 2010**, NUREG-0090, Vol. 33. Transmitted to Congress on June 22, 2012 and published on June 29, 2011.

EOI-04 Nuclear Fuel Services Inc.: **Adverse Chemical Reaction Event**

This event is the result of an adverse chemical reaction that did not result in a release of radioactivity but is included in this report because it caused NRC to increase its attention and oversight to this program area.

On October 13, 2009, Nuclear Fuels Services (NFS) (the licensee) experienced an unexpected exothermic chemical reaction within the Blended Low Enriched Uranium Preparation Facility. The elevated temperatures from the reaction created nitrogen compound gases within the associated process off-gas piping. An instrument located near the ceiling of the facility detected these gases and generated an alarm that resulted in the evacuation of employees from the affected area.

In addition, the elevated temperature of these gases caused portions of the plastic off-gas piping system to deform and sag. NFS personnel took action to shut down the system and as a result, no personnel were injured **and offsite environmental releases during the event were within regulatory limits.**

In response to the event, NRC formed a Special Inspection Team that arrived at the licensee's facility on October 19, 2009. NRC upgraded its response to an Augmented Inspection Team following notification by the licensee of their analysis of the event.

The licensee's analysis revealed that, based on the specific type of material processed in the event, the nitrogen compound gases generated could have resulted in high occupational consequences. As defined in Title 10, Part 70, Section 61 (b)(4) of the *Code of Federal Regulations* (10 CFR Part 70.61 (b)(4)), high occupational consequences refers to an acute chemical exposure to an individual from hazardous chemicals produced from licensed material.

The preliminary results of the augmented inspection and an interim review of the licensee's overall safety performance identified a number of concerns regarding the licensee's ability to provide reasonable assurance of its ability to safely operate the facility. These concerns involved the adequacy of the licensee's management oversight of facility process changes, perceived production pressures, lack of questioning attitude by workers and management, and poor communications. In addition, NRC identified concerns with the decisions made by the licensee's management in both October and November 2009 to restart the uranium aluminum process lines without fully understanding the causes of the events and without correcting the underlying problems.

On January 7, 2010, NRC issued a Confirmatory Action Letter regarding commitments made by the licensee in a letter dated December 30, 2009. The actions included (1) suspending operation of several processing lines, (2) completing specific actions before restart of operations, and (3) providing NRC with sufficient time to inspect completion of the actions.

After extensive team inspections, NRC authorized the restart of four processing lines in March 2010, May 2010, July 2010, and October 2010 respectively. Portions of one process line remain shutdown pending equipment modifications and restart inspections.

On September 2, 2010, NRC imposed a **civil penalty of \$140,000 based on a Severity Level III problem involving three violations associated with the event. The penalty was paid in October 2010. The three violations involved (1) failure to have adequate engineered or administrative controls for operations in violation of 10 CFR 70.61(b), (2) failure to comply with multiple facility operating procedures regarding the facility system change process, and (3) failure to maintain records necessary to support the licensee's determination that specific facility changes did not require prior NRC approval in violation of 10 CFR 70.72.**

07/28/2011 Integrated Inspection Report No. 70-143/2011-003 and **Notice of Violations (Two (2) Severity Level IV violations), April 2, 2011 to June 30, 2011, (ML112092311). (Note: On May 15, NFS management and hourly employees ratified a new multiyear labor contract).**

Items Opened:

70-143/2011-003-01 **VIO Failure to Maintain Configuration Control During Maintenance**

A self-revealing **violation of the NFS license was identified when a spill of SNM occurred in the U-Oxide system in building 333.** The spill was caused by an improperly installed valve actuator that allowed process material to flow from one dissolver to another and ultimately out of the safety-related overflow lines and onto the process floor. Section 2.11.2.1 of the License Application requires,

in part, that procedures maintain equipment in safe operating condition and in accordance with the configuration management program. Contrary to this requirement, NFS failed to provide adequate procedures to plant personnel to ensure adequate configuration control of the U-Oxide system.

On April 25, 2011, following maintenance, the licensee began a transfer of SNM from the 'B' U-Oxide dissolver to columns in building 333. Soon after the transfer began, operations personnel received and responded to a high level alarm in the 'A' dissolver and noted SNM spilled onto the process floor from the safety-related overflow lines. The U-Oxide system was immediately shutdown and cleanup efforts initiated.

The material was collected and the area was decontaminated within 24 hours and thus no formal notification to the NRC was required. The licensee entered the issue into the CAP and began a root cause investigation to analyze the event. A walk down of the system noted that the recently replaced actuator on valve HV-3A08A was improperly installed (rotated 90 degrees) such that flow was allowed from the 'B' to the 'A' dissolvers, contrary to the system design basis. A review of the work package (#152815) associated with this valve revealed that insufficient guidance was provided to maintenance personnel to ensure proper assembly of the actuator.

The investigation concluded there were two main causal factors which were 1) incorrect installation and, 2) lack of post maintenance checks or alignments. Several corrective actions and recommendations were generated as a result of this investigation. Following completion of the root cause analysis, follow on system recovery efforts were begun on May 17. Normal system operation was underway on May 23.

Analysis: The failure to maintain configuration control of equipment containing SNM is a performance deficiency and a violation of NRC requirements. This issue is more than minor because the failure resulted in the challenging of the safety-related IROFS, namely the dissolver overflow lines.

The inspectors evaluated this issue in accordance with the enforcement policy and the enforcement manual and noted that the violation is of very low safety significance because the performance criteria of 10 CFR 70.61 were always maintained.

Contrary to the above, on April 25, 2011, the **production or operations discipline failed to develop operating procedures and maintain facilities and equipment in a safe operating condition in accordance with the CM program.** Specifically, insufficient procedural guidance was provided to the maintenance technicians to ensure adequate control was maintained over configuration control

equipment, namely a control valve that transfers large quantities of SNM. Subsequently, a spill of high enriched material occurred as a result of an improperly installed valve actuator in the U-Oxide system.

(NOTE: This inspection report does not indicate how much was spilled, but questions to the NRC at public meetings indicated approximately **14 liters was spilled**).

70-143/2011-003-02 **VIO** Improper Use of a Work Instruction

(Note: Part of the Problem Identification & Resolution (PI&R) Inspection Report 70-143/2011-006)

A violation was identified involving improper use of a Work Instruction to change process parameters that could affect management measures.

A self-revealing violation was identified when a failure to properly review and evaluate a Work Instruction (WI) contributed to the generation of NO_x gases inside the CD line column dissolver glove box during the processing of uranium tetrafluoride (UF₄). The inspectors determined that the WI used to process UF₄ was not developed in accordance with NFS' requirements for procedures that support management measures associated with IROFS. [This was previously discussed in Inspection Report 70-143/2011-006, Paragraph 2.a.(2).]

Details: On January 21, 2011, during the initial processing of UF₄ in the building 301 column dissolver, a significant amount of NO_x gases were noted inside the glove box of the dissolver. The gases appeared following the elimination of the hydrogen peroxide (H₂O₂) phase of the process. The H₂O₂ is used to help reduce the amount of NO_x gases. The investigation by the licensee revealed that WI 409-51A-301 **utilized operating parameters different than the initial laboratory test plan for processing UF₄**. The specific differences included nitric acid concentration, frequency of UF₄ addition, ratio of H₂O₂ to U(Uranium), and target U concentration. **The WI was approved on Oct 12, 2010 by the process engineer and the building manager. WI do not receive the same level of review and approval as normal plant procedures. The inspectors determined in this particular case, a WI was not an appropriate mechanism to alter or affect process parameters that had the potential to affect the prescribed management measures in the CD line column dissolver.** Those management measures consisted of ensuring the proper amount of UF₄ and H₂O₂ are added to the dissolver in order to minimize or eliminate NO_x generation.

Analysis: The failure to properly review and approve a procedure affecting management measures associated with IROFS is a performance deficiency and a violation of NRC requirements. **This issue is more than minor because the failure resulted in a significant generation of NO_x gases inside the glovebox.**

The generation of NO_x gases inside the glovebox did not affect workers or the environment since the NO_x gases were removed by the building scrubber system.

Enforcement: Section 2.12.4.2 of the License Application states in part that, “procedures developed to support management measures shall be approved by the appropriate functional discipline manager and the safety discipline manager.”

Contrary to the above, “Column Dissolver Processing Instructions,” WI 409-51A-301, Rev. 3, was developed to support management measures without being approved by the appropriate safety discipline manager. Specifically, the safety discipline manager did not approve the WI form even though it contained process input parameters that negatively affected the performance of chemical safety IROFS CDCD-24 through CDCD-31. The WI specified U input quantities, which affect IROFS CDCD-24, 25, 28, and 29. These IROFS required that the operator, and an independent operator, limit material input into the dissolver to less than 745 grams of U in an hour. The WI also specified the amount of H₂O₂ input into the dissolvers, which affects IROFS CDCD-26, 27, 30, and 31.

These IROFS required that the operator, and an independent operator, add the amount of H₂O₂ listed on the work instruction. Upon implementation of the work WI, a buildup of NO_x vapor in the column dissolver glove box occurred.

Follow-up on Previously Identified Issues

2008

VIO 70-143/2008-003-02: Failure to Inspect Fire Dampers

The inspectors reviewed the NFS Fire Damper inspection records and the corrective actions assigned by NFS to prevent recurrence of a similar event. The inspection records were found to be accurate and complete. The corrective actions were found to be adequate and included changes to NFS-GH-22, “Fire Door Barrier and Damper Inspection and Maintenance,” that require a corrective action program entry when a fire damper cannot be tested or fails an inspection. Additionally, all IROFS related fire dampers have been added to the SRE program and non-IROFS related fire dampers have been added to the preventive maintenance program. The inspectors determined that NFS’s corrective actions were adequate to correct and prevent recurrence this type of event.

VIO 70-143/2008-004-01: Failure to Adhere to Plant Procedures

The inspectors reviewed the final corrective actions remaining regarding the inadvertent transfer of tank WF-04 to the waste treatment facility. The final action was to perform an extent of condition on the valve line-up vulnerability on the WD tanks due to the similarity to the WF tanks. The licensee decided to install the

same controls on the WD tanks to avoid similar issues. The inspectors reviewed the additional controls and found no issues.

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

The inspectors reviewed the results of NFS-GH-939, "Piping Integrity Plan," Rev. 3 to ensure the any potential deficiencies identified with material of construction for IROFS related material were identified and properly corrected. The results of the evaluation identified no deficiencies. In addition, the records for the various piping components and material of constructions were now incorporated to the electronic configuration management system. The inspectors noted no issues with the results.

2009

VIO 70-143/2009-003-01: **Failure to Implement a Safety Program Required By 10 CFR 70.62** (105 lab)

The inspectors reviewed the corrective actions assigned by NFS to prevent recurrence of a similar event. The corrective actions included changes to NFS-GH-27, "Planned Impairments to Fire Protection Equipment," and NFS SOP 392, "Work Request Procedure." These procedures were revised to ensure that the ISA department identify the appropriate personnel to review the affect that a work request will have on IROFS. Additionally, NFS developed and documented a system for **tracking fire impairments**, and defined the specific roles and responsibilities necessary to adequately implement these procedure changes. The inspectors had no further questions regarding VIO 70-143/2009-003-01.

LER 70-143/2009-004: EN 45497: **Fire in a Process Glove Box**

The NRC's review of this event identified a violation of NRC requirements due to the inadequate design of a system containing special nuclear material (VIO 70-143/2009-004-01). Follow-up inspection for this event notification was performed and documented in this report as part of the review of NFS's actions to address VIO 70-143/2009-004-01.

VIO 70-143/2009-004-01: Inadequate Design of a System Containing SNM

The inspectors interviewed NFS staff and reviewed the records and corrective actions identified by NFS in the Reply to Notice of Violation (EA-10-076), dated December 15, 2010. This violation resulted due to inadequate implementation of a facility change. This change did not identify or address the potential impacts of the change prior to placing the system in service. The corrective actions addressed the need for a more robust change control process. To improve the change control process, the site revised NFS-CM-004, "NFS Change Control Process," and NFS-TS-009, "Configuration Management of Process Change." The inspectors

reviewed the changes to these procedures and determined that if properly followed, the additional procedural requirements should prevent additional issues of this type.

2010

VIO 70-143/2010-002-02: **Failure** to Establish an Inspection Program for Sprinkler Systems Designated As IROFS

The inspectors interviewed NFS staff and reviewed the records and corrective actions identified by NFS in the Reply to Notice of Violation (VIO 70-143/2010-002-02), dated August 27, 2010. This violation was due to a procedure deficiency in that NFS's procedures omitted the National Fire Protection Association (NFPA) 25 requirements related to annual visual inspection of fire protection sprinkler systems. NFS performed a visual inspection of the associated sprinkler systems on May 27, 2010; this inspection was observed by an NRC inspector. This issue was entered into the site's corrective action program and NFS procedure, NFS-HS-A-16, was revised on March 28, 2011, to include an attachment entitled "ANNUAL SPRINKLER INSPECTION" to provide guidance for performance and documentation of the annual sprinkler system inspections.

On May 18, the inspector observed performance of a sprinkler system inspection using Attachment 6 of NFS-HS-A-16; the inspector did not note any discrepancies with regards to performance of these inspections. NFS plans to implement NFS-HS-A-104, "Testing/Inspection of Fire Barrier Systems" and NFS-HS-B-95, "Testing/Inspection of Fire Barrier Systems" to provide checklists for tracking and documenting performance of required fire protection inspections. **This item will remain open awaiting NFS's implementation of an adequate method to provide tracking and documentation of the completion of required fire protection inspections.**

IFI-70-143/2010-003-03: Lack of Radiation Protection Operating Experience Systems

The inspectors determined that the licensee had no means to share radiation protection operational experience nor did the licensee enter similar issues into the CAP. The inspectors discovered during this inspection that this IFI was captured in the licensee's CAP. Licensee's procedure NFS-OE-001, "Operating Experience Program," Rev. 1, was implemented to allow the program to capture and retrieve operational experiences and to provide metrics for measuring the effectiveness and cultural improvement of the program through external and internal sources. The inspectors reviewed the procedure and determined it to be adequate for implementing the operational experience program.

EEI 70-143/2010-009-01: **Failure to Provide Accurate Information in a Reply to a Notice of Violation**
(Escalated Enforcement Issue)

The inspectors interviewed NFS staff and reviewed the records and corrective actions identified by NFS in the Reply to Notice of Violation (EA-10-076), dated December 15, 2010. The inspectors found that NFS was completing the assigned corrective actions as described. The corrective actions associated with this violation included an effectiveness review to be conducted by NFS within one year of the issuance of the associated Confirmatory Order (dated November 16, 2010). This item will remain open until NFS has completed all actions required by the associated Confirmatory Order and those actions have been evaluated by the NRC.

EEI 70-143/2010-009-02: **Failure to Provide Accurate Information to NRC Inspectors**

The inspectors interviewed NFS staff and reviewed the records and corrective actions identified by NFS in the Reply to Notice of Violation (EA-10-076), dated December 15, 2010. The inspectors found that NFS was completing the assigned corrective actions as described. The corrective actions associated with this violation included an effectiveness review to be conducted by NFS within one year of the issuance of the associated confirmatory order (dated November 16, 2010). This item will remain open until NFS has completed all actions required by the associated Confirmatory Order and those actions have been evaluated by the NRC.

VIO 70-143-2010-003-02: **Failure** to Follow Procedure During SRE Testing

The inspectors reviewed the licensee's corrective actions with respect to this issue. **The licensee implemented a training toolbox for operations and engineering personnel to reemphasize the importance of verbatim compliance with functional tests.** The licensee also reemphasized the importance of verbatim compliance with the supervisors of the area. The inspectors reviewed the training materials and the list of attendees. No issues were noted. The inspectors also reviewed the status of the licensee's evaluation of SRE test instructions for utility supply systems (tracked as C15312 with a due date of June 30, 2012). The licensee's review was to focus on the clarity of the prerequisites and various steps. The licensee had not yet completed this action. This item will remain open to evaluate the results of the licensee's review.

Event Follow-up:

Event Notification: EN 46851 (NMED 110233) **Shipping Container Contamination Level Exceeds Surface Contamination Limits**

On May 13, NFS received a shipment of empty Type LR-230 containers from Westinghouse. The Westinghouse outgoing radiological contamination survey report that the driver delivered to NFS showed the activity levels found at all survey points to be below limits for outer surfaces of a package. As NFS personnel performed their routine receipt inspection, **they identified external contamination in excess of legal limits on one of the LR-230 containers.**

In response, NFS personnel performed additional, more extensive contamination surveys, notified Westinghouse and the respective regulatory agencies of the survey results, and performed decontamination operations to remove the contamination from the shipping container.

NRC regional inspectors followed up on the event and determined that the contamination occurred at the Westinghouse Electric Company's Columbia Fuel Fabrication Facility when approximately 2 – 3 quarts of liquid spilled inside the domed area of the container during unloading operations at that facility. Westinghouse entered the issue into its CAP. This event notification is being documented as LER 70-143/2011-003. The inspectors determined that the licensee actions were adequate.

10/31/2011 NRC Integrated Inspection Report No. 70-143/2011-004, July 1 through September 30, 2011, (ML11304A207).

Summary of Plant Status

The facility began the inspection period with the following process areas operating: 1) manufacturing facility (FMF); 2) Blended Low Enriched Uranium (BLEU) Preparation Facility (BPF) which included the Uranium (U)-Aluminum, U-Oxide, U-Metal, Solvent Extraction (SX), and the down-blending (DB) lines; and 3) Building 301 Commercial Development (CD) lines which included the Column Dissolvers and the Ammonium Diuranate (ADU) system. **The uranium hexafluoride (UF₆) systems in the CD line of Building 301 began the period shutdown, but were authorized to restart on July 12 based on the inspection results of the fifth restart readiness assessment. Actual UF₆ handling operations were not scheduled to occur until October 2011.**

Note that since the BLEU facility is currently shutdown, an operating crew is only maintained on 1st shift. (See Page 11)

Review of Problem Identification Resolution Correction System (PIRCS) item #26837 (IP 88135)

The inspectors performed a follow-up review of PIRCS #26837 to verify that the licensee was operating in accordance with procedural and regulatory requirements. This issue dealt with a **failure to follow procedures while operating the Uranium-Oxide system and included the following performance deficiencies:**

- Operator exceeded the maximum amount of SNM addition to the U-Oxide dissolvers and at a faster rate than that prescribed in procedure.
- Operator failed to add the proper amount of hydrogen peroxide (H₂O₂) following the addition of SNM.
- Operator failed to properly wash a piece of cheese cloth tainted with nitric acid prior to placing it into a waste receptacle.

SNM and Hydrogen Peroxide Additions:

The first two deficiencies as performed were addressed under an existing NFS accident sequence in the ISA and thus bounded by the NFS design basis. **It should be noted that inspector review of the operator logs showed the proper amounts of SNM and H₂O₂ were added. The conclusion that these activities were not performed as recorded was based on inspector interviews with plant personnel and an evaluation of the remaining contents of a can of SNM.**

In the ISA (Integrated Safety Analysis) summary, an intermediate consequence accident sequence similar to these events dealt with the generation of excessive nitrogen oxide compounds (NO_x) and ultimate exposure to the operator in excess of the Temporary Emergency Exposure Limits (TEEL). There were two IROFS associated with this sequence, BUM-29 and BUM-40, which were intended to prevent this accident.

BUM 29 was an administrative IROFS that limited the quantity of SNM added to the dissolver. BUM-40, also an administrative IROFS, required a minimum amount of H₂O₂ be added to the dissolvers to prevent the generation of NO_x. **In this event, the two administrative IROFS were not adequately maintained, however, no NO_x was generated.**

The ISA accident sequence also included three enabling events that included:

- (1) process ventilation **failure** as well as glove box failure with NO_x leaking out of the glove box;
- (2) room ventilation **failure** to remove NO_x; and,
- (3) **failure** of workers to evacuate in response to the loss of ventilation and its associated alarm.

The inspectors determined that since the performance requirements were met, the event was not required to be reportable to the NRC. **The issues of adding too much SNM and the improper amount of H₂O₂ were procedural violations** as they conflict with SOP 409 Sec 8, “U-Oxide Dissolution,” step 6.1.5 and step 6.1.6.

Nitric Acid Waste in Trash Receptacle

The inspectors reviewed the placement of a cheesecloth contaminated with nitric acid in a trash tube and determined that this was a violation of SOP 409, Sec 18, "Processing Materials Generated Inside BLEU Prep Facility MAA," step 3.3.1.

The inspectors evaluated the safety significance of the procedural violation and noted that this violation was self-identified and corrected by the licensee. The inspectors identified that IROFS were not affected and no adverse effects were encountered. Thus, the inspectors concluded that this violation was of **minor safety significance**.

Safety Culture Improvement Plan

The inspectors noted that the licensee had developed a Safety Culture Improvement Plan (SCIP) and that the plan **consisted of 142 corrective "Action Items" to address the 110 "Findings" identified in the SCUBA II report.**

As of the first week in September, the licensee had documented 39 Action Items (27%) as being complete, the majority in progress, and seven planned. The **inspectors also noted that 20 of the 39 completed Action Items were associated with SCUBA II High Priority Findings.**

Special Topics

Follow-up on Previously Identified Issues

NCV 70-143/2011-002-01: Failure to Add Hydrogen Peroxide to Building 301 Column Dissolvers During Dissolution Process

On February 8, operators were processing uranium tetrafluoride (UF₄) in the 301 column dissolvers when a senior NFS manager noted that H₂O₂ had not been added prior to the second material addition of UF₄ to one of the column dissolvers as required by the licensee's procedures. The addition of H₂O₂ prior to the addition of SNM is an administrative IROFS. The issue was entered into the CAP as PIRCS #28626.

NFS performed an apparent cause investigation. The inspectors noted that the first material addition occurred with the proper amount of H₂O₂. Calculations subsequent to the incident revealed that at the time of discovery, there was sufficient H₂O₂ in the dissolvers to suppress NO_x formation and that the IROFS was operable but degraded. The inspectors reviewed the licensee's corrective actions and had no further questions.

VIO 70-143/2009-002-01: Improper Securing of IROFS During System Operation

On April 27, 2009, maintenance personnel secured power to a blower in one process exhaust ventilation system. Process exhaust ventilation systems are required to be operating when material is being processed in process areas supported by that system. Plant operators responded in accordance with procedures. The licensee conducted an investigation that identified a number of corrective actions. The inspectors determined that NFS's corrective actions were adequate to correct and prevent recurrence of this type of event.

VIO 70-143/2010-002-02: **Failure** to Establish an Inspection Program for Sprinkler Systems Designated As IROFS

The inspectors found that NFS implemented two new procedures, NFS-HS-B-95, "Testing/Inspection of Fire Barrier Systems," and NFS-HS-A-104, "Testing/Inspection of Fire Barrier Systems." The inspectors noted that NFS had also implemented a third procedure, NFS-HA-A-53-03, "Fire Protection Program Summary of Routine Inspections, Testing, and Maintenance," to provide a method for tracking completion of the various fire protection inspections. The inspectors interviewed the acting fire protection engineer and reviewed the checklists used to track the completion of fire protection inspections.

The inspectors determined that the checklists were actively being used. The inspectors determined that NFS's corrective actions were adequate to correct and prevent a recurrence of this violation.

VIO 70-143/2010-003-02: **Failure** to Follow Plant Procedures During SRE Testing

The inspectors discussed the actions that the licensee had taken to date in response to this violation. The inspectors noted that the six months allotted before performing an effectiveness review following the training that operators received was reasonable. The inspectors also noted that SRE test instructions for utility supply systems were to be reviewed as one of the corrective actions. **The scheduled completion date for this action was noted to be over a year and a half after the violation occurred.** The inspectors discussed their concern regarding the scheduled completion date with the licensee. The licensee described the rationale for determining the scheduled closure date. The inspectors determined that the decision-making process conformed to procedural requirements and that the process accounted for the relative safety significance of a corrective action before assigning a completion date. **This item remains open.**

Event Follow-up:

Earthquake in Mineral, VA

On August 23, an earthquake occurred near Mineral, VA, approximately 330 miles from NFS. A few people on site at NFS felt tremors from the earthquake. The tremors were barely detectable and lasted for about 10 seconds.

System, equipment, and building walk downs were performed site-wide by plant personnel. The resident inspectors also completed a walk down of the site. No leaks or other effects to equipment or structures were identified by site personnel or the resident inspectors. No Emergency Action Level thresholds from the Emergency Plan were met and the plant remained operating. The event, as experienced at NFS, was not reportable to NRC.

Event Notification 47049: Degraded Audibility of Criticality Evacuation Alarm

On July 14, **intermittent trouble alarms associated with buildings 302 and 303 process area speakers were observed by the licensee. Plant personnel performed a test of the public address system and confirmed that the speakers could not be heard in those areas.** The affected speakers were also used for the criticality evacuation alarm and plant managers immediately implemented compensatory measures and filed an event notification with the NRC until a complete test of the criticality system could be performed. Further testing of the speakers associated with the criticality evacuation alarm system was subsequently performed. It was determined that although a portion of the public address system had been affected, the criticality evacuation alarm had not been affected. The criticality evacuation alarm was retested on July 15, and the speakers in the affected areas were determined to be operable. NFS retracted the event notification on July 15.

2012

01/30/2012 NRC Integrated Inspection Report No. 70-143/2011-005, October 1, 2011 to December 31, 2011, (ML12030A226).

Uranium Hexafluoride (UF6) Processing

Beginning on October 3, 2011, the inspectors observed the restart of the UF6 sublimation line, the last area of the CD line to be restarted following the restart readiness assessment inspection conducted in May 2011 and documented Inspection Report no. 70-143/2011-007. This system was shut down on November 14, 2009, due to a small fluorine fire in sublimation station #3. The inspectors reviewed the training, post-maintenance, and safety-related equipment (SRE) tests performed prior to restart of the UF6 - related systems. Uranium Hexafluoride (UF6) Processing.

Beginning on October 3, 2011, the inspectors observed the restart of the UF6 sublimation line, the last area of the CD line to be restarted following the restart readiness assessment inspection conducted in May 2011 and documented in Inspection Report no. 70-143/2011-007. **This system was shut down on**

November 14, 2009, **due to a fluorine fire in sublimation station #3**. The inspectors reviewed the training, post-maintenance, and safety-related equipment (SRE) tests performed prior to restart of the UF6 - related systems.

The inspectors noted that a number of the first cylinders selected for venting did not have the expected fittings, which presented operational and engineering challenges.

The inspectors noted that a few of the SRE tests required to be performed just prior to venting and sublimation did not pass and necessitated the performance of additional maintenance.

Of the cylinders vented through the end of 2011, only five cylinders contained pressures above atmospheric pressure. The results of those calculations suggested that these five cylinders contained UF6 at pressures ranging from 130.4 to 471 pounds per square inch gauge (psig).

The difference between calculated and actual pressures was attributed to the fact that the calculated pressure did not account for a “reverse” reaction that occurs as pressure increases. As the fluorine cover gas pressure increases, the reverse reaction causes some fluorine gas to recombine with any existing solid UF5 (to form solid UF6) which then mitigates the pressure increase. Since this reaction rate is not clearly known, it was not included in the original calculations.

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Inspectors evaluated the first “tapping” of a 2S cylinder which occurred on Dec. 20. Tapping was required if valve clarity could be determined and involved drilling a hole in the side of a 1S or 2Scylinder in order to relieve any pressure in the cylinder prior to sublimation. The tapping rig included dedicated piping that provided a flow-path from the drilled hole directly into specially designed fluorine gas traps in the vent and tap station.

One item of note occurred on November 12 and was documented in the CAP as Problem Identification Resolution and Correction System (PIRCS) item #32223. In this instance, **NFS noted an elevated effluent count rate (but below regulatory limits) in the building 301 continuous air monitor (CAM) at the start of the sublimation of a 5A cylinder**. The sublimation process was immediately shut down and the condition was evaluated.

The CAM was installed as a precautionary measure in order to obtain a real time

measurement of the radiological condition of the building 301 gaseous effluent. An investigation revealed that all but one of the UF6 gaseous effluent flow paths were routed through the sodium-fluoride traps prior to entering the building scrubber system and then ultimately to the stack.

This particular flow path directed effluent gases from the knockout column via an air gap through an ultra-low penetration air (ULPA) filter into the building scrubber. Further investigation revealed that the internals of the ULPA filter were not optimally compatible with a hydrofluoric (HF) acid environment. NFS removed this ULPA filter and rerouted the effluent path from the knockout column through an existing ULPA filter that was compatible with HF located on the cylinder over-pack station between sublimation stations #1 and #2. Following system modification and restart of sublimation, the effluent radiation levels returned to normal.

As of December 31, NFS had six 5A/5B, 39 1S, and 61 2S cylinders remaining (not including Hoke tubes) on site to be processed.

The inspectors also evaluated the operation of the ADU (Ammonium Diuranate) system as well as the ADU calciner that was used to further process high enriched uranium (HEU) that was in excess of a contractually determined enrichment, for ultimate transfer to the Department of Energy. All other HEU in the ADU form was redissolved and transferred to the DB (Downblending) line via the building 333 SX (Solvent Extraction) system.

The inspectors reviewed the licensee's personnel dosimetry program for adequacy in assessing worker exposures. The inspectors noted that assessments of personnel exposures were primarily based on airborne contamination monitoring data. The airborne contamination monitoring program consists of a combination of the use of stationary air sample stations and individual lapel air samplers. The inspectors found that air sampling data was used in conjunction with an individual's assigned work location(s) and stay-time. Worker exposures were calculated based on this information.

The inspectors noted an example whereby the licensee utilized established trending mechanisms to identify a potential source of airborne contamination. Based on the licensee's evaluation of the data, the source of the elevated airborne concentration was identified and corrective actions were implemented.

On November 12, NFS management shut down the UF6 systems to address elevated radiation levels in the building 301 stack. The system was modified and radiation levels were reduced to nominal values. Although the radiation levels were well below regulatory limits, NFS management showed a commitment to ALARA and radiation safety by ceasing production until the situation was resolved.

Special Topics

Follow-up on Previously Identified Issues:

(Closed) Unresolved Item (URI) 70-143/2010-002-03: Evaluation of Combustible Loading of Tube Cleaning Room Due to Tar Roof and Resulting Consequence Evaluation

The inspectors reviewed licensee corrective actions associated with this URI that were documented in PIRCS # 24944. The corrective actions included the development of a new fire model of the tube room that took the tar roof into consideration. This model concluded the worst-case scenario was a large fire involving the tar and gravel mezzanine roof. The tar roof was completely removed in Sept. 2011. The inspectors performed a walkdown of the mezzanine area and verified removal of the tar material. Thus, the original concern from the URI has been eliminated.

(Closed) URI 70-143/2010-002-04: Evaluation of Analysis Supporting “Unlikely” Probability of Fire in Solvent Extraction Area

The inspectors reviewed licensee corrective actions associated with this URI that were documented in PIRCS # 24943. This issue dealt with a fire scenario in the SX room located within building 333. The original scenario was deemed by NFS to be “intermediate consequence” and “unlikely” in an uncontrolled scenario, i.e. without IROFS.

However, the inspectors questioned the basis for the uncontrolled “unlikely” condition and opened this URI. Specifically, the licensee had previously assigned an initiating event of -1 (which is defined as “expected to occur during plant life”) to a fire that results in a release of solvent and an enabling event of -2 (which is defined as “not expected, but might occur during plant lifetime”) to the likelihood that solvent would ignite and continue to burn. **The scenario was not deemed to be an occupational hazard as the workers in the area would evacuate in the event of a significant fire but rather it is considered an environmental hazard.**

As part of the corrective actions, NFS reanalyzed this scenario and added an administrative IROFS. This IROFS was FIRE-2 and represented the monthly surveillance for combustible material.

The SX room is equipped with a suppression system; however the inspectors observed that the suppression system may not sufficiently cover the pulsar pumps which are a contributor to the potential ignition source. Thus, the licensee did not credit the suppression system as an IROFS but rather chose to credit FIRE-2.

(Closed) VIO 70-143/2010-003-02: **Failure** to Follow Plant Procedures During SRE Testing

The inspectors reviewed licensee corrective actions associated with this violation as documented in PIRCS #27441. The issue dealt with the failure to follow a plant procedure on September 17, 2010. Specifically, an SRE test was performed on a plant air valve that was designated as an IROFS while the SX system remained in operation which was contrary to the procedure. The inspectors reviewed the corrective actions and the reply to the Notice of Violation, dated December 3, 2010. The corrective actions included training of all operators on the event as well as an effectiveness evaluation of compliance with SRE test procedures.

(Closed) Apparent Violation (AV) 70-143/2010-009-01: **Failure** to Provide Accurate Information in a Reply to Notice of Violation

This issue was initially identified as an apparent violation by letter dated July 20, 2010. An alternative dispute resolution (ADR) was subsequently held on October 4, 2010, which resulted in the issuance of a Confirmatory Order (CO) dated November 16, 2010. NFS then issued a, "Reply to a Notice of Violation: (EA-10-076)," dated December 15, 2010. The letter identified three sets of corrective actions. The first set identified corrective actions NFS had taken to address providing inaccurate information to the NRC in a Reply to Notice of Violation. The corrective actions were entered into NFS' corrective action program (CAP). The inspectors reviewed the licensee's corrective actions that had been entered into the CAP and that were identified in its response letter. The inspectors determined that the actions were adequate in scope and depth to prevent a reoccurrence.

(Closed) AV 70-143/2010-009-02: **Failure** to Provide Accurate Information to NRC Inspectors

This issue was initially identified as an apparent violation by letter dated July 20, 2010. An ADR was subsequently held on October 4, 2010, which resulted in the issuance of a CO dated November 16, 2010. NFS then issued a, "Reply to a Notice of Violation: (EA-10-076)," dated December 15, 2010. The letter identified three sets of corrective actions. The second set identified corrective actions NFS had taken to address providing inaccurate information to NRC inspectors. The corrective actions were entered into NFS' corrective action program (CAP). The inspectors reviewed the licensee's corrective actions that had been entered into the CAP and that were identified in its response letter. The inspectors determined that the actions were adequate in scope and depth to prevent a reoccurrence.

(Closed) VIO 70-143/2011-002-02: **Failure** to Perform Required Personal Monitoring Upon Exit from the Radiologically Controlled Area

The inspectors reviewed licensee corrective actions associated with this violation. The inspectors found that management observations of personnel contamination

monitoring practices along with managements' efforts to re-enforce personnel survey expectations, and plant-wide communications efforts in this regard were effective in ensuring that required performance standards were achieved. The inspectors discussed recent enhancements to the radiation worker training program with responsible personnel. Licensee representatives stated that additional focus had been placed on proper personal contamination monitoring techniques and individuals were afforded more opportunities to practice these techniques. Based on field observations the inspectors found that plant personnel utilized proper contamination monitoring techniques in accordance with approved procedures and management expectations.

(Closed) ORDER 70-143/-00 - 4.a: Submit Reply to NOV Documenting Corrective Actions and Enhancements W/I 30 Days

In paragraph 4.a of the CO dated November 16, 2010, NFS was required to submit a Reply to a Notice of Violation within 30 days which documented its corrective actions and enhancements as discussed in section 3.3 of the same CO. Section 3.3 of the CO referred, in turn, to violations identified in a letter sent to NFS dated July 20, 2010. On December 15, 2010, NFS submitted a letter, "Reply to a Notice of Violation: (EA-10-076)," dated December 15, 2010. The letter contained corrective actions grouped into three sets documenting corrective actions related to the violations. Inspectors determined that the corrective actions and enhancements identified in the letter met the requirements of paragraph 4.a of the CO. This requirement is considered to have been met.

(Closed) ORDER 70-143/-00 - 4.b: Conduct an Effectiveness Review of Corrective Actions Identified in the Reply to NOV Within 1 Year

This requirement originated from two apparent violations (AVs), AV 70-143/2010-009-01 and AV 70-143/2010-009-02, which were identified by letter dated July 20, 2010.

Following an alternative dispute resolution (ADR) held on October 4, 2010, a CO dated November 16, 2010, was issued. Under paragraph 4.b of the CO, effectiveness reviews for each completed corrective action identified in NFS' written reply to the notice of violation were mandated. Inspectors assessed the corrective actions and the effectiveness review performed by NFS, and that were documented in the CAP under Corrective Action (CA) ID#14404. The inspectors noted that NFS had not identified any additional corrective actions as a result of its effectiveness reviews and discussed this observation with the licensee. The inspectors determined that the effectiveness reviews performed by the licensee met the requirements of paragraph 4.b of the CO and were adequate in scope and depth. This requirement is considered to have been met.

(Closed) ORDER 70-143/-00 - 4.c: Conduct an Assessment of the Effectiveness of Actions to Assure Adequacy and Accuracy of Information Submitted to the NRC Within 6 Months

This requirement originated from two apparent violations, AV 70-143/2010-009-01 and AV 70-143/2010-009-02, cited by letter dated July 20, 2010. Following an ADR held on October 4, 2010, an effectiveness review of the related corrective actions identified in NFS' reply to the notice of violation was incorporated into paragraph 4.c of the CO dated November 16, 2010. The inspectors evaluated the effectiveness review of the corrective actions performed by the licensee and documented in the CAP under CA ID#14405.

The inspectors assessed the effectiveness review conducted by the Quality Assurance (QA) department and found that the QA department operated independently from the safety organization. The inspectors determined that the effectiveness review met the requirements of paragraph 4.c of the CO and was adequate in scope and depth. This requirement is considered to have been met.

(Closed) ORDER 70-143/-00 - 4.g: Implement Metrics to Measure Overall Safety Performance

In paragraph 4.g of the CO issued to NFS, dated November 16, 2010, NFS was required to implement metrics to measure overall safety performance at the facility. Although the CO only required NFS to implement metrics related to safety, NFS developed and implemented metrics that measured Safety, Quality, Schedule, Cost, and Conduct of Business. The inspectors determined that NFS was monitoring 78 Key Performance Indicators (KPIs) that were eventually rolled-up into one of the five overarching categories mentioned above. Fifteen of the KPIs were dedicated to measuring safety.

The inspectors noted that the NFS management team reviews the "Performance Metrics Program" as a matter of routine business and that the performance of the metrics affects decision-making. The inspectors noted that a link to Performance Metrics was placed prominently on NFS internal website, providing access to all NFS employees. The inspectors determined that the KPI's selected and monitored by NFS management were adequate and had been effective in affecting the overall safety performance of the plant. NRC inspectors will continue to monitor this program. This requirement is considered to have been met.

03/12/2012 License Performance Review, January 1, 2011 and ending December 31, 2011, (ML12072A191).

During the previous review period, the NRC staff identified two areas needing continued focus the part of NFS management. The first of these areas was in Safety Operations. NRC's inspection findings for 2010 demonstrated that the corrective actions to address the underlying causes had not been fully effective

and sustainable. In addition, a number of commitments identified in the 2010 Confirmatory Action Letter (CAL) remained incomplete. These issues included the readiness of the uranium hexafluoride processing line to restart, the thoroughness with which NFS conducts causal evaluations, and the process for incorporating the results of these evaluations into operational decisions. As a result, the NRC concluded that the area of Safety Operations remained an Area Needing Improvement.

The **second area** requiring continued focus of NFS management was in the area of **Facility Support**. In November 2010, NRC issued a Confirmatory Order (ML103210213) in response to **NFS providing the NRC with inaccurate information and the lack of demonstrable progress in the area of safety culture** as evidenced by the events that led to the Confirmatory Action Letter.

These issues indicated that additional effort by NFS management was needed to improve management oversight of facility operations. As a result, the NRC concluded that the area of Facility Support remained an Area Needing Improvement.

Safety Operations, Radiological Controls, Facility Support

Although performance related findings were identified during the assessment, the NRC determined that the causes of the findings were not related. None were considered significant enough to warrant the identification of an area needing improvement. The review showed that NFS continued to conduct its activities safely and securely, protecting public health and the environment.

04/30/2012 NRC Integrated Inspection Report No. 70-143/2012-002 and **Notice of Violation, Two Severity Level IV Violations**, January 1, 2012 to March 31, 2012, and **Temporary Instruction 2600/015 Inspection Report No. 70-143/2012-006, (ML12122A186)**.

Summary of Plant Status

The facility began the inspection period with the following process areas operating: 1) Naval Fuel Manufacturing Facility (FMF); 2) Blended Low Enriched Uranium (BLEU) Preparation Facility (BPF) which included the Uranium (U) - Oxide, U-Metal, Solvent Extraction (SX), and the downblending (DB) lines; and 3) Building 301 Commercial Development lines which included the Uranium Hexafluoride (UF₆) sublimation stations, Column Dissolvers and the Ammonium Diuranate (ADU) system. As of March 20, 2012, NFS completed sublimation of all UF₆ material on site.

BLEU Complex Facility

On March 27, the inspectors performed a tour of the Areva-managed BLEU complex facility which included the Uranyl Nitrate Building (UNB), Effluent

Processing Building (EPB), and the Oxide Conversion Building (OCB). The BLEU complex is a facility that operates under the NFS license and is located adjacent to the NFS main complex. The inspectors noted that the OCB ceased converting liquid uranyl nitrate to U-Oxide powder in July 2009. Similarly, the EFB has been shut down since July 2009 due to the lack of material processing. The inspectors walked down the UNB and noted that IROFS were in place for various accident sequences. Since 2009, the UNB has received uranyl nitrate shipments from the Department of Energy's Savannah River site as well as the BPF facility in the NFS main complex; however, both activities are now complete. The current plan for the UNB is to ultimately ship the stored uranyl nitrate to Richland, Washington for processing at the Areva Richland facility.

Uranium Hexafluoride (UF6) Processing

As of the end of the inspection period, all UF6 sublimation activities were complete and all UF6 cylinders have been processed. No UF6 cylinders remain on site. However, five-cylinder heel containers remain which will ultimately be shipped back to NFS's customer for a forensic analysis to determine why the material could not be fully sublimated.

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened:

70-143/2012-002-01 **NOV** **Failure to Provide Adequate Management Measures to Ensure Functionality of a Firewall IROFS**

An NRC identified violation of 10 CFR 70.62(d) was discovered during a walkdown of Building 302. **The inspectors noted a firewall penetration carrying communication cables that contained no sealing compound within the penetration. The penetration was located in the east wall of Building 302 and this firewall was designated an IROFS (FIRE-18). This wall carried a two hour fire rating. This was a traditional enforcement violation and was cited as a Notice of Violation (NOV) with a Severity Level of IV.**

Enforcement: 10 CFR 70.62 requires, in part, that each licensee shall establish a safety program that demonstrates compliance with the performance requirements. One of the elements of the safety program is management measures. 10 CFR 70.62(d) requires, in part, that each licensee shall establish management measures to ensure compliance with the performance requirements. These measures shall ensure that an IROFS will be available and reliable to perform its intended function when needed, to comply with the performance requirements.

Contrary to the above, **prior to March 6, 2012**, the **licensee failed to implement a safety program** that would ensure an IROFS would perform its intended

function when needed to comply with the performance requirements. Specifically, the **safety program failed to ensure that IROFS FIRE-18** (a fire wall separating Buildings 302 and 303) would perform its intended safety function. The inspectors noted a penetration in this fire wall carrying communication cables that contained no sealing compound within the fire seal. Thus, the penetration seal no longer met the 2-hour NFPA fire rating as required by the NFS ISA. The lack of adequate management measures pertaining to the maintenance of a fire wall and its associated penetrations adversely affected its two-hour fire rating and thus the function and reliability of an IROFS.

In accordance with the NRC Enforcement Policy, violations that are less serious, but are of more than minor concern, and that resulted in no or relatively inappreciable potential safety or security consequences are characterized as Severity Level IV violations. The failure to establish adequate management measures that ensures the availability and reliability of a firewall IROFS is a Severity Level IV violation (VIO) of NRC requirements.

Details. On March 6, 2012, while performing a walkdown of Building 302, the inspectors observed a firewall penetration that appeared to lack the required fire stop material. The penetration carried electrical communication cables and was part of the east wall of Building 302. This particular fire wall separates Buildings 302 and 303. NFS procedure “IROFS FIREPREVENT, IROFS and SRE for Maintenance,” Rev. 8 designated this two-hour fire-rated wall an IROFS.

The penetration was considered an integral part of the fire wall and required by National Fire Protection Association (NFPA) 801, “Standard for Fire Protection for Facilities Handling Radioactive Materials,” 2008 edition, to be of the same hourly fire rating (two hours) as the entire wall.

Subsequent investigation by the licensee verified, in fact, that no fire sealant material was installed in the penetration following a prior maintenance activity of electrical cable routing. Therefore, the failure to install the required fire sealant in this penetration resulted in a failure to properly implement management measures to ensure the functionality of the IROFS. The licensee entered the issue into the corrective action program (CAP) as PIRCS #33672 and entered the deficiency into the fire impairment program pursuant to NFS-GH-27, “Impairments to Fire Protection Systems,” Rev. 9.

The inspectors reviewed the Operational Decision Making Issue (ODMI) - 09-006 “Evaluation of Fire Barrier Integrity in IROFS Space.” which was issued on October 8, 2009. This ODMI dealt with several issues including 1) Unknown or undocumented materials in penetration seal assemblies, 2) Lack of penetration seal assembly diagrams on file, 3) Fire door deficiencies, 4) Lack of **as-built** Fire Barrier construction specification and drawings. Although this ODMI attempted to bound the IROFS deficiencies, it did not address a complete lack of an installed

fire seal in a wall penetration. The inspectors also reviewed the completed, as well as planned, corrective actions associated with this OMDI.

For example, NFS has recently hired two fire safety engineers to manage the fire barrier/penetration program. Additionally, NFS has begun to upgrade all fire doors to a more robust design. NFS also plans to complete characterization of all penetrations and develop detail drawings by **August 31, 2012**.

Analysis: The failure to provide adequate management measures to ensure the functionality of IROFS was a performance deficiency and a violation of NRC requirements. This issue was more than minor because the lack of sealing material in a penetration resulted in the potential for degraded performance of a fire wall. This issue was specifically called out as more than minor in NRC Manual Chapter 0612 Appendix E, "Examples of Minor issues," example 'e.' This example states that the issue is more than minor if the "ability of the seal to perform its function is impacted." Since NFPA 801, "Standard for Fire Protection for Facilities Handling Radioactive Materials," 2008 edition, requires penetrations in fire walls to be protected consistent with the designated fire resistance rating of the barrier (i.e. two hour rating), the seal's ability to perform its function was affected. **Although more than minor, this violation is considered to be of low safety significance (Severity Level IV) due to defense in depth as follows: 1) The size of the penetration was small (approximately three square inches),**

70-143/2012-002-02 **NOV Inadequate Management Measures Associated with Column Supports**

Enforcement: 10 CFR 70.62 requires, in part, that each licensee shall establish a safety program that demonstrates compliance with the performance requirements. One of the elements of the safety program is management measures. 10 CFR 70.62(d) requires, in part, that each licensee shall establish management measures to ensure compliance with the performance requirements. These measures shall ensure that an IROFS will be available and reliable to perform its intended function when needed, to comply with the performance requirements.

Contrary to the above, **prior to February 8, 2012**, the licensee failed to properly implement procedures that would ensure an IROFS would reliably perform its intended function when needed to comply with the performance requirements. Specifically, the safety program failed to ensure that configuration controlled equipment in Building 302, classified as IROFS, remained reliable to perform its intended safety function. The NRC inspectors discovered **multiple examples of cracked structural fittings that supported storage columns designated as IROFS**. The lack of adequate management measures allowed the degradation of the structural supports that adversely affected the stability and reliability of the storage columns designated as IROFS.

In accordance with the NRC Enforcement Policy, violations that are less serious, but are of more than minor concern, and that resulted in no or relatively inappreciable potential safety or security consequences are characterized as Severity Level IV violations. The **failure to establish adequate management measures that ensures the preventative maintenance program functions in a manner that produces relevant and timely corrective actions to maintain full functionality of IROFS is a Severity Level IV violation of NRC requirements.**

An NRC identified violation of 10 CFR 70.62(d) was discovered during an onsite safety inspection of Building 302. The inspectors noted cracks in structural loadbearing fittings used to support vertical storage columns. Further inspections resulted in the discovery of additional cracked fittings in various 302 process areas. The storage columns were defined as generic IROFS. This is a **traditional** enforcement violation and is being cited as a NOV with a Severity Level of IV.

Details: On February 8, 2012, NRC inspectors identified cracks in structural fittings in the 302 process area. The structural fittings were used as interconnecting structural elements to support equipment and various storage columns in specified spatial locations. The affected storage columns contained licensed materials. The support structures were necessary to maintain equipment and columns at various locations and elevations and were required to maintain minimum spatial distances between adjacent columns.

The inspectors evaluated documentation from previous preventative maintenance program activities and noted that (1) previous preventative maintenance inspections had identified numerous cracked fittings, (2) the preventative maintenance inspection activity used to test the torque of set screws on the fittings had caused the fittings to crack, and (3) the preventative maintenance activity of evaluating the fittings had been suspended without relevant and timely corrective actions to repair the cracked fittings or revise the inspection activity. The NRC inspectors concluded that the licensee had not implemented timely corrective actions to revise the inspection activity and had not implemented timely repairs of the structural fittings.

The inspectors noted that the licensee failed to provide adequate management measures to ensure that NFS Preventative Maintenance activity, titled “302 BLDG SET SCREW TEST” was fully implemented and effective in the detection and timely repair of defective structural fittings. Procedure NFS-MNT-009, Rev. 6, specifies in part, that a preventative maintenance program will be implemented that will ensure that appropriate action is taken to preserve equipment based upon the results or lack of preventative (and predictive) maintenance inspections. Preventative maintenance inspection activity, titled “302 BLDG SET SCREW TEST” was developed and deployed to evaluate structural fittings used to support process equipment in Building 302. **The process equipment included vertical**

columns that **contained licensed material** and the columns were designated as IROFS.

The lack of adequate management measures pertaining to the identification and timely implementation of repairs of fittings, which structurally supported equipment identified as IROFS, potentially adversely affected the reliability of IROFS. The licensee entered the issue into the CAP as PIRCS #33251 on February 8, 2012, and a follow-up PIRCS #33901 on March 27, 2012. The licensee began to implement significant repair efforts in late March, 2012.

The failure to provide adequate management measures to ensure the functionality of IROFS was a performance deficiency and a violation of NRC requirements. **This issue was more than minor because the loss of stability of structural supports could cause: (1) shifting of the columns that may exceed spatial safety limits, (2) failure of the columns or attached piping resulting in a sudden loss of containment of licensed material. Thus, the failure of the supports could become a precursor to a more significant event, (i.e. inadvertent criticality or loss of material containment).**

Although more than minor, this violation is considered to be of low safety significance (Severity Level IV) due to the following factors: (1) The majority of structural fittings were functional, (2) Structural fittings adjacent to cracked fittings were functional and were supporting the vertical loads of the columns, 3) Emergency equipment was capable of mitigating personnel exposure to the licensed material given a sudden column failure and release of licensed material. The significance of this violation was also evaluated in accordance with the Enforcement Policy (dated July 12, 2011), Section 6.2, "Fuel Cycle Operations."

Opened & Closed:

70-143/2012-001-0 LER Report to Offsite Government Agencies and Press Release

Event Notification (EN) 47578: LER 2012-001-0, "Report to Offsite Government Agencies and Press Release Due to a **Chemical Spill Onsite**"

The inspectors reviewed the 30-day written report associated with EN 47578. This EN involved a spill of Nitric Acid at the bulk Chemical area on the south side of the protected area.

On January 9, at approximately 1150, a spill was noted at the Nitric Acid distribution station located within the Bulk Chemical Area. The nitric acid system was being supplied by a temporary chemical trailer as the installed system was undergoing renovation. All the acid spilled was contained within a large dike and

was not released to the environment. However, some vapor misting was observed in the Bulk Chemical area and the area was cordoned off.

Initial corrective actions included the shutdown of process areas and evacuation of personnel from the 300 complex as a precautionary measure. The site also activated the Emergency Control Center (ECC) in order to safely deal with the chemical spill. Appropriate state and local officials were notified of the event. No NRC licensed material nor hazardous materials produced from licensed material were involved in the spill. The nitric acid was ultimately pumped to portable chemical tote tanks for processing in the WWTF.

The inspectors noted effective command and control practices in ECC. Communications between the ECC, the State of Tennessee, and the incident commander at the scene ensured the safety of all involved personnel. This event was reported to the NRC Headquarters Operations Officer (HOO) on January 9 at 1432. The event was reported pursuant to 10 CFR 70 Appendix A (c) which requires a concurrent report for any event related to the health and safety of on-site personnel, the public, or the environment for which a news release was planned or a notification to other government agencies is made.

Subsequent investigation revealed that the cause of the spill was a failure of an in-line flow meter due to material incompatibility. As of the end of the inspection period, NFS rebuilt the entire dike and installed a new nitric acid tank and distribution system. The issue was entered into the CAP program as item #32815.

70-143/2012-002-0 LER Medical Treatment of a Potentially Contaminated Individual at Onsite facility.

Event Notification 47620: LER 2012-002-0, “Medical Treatment of a Potentially Contaminated Individual at Onsite Facility”

The inspectors reviewed the 30-day written report associated with EN 47620. This EN involved the treatment of an operator in the onsite medical facility. At approximately 1040 on January 23, 2012, an operator’s fingers were exposed to a few milliliters of uranyl nitrate, nitric acid, and uranyl fluoride. The operator had been working with Hoke tubes in a glove box located in Building 301. The operator’s fingers were immediately rinsed with water and a calcium gluconate cream. Due to the fact that the solution may have also contained HF, the operator was conservatively sent to the onsite medical facility for evaluation. The operator was monitored, decontaminated and released by medical personnel. No evidence of HF exposure was noted. No spread of contamination occurred. The event was reported to the HOO at 10:06 on January 24, 2012, pursuant to 10 CFR 70.50(b)(3) which requires a 24-hour notification for any event requiring unplanned medical treatment at a medical facility of an individual with spreadable contamination. Subsequent investigation that the Hoke tube glove box’s associated glove and the operator’s latex glove both had small tears that

allowed the individuals hand to come into contact with the SNM solution. This issue was entered into the CAP as PIRCS #32994.

TI 2600/015, “Evaluation of Licensees Strategies for the Prevention and/or Mitigation of Emergencies at Fuel Facilities”

- 70-143/2012-006-01 URI Further evaluate whether the license is in compliance with Table 2.2 of the license application regarding management measures for IROFS PREP-A and PREP-B.

- 70-143/2012-006-02 URI Further evaluate whether IROFS UNB-V seismic bracing was installed in accordance with NFPA 13 requirements.

- 70-143/2012-006-03 URI Further evaluate whether the licensee is in compliance with the requirements of 70.62(c) and 70.61 performance requirements regarding natural phenomena events accident sequences.

Evaluation of licensing basis for accident sequences and consequences associated with natural phenomena hazards.

The inspectors performed a review of licensing basis documents and the safety analysis to determine the facility design and licensing bases as they related to natural phenomena hazards (NPHs). Specifically, the inspectors evaluated the following hazards: earthquakes, high winds, flooding, and extended loss of power and water. A summary of the evaluated license basis events and potential consequences is presented below:

EARTHQUAKE:

The licensee stated in their ISA that the NFS site is located in the moderately active Appalachian Tectonic Belt with a Seismic Zone 2 designation, indicating moderate damage corresponding to Intensity VII on the Modified Mercalli scale. In 2001, the licensee performed a seismic analysis of the site to determine the safe shutdown earthquake for a 1,000 year return period. The safe shutdown earthquake was calculated to consist of a peak ground acceleration of 0.06 g for the horizontal component of ground motion and vertical acceleration of 0.04 g.

The inspectors performed a review of design documentation to verify the design input criteria for the seismic design of structures and components. The following is a summary of the information reviewed associated with structures and components that support SNM activities.

Building 333 (excluding solvent extraction), CDL Building, and the UNB were designed

to meet the seismic load criteria in accordance with the 1998 version of the ASCE 7 code, “Minimum Design Loads for Buildings and Other Structures.” In addition, these buildings were designated as IROFS for accident sequences involving seismic events.

The inspectors were able to review seismic design documentation for the CDL and UNB facilities. However, by the end of the inspection, the licensee could not provide seismic design information for Building 333 (corresponding to IROFS PREP-A and PREP-B). Therefore, the inspectors could not verify the earthquake design or construction requirements for Building 333. Table 2.2 of the license application states, in part, that record management, vendor specifications, and independent installation verification are part of the required management measures to ensure the availability and reliability of passive engineer controls designated as IROFS. An unresolved item (URI) 70-143/2012-06-01, was opened to further evaluate whether the license is in compliance with Table 2.2 of the license application regarding management measures for IROFS PREP-A and PREP-B.

In addition, the sprinkler system installed in the UNB is designated as IROFS UNB-V. Design specification, Drawing No. 510-UNB-800, “BLEU Conversion Complex Uranyl Nitrate Building Fire Protection Plan and Details,” Rev. 0 stated, in part, “Piping shall be braced per Zone 2 seismic forces in accordance with NFPA 13.” Thus, the licensee was unable to provide detail installation documentation for the sprinkler seismic bracing by the end of the inspection. URI 70-143/2012-06-02 was opened to further evaluate whether the seismic bracing for IROFS UNB-V was installed in accordance with NFPA 13 requirements.

WINDS:

The licensee stated in their ISA that National Oceanic and Atmospheric Administration regional data indicated a maximum sustained wind of 50 mph in 1951, and a peak wind gust of 86 mph in 1995. Wind data from the NFS Site collected over approximately the past three years indicated a maximum sustained wind of 29 mph. Buildings 333 (excluding solvent extraction) and 301 (i.e. CDL) were designed to meet the wind load criteria in accordance with the 1998 version of the ASCE 7 code, “Minimum Design Loads for Buildings and Other Structures.” The inspectors were able to review wind design documentation for the CDL and UNB Buildings. However, by the end of the inspection, the licensee could not provide wind design information for Building 333. As discussed above, URI 70-143/2012-06-01 was opened to further evaluate whether the license is in compliance with Table 2.2 of the license application regarding management measures for IROFS PREP-A and PREP-B.

In the event that a tornado did occur on site, protective actions would be implemented in accordance with the NFS Emergency Plan.

FLOOD:

The licensee’s ISA stated that the NFS site is not within the 100-year flood plain of the

Nolichucky River and that only the northern portion of the NFS site is within the 100-year flood plain of Martin Creek. The licensee described the site as fairly level, however, facilities on the northern portion of the site below an elevation of approximately 1640 feet (laboratories and the Waste Water Treatment Facility “WWTF”) may experience flooding conditions of 1 to 2 feet for a 100-year flood (Dewberry & Davis, Martin Creek Flood Plain, 1997). The licensee determined that this level of flooding is not expected to result in any significant safety impact. Operation of the WWTF and laboratory facility may be affected due solely to the displacement of operating staff. In the event of a flooding event, the licensee will activate their emergency response organization and compensatory measures will be implemented to address the situation.

The inspectors noted that the criticality accident alarm system (CAAS) at the NFS site may not be able to withstand the effects of an earthquake. If the CAAS was not operating at the NFS site, reentry into the buildings would be done in accordance with procedures to ensure that an inadvertent nuclear criticality had not occurred in the building. The inspectors noted the ISA design specification information regarding earthquake and wind design requirements only applied to new structures or processes that were licensed under 10 CFR 70.64 “Requirements for new facilities or new processes at existing facilities.”

However, at the time of the inspection, the licensee was not able to provide design specifications for structures licensed prior to implementation of 10 CFR 70.64. For example, the licensee had not analyzed for potential damage to IROFS or failure of IROFS due to ground movement and/or the seismic response of adjacent or interior IROFS. Therefore, during development of the ISA the licensee had not fully considered potential accident sequences as a result of credible natural phenomena events. As a result, the consequence and the likelihood of occurrence of each potential accident sequence related to NPHs were not determined.

NRC regulation 10 CFR 70.62(c) states, in part, that each licensee shall conduct and maintain an integrated safety analysis, that is of appropriate detail for the complexity of the process that identifies:

- potential accident sequences caused by credible external events, including natural phenomena
- the consequence and the likelihood of occurrence of each potential accident sequence identified and the methods used to determine the consequences and likelihoods
- each IROFS identified pursuant to 10 CFR 70.61(e), the characteristics of its preventive, mitigative, or other safety function, and the assumptions and conditions under which the item is relied upon to support compliance with the performance requirements of 10 CFR 70.61.

URI 70-143/2012-006-03 was opened to further evaluate whether the licensee is in compliance with the requirements of 70.62(c) and 70.61 performance requirements regarding natural phenomena events accident sequences.

Gaseous effluent monitoring

The gaseous effluents were reported for the 19 operating exhaust stacks on site. The inspectors noted that the effluent concentration values (calculated via the “sum of fractions” method) were exceeded on the following seven stacks: Main plant stack 416, Building 100 stack 421, Building 100 stack 424, Building 110 stack 600, Building 440 stack 773, Building 301 stack 774, and Process exhaust stack 704. In accordance with 10 CFR 20.1302, a licensee must show compliance with dose limits to the general public by either showing compliance with 10 CFR 20 Appendix B limits or by demonstrating that the worst case total effective dose to an individual at the site boundary does not exceed the annual dose limit of 100 milli-rem (mrem). NFS chose the latter and the total effective dose equivalent was calculated to be 0.0078 mrem. This value is well below the federal dose limit. NFS used the Department of Energy’s CAP88-PC computer program to obtain this value.

2013

01/18/2013 NRC Inspection Report #70-143/2012-204, announced nuclear criticality safety (NCS) inspection, Dec. 17-20. ML13011A159

An Inspector Followup Item (IFI) was identified concerning the use of non-destructive assay (NDS) to detect wet uranium accumulations in the process ventilation. The inspectors observed that the licensee does not have a process in place to examine trends from scan to scan; there is only action taken if the calculated value exceeds the action limit.

01/30/2013 NRC Integrated Inspection Report #70-143/2012-005, Oct. 1, 2012 - Dec. 31, 2012, ML13030A347

On November 16, the inspectors performed a detailed tour of the Areva-owned BLEU facility which is located on NFS property adjacent to the category I facility. The inspectors reviewed various IROFS and procedures. The BLEU facility is a separate category III facility that operates under NFS’ license. The facility is essentially comprised of three buildings: 1) Uranyl Nitrate Building (UNB), 2) Oxide Conversion building (OCB), and 3) Effluent processing building (EFB). The general function of the facility is to receive 5 percent (%) enriched liquid uranyl nitrate from the DB portion of the BPF facility and convert this liquid into a powdered form. The low enriched uranium (LEU) powder is then shipped off site for further processing and ultimate use in commercial reactors. The OCB has been in a shutdown status since 2009 due to operational demands. Similarly, due to shutdown of the OCB, the EFB has been in a standby status since 2009. However, the UNB has continued to store uranyl nitrate. In

November 2012, NFS and Areva began a campaign to pump the existing uranyl nitrate to LR-230 trailers located in the truck bay of the UNB. These NRC-approved trailers will be shipped to the Areva facility in Richland, Washington for further processing. Following completion of this pumping activity, the facility will remain in a shutdown status until a final decision is made on the future operation of the facility.

On November 16, 2010, the NRC issued NFS a Confirmatory Order (Order) that required NFS to develop and implement an appropriate safety culture improvement plan to address the findings identified in the 2009/2010 Independent Safety Culture Assessment (ISCA II). To verify that NFS had maintained compliance with the Order, the inspectors reviewed NFS' actions to address the **six deficiencies identified in the Panel Report**.

The **first deficiency** that the Panel Report identified was the need for the licensee to develop and provide formal training to the appropriate front-line supervisors to improve their understanding and use of Operating Experience.

The **second deficiency** the Panel Report identified was that the licensee lacked a way to document the review for major organizational changes during the change process review by the Change Control Board.

The **third deficiency** the Panel Report identified was to update the procedure for conducting CAP effectiveness reviews (NFS-CAP-010), and update the list of personnel required to be trained on the procedure.

The **fourth and fifth deficiencies** from the Panel Report involved the URIs identified in the April 2012 NRC inspection. They are: Unresolved Issue (URI) 70-143/2012-007-02, Deficiencies in the consistent application of the corrective action program (CAP) within the Security and the Material Control and Accounting (MC&A) Departments. Therefore, while NFS' actions remain in compliance with the Order, this item remains open for additional evaluation.

The **sixth deficiency** the Panel Report identified was the need for the licensee to develop consistent standards and expectations for supervisors with regards to improving oversight of work activities.

Finally, the inspectors reviewed action item, RES4, which involved a recommendation that the licensee evaluate the overall effectiveness of their equipment reliability program.

04/25/2013 NRC Inspection Report #70-143/2013-201, announced nuclear criticality safety (NCS) inspection, March 25-28, 2013, ML13100A098.

IFI 70-143/2013-201-01. The **inspection did identify a weakness with the timeliness of completing actions in your corrective action program**. While your

program identified issues needing correction, your performance in taking prompt and effective corrective action for identified non-compliances with your NCS Program warrants NRC inspection follow-up. **Deficiencies that are not in compliance with your NCS Program and procedures should not be permitted to persist for several years until they are addressed.**

An Inspection Follow-up Item (IFI) was identified regarding the licensee's NCS audits. Specifically, NCS audits and a review of the licensee's corrective action program identified that several corrective actions remained unresolved for an excessive period of time. The timeliness of corrective actions was identified as a programmatic weakness.

For most of the inspection the alarm system covering the waste water treatment facility (WWTF) was malfunctioning, resulting in a stop work order for this process.

The inspectors reviewed audit reports issued since the previous NCS inspection. Audits are performed frequently and a different portion of the facility is selected for review in each audit. Among the items examined during the NCS audits are any open problem reports (PIRCS entries) and corrective actions. Although there were no findings or observations in most of the recent audits, the inspectors noted that there were several remarks **about items in PIRCS that had not been resolved, in some instances for several years.** In audit NCS-2012-36, the auditor observed that PIRCS # 1798 and 1801, both **opened January 21, 2004**, were still unresolved. Audit NCS-2013-03 observed that PIRCS # 8012, 8013, and 8014, all opened **June 22, 2006**, were still unresolved. **A quick survey of the PIRCS system identified issues (criticality and otherwise) dating from 2001.**

The inspectors then reviewed these long-standing PIRCS items, as well as new items resulting from recently-performed audits, to determine their risk-significance and whether the timeliness of their resolution was commensurate with their significance. PIRCS # 1798, opened January 21, 2004, had a currently assigned due date of January 1, 2020. This issue concerned the finding that certain portable containers authorized by procedure NFS-HS-CL-10 had not been analyzed or authorized for use in the applicable NCSA (portable container NCSA or its addenda). The licensee had justified this based on concluding that the risk was "very low" because the container was bounded by other, authorized containers. However, no record of this determination was provided during the inspection.

PIRCS #1801, opened January 21, 2004, also had an assigned due date of January 1, 2020. This issue concerned the observation that procedure NFS-HS-CL-10 allowed the transport of containers of sample bottles in outer containers without lids.

PIRCS # 8012, 8013, and 8014, were opened June 22, 2006, and had an assigned due date of January 1, 2020. All of these concerned issues identified in the BPF ventilation system NCSA.

Audit NCS-2012-39 for uranium dissolution and storage columns identified two observations that resulted in PIRCS # 37465 and 37457; as discussed in the previous inspection report. The **first observation** was that a container was placed in an enclosure airlock without first completely filling out a runsheet to keep track of the mass.

The **second observation** involved discovery of a 2-liter bottle marked “No SNM” that contained solution.

The two observations about whether there is adequate margin for NDA (non-destructive assays) measurements and a failure to identify all CCE (Configuration control equip) **attributes are more significant, but were assigned a due date of December 31, 2016.** While the identification of safety margin is often a matter of judgment, the failure to identify CCE attributes is not in compliance with NCS Program requirements. The failure to document CCE attributes in the NCSE is a violation of minor significance.

A programmatic weakness was identified regarding the follow-up of audit findings and observations, and the timely completion of corrective actions associated with program non-compliances. The corrective action program warrants NRC inspection follow-up because it did not always take prompt and effective corrective action to restore compliance or resolve identified weaknesses.

The licensee’s procedures require that the licensee stop work with SNM in the area affected; which in this case is the WWTF. The licensee made a conservative decision to stop work with SNM in all areas when working on the CAAS, because the horns throughout the facility are disabled when working on the CAAS. While the horns are disabled, personnel are assigned to watch the CAAS alarm board and use the public address system to signal evacuation if a criticality accident occurs. However, the licensee considered it safer to stop all SNM handling while the CAAS was being worked on, in order to reduce the risk of a criticality accident.

The inspector discussed the use of the CAAS during evacuation and emergency response with licensee personnel. The licensee has made provisions for accessing the CAAS during evacuation by providing a ‘read-only’ CAAS alarm board at the assembly area. The licensee relies on the use of hand-held detectors in its emergency response procedures to verify if an actual criticality occurred or not. **However, the CAAS has the ability to indicate the dose rates** at the various detectors, which detector(s) alarmed, and why they alarmed. So, if the CAAS is operational following a criticality accident it can be used to assist the emergency response function.

During a walkdown the inspectors noticed an unpacked piping penetration of a firewall. The licensee requires that penetrations of firewall be packed to prevent the spread of a fire. Closer examination revealed that one side of the penetration was packed and the other wasn't. The licensee NCS engineers referred this issue to the licensee's fire protection function. **The fire protection function examined the wall and identified a further instance where a penetration had no packing at all. This was documented in PIRCS # 38856, along with the immediate corrective actions taken, such as establishing a fire watch. The inspectors referred this fire protection issue to the resident inspectors.**

IFI 70-143/2012-204-01 Tracks completion of investigations and corrective actions associated with, and examination of NDA methods suitable for wet uranium accumulations in process ventilation.

07/12/2013 NRC Inspection Report #70-143/2013-203, nuclear criticality safety inspection, June 10-13, 2013, ML13190A150

URI 70-143/2013-203-01 Lack of a detailed justification for why changes do not require a license amendment

IFI 70-143/2013-201-01 This items tracks completion of corrective actions identified as "long-term" in the Problem Identification, Resolution, and Correction System (PIRCS) **that involve programmatic non-compliance.**

IFI 70-143/2012-204-01 This items tracks completion of investigations and corrective actions associated with, and examination of, NDA (non-destructive assay) methods suitable for wet uranium accumulations in process ventilation.

Observations and Findings: During the inspection, inadvertent unfavorable geometry containers were discovered in a container-controlled area. These were escape air respirator containers which are located throughout the area where the CO2 fire suppression system is installed. The adhesive that holds view ports to the otherwise fully enclosed container was degrading. The inspectors observed that in some cases the adhesive degradation allowed the view ports to come loose and/or unattached which provided a possible entry point for fissile solutions into the container. Several containers were found with this condition and an immediate corrective action was initiated to duct tape all view ports to their containers, which temporarily secured the view ports.

Inspectors toured the BLEU complex which has been shut down. When the facility was operating, it converted Uranyl Nitrate to UO2 powder for use in commercial power reactor fuel. The Uranyl Nitrate was received from downblending at the BPF and other sources. After the process was shut down the

licensee conducted a partial clean out of the BLEU complex. Solution was drained and vacuumed out; powder was blown and knocked out of powder handling equipment, however, no equipment was disassembled. Based on previous experience the licensee expects to be able to retrieve more material from equipment that can be easily disassembled.

The cognizant licensee NCS engineer stated that hold up accumulations ranged from less than the minimum detectable amount to a couple hundred grams dry powder which does not normally pose a NCS concern in isolation. However, BLEU management did not express confidence in the hold-up measurements due to self-shielding, complex and unknown configurations, and lack of standards to validate the measurements. The licensee intends to obtain a better assessment of the hold-up remaining in the process prior to terminating the NCS controls or criticality accident alarm system coverage. Because the amount and the configuration of the SNM held-up in the process is not known, the criticality alarm system and NCS IROFS continue to be in effect in the process areas.

10/31/2013 NRC Integrated Inspection Report, #70-143/2013-004, July 1, 2013 – Sept. 30, 2013, ML13305A075

The inspectors interviewed licensee staff on environmental program changes made during the last year and determined that the program functions remained in compliance with the license application.

The inspectors interviewed environmental management about a routine groundwater sample that indicated a rise in uranium activity above the historical mean concentration. The temporary rise occurred at the North Site Remediation area in 2012. **A routine sample of groundwater from well # 98A experienced a temporary increase of uranium activity that was above the historical mean concentration level**, but well below regulatory discharge limits. The temporary increase triggered an investigation and additional sampling efforts were conducted. The levels have since decreased back to near the low historical levels. No definite cause was identified. Inspectors reviewed the investigation report concerning the temporary rise at well #98A. The investigation was conducted by the licensee's environmental contractor ARCADIS. The contractor completed the investigation in 2013, but was unable to identify any significant changes at the site and suggested continued sampling/monitoring.

2014

1/28/2014 The inspectors identified a URI (Unresolved Issue) involving the reporting of events in accordance with 10 CFR 70.50(b)(3) for **two separate incidents where workers were injured and transported off-site for required medical treatment with reported potential contamination on their clothing or body.**

On October 17, 2013, a security officer, while patrolling in the process

radiological controlled area, experienced a medical emergency and lost consciousness. He was found to have contamination on his clothing, so the section of clothing was removed. He was transported offsite by ambulance to the local community hospital for treatment along with health physics staff. Initially, the licensee reported contamination was found on the officer's clothing at the hospital, but on further analysis, the licensee reported detectable transferrable contamination was not found.

On October 29, 2013, a maintenance mechanic, while climbing down a ladder off a roof, lost his grip and fell to the lower roof breaking his leg. The worker had just completed work involving checking and cleaning monitoring probes on the air effluent stacks. The worker was found to have contamination on a lower leg of his coveralls, so the section was removed, and then he was found to have contamination on the underlying skin. He was transported offsite by ambulance to the regional medical center for treatment along with health physics staff. The licensee reported no contamination was found on the mechanics skin or coveralls at the hospital, but the smear results on the hospital floor indicated the presence of removable contamination. At the time of the radiation protection exit meeting, the licensee evaluated the contamination as naturally occurring radioactive material.

The inspectors opened URI 70-143/2013-005-01, Unplanned Medical Treatment Reporting, to allow time for the licensee to provide the survey results and data to the NRC. The NRC will review the results to determine if required 24-hour reports should have been made to notify the NRC for events that required unplanned medical treatment at a medical facility for an individual contaminated with radioactive materials.

2/21/2014 Event Report 49848 (dated March 17, 2014). The issue occurred on February 21, 2014, at approximately 0839 hours (ET). The report of the event was made on February 21, 2014, at approximately 1427 hours (ET). The location of the event is the Nuclear Fuel Services, Inc. (NFS) facility (Building 101B Restroom), located in the town of Erwin, Unicoi County, Tennessee.

An employee identified safety item was entered into to the facility Corrective Action Program (PIRCS # 42900) regarding difficulty hearing plant announcements and alarms in the recently renovated Building 110B restroom. The Building 110B restroom is located outside of any SNM processing areas. Testing of the Public Address (PA) system confirmed that announcements were difficult to hear in the Building 110B restroom. The speakers associated with the PA system are also used for annunciating the site evacuation warning. Subsequent testing of the evacuation alarm indicated the alarm was also difficult to hear in the Building 110B restroom. Safety management personnel were notified of the problem; and, the restroom was locked and posted with signs indicating the area was not to be occupied, pending resolution of the audibility issue.

7/10/2014 The Nuclear Regulatory Commission is launching a **special inspection** today at the Nuclear Fuel Services fuel fabrication facility **to assess the circumstances surrounding the alleged improper disabling of safety devices in violation of NRC regulations.**

On June 17, an employee was observed by an NFS supervisor to be improperly operating two valves that are identified as key safety devices. The valves were propped open, which rendered them unable to perform their intended safety function. They are intended to be manually operated to prevent a hazardous chemical solution from spilling on the floor and causing a chemical exposure.

7/30/2014 70-143/2014-003-01 **VIO Failure to Make a Report Required by 10 CFR 70.50(b)(3) (Paragraph D.1.a)** (ML14212A026)

10 CFR 70.50(b)(3) requires the licensee to notify the NRC within 24 hours of an event that requires unplanned medical treatment at a medical facility of an individual with spreadable radioactive contamination on the individual's clothing or body.

Contrary to the above, the **licensee failed to notify the NRC on October 17 and again on October 29, 2013**, of events that required unplanned medical treatments at medical facilities of individuals with spreadable radioactive contamination on their clothing or body.

8/29/2014 Special Inspection Report (SIT) 70-143/2014-006; July 10 through July 17, 2014 (ML14241A553)

Apparent Violation 2014-006-01 **Circumvention of Safety Related Components** (Section 2)

On June 17, 2014, an NFS operator was observed by a supervisor inappropriately operating the two-spring return IROFS valves, 302-BA-0B01 and 302-BA-0B85. The valves were observed to be inappropriately operated by using a box end wrench wedged into the system structure on each valve, thus rendering the valves unable to perform their intended safety function. The operator was observed removing the wrenches as the supervisor and another operator approached the process area. The operation of the valves was contrary to Standard Operating Procedure (SOP) 401-22-302, "Building 302 Area B," Step 4.2.8 Note which stated that **"toggle or self-closing valves must never be held open by any means other than an individual holding the valve handle."** The licensee removed the operator from shift operation duties, placed associated processes in a safe condition, performed valve line-ups and testing of safety components related to the affected process, and reviewed other recent activities performed by the individual. On June 18, 2014, the licensee notified the NRC of the loss of IROFS FAB-13 (Event No. 50208), pursuant to the requirements in 10 CFR 70 Appendix A Reportable Safety Events, (a) One Hour Report (4)(i), in part:

*An event such that no IROFS, as documented in the Integrated Safety Analysis (ISA) summary, remain available, in an accident sequence evaluated in the ISA, to perform their function in the context of the performance requirements in 10 CFR 70.61(b)(4) **High Consequence Event** – an acute chemical exposure to an individual from hazardous chemicals.*

2015

1/27/2015 Integrated Inspection Report 70-143/2014-005, ML15027A241

Discussed 50577 Event Notification - Unanalyzed Condition (Paragraph A.5)
The inspectors reviewed the licensee response to a selection of recent internally reported events (e.g., 43868, 45019, 45052, 45116, 45547, 50577), and a recent Nuclear Criticality Safety (NCS) related event that the licensee reported to the NRC (Event Notification 50577). (See below IIR dated April 17, 2015)

2/20/2015 30-day Report of Event 50748, ML15076A034

On January 21, 2015, testing of a proposed method for the recovery of uranium from used polypropylene cartridge filters was being conducted in the Research & Development Laboratory. The test involved placing a sample filter into a calciner furnace located inside a ventilation hood. The furnace door was closed once the heating process was initiated. **When the furnace reached its target temperature, flames were observed at the top of the furnace door.** The flames were fully contained within the confines of the ventilation hood. **The flames lasted for approximately 5 to 10 minutes. The glass in the sash for the ventilation hood developed spider cracks from the heat of the flame;** however, it remained intact throughout the event. When the flames were observed to be sustained in duration, the electric power to the furnace was secured and the fire self-extinguished. No indication of the fire having extended to any areas outside the ventilation hood or into the ductwork was noted during subsequent inspections by qualified personnel.

4/17/2015 Inspection Report 07000143/201-5002 w/Violations, Jan.1, 2015 through March 31, 2015, ML16107A039

Opened:

70-143/2015-002-01, **VIO, Circumvention of Safety Related Components** (Paragraph D.1.b):

A Severity Level (SL) IV violation of the licensee's Standard Operating Procedure (SOP) 401-22-302, Building 302 Area B, was identified for an operator holding open safety-related self-closing valves with means other than physically

holding the valve handles. The inspectors determined that the operator defeated the spring return closed function of the valves resulting in unavailability of IROFS and reduction in IROFS controls, respectively, for **two potential high consequence accident sequences, chemical exposure and Nuclear Criticality Safety (NCS). The consequence of concern was the inhalation of the pure ammonium hydroxide by personnel in the area once the chemical became airborne.**

70-143/2015-002-02, **VIO, Failure to Analyze Credible Abnormal Condition** (Paragraph D .1.c):

The inspectors identified a SL IV Violation of Title 10 of CFR 70.61(a) and 70.61(d) in which the licensee failed to evaluate the risk of a nuclear criticality accident in the ISA to assure that, under credible abnormal conditions, all nuclear processes remained subcritical. Specifically, the licensee failed to evaluate and limit the risk of a nuclear criticality accident involving the accumulation of fissile material in unfavorable geometry electrical boxes. As a result, the licensee's safety basis assumption that leaks would spill to the floor was not valid.

Shortly before 0300 October 29, 2014, licensee staff was troubleshooting a resistance temperature detector (RTD) for IROFS FAG-06 in the first pass of the uranium recovery boil-down system, which had been alarming and shutting down the system since the morning of October 28, 2014. When technicians opened the sealed junction box containing the wiring block for the RTD, they found 90 mL (three ounces) of solution inside the thermowell and junction box. The electrical conduit exiting the junction box provided a flow path for solution to enter an unfavorable geometry electrical box that had not been analyzed in the licensee's ISA. The licensee's analysis had assumed that leaking solution would spill to the floor.

When the junction box was opened, the licensee found extensive corrosion inside the junction box, including on and around the RTD connection. The connection block was found to have detached from the back wall of the junction box and fallen into the solution at the bottom of the junction box. In addition, the internals of the junction box appeared to be covered in condensation. The solution level had not reached the level of the conduit, and no solution was found in the conduit. The integrity of the thermowell had failed, allowing solution to enter the junction box containing the RTD connections. When the licensee later removed the thermowell, it was found to have degraded due to pitting corrosion, allowing the formation of a pinhole leak. **The thermowell had been in service for 15 years.** The RTD was serviced and the junction box opened every six months, most recently four months before the event in July, during which no solution was observed. However, **the thermowell itself had not been removed for inspection or servicing since installation.**

7/28/2015 Integrated Inspection Report 70-143/2015-003 AND NOTICE OF VIOLATION
ML15209A728

Open: 70-143/2015-003-01, VIO, **Inadequate Procedural Guidance for the Proper Handling and Cleaning of Potentially Contaminated Waste** (Paragraph D.1.d)

The inspectors identified a cited Severity Level IV violation of SNM License SNM-124, Safety Condition 01, for the failure to have adequate procedural guidance for handling waste material. Specifically, the lack of detailed procedural guidance in SOP-401-17, FMF Cleaning, Revision (Rev.) 7, resulted in a release of waste material due to over-pressurization of a two-liter container. **The over pressurization of the two-liter container was due to an unplanned chemical reaction.**

On Saturday, April 4, 2015, a NFS fuel supervisor noticed an unusual odor coming from an area near the main process floor. Upon further investigation, the supervisor and an operator discovered a ruptured and smoldering two-liter container on the floor of an unoccupied storage area and a **visible brownish-red haze in the air**. The contents of the container, cleaning products, had been ejected onto the floor and adjacent areas within the 306 West storage area. Access to the area was immediately restricted and additional entry requirements posted to allow for cleanup activities. No one was injured. The licensee reported this event to the NRC as EN 50954 and entered it into the CAP as PIRCS #47925.

In an effort to avoid unplanned chemical reactions, NFS had procedures and training in place which provided details on how items were to be rinsed and dried prior to being placed into approved containers to minimize the potential for a chemical reaction. A lack of detailed guidance in SOP-401-17 was identified by the licensee as a causal factor to the April 4, 2015, event. The SOP did not provide detailed guidance to operators on how to adequately clean non-compatible materials. Specifically, detail was lacking in the procedure concerning rinsing and drying of items prior to placement into containers.

Closed:

Event Notification (EN) 50748: Building 110B Furnace Fire (Paragraph D.1.a)
Failure to Analyze Credible Abnormal Condition (Paragraph D.1.b)
Circumvention of Safety Related Components (Paragraph D.1.c)
Handling and Cleaning of Potentially Contaminated Waste (Paragraph D.1.d)
70-143/2015-504-0 LER EN 50954: Unplanned Contamination Event (Paragraph D.1.d).

9/18/2015 **Physical Security Inspection** Report No. 07000143/2015403, ML15264A785

Two apparent violations (AVs) were identified, and are being considered for escalated enforcement action, in accordance with the NRC Enforcement Policy. Document is OOU (Official Use Only).

10/23/2015 Integrated Inspection Report Number 70-143/2015-004, ML15296A160

70-143/2015-004-01 Non-cited Violation (NCV) **Failure to Treat Mixed Waste (Paragraph C.5)**

The inspectors identified a Non-Cited Violation for failure to treat mixed waste prior to shipping the waste to a disposal facility as required by 10 CFR 61.56(a).

On September 4, 2014, the licensee officially notified the Division of Solid Waste Management of the Tennessee Department of Environment and Conservation (TDEC) that it had inadvertently shipped a total of eight filters in five containers of low-level mixed hazardous waste as non-hazardous low-level radioactive waste to the Nevada National Security Site (NNSS).

The chromium concentration in the filters was estimated after-the-fact to be between 6-16 parts per million (ppm), which was above the 5ppm regulatory limit. The filters were included in three separate shipments that occurred earlier in the year. The licensee immediately suspended shipments to NNSS until the issue was investigated and corrective actions taken.

In the uranium metal processing area, the licensee processes both metal and oxide feed. The licensee determined that it erroneously designated a batch name for metal, which per process knowledge is non-hazardous, to the oxide feed stream. As a corrective action, the licensee modified its process for assigning batch numbers to the waste streams to prevent recurrence of the issue.

11/5/2015 **Physical Security** Inspection Report and Notice of Violation, No. 07000143/2015403, Aug 4-6, 2015, ML15309A525.

Apparent security violations of U.S. Nuclear Regulatory Commission (NRC) requirements were identified. Details regarding the apparent violations (AVs) were provided in NRC Inspection Report (IR) No. 07000143/2015403, dated September 18, 2015.

On October 15, 2015, a closed pre-decisional enforcement conference was conducted in the Region II office with members of your staff to discuss the AVs, the significance, root causes, and your corrective actions.

This violation has been categorized as an escalated enforcement action in accordance with the NRC Enforcement Policy. (Note: All documents involving these issues are OOU, Official Use Only).

NOTE: Ref the **Pre-Decisional Enforcement Conference** on Oct 15 at Region II involving the above physical security violations. Document date is 10/23/2015, ML15296A385, and is **Official Use Only (OUO)**.

2016

4/29/2016 Integrated Inspection Report 70-143/2016-201-6002, Violations, (ML16120A089)

Opened:

70-143/2016-002-01 VIO **Failure of the Fire Protection Program to Maintain Records of Inspection Testing and Maintenance of Fire Protection Systems and Components.** (Paragraph A.8.a.1))

70-143/2016-002-02 VIO **Failure to Perform Functional Testing on Two Non-Configuration Management (CM) Controlled Isolation Valves Following the Connection to a CM Controlled Operating System.** (Paragraph C.4)

Discussed:

70-143/2013-003-01 VIO **Failure to Comply with NFPA 101 Required 1.5 Hours Emergency Lighting System Test In Accordance with Licensee Commitments in the License Application** (Paragraph D.1)

First Severity IV Violation: The NRC-identified a SL IV violation of Special Nuclear Material License SNM- 124, Chapter 7, “Fire Safety”, Section 7.2.3 “Inspection, Testing, and Maintenance of Fire Protection Systems”, for failure to have required records available for all inspections, tests, and maintenance of the fire protection systems and components, and Section 7.4.1 “Facility Design Criteria”, for failure to record follow-up actions in accordance with referenced NFPA 801, Section 4.4 “Testing, Inspection and Maintenance.” **Specifically, the licensee could not produce and did not have complete records for Fire Protection systems surveillance, testing, inspection results, and follow-up actions.**

During the inspection the week of February 1, 2016, the inspectors identified that required records of the inspection, testing and maintenance of the licensee’s fire protection systems and components could not be readily retrieved. The licensee entered this condition into their CAP as PIRCS P20915 “Review and Revise the Fire Protection Inspection/ test procedures”.

Additionally, during a review of the available inspection, testing and maintenance records the NRC inspectors identified multiple instances where fire protection system deficiencies had been identified, but no follow-up actions had been

recorded indicating that these issues had been evaluated or addressed (e.g. corrective action documents, work requests, or other resolutions). **An example of a deficiency identified was Fire Door D344, a component of IROFS Fire-19, which had been inspected and tested per NFSHS-B-95 on January 27, 2015 and found to be non-functional because of deficiencies in the latching mechanism and no records were found to demonstrate that follow up actions had been taken to address this deficiency before February 18, 2016. The function of D344 was to close and latch in the event of a detected fire in the immediate area in order to ensure the fire would not migrate into adjacent areas. During additional testing conducted on February 18, 2016, it was noted again that D344 would not latch.** The licensee initiated WR 245781 to repair the door, the Fire System Impairment 2016-034 on February 19, 2016, to evaluate compensatory action. In addition, the licensee initiated PIRS 52932 to document this issue.

Second Severity Level IV Violation: The inspectors identified a self-revealing cited SL IV violation of Special Nuclear Material License SNM-0124, for failure to follow Section 11.1.3 of the license which requires that the implementation of the CM Program be accomplished through procedures and instructions that delineate the responsibilities and actions of personnel to effectively implement the CM Program elements. Specifically, the inadequate control of the installation of Unit K in Area 800 resulted in potentially exposing an operator to an unplanned radiological release.

A new unit (Unit K) in area 800 was authorized to be installed on March 19, 2015 through a change authorization in accordance with licensee procedures. The existing off-gas system did not have valves that could be used as isolation for tie-in of the new Unit K, therefore, the work scope included the installation of two new isolation valves to provide the necessary isolation between Unit K and the common off-gas header.

The installation of the new unit and the tie-in into the existing common off-gas header required a work package and an approved letter of authorization (LOA) in accordance with licensee procedures. The LOA was approved and effective on September 16, 2015, **but did not require that the newly installed isolation valves be functionally tested prior to restart of the common off-gas system.**

The work request was approved on April 1, 2015, but lacked details of specific work activities to be performed during the tie-in and did not require functional testing of the two new isolation valves. In addition, the work request had a hand written note stating that a separate work request was needed for the tie-in of Unit K into the operating off-gas system.

The purpose of the second work request was to provide the necessary requirements for system tie-in including functional testing; however, a separate work request was never issued. Therefore, on September 27, 2015

Unit K was connected to the operating off-gas system and the valves were installed without completing the required functional testing.

On Sunday September 28, 2015, while conducting normal operations in an adjacent unit, **an operator pressurized the common off-gas header. He noted a “puff” coming out from the new isolation valves. The “puff” was off-gas material released into the room via the loose unions on the top of the valves. The area was isolated and the licensee performed air samples and smears. The initial high volume air sample exceeded the administrative limit for the area; however, after a few minutes of recycling the air in the room, a follow up evaluation demonstrated that there were no exposure concerns for the operators.**

The licensee performed nasal smears on the operators and **no measurable uptake** was noted. After the event, the licensee conducted a root cause investigation.

Specifically, NFS failed to follow the following CM procedures and instructions as evidenced by the following examples:

- Example 1: **NFS failed** to include instructions in the LOA to perform functional testing of the new Unit K isolation valves following connection to the operating system as required by Section 4.2.3 of NFS-CM-002, Identification and Control of Configuration Items.
- Example 2: **NFS failed** to meet NFS-WM-001, Control and Execution of Work, Section 5.1 which states that “Complex project work that is considered a ‘Change’ to plant Systems, Structures, or Components, involving multiple phases/work sequences shall not be initiated using a single work request.”

(Discussed) Severity Level IV Violation (VIO) 70-143/2013-003-01, **Failure to Comply with NFPA 101 Required 1.5 hours Emergency Lighting System Test in accordance with Licensee Commitments in the License Application**

On June 12, 2013, the licensee discovered that the 1.5-hour functional test of the emergency lights required by NFPA 101, Life Safety Code, 2009 edition, was not being performed. The licensee authorized a deviation from the code. The inspectors reviewed the licensee documentation and concluded that requisite testing had not been performed and that the licensee did not have the authority to make a code deviation decision.

Details of the VIO are documented in NRC Inspection Report 70-143/2013-003. Meeting Discussion

On February 26, 2016 at the NFS plant site, a meeting occurred between NRC Region II representatives and licensee management concerning the status of NRC VIO 2013-003-01. Fundamentally, the licensee accepted that a code deviation should not have been authorized, and as allowed by the NFPA code, should have

been documented as an equivalency. The licensee later revised their documentation to justify an equivalency which the NRC did not accept both through a continuing dialogue and during a 2015 NRC fire protection inspection. **The NRC stated that the majority of the licensee's equivalent package of protection was not specific to the emergency lighting function, and therefore unacceptable.**

12/2/2016 **Physical Security** Inspection Report 70-143/2016-405, ML16341A885

Onsite inspection conducted from November 14-18, 2016, at the Erwin, Tennessee facility. Based on the results of the inspection, the NRC has determined that **two Severity Level (SL) IV Violations** of NRC requirements were identified. (Note: Document is classified).

2017

2/13/2017 Integrated Inspection Report No. 70-143/2016-005 and **APPARENT Violations** 2016-005-01 and 2016-005-02, ML17045A037

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened:

70-143/2016-005-01 AV **Failure to Maintain CAAS Audibility** (Paragraph A.4)

70-143/2016-005-02 AV **Failure of CAAS Self-Monitoring Feature** (Paragraph A.4)

Opened & Closed:

70-143/2016-005-03 NCV **Failure to Treat Mixed Waste** (Paragraph D.1)

Closed:

70-143/2016-005-0 (EN 52358) LER FMF **Loss of Criticality Accident Alarm System** (CAAS) Notification Capability (Paragraph D.2)

Discussed:

70-143/2016-002-0 (EN 52190) LER **Building 120 CAAS Speaker Non-Functional** (Paragraph D.3)

First Severity Level IV Violation: Failure to ensure the CAAS was maintained to provide an audible alarm signal if an accidental criticality occurs. The licensee failed to maintain in each area in which such licensed SNM is handled, used, or stored, a monitoring system which will energize clearly audible alarms if accidental criticality occurs. Specifically, CAAS speakers within the B302, B303, and B306 West were unavailable for a substantial time period where HEU was being handled, used, and stored.

On November 9, 2016, a series of public address announcements were made pertaining to a “Stop Movement” of SNM within the FMF. Personnel involved with the “Stop Movement” noted that speakers within the FMF did not provide an audible signal. The speakers are a component of the CAAS to provide an audible alarm to plant personnel to evacuate in the event of an accidental criticality to minimize the potential exposure to radiation. The CAAS is required by regulation under 10 CFR 70.24, “Criticality Accident Requirements”.

Additionally, the severity and duration of the event were increased due to a failure of the self-monitoring feature of the system. **Due to the loss of the safety system with no redundant backup, the licensee made a 24-hour event notification on November 9, 2016 under 10 CFR 70.50(b)(2).**

The licensee completed a preliminary investigation of the event and noted that the **probable cause included degradation of two components. The first is a degradation of a portion of the speaker cable due to age or insulation breakdown. The second is a failure of the self-monitoring capability of the system to identify all circuit faults on the affected speaker zone.**

Second Severity Level IV Violation: Failure of Self-Monitoring Feature to Detect System Fault. Violation of the License Application, Section 4.7.12.4, “Criticality Detection System”, was identified for the **failure to ensure the self-monitoring feature of the CAAS was capable of detecting electronic component failures to provide a warning signal to personnel in the event of such a failure.**

On November 9, 2016, NFS employees identified inoperable CAAS speakers within the Fuel Manufacturing Facility (FMF) when they could not hear announcements pertaining to a “Stop Movement” of Special Nuclear Material within the FMF. Further investigation by the licensee identified that the self-monitoring feature of the system did not detect an apparent wiring fault which resulted in a loss of speaker function.

6/16/2017 **Air Pollution Permit Violation Notification (State of Tennessee),**
(ML17173A142)

On May 25, 2016, the Technical Secretary issued operating permit number 07141 SP for the enriched uranium processing operations at your facility located at 1205 Banner Hill Road in Erwin, Tennessee. Condition 20 of operating permit number 07141 SP requires you to comply with all applicable state and federal air pollution regulations. On or about April 18, 2017, the Division received your Blower Replacement Notification (Notification) concerning a replacement blower on Stack 573 at the enriched uranium processing operations. Your Notification indicates that this replacement blower was installed on March 28, 2017.

Based on the information in the Notification, the Division has determined that the **installation of the replacement blower does indeed qualify as a change in exit velocity of greater than twenty-five (25) percent, and that the Technical Secretary was not notified thirty (30) days before this change was made as required by Tenn. Comp. R. & Regs. 1200-03-09-.02(7)**

10/17/2017 Integrated Inspection Report No. 70-143/2017-004, July 1 to September 30, 2017, and **Notice of Violation**, ML17290A763

Severity IV Violation: Failure to Comply with Applicable DOT Requirements for Transporting Licensed Material Outside the Site Usage on Public Highways.

On June 13, 2017, the licensee began the process of implementing a Work Request to remove a section from the X804 vessel (sidearm) to be shipped to BWXT for metallurgical testing at the Lynchburg Technology Center (LTC). Maintenance personnel cut the gooseneck section of the vessel into four sample sections which were prepared and sealed individually into four bags. The four bags were placed into one larger bag and transported to the 300 area for surveying. Since the items were to be shipped to the LTC, the administrator for the Transportation Waste Management Program, requested completion of a detailed survey.

On June 20, 2017, a RADCON technician performed smears and direct frisking on the external surface of each of the individual bags containing the sample sections. No contamination was detected. The individual sample sections within the bags were not surveyed. These survey results were recorded and submitted to the administrator for the Transportation Waste Management Program. It was clearly noted on the survey records that only external smears and frisks had been performed on the bags and the destination for the samples was the 300 Warehouse, not an offsite location. The four sample bags were returned to the larger bag and moved to the 300 Warehouse on June 20, 2017, and the survey results were submitted to the administrator. The administrator did not recognize that the survey that was performed did not include sufficient information to properly classify the package for shipment offsite.

Specifically, the licensee shipped the package containing the sample items as non-DOT regulated with contamination on the items above the maximum of 2,200 dpm/100cm² removable alpha. The licensee's failure to comply with DOT requirements constitutes a violation of 10 CFR 71.5(a), which states, in part, "Each licensee who transports licensed material outside the site of usage, where transport is on public highways shall comply with the applicable requirements of the DOT regulations in 49 CFR parts 107, 171 through 180, and 390 through 397, appropriate to the mode of transport."

12/21/2017 **30-Day Written Report of Legacy Contamination Identification**, ML18002A363

On November 24, 2017, Nuclear Fuel Services, Inc. (NFS), Erwin, TN, identified transferable contamination in overhead surfaces in the tool room of Building 120 (B120), the NFS Maintenance shop. This building is inside the Protected Area and known to have fixed radioactive contamination but has been an uncontrolled area for contamination control purposes. The maximum transferable contamination level identified was 16,791dpm/100cm² alpha. The transferable alpha contamination action level is 200 dpm/100cm² for uncontrolled areas per Table 4-7 of SNM-124.

Radiological survey data collected in the overhead surfaces obtained on November 24, 2017, through November 28, 2017, identified a mean alpha transferable contamination value of 2,052 dpm/10cm² and a maximum value of 16,791 dpm/100cm² transferable alpha contamination. Gamma Spectroscopy Analysis of a large area wipe characterized the transferable contamination as containing 48% Th-232, 24% U-235 and 28% U-238 activity.

Facility records maintained per 10 CFR 70.25(g)(3) indicate B120 was constructed in 1957. B120 is known to contain fixed radioactive contamination and is posted with this information. The building was primarily used for maintenance of plant facilities including radioactively contaminated equipment.

During its history, a portion of the building housed a high-enriched uranium process and a lathe that was used to turn uranium/thorium ingots. In the 1980's satellite maintenance areas were developed and B120 was decontaminated and treated as an uncontaminated area.

In November 2017, Maintenance personnel initiated a housekeeping project in this area including removal of some legacy electrical conduit. Subsequent radiological surveys identified the conduit contaminated up to 1,248 dpm/100cm² transferable alpha contamination which led to the discovery of the legacy contamination in the overhead areas of the building.

The probable cause of the event was inadequate decontamination, remediation, and controls in the 1980's which led to an inappropriate release of the area from contamination controls.

2018

1/4/2018 **Physical Security** Inspection Report No. 70-143/2017-401, Nov. 13-17, 2018, and **Notice of Violation**, ML18005A018

Based on the results of the inspection and in-office NRC staff review, the NRC has determined that a **Severity Level (SL) IV violation** of NRC requirements was identified. (**Note:** This document is classified)

4/19/2018 Integrated Inspection Report No. 70-143/2018-002, Jan. 1-Mar. 31, 2018, and **Notice of Violation**, (ML181909A306)

Severity Level IV Violation: From October 1, 2011 to February 9, 2018, the licensee did not (1) design the Criticality Accident Alarm System (CAAS) to be able to respond to the minimum accident of concern while in Storm Mode and (2) perform tests of the Storm Mode logic when periodically testing the CAAS.

The licensee uses Storm Mode to minimize false alarms during thunderstorms and maintenance. In Storm Mode, the normal system logic of a detector pair alarming to activate the CAAS is replaced with a set of four or more detectors needing to alarm to activate the CAAS. Storm Mode is implemented by a programmable logic controller (PLC) located adjacent to the hardwired CAAS control panel.

Storm Mode was installed on October 1, 2011, because the CAAS had been inadvertently activated by both thunderstorms and construction vibration. Excessive vibrations can set off the CAAS detectors, which had been periodically occurring with both detectors in the detector pair going into alarm and inappropriately activating the CAAS. Storm Mode required multiple, non-co-located detectors to alarm simultaneously, thus reducing the CAAS activations and subsequent evacuations.

Based on the information reviewed, the inspectors concluded that the licensee did not have a technical basis (i.e., from modelling) demonstrating that the minimum accident of concern would activate enough detectors (i.e., expose them to 20 mrem/hr or more) to trigger the CAAS to alarm, depending on the location and magnitude of the criticality accident.

Additionally, the licensee failed to periodically test the Storm Mode PLC logic as required by ANSI/ANS-8.3, Section 6.4, "Periodic Tests." Specifically, Section 6.4 requires, in part, that "The entire alarm system shall be tested periodically." The inspectors determined that the CAAS system is tested on a periodic basis; however, **the Storm Mode PLC logic was only tested at the time of installation in 2011.**

5/18/2018 **Notice of Violation from State of Tennessee**, ML19178A282 (Note: This was added to NRC ADAMS on 6/28/19)

Failure to Report Non-Compliance to the State Division of Water Resources within 24 hours of the discharge is a violation of NFS' NPDES Permit TN0002018– Fire Water Loop Discharge of City Water and Soil into Storm Water Drainage System

On May 3, NFS experienced a break in the main fire water loop due to construction activities. **The damage to the pipe occurred as construction personnel were excavating** with a track hoe to prepare the area for a concrete pad to be poured. The fire water loop is fed by city water. The break in the fire water pipe caused water and soil to be displaced into the nearby storm water drainage system. The water was isolated by closing certain valves within the NFS fire water loop system. NFS estimated the amount of chlorinated water lost was between 5,000 and 7,000 gallons and the volume of potentially contaminated soil was 1 cubic yard. The storm water drainage system gate had been closed prior to the construction work as a precaution. The majority of the water and soil was contained within the storm water drainage system but a discharge did occur to Martins Creek via the South West Stormwater Ditch because **the gate does not fully prevent seepage and was momentarily opened slightly to prevent the flooding of an adjacent building.**

8/8/2018

30-day written reply to Event Notification 53502, (**Spill of 17 Liters of HEU mixed with molar nitric acid in Bldg 333**), ML18236A554 on July 11, 2018, at approximately 0645 hours (ET) in Building 333, Uranium Metal Dissolution area, **approximately 17 liters of Uranyl Nitrate was spilled.** This solution consisted of approximately two (2). Molar nitric acid with 3 .1 ES micro Curies of Highly Enriched Uranium. Leakage was from Column C303.

The spill was contained within an area of approximately 150 sq. ft. The event was entered into the corrective action program. Cleanup activities were initiated at approximately 1000 (ET). On July 12, 2018, it was discovered that the glass column was cracked and structural stability was in question. Cleanup activities were suspended pending further evaluation to ensure safety while continuing additional decontamination activities.

Potential health and safety consequences to workers include exposure to nitric acid and potential spread of radioactive contamination. During cleanup activities, one worker had skin contamination of 2,332 dpm alpha on his hand which was quickly decontaminated. Work records indicate the individual could not have been contaminated greater than approximately two (2) hours.

As a result, adjacent columns were drained and isolated to eliminate potential sources of additional leakage. Actions to decontaminate the affected area to below building limits, and replace and retest the failed column were completed on July 25, 2018.

The **probable cause of the column failing was minor component misalignment and previous torque application resulting in unacceptable lateral tensile stresses in the glass column.** The fractured column was Kimax Beaded Process Pipe manufactured by Kimble Glass, Inc.

10/31/2018 **Physical Security** Inspection Report No. 70-143/2018-411, Oct. 1-4, 2018 and **Notice of Violation**, ML18305A005

Areas examined during the inspection consisted of your programs related to security training and NRC's annual observation of a security force-on-force drill. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations of activities in progress.

Based on the results of the inspection, the NRC has determined that a **Severity Level (SL) IV Violation** of NRC requirements was identified.

(**Note:** Document is classified)

2019

9/12/2019 30-day written report of Event 54218, ML19262D347

At approximately 1320 hours (ET), on August 13, 2019, a series of Public Address announcements were made. A supervisor noted that the public address announcement was not audible in Building 333 LEU high bay. The speaker system provides coverage for the CAAS and the Fire Alarm systems which is also used for public address announcements.

Notifications were made and at approximately 1425 hours (ET) another PA announcement was made to confirm speaker audibility in all speaker locations associated with the effected speaker zone. This testing confirmed the only area with a speaker out of service was in Building 333 LEU high bay. At approximately 1430 hours (ET) compensatory measures were established to restrict personnel access in the impacted area to require radio communication with the alarm room.

At approximately 1600 hours (ET) the CAAS alarm audibility was tested which confirmed that the CAAS was not audible from adjacent redundant speakers. After making appropriate preparations, at approximately 1726 hours (ET) the speaker was replaced and retested satisfactorily.

(**NOTE: CAAS alarms have been on ongoing problem for many years at NFS**)

(**Note: All NRC inspections during this period stated "no violations of more than minor significance were identified."**)

2020

(Note: All NRC inspections during this period stated “no violations of more than minor significance were identified.”)

2021

4/28/2021 Integrated Inspection Report 07000143-2021-001, March 31, 2021, MLL21118B020, (**Minor Violation** regarding:

60-Day Written Notification of Event, dated December 16, 2020 (ADAMS ML21029A067).

On September 15, 2020, the licensee shipped 40 empty ES-3100 shipping drums to the Y-12 National Security Complex. On November 4, 2020, Y-12 personnel identified that on one of the empty ES-3100 drums seven of the eight outer lid bolts were not tightened to applicable regulations.

Minor Violation: 10 CFR 71.17(c)(2) states, in part, “that each licensee shall comply with the terms and conditions of the license application, certificate, or other approval, as applicable.” Certificate of Compliance Number 9315, Revision 15, which is applicable to ES-3100 Shipping Package, Safety Analysis Report Section 7.1.2.2, requires the outer lid bolts to be torqued to 30 ft-lb. Contrary to the above, on September 15, 2020, NFS shipped 40 empty ES-3100 shipping packages to the Y-12 National Security Complex and one of the ES-3100 packages (identification number USA/9315/B(U)F-96) was found to have seven of the eight outer lid bolts not tightened to the required torque specifications. No issues were found with the torque of the other 39 ES-3100 packages on the shipment. Additionally, no issues were found with the torque of the inner containment vessel closure nuts on any of the 40 ES-3100 packages on this shipment.

6/25/2021 **Physical Security** Core Inspection Report, 07000143/2021-402 and **Notice of Violation**, ML21176A156

On June 3, 2021, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Nuclear Fuel Services, Inc. and discussed the results of this inspection with Mr. Mike Tesar and Mr. Tim Knowles and other members of your staff. The results of this inspection are documented in the enclosed report. The enclosed report documents a cited **Severity Level IV violation**.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response.

SpecificResponseDescription The NRC's review of your response will also determine whether further enforcement action is necessary to ensure your compliance with regulatory requirements.

8/13/2021 Core Inspection Report, 07000143/2021-403, **Severity Level IV Violation.**
(Note: Document is classified). ML21225A074

9/21/2021 30-Day Written Notification of Violation (SNM-124 License
Condition S-7) WER 07000143/2021-003-00

In September 2021, an NFS-authorized contractor was performing groundwater treatment activities at the NFS site using bioremediation technologies to mitigate tetrachloroethylene (PCE). The treatment involved the injection of Anaerobic BioChem Plus (ABC+) into ground water wells located on the North Site of the NFS property. On September 9, 2021, NFS personnel identified groundwater treatment chemicals surfacing in the storm water drainage system. The release was identified as a ground water treatment injection mixture, ABC+, which entered the storm water drainage system known as the west ditch that flows to Martin Creek. When NFS identified the release, all groundwater injections were stopped.

Water from the west ditch was pumped to an upland location on the North Site and allowed to soak into the ground to prevent the ABC+ mixture from further progressing to the west ditch and into Martin Creek. Spill pads and booms were also placed in the west ditch to capture any oily sheen present. Impacted algae, sediment, and rocks from the west ditch were manually removed as part of clean-up efforts. The licensee collected "grab samples" and did not identify gross radioactivity values in **excess** of regulatory limits. The licensee entered the event into the licensee's PIRCS program (PIRCS 30604), conducted a general investigation, and developed a corrective action plan.

On September 9, 2021, NFS personnel verbally reported the issue to the Tennessee Department of Environment and Conservation (TDEC), followed by a written report on September 14.

On November 4, 2021, TDEC issued a notice of violation for the subject storm water drainage system discharge. On December 2, 2021, NFS provided a 30-day written notification of the violation (ADAMS ML21344A052) to the NRC as required by SNM-124 License Condition S-7.

10/13/2021 Core Inspection Report, 07000143/2121-404, **Severity Level IV Violation.**
(Note: Document is classified), ML21287A667

10/20/2021 Core Inspection Report, 07000143/2021-003, **Severity Level IV Violation.**

(Note: Document is classified), ML21293A113

2022

6/16/2022 30-Day Speaker Event (NRC Event No. 55902)

On May 18, 2022 at approximately 1450 hours (ET), an electrical switch for the (CAAS) legacy speakers was noted to be out of its normal position. A functional redundant speaker system is installed in the main processing plant and laboratory. As a consequence of the switch being out of position, in the highly unlikely event that the CAAS had actuated, the alarm would not have been annunciated in areas outside of the main processing area and laboratory where there are no redundant speakers.

Compliance was restored at approximately 1500 hours (ET) when the switch was placed back in its normal position. The system was subsequently tested and confirmed to be operational. The most recent audibility test of the speaker system had been performed on May 13, 2022 at approximately 1100 hours (ET). The licensee notified the NRC Resident Inspector on May 18, 2022 at approximately 1625 hours (ET).

8/1/2022 Core Inspection Report, 07000143/2022-002 and **Notice of Violations**, June 30, 2022, ML22213A046 (**two Severity Level IV violations**)

First Severity IV Violation: On January 25, 2022, the licensee failed to follow the chemical safety instructions in procedure SOP-401-17 to segregate cleaning materials (i.e., cheesecloth) that had been in contact with an incompatible chemical (i.e., nitric acid), resulting in a small fire involving NRC-licensed material.

On January 25, 2022, a chemical reaction occurred in a two-liter container during material inventory cleanout activities in Building 302. The container was inside a process enclosure at the time plant operators observed the first indications of a chemical reaction and smoldering, which eventually progressed to a small fire. The container was damaged in the fire, releasing its contents to the enclosure. The contents of the two-liter container were a combination of cleanup material waste commingled with highly enriched uranium. The NFS's Fire Brigade responded promptly and extinguished the fire inside the enclosure. The licensee did not identify equipment damage outside of the process enclosure. Additionally, the licensee did not identify any personnel injuries, exposures, contamination, or releases to the environment exceeding regulatory limits. The licensee reported the event within 24 hours under the provisions of 10 CFR 70.50 (ADAMS Accession Number ML22066B008).

The cause of the fire was attributed to chemical incompatibility of the materials placed in the two-liter container by plant operators. Per NFS's standard operating procedure (SOP) 401-17, "FMF Cleaning," inventory cleanout of equipment in the affected process area may consist of sequential rinses with caustic solution, acid solution, and deionized water. Cheesecloth rags are typically used for wiping down surfaces during these cleanout rinses. Per SOP-401-17, cheesecloth rags that have been in contact with nitric acid are supposed to be thoroughly rinsed with water after use and dried before being placed in waste containers to avoid introduction of incompatible materials in the same container.

Second Severity IV Violation: From May 13 through 18, 2022, the licensee failed to maintain a monitoring system capable of energizing clearly audible alarm signals in certain areas of the facility in which licensed SNM is handled, used, or stored if an accidental criticality had occurred in any area of the facility monitored by the CAAS. Specifically, an announcement for a non-nuclear event revealed that the CAAS and fire protection systems were unable to provide annunciation coverage in certain peripheral buildings where SNM is handled due to a mispositioned switch that disabled the signal amplification function to the speakers in those areas for approximately five days.

This violation is identified as VIO 70-143/2022002-02, "Failure of Criticality Accident Alarm System Speakers (Event Notification 55902/Written Event Report 2022-002-00)."

2023

1/12/2023 NFS **Material Control and Accounting Program** Inspection Report 07000143/2022406, ML23013A060 (**Note:** Document is For Official Use Only; therefore, no details on either of these violations; however, both should be considered serious). **Two Severity Level IV violations.**

Based on results of this inspection, the NRC determined that a **Severity Level IV violation of NRC requirements occurred.**

Additionally, based on the results of this inspection, **NRC determined that one additional Severity Level IV violation** of NRC requirements occurred.

1/23/2023 NFS Inspection Report 07000143/2022004, and Notice of Violation (ML23017A096)

During an NRC inspection completed on December 31, 2022, a violation of NRC requirements was identified. This is a **Severity IV Violation** (Section 6.2.d.2 of NRC Enforcement Policy).

On November 10, 2022, the licensee failed to handle SNM in accordance with written procedure SOP-401-02-302, Revision 052E, Area 200. Specifically, A designated operator failed to follow written instructions to observe the process start-up, which resulted in a missed opportunity to identify an incorrect system configuration that ultimately caused a spill of SNM and an unplanned contamination in a process area.

ADDED:

Sixteen (16) Known Environmental Releases Which Triggered Outside Notification, as follows:

8/29/1997, Ground Water leak during transfer to Waste Water Treatment Facility (WWTF). Notified TDEC and NRC

9/4/1998, Sewer discharge to Town of Erwin Publicly Owned Treatment Works (POTW) exceeded Gross Beta limits of 300 pCi/l. Notified Erwin Utilities and NRC

5/12/1999, Sewer discharge to Town of Erwin Publicly Owned Treatment Works (POTW) exceeded 25pCi/l for U238. Notified Erwin Utilities and NRC

8/3/2000, The May 2000 monthly isotopic composite sample result for Waste Water Treatment Facility (WWTF) discharges was elevated. Notified NRC

8/8/2000, Groundwater infiltration caused an overflow of lab waste water pit. Notified TDEC and NRC

11/19/2000, A defect in the floor trench of the Waste Water Treatment Facility (WWTF) was identified during an inspection. Notified TDEC.

9/22/2003, The Waste Water Treatment Facility (WWTF) discharged a batch with elevated nitrite plus nitrate attributes. Notified TDEC.

2/05 & 3/05, Sewer discharge to the Erwin Publicly Owned Treatment Works (EPOTW) exceeded the Technical Review Criteria and the monthly Average permit limit for U-238 in March 05. Notified EPOTW and NRC.

2/5/09, Sanitary sewage leak from a portable toilet into the storm water drainage system. Notified TDEC.

4/28/10, Water and molasses leached from a ground water monitoring well into the storm water drainage system. Notified TDEC.

10/4/10, Water and molasses leached from a ground water monitoring well into storm water drainage system. Notified TDEC.

5/3/18, City water and soil were discharged into a storm water drainage system. Notified TDEC.

8/29/18, Water and emulsified vegetable oil leached into the storm water drainage system. Notified TDEC.

12/9/19, Sanitary Sewer pH of 9.14 standard units (su) exceeded the permit limit of 9.0 su. Notified Erwin Utilities.

7/23/20, Rupture of a hydraulic seal on a facility elevator released hydraulic fluid into the storm water drainage system. The hydraulic seal ruptured occurred during a large rain event. Notified TDEC.

9/9/21, Groundwater treatment injection mixture leached into the storm water drainage system.

Sources: 2009 NFS Environmental Report, Table 2, Page 2-17, (ADAMS #ML91900072).
Updated by 11/30/2021 Supplemental Environmental Report, Table 2, Pages 9, 10, 11. (Added to ADAMS #ML22066B005 on 3/8/2022).

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