



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-8931

[REDACTED]

May 16, 2005

Nuclear Fuel Services, Inc.
ATTN: Mr. Kerry Schutt
President, General Manager
P. O. Box 337, MS 123
Erwin, TN 37650

SUBJECT: NRC INSPECTION REPORT NO. 70-143/2005-02 AND NOTICE OF VIOLATION

Dear Mr. Schutt:

This refers to the inspection conducted from March 6, 2005 through April 16, 2005, at your Erwin facility. The purpose of the inspection was to determine whether activities authorized by the license were conducted safely and in accordance with NRC requirements.

Areas examined during the inspection included the following: Plant Operations, Fire Protection, Radiation Protection, Nuclear Criticality Safety, Decommissioning, Emergency Preparedness, and Physical Protection. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observation of activities in progress.

Based on the results of this inspection, the NRC has determined that four violations of NRC requirements occurred. Three violations are cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding them are described in detail in the subject inspection report. 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. For your consideration when determining corrective actions for violations, NRC Information Notice 96-28, "SUGGESTED GUIDANCE

[REDACTED]

[REDACTED]

RELATING TO DEVELOPMENT AND IMPLEMENTATION OF CORRECTIVE ACTION" may be viewed at <http://www.nrc.gov/reading-rm/doc-collections/gen-comm/info-notices/1996/in96028.html>.

The fourth violation is being treated as a non-cited violation (NCV), consistent with Section VI.A.8 of the Enforcement Policy. The NCV is described in the enclosed inspection report. If you contest the violations or significance of this NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001, with copies to the Regional Administrator, Region II, and the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001, and the NRC Resident Inspector at your facility.

By letters dated May 3, 2005, we received your replies to our Notice of Violation which was issued on April 4, 2004. The replies met the requirements of 10 CFR 2.201 and your corrective actions will be reviewed during a future inspection.

Should you have any questions concerning this letter, please contact us.

Sincerely,

/RA/

David A. Ayres, Chief
Fuel Facility Inspection Branch 1
Division of Fuel Facility Inspection

Docket No. 70-143
License No. SNM-124

Enclosures: 1. Notice of Violation
2. NRC Inspection Report

cc w/encls:
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Vice President
Safety and Regulatory Management
Nuclear Fuel Services, Inc.
P. O. Box 337, MS 123
Erwin, TN 37650

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ADAMS: Yes ACCESSION NUMBER: _____

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NOTICE OF VIOLATION

Nuclear Fuel Services, Inc.
Erwin, Tennessee

Docket No. 70-143
License No. SNM-124

During an NRC inspection conducted from March 6, 2005 - April 16, 2005, violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedures for NRC Enforcement Actions - May 1, 2000," NUREG-1600, the violations are listed below:

- A. 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 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.

This is a Severity Level IV violation (Supplement VI)

- 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 Section 1.7.4 and 1.7.5."

Standard Operating Procedure (SOP) 401, section 4A-302, required [REDACTED] 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 [REDACTED] after completion of a discard operation.

Enclosure 1

[REDACTED]

This is a Severity Level IV violation (Supplement VI).

- C. 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 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 [REDACTED] was not controlled by operating procedure or RWP.

This is a Severity Level IV violation (Supplement IV).

Pursuant to the provisions of 10 CFR 2.201, Nuclear Fuel Services, Inc. is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555 with a copy to the Regional Administrator, Region II, and a copy to the NRC Resident Inspector at the facility that is the subject of this Notice, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, D.C. 20555-0001.

[REDACTED]

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days.

Dated this 16th day of May, 2005.

[REDACTED]

[REDACTED]

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 70-143

License No.: SNM-124

Report No.: 70-143/2005-02

Licensee: Nuclear Fuel Services, Inc.

Facility: Erwin Facility

Location: Erwin, TN 37650

Dates: March 6, 2005 - April 16, 2005

Inspectors: D. Rich, Senior Resident Inspector
W. Britz, Fuel Facility Inspector
O. Lopez, Fuel Facility Inspector
C. Taylor, Health Physicist
R. Gibson, Health Physicist

Approved by: D. Ayres, Chief
Fuel Facility Inspection Branch 1
Division of Fuel Facility Inspection

[REDACTED]

EXECUTIVE SUMMARY

Nuclear Fuel Services, Inc.
NRC Inspection Report 70-143/2005-02

This inspection included activities conducted by the senior resident inspector and regional inspectors during normal and off normal shifts in the areas of plant operations, fire protection, radiation protection, decommissioning, emergency preparedness and physical protection.

Plant Operations

- A violation was identified for failure to remove danger isolation tags prior to system operation for testing (Paragraph 2a).
- A violation was identified for failure to lock shut a discard control valve. Implementation of corrective actions to prevent a recurrence of the event were not prompt. A procedural weakness was identified, which was not addressed by the nuclear criticality safety (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 (Paragraph 2a).
- The inspector determined that items relied on for safety (IROFS) failure reports were identified, documented, and resolved in accordance with the regulations (Paragraph 2b).
- The reviewed IROFS were adequately implemented and maintained (Paragraph 2c).
- Plant activities reviewed were performed safely and in accordance with license requirements. Housekeeping was adequate to not adversely affect radiological safety or facility emergency egress (Paragraph 2d).
- The observed operations were conducted in accordance with approved procedures and license requirements. The inspector also determined that reviewed facility modifications were reviewed, approved, and documented according to licensee procedures (Paragraph 2e).
- The licensee performed the source checks and audible test for the criticality detectors at the specified frequencies and in accordance with approved procedures (Paragraph 2f).
- The licensee identified an omission in environmental sampling requirements, in that insoluble activity in the BLEU complex sewer effluent was not analyzed.

[REDACTED]

- Review of other analyses demonstrated levels of radioactive elements in sewer effluents were a small fraction of allowable levels (Paragraph 2g).

Fire Protection

- Fire protection and detection equipment was adequately maintained. Fire hazards were minimized by appropriate housekeeping (Paragraph 3a).

Radiation Protection

- The licensee's self-assessments of the radiation protection program were implemented in accordance with the license and the regulatory requirements (Paragraph 4a).
- The external exposure monitoring program was implemented in a manner to maintain doses as low as reasonably achievable (ALARA). Exposures were less than the occupational limits in 10 CFR 20.1201 (Paragraph 4b).
- Internal exposures were significantly less than the limits of 10 CFR Part 20.1201 (Paragraph 4c).
- Respiratory protection equipment issuance and training assured that equipment was obtained by certified users only. The inspector concluded that the licensee maintained adequate records for respiratory protection (Paragraph 4d).
- Radiological safety postings and Radiation Work Permits (RWPs) were properly used to communicate potential hazards and protective equipment requirements to workers (Paragraph 4e).
- The radiation and contamination survey programs were appropriately implemented to protect workers, and to identify potential work areas posing an internal or external radiation hazard to workers (Paragraph 4f).
- The licensee's ALARA Program was properly implemented (Paragraph 4g).
- A violation was identified for failure to control work in contaminated areas within the blended low enriched uranium preparation facility by written procedures (Paragraph 4h).

Decommissioning

- The licensee performed decommissioning activities at the North Site in accordance with approved procedures. Three soil samples were split between the licensee and NRC. Those samples were shipped to NRC's contractor for analysis (Paragraph 5b).



Emergency Preparedness

- Changes to the Emergency Plan (EP) did not impact the effectiveness of the emergency management program (Paragraph 6a).
- The revised emergency procedures continued to adequately implement the EP (Paragraph 6b).
- The licensee maintained an emergency response training program which provided instructions to those individuals expected to implement the EP. The staffing for emergency preparedness positions was adequate (Paragraph 6c).
- The licensee maintained effective coordination with offsite support organizations for the emergency preparedness program (Paragraph 6d).
- The licensee conducted drills, critiques, communications checks, independent audits, and implemented corrective actions as a result of critique and audit findings (Paragraph 6e).
- The equipment used for emergency response was maintained as described in the EP (Paragraph 6f).

Physical Protection

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- Attachment:
Partial List of Persons Contacted
Inspection Procedures Used
List of Items Opened, Closed, and Discussed
List of Acronyms



[REDACTED]

REPORT DETAILS

1. Summary of Plant Status

The fuel manufacturing and scrap recovery processes operated throughout the reporting period, with short term outages for inventory. Operations continued at the uranyl nitrate [REDACTED] building and construction of the other blended low-enriched uranium facilities continued. Efforts continued in decommissioning older facilities on site. The processing, analysis, packaging, and shipments of contaminated soils and debris from the burial grounds continued and construction continued in several areas.

2. Plant Operations (Temporary Instruction (TI) 2600/006 / Inspection Procedure (IP) 88020)

a. Routine Observations

(1) Scope and Observations

The inspector reviewed plant operations in progress during normal and off-normal operating shifts to evaluate plant safety and compliance with the license. The inspector made routine tours of the plant operating areas and determined that equipment and systems were operated safely and in compliance with the license. Some daily operational meetings were observed where production status and issues were discussed. The inspector verified the Emergency Control Center (ECC) and associated equipment were maintained in a state of readiness. The inspector reviewed selected licensee identified events and corrective actions for previously identified events and found no significant deficiencies in the items reviewed.

On March 15, the inspector observed the outlet valves [REDACTED] [REDACTED] 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

[REDACTED]

[REDACTED]

not being consistently applied in the [REDACTED] fuel area. The licensee planned to broaden the review of lock-out/tag-out operations to include fuel operations.

The inspector reviewed an event involving transfer of waste solutions from favorable to unfavorable geometry storage [REDACTED]. On February 9, an operator performed an authorized transfer operation, by discarding solution from a favorable geometry [REDACTED] [REDACTED] to an unfavorable geometry storage [REDACTED]. One IROFS which provided for safe operation of this system was dual independent sample verification of [REDACTED] 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 [REDACTED].

After completion of the authorized discard, the operator attempted to perform an operation on [REDACTED] which contained [REDACTED] material [REDACTED]. The operator apparently attempted to transfer some of this [REDACTED] 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 [REDACTED] 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 [REDACTED] to be locked shut after completion of a discard. Failure to lock shut valve [REDACTED] 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 [REDACTED] material concentration.

The licensee investigated the event and found no indications of malfunction or valve leakage [REDACTED]. 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

[REDACTED]

[REDACTED]

not conducted any documented training to refresh operators on the safe operation of this system.

The inspector found that SOP 401 did not require a verification that the discard block and bleed valve was locked shut prior to performing a transfer operation between banks, which was apparently the operation being attempted by the operator. This was a contributing cause of a similar unauthorized discard from the process WD tanks (reference NRC report 70-143/2002-205, section 4.0). The inspector also noted that the nuclear criticality safety (NCS) evaluation flow-down did not address this omission.

The inspector also observed that the physical configuration of the system allows simultaneous operations to be performed. The storage area consists of [REDACTED], any of which can be serviced by two mixing and transfer pumps. A mixing and sampling operation with one pump could be performed at the same time as a discard operation with the second pump. SOP 401 did not prohibit simultaneous operations, and interviews with supervision confirmed that some operators do perform simultaneous operations. Licensee supervision acknowledged that this was a poor practice, because an error in valve alignment or a valve malfunction could defeat administrative safety controls and cause an unauthorized discard.

The inspector reviewed the procedure which addressed the transfer of [REDACTED] to the other. SOP 401 stated the operation should not normally be performed, but allowed the operation to be performed at the discretion of building supervision or process engineering. Contrary to this guidance, area supervision stated such operations are typically performed at the operators discretion, and although supervisors may be aware of the operation, supervisory permission or cognizance is not required.

As noted above, the licensee identified possible use of a checklist including valve position verification as one corrective action for this event. The inspector noted that, in addition to NRC report 70-143/2002-205 (noted previously), NRC report 70-143/2004-01 (Paragraph 2b) also discussed an event related to failure to control a locked discard valve. The corrective actions for both these events directly apply [REDACTED]. However, the operational experience from these events was not applied [REDACTED]. The continued existence of vulnerabilities identified from previous events demonstrate incomplete extent of condition reviews and failure to apply operating experience to areas with identical vulnerabilities.

(2) 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.

[REDACTED]

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.

b. Management and Administrative Practices (03.01)

(1) Scope and Observations

The inspector interviewed plant personnel and reviewed selected items relied on for safety (IROFS) failure reports to verify that failures of IROFS were identified, documented, and resolved in accordance with 10 CFR 70.62. The inspector noted that reviewed IROFS failure reports included the required information as specified in the regulations. The inspector reviewed the compensatory measures taken by the licensee in response to two IROFS that were unable to perform their intended safety function. No safety issues were noted.

(2) Conclusions

The inspector determined that IROFS failures reports were identified, documented, and resolved in accordance with the regulations.

c. Safety Function (O3.02)
Maintenance of Nuclear Criticality Safety Systems (O3.07)

(1) Scope and Observations

The inspector reviewed the integrated safety analysis [REDACTED]. The inspector also walked down a selection of IROFS for these process areas to verify the condition of the equipment and that they were implemented adequately. [REDACTED]

[REDACTED] The inspector noted no safety issues.

The inspector reviewed functional test and inspection records for the reviewed IROFS. The inspector also reviewed the functional test instructions. The inspector noted that functional tests were performed at the required frequency and that instructions contained the appropriate amount of detail to perform the test. No safety problems were identified.

(2) Conclusions

The inspector determined that reviewed IROFS were adequately implemented and maintained.

[REDACTED]

d. Plant Activities (O3.03)

(1) Scope and Observations

The inspector observed activities in the fuel process and the Blended Low Enriched Uranium (BLEU) preparation facility (BPF) to assess whether activities were performed safely and in accordance with license requirements.

The inspector noted that nuclear criticality safety postings, radiological signs, and procedures were properly posted or available to the operators. The inspector did not observe any issues where the housekeeping could affect the radiological safety or emergency egress of the facility. The inspector observed that plant personnel working in radiological control areas wore dosimetry and the proper personal protective equipment. The inspector also observed proper spacing practices and controls in storage locations. No safety problems were identified.

(2) Conclusions

Plant activities reviewed were performed safely and in accordance with license requirements. Housekeeping was adequate to not adversely affect radiological safety or facility emergency egress.

e. Configuration Control (O3.04)
Nuclear Criticality Safety Change Control (O3.05)
Operating Procedures (O3.06)

(1) Scope and Observations

The inspector reviewed recent facility modifications to verify that safety significant modifications were reviewed, approved, and documented according to licensee procedures. The inspector reviewed the internal authorization change package for the installation of the [REDACTED] cleaning station. The inspector toured and discussed proposed IROFS and safety requirements with the cognizant engineer. The inspector also reviewed documentation related to the installation of additional nitrogen flow meters in the [REDACTED] process. The inspector verified that drawings, SOPs, safety related equipment (SRE) functional tests were revised to reflect the new equipment. No safety problems were identified.

The inspector observed operations throughout the fuel process and the BPF. The inspector observed that operators complied with nuclear criticality safety requirements. The inspector also discussed safety controls with operators, and walked down several sections of SOPs [REDACTED] to verify operator knowledge of the SOPs and verify that configuration control was maintained. The inspector noted that reviewed SOPs adequately identified process parameters, startup, routine operations, and shutdown (emergency and normal). The inspector also noted that operators were knowledgeable of the SOPs and safety requirements. The inspector

[REDACTED]

also reviewed active temporary procedures for the fuel process and the BPF noting no safety issues.

The inspector witnessed supervisor training related to changes to an IROFS in the [REDACTED] area. No safety problems were identified.

(2) Conclusions

The inspector determined that observed operations were conducted in accordance with approved procedures and license requirements. The inspector also determined that reviewed facility modifications were reviewed, approved, and documented according to licensee procedures.

f. Criticality Alarm System (03.10)

(1) Scope and Observations

The inspector reviewed the monthly source check and audible test records for the criticality warning system from January 2005 to the present to verify that they were performed in accordance with approved procedures. The inspector noted that the source check and audible test were performed at the required frequency. The licensee revised applicable procedures to include new detectors installed in the new storage facility. No problems were identified. 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.

(2) Conclusions

The licensee performed the source checks and audible test for the criticality detectors at the specified frequencies and in accordance with approved procedures. The licensee continued work in resolving trouble conditions and alarms.

g. Follow-up on Licensee Identified Issues

(1) Scope and Observations

The inspector reviewed findings and corrective actions pertaining to a licensee identified issue. On March 28, the licensee identified that analyses for effluents from the BLEU complex to the municipal sewer did not include a monthly composite sample for insoluble radioactivity. The inspector reviewed available records, and noted the highest monthly composite results for gross alpha was 1.62 picocurie per liter (pCi/l). The average daily

result for gross alpha for the time period from August 1, 2004 through March 17, 2005 was less than 1 pCi/l, with the highest reading being 8.6 pCi/l. Sample results for gross beta were similarly very low. The action level per license application table 5.1 was 300 pCi/l gross alpha and 6000 pCi/l gross beta. Therefore, although sample results for insoluble activity were not obtained, results for gross activity demonstrate that levels of discharge were a small fraction of allowable limits. The licensee investigated the issue and found Procedure NFS HS-B-68 had not been revised to add the requirement for monthly insoluble activity analyses required by license application Table 5.1. A review of plant operations revealed that monthly samples were required but not obtained for September, October, and November of 2004, and January, 2005. The BLEU complex was shutdown for maintenance during December 2004. The licensee was able to perform the analysis on a February 2005 sample which had been retained, and found insoluble activity to be 0.883 pCi/l gross alpha, and 8.32 pCi/l gross beta. Planned corrective actions include a change to the procedure and further reviews to ensure all required samples are addressed. Failure to perform monthly composite samples for insoluble radioactivity for the BLEU complex sewer was a violation of NRC requirements. This non repetitive, licensee-identified and corrected violation is being treated as a non-cited violation (NCV), consistent with Section VI.A.8 of the NRC Enforcement Policy (NCV 70-143/2005-02-03).

(2) Conclusions

The licensee identified an omission in environmental sampling requirements, in that insoluble activity in the BLEU complex sewer effluent was not analyzed. Review of other analyses demonstrated levels of radioactive elements in sewer effluents were a small fraction of allowable levels.

h. Follow-up on Previously Identified Issues

- (1) (Closed) IFI 70-143/2004-12-03: Changes to the [REDACTED] 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.

3. Fire Protection (TI 2600/06)

a. Routine Observations

(1) Scope and Observations

The inspector reviewed fire detection and protection systems in accordance with the license and additional licensee commitments. The inspector determined that fire

protection and detection equipment was adequately maintained. Portable fire extinguishers were charged to the normal operating zones and no visible damage was noted. Fire hazards were minimized by appropriate housekeeping.

(2) Conclusions

Fire protection and detection equipment was adequately maintained. Fire hazards were minimized by appropriate housekeeping.

4. **Radiation Protection (TI 2600/006, IP 83822)**

a. Radiation Protection Program Implementation (R1.01)

(1) Scope and Observations

The inspector conducted interviews and reviewed licensee documentation to determine the status of self-assessments of the radiation protection program.

The inspector determined that the licensee's health physics staff performed self-assessments of the radiation protection program to determine if the program elements were implemented in accordance with the license and NRC regulations. The inspector determined that NRC and licensee identified issues were documented and tracked via a plant wide system known as the Problem Identification Resolution and Correction System (PIRCS). The licensee conducted management quarterly audits and health physics monthly audits of the radiation safety program. The inspector reviewed the results of the audits and determined that there were no major safety issues identified. The inspector determined that the self-assessments were effective in verifying program implementation and for aiding managers to track and trend issues as appropriate to ensure compliance with license commitments and regulations.

(2) Conclusions

The inspector concluded that the licensee's self-assessments of the radiation protection program were implemented in accordance with the license and the regulatory requirements.

b. External Exposure Control (R1.04)

(1) Scope and Observations

The inspector had discussions with licensee representatives, reviewed radiation protection procedures, and reviewed personnel exposure data, to determine if exposures were in compliance with 10 CFR Part 20.1201 limits, and if controls were in place to maintain occupational doses (ALARA).

Based on interviews, procedural reviews, and observations of plant personnel inside radiation control areas, the licensee's monitoring program was consistent with the requirements in 10 CFR Part 20. Table 1 below displays the maximum assigned exposure data for calendar years (CY) 2004 and 2003. CY 2004 annual exposures were less than the exposures for CY 2003. The inspector determined that the reasons for the reduction in the annual external exposures were due largely to the implementation of International Commission on Radiological Protection (ICRP) Publication 68, and also to the completion of many large decommissioning tasks.

The licensee continued to measure shallow dose extremity (SDE) for the BPF areas except in the materials receipt/check-weighing activities. The licensee concluded from results of finger rings worn from July 2003 -June 2004 that the majority of individuals in that area were receiving less than 30 mrem. Table 1 also provides the maximum ring dose "SDE" for an individual in CY 2004, who was located in the BPF processing area. The dose was well below the 10% regulatory limit of 50 rem and well below the results from the previous year. The licensee does not measure SDE doses in the normal fuel operations and other areas of the plant because of historically low exposure to extremities in those areas. The licensee continues to take actions through its ALARA committee to try to maintain external exposures below their action limits.

Table 1. Annual Exposures

Year	Deep Dose Equivalent (DDE)	Shallow Dose Extremity (SDE)	Total Effective Dose Equivalent (TEDE)	Collective TEDE (person-rem)	Committed Effective Dose Equivalent (CEDE)
2003	0.383 rem	0.340 rem	1.213 rem	81.29 person-rem	1.12 rem
2004	0.288 rem	0.140 rem	0.429 rem	42.104 person-rem	0.301 rem

(2) Conclusions

The external exposure monitoring program was implemented in a manner to maintain doses ALARA. Exposures were less than the occupational limits in 10 CFR 20.1201.

c. Internal Exposure Control (R1.05)

(1) Scope and Observations

The inspector reviewed licensee procedures for assessing internal exposure to determine if controls were in place to monitor occupational doses, and verify that the administrative limits were established to control occupational dose ALARA. Exposure data was

examined to determine if exposures resulting from various plant operations exceeded limits in 10 CFR Part 20.

The licensee continued to use the annual limit on intake and derived air concentration (DAC) values based on dose coefficients adopted by the ICRP as published in ICRP Publication 68. Table 1 shows a decrease in the committed effective dose equivalent (CEDE) for CY 2004 compared to CY 2003. The inspector determined that the decrease in exposure was due largely to the implementation of ICRP 68, and also to the completion of many large decommissioning tasks.

The inspector determined that administrative controls and procedures were in place to monitor and assign the dose resulting from a spill that occurred [REDACTED] 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. Response by the operators, the Rad Technicians and the health physicists (HPs) was immediate and effective. The high volume air sample at the spill did not indicate any levels above the licensee's action level of 25% DAC. Smears taken before and after the cleaning of the spill indicated less than 5000 disintegrations per minute per 100 square centimeters area smeared.

The inspector interviewed the health physicist responsible for monitoring employees who are approaching and/or exceeding the licensee's action limits for internal exposures. The inspector reviewed the procedure for internal monitoring and the procedure for in-vivo counting. From a review of procedures, records, and interviews with licensee representatives, the inspector determined that the licensee adequately tracked compliance with administrative limits.

(2) Conclusions

Internal exposures were significantly less than the limits of 10 CFR Part 20.1201.

d. Respiratory Protection (R1.06)

(1) Scope and Observations

Respiratory protection equipment issuance and training verification were examined for adequacy in assuring that equipment was obtained by certified users only.

A record review and interviews with radiation technicians gave inspector a good understanding of the Radiation Exposure Monitoring and Control (REMCON) System which tracks and verifies respirator training qualifications. No examples were observed of unauthorized use of equipment by untrained personnel or workers with expired training. The inspector observed the process for requiring a respiratory fit test. The radiation technician went through the protocols necessary for being qualified to wear a respirator. No problems were identified.

(2) Conclusions

Respiratory protection equipment issuance and training assured that equipment was obtained by certified users only. The inspector concluded that the licensee maintained adequate records for respiratory protection.

e. Postings, Labeling and Control (R1.07)

(1) Scope and Observations

The inspector reviewed the licensee's program for posting as required by 10 CFR 19.11 to determine if documents were posted in sufficient places to permit individuals engaged in licensed activity to observe them. Several work locations were examined to determine if radioactive containers were properly labeled and to assess the adequacy of the licensee's compliance to 10 CFR 20.1902, Posting Requirements. RWPs were also reviewed to determine the adequacy of the requirements posted for worker protection and the degree to which those requirements were implemented.

During tours of various areas, the inspector noted that radiological signs, postings and procedures were properly posted and readily available. Observed work areas involving radioactive material or potentially contaminated materials were properly posted and containers labeled. The inspector determined through review of records and observations that radiologically controlled areas were properly posted and identified. The inspector noted that workers complied with the RWPs.

(2) Conclusions

Radiological safety postings and RWPs were properly used to communicate potential hazards and protective equipment requirements to workers.

f. Surveys (R1.08)

(1) Scope and Observations

The radiation survey program was reviewed to determine if surveys were effective in the identification of radiation and contamination. During tours of the plant, the inspector observed a radiation technician perform high volume air sampling at the spill [REDACTED] that occurred on March 21, 2005. Also, fixed air samples were collected and analyzed in the laboratory. The inspector observed the fixed samples being counted to determine initial gross alpha counts. According to procedures, the samples were recounted later in the shift after daughter product decay. No problems were noted.

The inspector reviewed the licensee's PIRCS, interviewed staff members and reviewed radiation and contamination survey results, and determined that the licensee had identified and taken immediate and effective actions for occurrences of radiological contamination. From the review of PIRCS and interviews with cognizant licensee

representatives, the inspector did not note any significant external or internal doses to the exposed individuals.

(2) Conclusions

The radiation and contamination survey programs were appropriately implemented to protect workers, and to identify potential work areas posing an internal or external radiation hazard to workers.

g. Implementation of ALARA Program (R1.10)

(1) Scope and Observations

The licensee's ALARA program was reviewed to determine if the program and ALARA goals were developed and implemented in accordance with the license. In addition, the program for reinforcing the ALARA concept among employees was assessed. Managers, operators, and HPs were interviewed regarding ALARA, and demonstrated an adequate knowledge and/or understanding of the ALARA concepts.

The inspector reviewed the licensee's 2004 ALARA annual report. The licensee also generated semi-annual ALARA reports for review by management. The reports included detailed ALARA goals and exposure summaries to identify undesirable trends. The annual threshold dose limit for 2004 was set at 0.5 rem for internal and external exposure for all areas except the BLEU area [REDACTED] which was set at 1.0 rem.

(2) Conclusions

Based on a record review and interviews, the inspector concluded that the licensee's ALARA program was properly implemented.

h. BLEU Preparation Facility, Oxide Conversion Building, and Environmental Processing Building

(1) Inspection Scope and Observations

The implementation of the licensee's radiation protection program was reviewed to ensure that the necessary equipment and procedures were in place to support the operations in the BPF, Oxide Conversion Building (OCB), and Environmental Processing Building (EPB) areas. The inspector reviewed revised procedures and observed modifications since the initial start-up of activities in early September 2004.

The inspector performed walk-downs of the BPF [REDACTED] with the health physics project manager. In the BPF, the inspector verified that radiological controls such as safety postings, radiological signs, and procedures were properly posted or available to the operators. The inspector did not observe any issues where the housekeeping could affect the radiological safety or emergency egress of the facility.

[REDACTED]

With the exception noted below, the inspector observed that plant personnel working in radiological control areas wore dosimetry and proper personal protective equipment. [REDACTED] the inspector observed radiological controls such as criticality detectors and additional lead shielding [REDACTED]

The inspector observed cleaning operations on March 30 on the low enriched uranium (LEU) side [REDACTED]. The area [REDACTED] 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.

During the walk-down, the inspector performed independent surveys [REDACTED]. The highest readings, 70 to 80 mrem/hr, were observed in a locked hallway [REDACTED]. At the time of the inspection, material in [REDACTED] area had not been used or moved and personnel allowed in the area were required to wear alarming rate dosimeters. The licensee anticipated that the dose rates in the [REDACTED] would decrease significantly once the material was moved [REDACTED].

The other [REDACTED] areas averaged 20-30 mrem/hr at the [REDACTED] entrance. The licensee had recently purchased mobile lead shields that would be used by clerks and operators who needed to enter the [REDACTED] areas for future [REDACTED] purposes.

The inspector had determined from discussions with the licensee that several modifications had been made in the [REDACTED] areas that would aid in controlling contamination problems and decreasing the amount of time for maintenance work in the area. The inspector observed daily dose rate status maps, stationary air samplers, and one active RWP in progress near the downblending area. The inspector identified no problems with the RWP documentation nor the knowledge of the individuals working under the RWP.

[REDACTED]

[REDACTED]

The inspector reviewed dosimetry records and monthly health physics reports. The reports showed that contamination incidents had decreased slightly since the last inspection. The inspector noted that the highest TEDE, CEDE, DDE, SDE, in the BPF area was 0.351 rem, 0.221 rem, 0.244 rem, and 0.140 rem respectively. All doses were well below regulatory limits but higher than normal plant operation processes due to the nature of the [REDACTED] materials being used. 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 licensee indicated they increased radiological training for the BPF area and had made modifications to the downblending area that would aid in minimizing contamination issues.

The inspector conducted facility walk-downs [REDACTED] with the project health physicist. The inspector verified and evaluated the identification of radiological hazards [REDACTED]. At the time of the inspection, [REDACTED] operations were in shut down mode for periodic maintenance activities. In the areas observed, the inspector observed adequate procedures, postings and personnel protective equipment for operators working under an RWP. The inspector reviewed external radiation hazards and determined from discussions that the licensee had noticed elevated air sample results from the [REDACTED] areas. The inspector reviewed the results and found none of them to exceed any regulatory limits. The licensee was able to identify the problem as a seal malfunction. The inspector verified that stationary air samplers were placed in representative locations. The inspector accompanied a radiation specialist while performing daily surveys and swipes and found no problems. The inspector noted the radiation protection program [REDACTED] was consistent with the NFS radiation protection program, with some minor procedural differences.

The inspector reviewed records from PIRCS to determine if notification and reporting of incidents [REDACTED] were done in accordance with the regulations and requirements of the license. The inspector verified that the selected incident did not require notification to NRC. The licensee's review and evaluation of the incidents were prompt and actions to prevent a recurrence were timely. No problems were identified.

(2) Conclusions

A violation was noted for failure to control work in contaminated areas by written procedures.

j. Follow-up on Previously Identified Issues

Closed IFI 70-143/2004-12-07: Contamination [REDACTED] This issue relates to persistent elevated contamination levels and instances of contaminated shoes [REDACTED]. The inspector reviewed the licensee's immediate and corrective actions, reviewed survey records [REDACTED] since the occurrences, and interviewed licensees' representatives. The inspector determined that the licensee had reduced shoe

[REDACTED]

contamination from exiting [REDACTED] and reduced the excessive contamination [REDACTED]. The inspector noted the licensee had an optional "plant shoe" policy, which allowed [REDACTED] personnel to wear company issued shoes when working [REDACTED]. The licensee also improved cleaning practices and placed a step on "sticky" pad at all entries [REDACTED] for contamination control. Results of these controls have reduced the contamination trend of personnel and equipment [REDACTED]. This item is closed.

5. **Decommissioning (IP 88104)**

a. **Scope and Observations**

The inspector accompanied plant personnel and witnessed the collection of several soil samples from randomly selected areas of the North Site's west end boundary. The inspector split three samples with the licensee. Those samples were shipped to NRC's contractor for analysis.

From discussions with the licensee, the inspector determined that the licensee wanted to install additional sewer piping to control storm water runoff and build a road on the west end corner of the North Site inside the controlled area for logistical purposes. The sampled area's dimensions were 40 ft X 30 ft X 17 ft deep.

The inspector reviewed the licensee's sampling protocols and observed appropriate personnel protective equipment being used by the technicians when collecting the samples. The technicians were knowledgeable of the sampling protocols and contamination risks. 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. The inspector identified no problems during sample collection and chain of custody.

At the time of report issuance, results from the soil samples were still pending and not available.

b. **Conclusions**

The licensee performed decommissioning activities at the North Site in accordance with approved procedures. Three soil samples were split between the licensee and NRC's inspector. Those samples were shipped to NRC's contractor for analysis.

6. Emergency Preparedness (IP 88050) F3

a. Review of Program Changes (F3.01)

(1) Inspection Scope and Observations

Changes to the emergency response program since the last inspection were reviewed to determine the effectiveness of the program. Since the last inspection, the licensee submitted (EP) Revision 8 dated April, 2004, which was approved by the NRC by a letter to the licensee dated November 1, 2004. Changes to the EP included updating drawings with current buildings, updating decommissioning activities, updating systems, updating phone numbers, updating the Pre-Fire Plan reference and updating letters of agreement. The program changes were reviewed by the inspector and found acceptable.

(2) Conclusions

Changes to the EP did not appear to impact the effectiveness of the emergency management program.

b. Implementing Procedures (F3.02)

(1) Inspection Scope and Observations

EP implementing procedures were reviewed to determine if procedures were adequate to implement the EP. Procedures which had been revised since the last inspection were reviewed. Changes to procedures included personnel and additional site buildings. The reviewed changes did not result in a decrease in the effectiveness of the program or any inconsistencies between the EP and implementing procedures.

(2) Conclusions

The revised emergency procedures continued to adequately implement the EP.

c. Training and Staffing of Emergency Organization (F3.03)

(1) Inspection Scope and Observations

Emergency response training was reviewed to determine if the licensee had provided training to response personnel in accordance with EP. The inspector reviewed the training program, lesson plans and attendance sign-in sheets for several emergency response positions and functions. The staffing for the emergency preparedness positions was reviewed. Replacement personnel and their training for recently retired personnel were reviewed.

2) Conclusions

The licensee maintained an emergency response training program which provided instructions to those individuals expected to implement the EP. The staffing for emergency preparedness positions was adequate.

d. Offsite Support (F3.04)

(1) Inspection Scope and Observations

Licensee activities in the areas of training, agreements, and exercises were reviewed to determine if the licensee was periodically involving off site support groups. The licensee had maintained and updated agreement letters with offsite support groups that provide services during an emergency. The inspector reviewed documentation to show that the offsite authorities were being offered training and opportunities to participate in drills and exercises.

(2) Conclusions

The licensee maintained effective coordination with offsite support organizations for the emergency preparedness program.

e. Drills and Exercises (F3.05)

(1) Inspection Scope and Observations

The inspector reviewed the audits, drills, exercises, critiques and the corrective actions taken as a result of the critiques and program audits. The critiques and corrective actions for the [REDACTED] biennial exercise were reviewed and discussed with the licensee. The inspector verified the conduct of the required quarterly communication checks with offsite response organizations. An independent audit was performed and reviewed.

(2) Conclusions

The licensee conducted drills, critiques, communications checks, independent audits, and implemented corrective actions as a result of critique and audit findings.

f. Emergency Equipment and Facilities (F3.06)

(1) Inspection Scope and Observations

The emergency response facilities and equipment were inspected to determine whether the facility, emergency response equipment, instrumentation, and supplies were maintained in a state of operational readiness. The licensee's emergency equipment and kits were inspected in the emergency operation locations, in the emergency vehicle and in the plant. The equipment locations inspected contained the specified equipment and

[REDACTED]

the required equipment was calibrated and maintained. The equipment was determined to be maintained as described in the EP.

(2) Conclusions

The equipment used for emergency response was maintained as described in the EP.

7. **Physical Protection (Temporary Instruction 2600/006)**

■ [REDACTED]

■ [REDACTED]

[REDACTED]

■ [REDACTED]

[REDACTED]

■ [REDACTED]

■ [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

8. Exit Interview

The inspection scope and results were presented to members of the licensee management at various meetings throughout the inspection period and were summarized on April 22, 2005. No dissenting comments were received from the licensee.

[REDACTED]

ATTACHMENT

1. PERSONS CONTACTED

Partial List of Licensee's Persons Contacted

S. Barron, Manager, Emergency Preparedness
D. Buck, Vice President, Human Resources
K. Crutcher, Analytical Services Manager
B. Drane, Director, Site Services
R. Droke, NFS Licensing & Compliance Director
B. Faidley, Fuel Facilities Manager
R. Holley, Senior Project Manager
P. Johnson, Vice President, Applied Technology
N. Kenner, Training Manager
J. Kramer, Manager, Project Engineering Section
M. Moore, Vice President, Safety and Regulatory
J. Nagy, Senior License & Regulatory Compliance Officer
J. Parker, Industrial Safety Manager
J. Pugh, Transportation and Waste Manager
K. Schutt, President and General Manager
M. Shope, Quality Engineering Supervisor
J. Stout, Security Director
M. Tester, Sr. Manager, Radiation Control
G. Tipton, Director, Plant Facilities
A. Vaughn, Director, Fuel Production
A. Ward, General Counsel
D. Wise, Vice President, Fuel Production
C. Woodhall, Consultant

2. INSPECTION PROCEDURES USED

TI 2600/006 Safety Operations, Safeguards, Radiological Controls & Facility Support
IP 83822 Radiation Protection
IP 88020 Regional Criticality Safety Inspection Program
IP 88050 Emergency Preparedness
IP 88104 Decommissioning

3. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

<u>Item Number</u>	<u>Status</u>	<u>Type</u>	<u>Description</u>
70-143/05-02-01	Open	VIO	Control of Danger Tagged Components.
70-143/05-02-02	Open	VIO	Failure to Lock Shut Discard Control Valve.

70-143/05-02-03	Closed	NCV	Failure to analyze required effluent samples
70-143/05-02-04	Open	VIO	Failure to control work in contaminated areas by written procedures
70-143/04-201-02	Reviewed	IFI	Resolution of criticality alarm system equipment and installation problems.
70-143/04-12-03	Closed	IFI	Changes to the [REDACTED] Process Safety Controls
70-143/04-12-07	Closed	IFI	Contamination [REDACTED]

4. LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management Systems
ALARA	As Low As Reasonably Achievable
BLEU	Blended Low Enriched Uranium
BPF	Blended Low Enriched Uranium Preparation Facility
CEDE	Committed Effective Dose Equivalent
CFR	Code of Federal Regulations
CY	Calendar Year
DAC	Derived Air Concentration
ECC	Emergency Control Center
EP	Emergency Plan
EPB	Environmental Processing Building
HEU	High Enriched Uranium
HP	Health Physicist
ICRP	International Commission on Radiological Protection
IFI	Inspection Followup Item
IP	Inspection Procedures
IROFS	Item Relied on for Safety
LEU	Low Enriched Uranium
NCV	Non Cited Violation
NFS	Nuclear Fuels Services
NRC	Nuclear Regulatory Commission
OCB	Oxide Conversion Building
PARS	Publicly Available Records
PIRCS	Problem Identification, Resolution and Corrective Action System
PPE	Personal Protective Equipment
REMCON	Radiation Exposure Monitoring and Control
RWP	Radiation Work Permit
RCT	Radiological Controls Technician
SDE	Shallow Dose Extremity
SNM	Special Nuclear Material

SOP Standard Operating Procedure
SRE Safety Related Equipment
TVA Tennessee Valley Authority
[REDACTED]
U-235 Uranium-235
UNB Uranyl Nitrate Building
UPS Uninterruptible Power Supply
VIO Violation