UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-8931

July 16, 2007

Mr. D. B. Ferguson, Jr.
President & CEO
Nuclear Fuel Services, Inc.
P. O. Box 337, MS 123
Erwin, TN 37650

SUBJECT: NRC INSPECTION REPORT NO. 70-143/2007-004

Dear Mr. Ferguson:

This refers to the inspection conducted from May 6, 2007, through June 16, 2007, at the Nuclear Fuel Services facility. The purpose of the inspection was to determine whether activities authorized by the license were conducted safely and in accordance with NRC requirements. At the conclusion of the inspection, the findings were discussed with those members of your staff identified in the enclosed report.

Areas examined during the inspection included Safety Operations and Facility Support. 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 one Severity Level IV violation of NRC requirements occurred. This violation is being treated as a Non-Cited Violation (NCV), consistent with Section VI.A of the Enforcement Policy. This NCV is described in the subject inspection report. If you contest the 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: (1) the Regional Administrator, Region II; (2) the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and (3) Stephen P. Burris at the Nuclear Fuel Services, Inc., facility.

This letter and the enclosed report contain sensitive unclassified information and will not be available for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS).

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

Enclosure: NRC Inspection Report

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

L. Edward Nanney, Director
Division of Radiological Health
Tennessee Dept. of Environment & Conservation
L&C Annex, Third Floor
401 Church Street
Nashville, TN 37243-1532

Distribution w/encl: (See page 3)

[redacted]

Distribution w/encl:
D. Ayres, RII
M. Crespo, RII
S. Burris, RII
G. Smith, RII
G. Wertz, RII
K. Ramsey, NMSS
M. Lamastra, NMSS
nmed@inl.gov

☐ PUBLICLY AVAILABLE X☐ NON–PUBLICLY AVAILABLE X☐ SENSITIVE ☐ NONSENSITIVE

ADAMS: ☐ Yes ACCESSION NUMBER:_____

OFFICE	RII:DFFI	RII:DFFI	RII:DFFI	RII:DFFI			
SIGNATURE	via e-mail	via e-mail	DAyres for	DAyres for			
NAME	SBurris	GSmith	AGooden	DERVCLASS			
DATE	07/13/2007	07/13/2007	07/16/2007	07/16/2007	7/ /2007	7/ /2007	7/ /2007
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY G:\REPORTS\Final Report\NFS\REDACTIONS\2007-004 Final Version.wpd

[redacted]

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.:	70-143
License No.:	SNM-124
Report No.:	70-143/2007-004
Licensee:	Nuclear Fuel Services, Inc.
Facility:	Erwin Facility
Location:	Erwin, TN 37650
Dates:	May 6, 2007 - June 16, 2007
Inspectors:	S. Burris, Senior Resident Inspector G. Smith, Resident Inspector A. Gooden, Sr. Fuel Facilities Inspector
Approved by:	D. Ayres, Chief Fuel Facility Inspection Branch 1 Division of Fuel Facility Inspection

Enclosure

EXECUTIVE SUMMARY

Nuclear Fuel Services, Inc.
NRC Inspection Report 70-143/2007-004

This inspection included observations conducted by the Resident Inspectors during normal and off-normal shifts in the area of Safety Operations and Facility Support Operations. Specialized inspections and reviews of documentation were conducted by regional inspectors in the areas of Emergency Preparedness and Emergency Response Organization and Controls.

Safety Operations

- The inspectors noted two examples of procedural violations on June 7, 2007, and June 11, 2007, resulting in a Non-Cited Violation (NCV). The first non-compliance 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 non-compliances were considered to be of low safety significance due to a design configuration that had sufficient defense in depth. Review of other process work activities, identified documents, and closure packages was found to be acceptable with no identified issues. With the exception of the NCV associated with procedure compliance, all of the operations activities observed were performed safely and in accordance with approved procedures (2.a).

Facility Support

- The inspectors determined that the licensee adequately performed maintenance/surveillance activities and documented any identified adverse conditions (Paragraph 3.a).

- The licensee provided adequate training to its employees in the required areas of radiation protection, criticality safety, emergency preparedness, procedure adherence, and general employee training. The training observed showed that the employees had a good understanding of the processes (Paragraph 3.b).

- Returning personnel were being appropriately trained and qualified as required by license and procedure requirements. Results were documented and conveyed to management, and any findings were resolved in a timely manner. The inspectors will closely monitor the effectiveness of the Problem Identification, Resolution and Corrective Action System (PIRCS) program to properly identify all issues of concern. Reviewed audits were of sufficient depth and appropriately targeted, the results were documented and conveyed to management, and audit findings were resolved in a timely manner. The inspectors determined that the licensee adequately implemented the Safety and Safeguards Review Council (SSRC) (Paragraph 3.c).

- The licensee conducted an emergency exercise in accordance with the Emergency

[redacted]

Plan. The scenario details provided a realistic set of conditions for evaluating the onsite response capability and the state of readiness for responding to incidents. The exercise critique was a candid assessment of the response. Contamination control, offsite dose projection, and communication of protective action recommendations were identified as areas needing improvement (Paragraph 3.d).

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

[redacted]

[redacted]

REPORT DETAILS

1. Summary of Plant Status

Fuel manufacturing, training activities, and scrap recovery processes were operated throughout the reporting period. Blended low-enriched uranium (BLEU) oxide conversion activities operated normally during the inspection period. BLEU Preparation Facility (BPF) operations were conducted in accordance with license requirements. Decommissioning, including processing, packaging, and shipping contaminated soil and debris from burial grounds continued under normal operations.

2. Safety Operations

a. Plant Operations (Inspection Procedure (IP) 88135 and IP 88020)

(1) Inspection Scope and Observations

The inspectors performed various tours of the fuel process areas, BPF, and waste treatment facility. The inspectors verified that there was adequate staffing, operator attentiveness, compliance with procedures and station limits and verified that safety controls were implemented and controlled. Communications were monitored between supervision and line operators to ensure that safety activities were being performed in accordance with design and administrative controls. Adequate oversight was provided by supervision. The inspectors verified procedural compliance within the operating areas.

However, the inspectors noted two instances of procedural non-compliance during the inspection period. The first occurred on June 7, 2007, during a transfer of waste water from [redacted] to waste water tank WF01. This evolution is tightly controlled via procedure since it also involves a transfer from a geometrically safe to an unsafe geometry. Prior to the transfer, however, the operator failed to properly select the correct tank at the control panel and mistakenly sent the column contents to waste water tank WD01. This complicated the waste treatment strategy as this tank used different piping and was connected to different systems located within the waste treatment facility. However, this issue was deemed to be of low safety significance.

Additionally, on June 11, 2007, an operator on afternoon shift noted that the room exhaust, as well as the [redacted] removal fans in the building 307 portion of [redacted], were not running. The fans were immediately restarted and supervision was notified. Initial investigation revealed that the fans were not started on the midnight shift (as required by procedure) when the process area was restarted (following a weekend shutdown) approximately twelve hours earlier. The fans are considered items relied on for safety (IROFS) with the main hazard being a [redacted]. A review of the

[redacted]

[redacted]

Integrated Safety Analysis (ISA) revealed that the loss of the exhaust fans did not result in a failure to meet a performance requirement as required by 10CFR70.61, thus the event was not required to be reported. The licensee promptly documented both issues within their corrective action program as Problem Identification, Resolution and Correction System (PIRCS) items #10074 and #10124, respectively. In both cases, failure to follow plant operating procedures 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 70-143/2007-004-01).

The inspectors performed a detailed walkdown of the solvent extraction (SE) system located with the BPF. As part of this walkdown, the inspectors reviewed the Integrated Safety Assessment (ISA) to verify that assumptions and controls were properly implemented in the field via engineered and administrative controls. The inspectors also verified that the operating personnel were aware of these assumptions and controls. The inspectors sampled various components and verified that the as-built configuration matched the process drawings. IROFS were verified to be properly functioning and operators were knowledgeable of requirements associated with these IROFS. The inspectors also verified that there were no external hazards that could degrade system performance.

The inspectors performed walkdowns of the Naval fuel process areas, BPF, and the waste treatment facility. The inspectors verified that there was adequate staffing, operators were attentive to their duties, activities were performed in compliance with procedures and station limits, and verified that safety controls were in place and were being controlled with supervision. The inspectors verified procedural compliance within the operating areas. The inspectors walked down sections of the standard operating procedures and verified that IROFS were identified and present in the 200, 300, 500, 600, and 800 areas. No issues were noted.

The inspectors observed modifications of equipment as well as the documentation and controls used to support these modifications in order to verify that; 1) work documents reflected the proper approvals and reviews of the proposed activities, 2) personnel were properly implementing these changes as designed and 3) management oversight was evident during the work activities. Proper controls (Work Request, Lockout/Tagout, Special Work Permits) were in place and implemented during the work activities. The inspectors evaluated the following activities:

- Modification of the Fuel Manufacturing Facility transfer carts to improve access to lower level storage racks. The inspectors reviewed NFS Work Request (WR) #114456 and the Acceptance Form for Work Completed.

- Modification of three step stools within the Material Access Area (MAA) by drilling 1 ½ inch- diameter holes in engineering specified locations. This was performed to ensure that special nuclear material (SNM) would

[redacted]

not be able to accumulate within the confines of the step stool, potentially creating a criticality safety issue. WR #115191 was reviewed to ensure that adequate controls were in place to control the modification activities.

- Replacement of leaking recovery area ball valve under WR #115756 and Special Work Permit #11920. The licensee provided the proper lockout/tagout (LO/TO) controls prior to the work and then properly removed the identified controls.

- Replace one of the area 302 fire doors. The fire door had been previously identified in the licensee's PIRCS system as being degraded and therefore was replaced under WR #113438. The inspectors verified that the proper compensatory measures were in place during the time the door was considered inoperable.

- 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. This item was identified as an Inspector Followup Item (IFI) 70-143/2007-004-02, "Incorrectly Designed Check Valve for Application."

(2) Conclusions

Review of the process work activities, identified documents, and closure packages were found to be acceptable with no identified issues. With the exception of a NCV associated with procedure compliance, all of the operations activities observed were performed safely and in accordance with approved procedures.

3. Facility Support

a. Maintenance/Surveillance (IP 88025 and IP 88135)

(1) Inspection Scope and Observations

The inspectors performed an assessment of the maintenance and surveillance activities to ensure that IROFS and other safety controls were in place and available to perform their safety function when needed. These assessments included work control documents, permits, and other required controls.

[redacted]

Through interviews with personnel, observation of on-going activities, and discussions with the licensee, the inspectors determined that procedures associated with operations and safety management systems were reviewed in the appropriate time frame and approved by the appropriate management. The inspectors verified that changes to procedures were properly reviewed by the appropriate level of management and were performed at the designated frequency. The inspectors verified that the appropriate safety management personnel were included in the review and approval of procedure changes. The inspectors found no examples of outdated procedures during the inspection.

The inspectors attended selected meetings and reviewed the most recent minutes from various Safety & Safeguard Review Council (SSRC) meetings. The 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. The inspectors found that the required disciplines (e.g. Safety, Security, Material Control and Accounting Management, Production, etc.) were represented in the meetings. The inspectors found that the items reviewed were given appropriate consideration and management attention. No findings of significance were identified.

The inspectors evaluated the licensee's maintenance efforts associated with the groundwater treatment system demolition/upgrade at the waste water treatment facility. The inspectors reviewed WR #112861, SWP/RWP #11904, LO/TO permit #07-134, and confined space permit #679. One minor violation of radiological controls was noted and brought to the attention of management. This issue was quickly rectified and PIRCS #10030 was generated.

(2) Conclusions

The inspectors determined that the licensee adequately performed maintenance and sufficiently documented any identified adverse condition.

b. Training (IP 88010 and IP 88135)

(1) Inspection Scope and Observations

The inspectors reviewed the licensee's schedules for returning workers. A major aspect was the emphasis placed on the different ways that the employees have to notify management of any event or violation of regulatory requirements. The main areas reviewed included: General Employee Training (GET), radiological training, site/area specific training and health and safety training.

[redacted]

The inspectors observed on the job training (OJT) for the 303 area, 200, 300 and 500, 302 area, 600 and 900 process areas and the solvent extraction (SE) process to review the adequacy of the licensee's OJT and the operating procedures training. The inspectors were able to verify that the employees were aware of the radiological and criticality safety concerns and safety controls of the designated work area.

(2) Conclusions

The licensee provided adequate training to its employees in the required areas of radiation protection, criticality safety, emergency preparedness, procedure adherence, and general employee training. The training observed indicated that the employees had a good understanding of the training acquired and how it is implemented in the work area. No findings of significance were identified for the areas inspected.

c. Management Organization and Controls (IP 88005, IP88071 and IP 88135)

(1) Inspection Scope and Observations

The inspectors reviewed staffing changes due to the increased number of returning union employees and their reassignment to new areas. The inspectors reviewed these changes in personnel assignment, responsibilities and functions that occurred since the last inspection in order to verify that personnel training and qualification requirements were met. The inspectors determined that these changes, as specified in the license, were satisfied.

The inspectors reviewed the licensee's PIRCS entries to ensure that items adverse to requirements and quality were being identified and tracked to closure. Those items reviewed were being properly identified, reviewed and tracked to completion.

(2) Conclusions

Returning personnel were being appropriately trained and qualified as required by license and procedure requirements. Results were documented and conveyed to management, and any findings were resolved in a timely manner. The inspectors will closely monitor the effectiveness of the PIRCS program to properly identify all issues of concern. The inspectors determined that the licensee adequately implemented the SSRC.

d. Emergency Preparedness (IP 88051) (F4)

(1) Inspection Scope and Observations

Section 7.3.1 of the Emergency Plan required that biennially an emergency exercise be conducted. The exercise was conducted on May 10, 2007, in fulfillment of Section 7.3.1 of the Plan. The licensee submitted in advance of the exercise date the final details on the exercise scenario, scope, and objectives for NRC review. The exercise scenario

and objectives were reviewed for adequacy in testing the onsite response capability. The licensee's performance in the implementation of the Emergency Plan in response to the simulated emergency and the critique to self identify areas of improvement were evaluated. The inspectors observed the licensee's response to the simulated emergency at the incident scene, the On-Scene Command Post, and the Emergency Control Center (ECC).

The inspectors 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. [redacted] The scenario was realistic, well planned, and the use of props at the incident scene enhanced the training experience for responders.

Offsite exercise participants included the Erwin Fire Department, Quality Care Ambulance Service, Unicoi County Memorial Hospital, Johnson City Medical Center (which included air transport of a simulated injured victim by WINGS Helicopter Service), Unicoi County Emergency Management, Tennessee Emergency Management Agency, and the Nuclear Regulatory Commission.

The licensee's response to the postulated accident was considered successful. The emergency classification was timely, notifications to offsite authorities were completed within the required time limits, and the appropriate protective actions recommendations (PARs) were selected and posted on the status boards inside the ECC. However, the inspectors noted that the initial Emergency Information Message (EIM) Form transmitting the PARs to offsite authorities was inconsistent with Table 5-2 of the Emergency Plan (EP) and the PARs selected and discussed with offsite authorities located in the ECC. In response, the licensee discussed plans to review the EIM form for making changes to remove the potential for recording the incorrect PARs. In addition, Attachment B to Emergency Procedure NFS-HS-E-09 (Off-site Dose Projection For Radiological Emergency) used for making prompt off-site dose projection appears to be overly conservative in the estimate of offsite consequences resulting in potentially unnecessary PARs being recommended. The licensee acknowledged the need to re-evaluate assumptions in light of past and present changes involving operations and site physical changes. The inspectors discussed the licensee's review of the default values and assumptions incorporated into NFS-HS-E-09 and modifications to the EIM Form transmitting PARs as IFI 70-143/2007-004-03; "Verify corrective actions to EIM Form."

The licensee's response to control contamination during the simulated accident was considered an area of weakness. Several re-entry teams were observed entering and exiting potentially contaminated areas without personnel contamination surveys being performed. In addition, no contamination surveys were performed on equipment, and no step-off pads or contamination-control zones were established. During the licensee's critique, contamination concerns regarding the vehicle and equipment were also expressed by the offsite support medical transport group. The licensee was informed that the corrective actions taken to resolve the onsite and offsite contamination concerns

[redacted]

will be tracked as IFI 70-143/2007-004-04; "Verify corrective actions to resolve the onsite and offsite contamination."

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.

(2) Conclusions

The licensee conducted this exercise in accordance with the Emergency Plan. The scenario details provided a realistic set of conditions for evaluating the onsite response capability and the state of readiness for responding to incidents. The exercise critique was a candid assessment of the response. Contamination control, offsite dose projection, and communication of protective action recommendations were identified as areas needing improvement.

4. Followup on Previously Identified Issues

(Closed) IFI 70-143/2005-010-01 "Replacement of IROFS": The inspectors reviewed this IFI which dealt with the equivalent replacement of IROFS. This IFI identified various concerns regarding the use of replacement IROFS as a result of some sort of failure or unreliability. Some specific examples included:

- Mass flow meter used in the BPF downblending area never functioned properly from initial startup of the system. The purpose of the device was to ensure that the administrative limit of 600 liters was not exceeded during any downblend. The 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 302 recovery area, failed float valves had compensatory measures embedded in the operating procedures. These compensatory measures allowed continued operation of the system.

10CFR70.72 allows a licensee to make changes to the site, structures, processes,

[redacted]

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. The inspectors performed a walkdown of the affected systems, reviewed the ISA, and discussed the above issues with criticality as well as ISA safety engineers. In all cases, the replacement IROFS were deemed either: a) not needed to meet the performance requirements of 10CFR70.61 due to a robust design or b) satisfactory equivalent replacements as described above. Thus, the inspectors concluded that this IFI was not a safety issue. This item is closed.

5. Exit Meeting

The inspection scope and results were presented to members of the licensee management at various meetings throughout the inspection period and were summarized on June 15, 2007. No dissenting comments were received from the licensee.

[redacted]

ATTACHMENT

1. PERSONS CONTACTED

Partial List of Licensee's Persons Contacted:

S. Barron, Emergency Management
R. Bond, Jr., Sr., Project Director, BPF
R. Droke, Licensing/Acting Safety Director
S. Gizzie, Nuclear Criticality Safety Engineer
T. Lindstrom, Executive Vice President, HEU Operations
M. Moore, Vice President, Safety & Regulatory
J. Nagy, Sr. Licensing & Regulatory Compliance Officer
J. Parker, Industrial Safety Manager
R. Shackelford, Nuclear Criticality Safety Manager
T. Sheehan, HEU Operations Director
M. Tester, Sr. Manager, Radiation Control
A. Vaughan, Director Fuel Production
K. Weir, Deputy Security Director
D. Wise, Vice President, Fuel Manufacturing

2. INSPECTION PROCEDURES USED

IP 88005	Management Organization Controls
IP 88010	Operator Training/Retraining
IP 88020	Operational Safety
IP 88051	Evaluation Exercises and Drills
IP 88071	Configuration Management Programmatic Review
IP 88135	Resident Inspector Program for Category 1 Fuel Cycle Facilities

3. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

70-143/2007-004-01	Open/Closed	NCV	Failure to Comply with Operations Procedures
70-143/2007-004-02	Open	IFI	Incorrectly Designed Check Valve for Application
70-143/2007-004-03	Open	IFI	Verify Corrective Actions to EIM Form
70-143/2007-004-04	Open	IFI	Verify Corrective Actions to Resolve On-Site and Off-Site Contamination
70-143/2005-022-01	Closed	IFI	Replacement of IROFS

[redacted]