



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
245 PEACHTREE CENTER AVENUE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

January 28, 2011

Mr. Joseph Henry
President
Nuclear Fuel Services, Inc.
P. O. Box 337, MS 123
Erwin, TN 37650

SUBJECT: NRC INSPECTION REPORT NO. 70-143/2010-004

Dear Mr. Henry:

This letter refers to the inspections conducted from October 1, 2010 to December 31, 2010 at the Nuclear Fuel Services (NFS) facility in Erwin, TN. The purpose of these inspections was to determine whether activities authorized under the license were conducted safely and in accordance with NRC requirements. At the conclusion of the inspections, the findings were discussed on January 10, 2011, with those members of your staff identified in the enclosed report.

The inspections consisted of an examination of activities conducted under the license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of the license. Areas examined during the inspections are identified in the enclosed report. Within these areas, the inspections consisted of a selective examination of procedures and representative records, observations of activities in progress, and interviews with personnel.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosures will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

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

Sincerely,
/RA/ J. Pelchat for

Steven J. Vias, Chief
Fuel Facility Inspection Branch 1
Division of Fuel Facility Inspection

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

Enclosure: (See page 2)

J. Henry

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Enclosure:
NRC Inspection Report No. 70-143/2010-004

cc w/encl:
Christa Reed
Director, Operations
Nuclear Fuel Services, Inc.
Electronic Mail Distribution

Mark Elliott
Quality, Safety, & Safeguards Director
Nuclear Fuel Services, Inc.
Electronic Mail Distribution

Lawrence E. Nanney
Director, TN Dept. of Environment & Conservation
Electronic Mail Distribution

William D. Lewis
Mayor, Town of Erwin
211 N. Main Avenue
P.O. Box 59
Erwin, TN 37650

Gregg Lynch
Mayor, Unicoi County
P.O. Box 169
Erwin, TN 37650

Johnny Lynch
Mayor, Town of Unicoi
P.O. Box 169
Unicoi, TN 37692

Distribution w/encl: (See page 3)

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SIGNATURE	Via email	Via email	JP 1/28//11	ViA EMAIL		
NAME	GSmith	MChitty	JPelchat	JFoster		
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J. Henry

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Letter to: Joseph Henry from Steven Vias dated January 28, 2011

SUBJECT: NRC INSPECTION REPORT NO. 70-143/2010-004

Distribution w/encl:

PUBLIC

nmed@inl.gov

M. Chitty, RII

J. Diaz, RII

P. Habighorst, NMSS

J. Pelchat, RII

K. Ramsey, NMSS

G. Smith, RII

M. Tschlitz, NMSS

S. Vias, RII

U. S. NUCLEAR REGULATORY COMMISSION
REGION II

Docket No.: 70-143

License No.: SNM-124

Report No.: 70-143/2010-004

Licensee: Nuclear Fuel Services, Inc.

Facility: Erwin Facility

Location: Erwin, TN 37650

Dates: October 1, 2010 – December 31, 2010

Inspectors: G. Smith, Senior Resident Inspector
M. Chitty, Resident Inspector
J. Foster, Fuel Facility Inspector

Approved by: S. Vias, Chief
Fuel Facility Inspection Branch 1
Division of Fuel Facility Inspection

Enclosure

EXECUTIVE SUMMARY

Nuclear Fuel Services, Inc.
NRC Integrated Inspection Report 70-143/2010-004
October 1 – December 31, 2010

Inspections were conducted by the resident and regional inspectors during normal and off normal shifts in the areas of safety operations, radiological controls, and facility support. The inspectors performed a selective examination of licensee activities which was accomplished by direct observation of safety-significant activities and equipment, tours of the facility, interviews and discussions with licensee personnel, independent verification of safety system status and limiting operation conditions, corrective actions, and a review of facility records.

Safety Operations

- Plant operations were performed safely and in accordance with approved plant procedures. (Paragraph 2.a)
- Criticality controls were followed throughout the facility. (Paragraph 2.b)
- Fire Protection equipment and barriers were adequately maintained. A plant fire drill demonstrated the readiness of the fire brigade. (Paragraph 2.c).

Radiological Controls

- The licensee adequately implemented the radiation protection program consistent with the license and regulations. Radiation work permits were adequately developed and implemented in order to ensure personnel exposure was kept as low as reasonably achievable (Paragraph 3a).
- The licensee adequately implemented the radiation protection program consistent with the license and regulations. (Paragraph 3b).
- Radioactive effluents were maintained within regulatory limits. One unresolved item was opened to address the lack of updates to a design basis document associated with isotopic ratios used in the gaseous effluent analysis. Additionally, an inspector follow-up item was opened to address negative activity values reported in the semi-annual radiological effluent release report. (Paragraph 3c).
- Radioactive waste management practices were implemented in accordance with approved plant procedures (Paragraph 3d).
- Radioactive material transportation activities were performed in accordance with applicable Department of Transportation regulations. (Paragraph 3e).

Facility Support

- Adverse conditions were adequately identified and evaluated. (Paragraph 4a).
- The Emergency Preparedness program was implemented in accordance with the site Emergency Plan as evidenced by a plant drill conducted on November 15, 2010. Based on interviews and documentation review, program changes made since the last inspection did not decrease the effectiveness of the program (Paragraph 4b).

Attachment

Key Points of Contact

List of Items Opened, Closed, and Discussed

List of Inspection Procedures

REPORT DETAILS

1. Summary of Plant Status

This inspection period covered a three month period from October 1 to December 31, 2010. The facility began the period with the Navy fuel manufacturing facility (FMF), Uranium (U)-Aluminum, U-Oxide, U-Metal, Solvent Extraction (SX), the down-blending (DB) lines located in the Blended Low Enriched Uranium (BLEU) Preparation Facility (BPF), and the Building 301 Column Dissolvers all in operation. All remaining systems located in the commercial development line of Building 301 began the period shutdown pursuant to a confirmatory action letter (CAL) issued on January 7. Following completion of the fourth restart readiness assessment which focused on the Building 301 ammonium di-uranate (ADU) system (NRC Inspection Report 70-143/2010-011), restart of these operations was authorized by NRC letter on October 22. However, due to operational needs, the ADU system remained in a shutdown condition. Other processes continued operations until Dec 23, at which time all process lines were shut down as part of a planned maintenance outage which was scheduled to extend into the first week of January 2011. All remaining systems affiliated with uranium hexafluoride located in the commercial development line of Building 301 remained in a shutdown condition pursuant to the CAL.

2. Safety Operations

a. Plant Operations (IP 88135)

(1) Inspection Scope and Observations

i. Operating Area Observations

The inspectors performed daily tours of plant operating areas and determined that equipment and systems were operated safely and in compliance with the license. Daily operational meetings and turnover meetings where production status and operational issues were discussed were observed throughout the period. The inspectors reviewed selected licensee-identified events and corrective actions for previously identified events and found no significant deficiencies in the items reviewed. The inspectors focused on plant operations, safety related equipment (valves, sensors, instrumentation, in-line monitors, scales, etc) and items relied on for safety (IROFS).

The daily tours included walk-downs of the BPF, FMF, storage areas, vaults, and the waste treatment facility. The inspectors verified that there was adequate staffing and that operators were attentive to their duties and the status of alarms and annunciators. The inspectors observed activities during normal and upset conditions for compliance with procedures and station limits. The inspectors noted that safety controls were in place and were being controlled. The inspectors verified the adequacy of communications between supervisors and operators within the operating areas. The inspectors walked down portions of the standard operating procedures and verified that IROFS were identified and operable. The inspectors reviewed log books, lockout tag-out records, and Letters of Authorization (temporary modifications) to obtain information

concerning operating trends and activities. The inspectors verified the licensee actively pursued corrective actions for conditions requiring temporary modifications and that compensatory measures were prescribed as required.

ii. Plant Tours

The inspectors performed periodic tours of the out-lying 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, storage of compressed gas containers, potential degradation of plant security features, and potential fire hazards. During these tours the inspectors also verified that required notices to workers were appropriately and conspicuously posted in accordance with 10 CFR 19.11.

iii. Plan-of-the-Day-Meetings.

The inspectors attended various plan-of-the-day meetings throughout the inspection period in order to determine the overall status of the plant. The inspectors evaluated the adequacy of the licensee's response to significant plant issues as well as their approach to solving various plant problems.

The inspectors attended a number of Safety and Safeguards Review Council (SSRC) meetings and observed some potential weaknesses with respect to the level of detail and comprehensiveness of plant changes presented to the SSRC for review. Although no license requirement or procedure specifies how material should be presented for review by the SSRC, the inspectors noted that plant changes were frequently presented to the SSRC in segments instead of in their entirety. Specifically, the system design information, related procedure changes, and related system safety tests were routinely presented to the SSRC at different meetings throughout the inspection period. The inspectors also noted that documentation associated with proposed changes may not have been made available to SSRC members for review in a timely fashion. The inspectors also noted that the presentation of one set of audit results addressed what audits had been completed, but made no mention of the results of any of the audits. This lack of detail was not questioned by any member of the SSRC. Although the noted potential weaknesses do not constitute violations of NRC requirements, they were brought to the attention of plant management for further review.

iv. Safety-Significant System Walk-down

During the inspection period, the inspectors performed two walk-downs of safety significant systems involved with the processing of SNM. As part of the walk-downs, inspectors verified the as-built configuration matched approved plant drawings. The inspectors interviewed operators in order to ensure that plant personnel were familiar with the assumptions and controls associated with these IROFS systems and instrumentation for maintaining plant safety. The inspectors also verified that IROFS assumptions and controls were properly implemented in the field. The inspectors reviewed the related Integrated Safety Analysis (ISA) to verify the systems' ability to perform its functions could not be affected by outstanding design issues, temporary

modifications, operator workarounds, adverse conditions, or other system-related issues. The inspectors also verified that there were no conditions that would degrade plant performance, the operability of IROFS, safety-related devices, or other support systems essential to safety system performance. Examined systems included:

- Building 303, Area 900
- Building 301, Column Dissolvers

To determine the correct system alignment, the inspectors reviewed the procedures, drawings, related ISAs, and 10 CFR 70.61. During the walk-downs, the inspectors verified the following:

- Criticality safety hazards and controls were maintained;
- Chemical safety hazards and controls were maintained;
- The configuration of metal and glass columns was maintained in accordance with Nuclear Criticality Safety Evaluations;
- Valves were correctly positioned and did not exhibit leakage that would impact the valve's function;
- Electrical power was available as required;
- Major system components were correctly labeled, lubricated, cooled, ventilated, etc.;
- Hangers and supports were correctly installed and functional;
- Tagging clearances were appropriate with breakers and valves correctly positioned and locked as required by the lockout/tagout program;
- Cabinets, cable trays, and conduits were correctly installed and functional;
- Visible cabling appeared to be in good material condition;
- Essential support systems were operational; and
- Ancillary equipment or debris did not interfere with system performance.

(2) Conclusions

No findings of significance were identified.

b. Criticality Safety (IP 88135)

(1) Inspection Scope and Observations

During daily production area tours, the inspectors verified various criticality controls to be in place, that personnel followed criticality station limit cards, and that containers were adequately controlled to minimize potential criticality hazards. The inspectors sampled a number of criticality-related IROFS for operability and for adequate identification in the field as well as on drawings. The inspectors noted that operators were knowledgeable of the requirements associated with IROFS.

(2) Conclusions

No findings of significance were identified.

c. Fire Protection

i. Routine Fire Inspection (IP 88135)

(1) Inspection Scope and Observations

During daily plant tours, the inspectors verified that transient combustibles were being adequately controlled and minimized and that fire barriers located between fire areas were being properly maintained.

(2) Conclusions

No findings of significance were identified.

ii. Fire Area Walkdown (IP 88135)

(1) Inspection Scope and Observations

During the inspection period, the inspectors conducted a fire safety tour of building 330. The inspectors verified adequate control of combustible material. The inspectors walked down various fire suppression components and systems that supplied building 330 and verified these systems were properly aligned and operational. The inspectors verified that various aspects of the fire protection/prevention strategies conformed to the applicable nuclear criticality safety evaluation.

(2) Conclusions

No violations of NRC requirements were identified.

iii. Annual Fire Drill (IP 88135)

(1) Inspection Scope and Observations

On November 15, the inspectors evaluated personnel performance during the conduct of a fire brigade drill. The inspectors evaluated the readiness of station personnel to prevent and fight fires. The drill simulated a fire in the structure of the Building 306 West mezzanine roof. The inspectors observed fire brigade members using protective clothing, turnout gear, and self-contained breathing apparatuses while entering the area. The inspectors noted that fire brigade members entered the area in a controlled manner. The inspectors also noted that fire-fighting equipment brought to the fire scene had been adequately maintained and was used appropriately and effectively to control and extinguish the simulated fire. The inspectors noted that appropriate medical and radiological controls personnel were on the scene to treat potentially contaminated injured personnel. The inspectors observed the fire fighting directions to, and communications between, fire brigade members. The inspectors noted that off site assistance was requested and available. The brigade chief displayed sufficient command and control and adequately implemented pre-fire plan strategies to combat

the fire. The inspectors verified that the pre-planned drill scenario was followed and monitored the post drill critique to determine if drill objectives were satisfied and that drill weaknesses were adequately captured and discussed.

(2) Conclusions

No findings of significance were identified.

3. Radiological Controls

a. Radiation Protection

i. Radiological Work Permit (RWP) Review (IP 88135)

(1) Inspection Scope and Observations

During tours of the production areas, the inspectors verified that workers complied with health physics procedures. The inspectors noted that plant workers properly wore dosimetry, used protective clothing in accordance with applicable RWPs, and properly frisked upon exiting the controlled area. The inspectors noted that radiation area postings complied with plant procedures and included radiation maps with up-to-date radiation levels. The inspectors monitored the operation of radiation protection instruments and reviewed the calibration due dates of those instruments. Radiation work permits were adequately developed and implemented in order to ensure personnel exposure was maintained as low as reasonably achievable.

On November 4, inspectors performed a review of Safety Work Permit (SWP) #14142 which was issued to repair a leak on the building 301 Column Dissolvers. The inspectors noted that four Work Requests (WRs) were being implemented, but only three had been authorized under the SWP. The residents brought this to the attention of supervisory personnel. NFS supervisors identified the cause and the WR was added to the SWP. The residents noted that although the fourth WR changed the scope of the work being performed under the SWP, the requirements of the SWP were adequate to cover the WR. The inspectors noted that the WR had received the appropriate authorization for work to commence and was covered under an adequate lock-out-tag-out. The inspectors determined that the failure to initially include the WR under the SWP did not represent an increase in risk or unsafe condition.

On December 14 and 16, inspectors performed detailed reviews of SWP-10-18-011 and SWP-10-18-012 respectively. The work associated with SWP-10-18-011 was to repair or replace waste process pump 0B04 in 303-B under WR-149640. The work associated with SWP-10-10-012 was to repair Area 801 vessels under WR-147739. Both SWPs included radiological requirements detailed under the RWP section. The inspectors verified that craft personnel complied with the prescribed controls and precautions. The inspectors noted that the RWPs contained adequate requirements concerning the radiation levels, respiratory equipment, dosimetry, contamination levels, special tools and equipment, airborne radioactivity, and containment devices. Each area was

effectively controlled by health physics personnel. The SWPs were prominently posted for employees to observe and review. Workers entering the SWP areas signed onto the SWPs, verifying their knowledge of the entry requirements.

(2) Conclusions

No findings of significance were identified.

i. Radiation Protection Program Review (IP 88030)

(1) Inspection Scope and Observations

The inspectors performed a semi-annual review of the radiation protection program. This review included a review of radiation protection (RP) procedures, RP instruments, exposure controls, postings, labeling and surveys, and a review of the radiation protection program organization. The inspectors noted that no key personnel changes had been made since the last inspection. Inspectors interviewed selected individuals in the radiation protection organization and verified that these personnel were qualified in accordance with the licensee's program. Inspectors reviewed training, qualification, and requalification records for contractors and licensee employees. The inspectors noted that individuals were trained and qualified in accordance with the training program.

Inspectors reviewed the latest annual As Low As Reasonably Achievable (ALARA) report. Inspectors noted that annual personnel exposures were well below regulatory exposure limits. A downward trend in the number of personnel contaminations was noted since calendar year 2009. Inspectors interviewed randomly selected workers to determine their understanding of the ALARA program. Inspectors determined that the majority of workers were familiar with the term ALARA and the importance of time, distance, and shielding. Inspectors concluded that the licensee is in compliance with 10 CFR 20.1201.

Inspectors reviewed licensee self-assessments for the radiation protection program. Findings were entered into the licensee's corrective action program in accordance with approved procedures. The self-assessments were adequate with a low threshold for identifying issues. Procedures reviewed from this database were adequate.

Inspectors observed licensee personnel performing operational response checks and source checks on portable survey meters and digital personnel dosimeters. Licensee personnel were knowledgeable of the daily response check requirements and associated procedural requirements. Instrument response checks and calibration sources were appropriate for their intended function and instruments were readily available for use. The inspectors verified that the calibration of portable survey equipment and digital personnel dosimeters was current. Inspectors noted that daily operational checks and calibration of radiological laboratory equipment utilized for the analysis of air samples and for determination of contamination levels were performed in accordance with approved procedures.

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 was entered into the corrective action program.

Inspectors reviewed bioassay records and noted that bioassay results were well below the licensee's action levels and that bioassay samples were collected routinely and subsequently analyzed by a qualified, off-site, analytical facility. Inspectors also reviewed external exposure records and evaluated the licensee's performance against their external dosimetry program procedure. All external exposures were well below the occupational limits in 10 CFR 20.1201 (Subpart C).

Inspectors observed the location and condition of respirators available for use. Inspectors noted that measures were in place to prevent unauthorized issuance of respirators to non-qualified individuals. The inspectors found that the licensee's respiratory protection training and qualification program adequately addressed regulatory requirements. The documentation reviewed was procedure NFS-GH-07, "Respiratory Protection Program", Revision 18, July 30, 2010. This procedure was found to be adequate.

The inspectors noted that the licensee utilizes lapel breathing zone air samples to evaluate internal exposures to workers. Based on field observations, inspectors noted that operators were equipped with lapel breathing zone air samplers in accordance with approved procedures. General work area airborne concentrations were monitored by several stationary air sample stations located within radiologically controlled areas. The licensee has equipment on-site to analyze the samples. Procedures for using this equipment and corresponding calibration data were reviewed and were found to be adequate. The inspectors also reviewed air sample airborne concentration data and associated equipment documentation.

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. The inspector subsequently expanded the inspection of radiological postings and determined that all other radiological postings and signage were in compliance with 10 CFR 20.1901, 1902, and 19.11.

Inspectors reviewed the radiological survey program with attention to the accuracy and thoroughness of radiological survey maps. The inspectors witnessed plant personnel performing radiation surveys in the raffinate area and reviewed the completed radiological survey maps. The inspector determined that the survey maps accurately described the radiological conditions for the areas surveyed. Inspectors also witnessed licensee personnel performing contamination surveys.

(2) Conclusions

No findings of significance were identified.

c. Effluent Control and Environmental Protection (IP 88045)

(1) Inspection Scope and Observations

During the first week of October 2010, the inspectors performed a detailed review of the semi-annual effluent monitoring reports issued in February and August. These reports covered the last half of 2009 and the first half of 2010, respectively. The reports were submitted as required by 10 CFR 70.59. The inspectors verified that the maximum potential annual radiation dose to the public from gaseous and liquid effluent releases remained significantly below the licensee's design objectives and the limits prescribed in 10 CFR 20.1301. 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 reviewed the National Council on Radiation Protection and Measurements' (NCRP) report 58, "A Handbook of Radioactivity Measurements Procedures," 2nd edition, and noted that it contained the following guidance:

"Negative values (below background) are as valid a measurement as positive values and should be retained in any series of data."

The NCRP report notes that radioactive decay is a statistical process and consequently repetitive measurements of the same sample will result in a range of concentrations. Effluent analyses require a high level of confidence that the "true" amount of radioactivity has been determined. Since the concentrations of some radionuclides in effluent releases are indistinguishable from background radiation levels, there is a statistical probability that a given measurement may be "less than" background levels. A negative

value is a valid measurement and simply indicates that no measurable amount of radioactivity was statistically detected in the sample above background levels. The NCRP report states that under these circumstances a negative value may be reported.

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. The inspectors opened Inspector Follow-up Item (IFI)-70-143/2010-004-01 to review the practice of using negative ECVs in the sum of fractions portion of the semi-annual effluent reports. Notwithstanding the potential non-conservatism of this practice, the inspectors noted that even if all negative ECVs in the liquid effluents were replaced with a zero value, the sum of ECV fractions would still remain less than one and would, therefore, remain within regulatory limits. NFS entered this issue into the corrective action program (CAP) as Problem Identification Resolution and Correction System (PIRCS) item #28060.

The inspectors performed a tour of the environmental laboratory and the building 110D laboratory. The inspectors verified that the liquid samples from the two sewers as well as the WWTF were being properly analyzed and observed that monthly composite samples were correctly collected for further analysis. Laboratory practices and techniques were observed and noted to be effective and sound. The inspectors also verified that the isotopic analyses for the liquid effluent discharges were performed by General Engineering Laboratories (GEL), an independent laboratory. The inspectors reviewed the results generated by GEL and noted no anomalies.

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 sample pumps at the various locations appeared to have been properly maintained and were in good working order. 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 technician removed the existing air filters for counting purposes and installed new air filters. The inspectors also reviewed recent data associated with the collection and analysis of soil, water, and vegetation samples from the areas surrounding the facility. The inspectors noted that activity levels were generally very low. The inspectors performed a walk-down of the effluent discharge pipe from the WWTF to the Nolichucky River. The inspectors verified appropriate signage at the end of the discharge pipe and the pipe was in satisfactory condition.

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 (URI)-70-143/2010-004-02. NFS entered this issue into the CAP as PIRCS #28061.

(2) Conclusions

No findings of significance were identified.

d. Waste Management (IP 88035)

(1) Inspection Scope and Observations

The inspectors observed radioactive waste storage and handling areas. The inspectors noted that entrances to storage locations were properly posted and that containers were labeled and storage areas were posted in accordance with approved procedures and regulatory requirements. The physical condition of storage containers was noted to be adequate. The inspectors interviewed personnel regarding Transportation and Waste Management (T&WM) activities. The inspectors found that personnel were knowledgeable of the requirements associated with the storage and control of radioactive waste material and the routine inspection requirements for storage locations.

The inspectors reviewed records associated with the generation and tracking of radioactive waste material. The inspectors found that radioactive material containers were properly inventoried, inspected, and stored in specified locations. The inspectors observed personnel perform waste material inventory and tracking functions. The inspectors noted that personnel were able to determine the appropriate labeling and applied labels to storage containers in accordance with written procedures. The inspectors also noted that personnel correctly assigned container identification numbers and entered those numbers into the data tracking system. Radioactive waste package certification records were current and cognizant personnel knowledgeable of program requirements for tracking radioactive waste material. Documentation accurately reflected the location, amounts, and description of radioactive waste material.

The inspectors reviewed procedures and found that procedures adequately described the responsibilities and roles of T&WM personnel and organizations with radioactive waste management program responsibilities.

The inspectors interviewed personnel regarding self assessments of the radioactive waste management program and the tracking of assessment findings. The licensee's Quality Assurance group had developed a schedule to routinely assess the radioactive waste management program. The inspectors reviewed selected audits and confirmed that assessment findings were entered into the licensee's corrective action program for tracking.

(2) Conclusions

No violations of NRC requirements were identified.

e. Transportation (IP 86740)

(1) Inspection Scope and Observations

The inspectors reviewed procedures associated with the radioactive material transportation program. Procedures adequately described the responsibilities and roles of T&WM personnel and organizations responsible for the transportation of radioactive and hazardous materials.

The inspectors interviewed personnel responsible for the preparation, receipt, and shipment of radioactive waste material. The inspectors found that personnel were knowledgeable of burial site criteria, and Department of Transportation (DOT) regulations related to the preparation, packaging, and labeling of radioactive material shipments. The inspectors observed the receipt inspection of a radioactive material shipment. Receipt inspection activities were implemented utilizing peer checks and performed in accordance with written procedures. Personnel were knowledgeable of requirements associated with the receipt of radioactive material.

The inspectors reviewed radioactive waste shipment manifests for completeness and accuracy. The inspectors found that manifests correctly reflected the classification, quantity, and labeling requirements for the respective shipment. The inspectors interviewed personnel and determined that personnel responsible for certifying that shipments are prepared in accordance with DOT regulatory requirements were knowledgeable of their duties and associated regulatory requirements.

The inspectors observed the operation and daily performance checks of a radioactive material assay system. The inspectors interviewed personnel regarding equipment operation and maintenance and determined that personnel were knowledgeable of equipment operating procedures and acceptance criteria. The inspectors reviewed associated operating procedures and equipment operability records and found that equipment was adequately maintained.

The inspectors reviewed training and qualification records for individuals responsible for key aspects of the radioactive material transportation program. The inspectors found that training records were current and adequately covered DOT training requirements in addition to training and qualification requirements specified in applicable licensee procedures.

(2) Conclusions

No violations of NRC requirements were identified.

4. Facility Support

a. Management Organization and Controls (IP 88135)

(1) Inspection Scope and Observations

The inspectors reviewed the licensee's CAP to ensure that items adverse to safety were being identified and tracked to closure. To aid in the identification of repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed frequent screenings of items entered into the CAP.

During the week of October 18 inspectors performed a detailed review of 20 work requests (WR) pulled from a population of approximately 100. The inspectors reviewed the WRs for proper identification of IROFS and inclusion of post maintenance Safety Related Equipment (SRE) testing. The inspectors also evaluated the WRs for compliance with applicable procedures. Although the inspectors determined that the WRs were not deficient with respect to IROFS and SRE testing, the inspectors did note numerous inconsistencies and a general lack of uniformity in how the WRs were filled out. A number of forms contained required blocks that were not completed and most of the WRs did not contain the required level of detail as specified by SOP-392, "Work Request Procedure," Section 5.1, "Description of Work." Additionally, although most of the WRs reviewed met the criteria for "Qualified Problems" as defined by Section 4.0 of NFS-GH-65, "Problem Identification," procedure, because the related PIRCS information had not been entered on the WR forms, neither the licensee or the inspectors could determine if a PIRCS entry had ever been made. The inspectors notified station management of the noted potential weaknesses associated with the WR process.

(2) Conclusions

No findings of significance were identified.

b. Emergency Preparedness

(1) Inspection Scope and Observations

i. Emergency Drill (IP 88135)

On November 15, the inspectors evaluated an emergency drill. The NRC did not participate in this emergency exercise. One inspector evaluated the command, control, and communications of the Emergency Response Organization (ERO) in the Emergency Control Center (ECC) while another inspector evaluated activities at the scene of the simulated event. The inspectors noted that the drill scenario was challenging for both the ERO and the fire brigade and tested key elements of the emergency plan. The inspectors noted that the scenario was properly classified by the ECC within regulatory

time limits. The inspectors verified the event and classification were reported to local authorities in a timely fashion. The inspectors evaluated the drill assessment performed by the licensee. The critique consisted of ERO members, fire brigade members, and other personnel involved at the scene. The inspectors noted that the licensee had good communication during the drill critique. All deficiencies noted during the exercise by NRC inspectors were independently captured by licensee personnel conducting the exercise and were subsequently discussed at the critique and entered into the corrective action program.

(2) Conclusions

No findings of significance were identified.

ii. Emergency Preparedness Program Review (IP 88050)

(1) Inspection Scope and Observations

The inspectors discussed changes in the facility and Emergency Response program that affected the program in the last year with the Emergency Response Coordinator. The licensee had organizational changes in the last year. However, the Emergency Response Organization (ERO) did not lose any members. The inspectors noted that several new managers were in training for the Emergency Coordination Director (ECD) role and had not yet qualified under the NFS training program.

The inspectors discussed the operational status of NFS, over the past year with the Emergency Response coordinator. The facility was shutdown in early 2010 and maintained a reduced workforce. The reduced workforce affected the number of fire brigade members on-site, but did not affect the overall staffing of the ERO. NFS had made arrangements with the Erwin Fire Department to act as a first responder for facility support. The inspectors confirmed this with the Erwin Fire Chief. The Erwin Fire Chief stated that he was aware of the impact of the reduced workforce on the NFS fire brigade and that the Erwin Fire Department made the necessary adjustments to act as first responder during this time. The inspectors also interviewed the Fire Chief on training opportunities provided by NFS, both on-site and contracted, and determined that the Fire Chief considered the opportunities to be adequate. The Fire Chief stated that the Erwin Fire Department and NFS maintained a good working relationship.

The inspectors noted that the ambulance service supporting the facility had changed. iCare Emergency Medical Services (EMS) had replaced the Professional Medical (ProMed) Transportation Inc. as the ambulance service. The inspectors verified that iCare EMS Letter of Agreement (LOA) was in place as required. The inspectors contacted iCare EMS and determined that the previous point of contact for the facility had left the company. Although the new point of contact was unaware of the existence of the formal LOA, they did understand their organization's response roles and responsibilities. The inspectors determined that iCare EMS would service NFS in the event of an emergency and would transport contaminated personnel if necessary. The inspectors verified that iCare EMS had been offered on-site training by NFS in the past

year. During the interview of the new point of contact, the inspectors confirmed that the Emergency Medical Technicians had not changed with the management change and were familiar with the emergency service to be provided to NFS.

The inspectors reviewed training material for off-site agencies, including training sessions held for the Erwin Fire Department, Southside Volunteer Fire Department, Professional Medical Ambulance Services, and Unicoi County Memorial Hospital. The inspectors determined that the training materials were adequate.

The inspectors reviewed an issue identified during the NRC-evaluated September 2009 emergency exercise (PIRCS #20795) which had been discussed with NFS during the last routine emergency preparedness inspection. The issue was self-identified by the licensee and pertained to the dose assessor's over-estimation of the inventory of special nuclear material in the building involved in the scenario. In response to this issue, the licensee developed a worst case look-up table for various building fires. The inspectors reviewed the table, RJF-09-076 Rev. 0, "Estimation of Potential Dose to an Off-Site Receptor Resulting from a Postulated Major Fire or Explosion," which summarized the source terms and specific parameters for each building that contained Special Nuclear Material (SNM). The document summarized HotSpot, Version 2.05, dose calculation results for fires and explosions at the facility. The inspectors reviewed NFS-HS-E-09 Rev. 21, "Off-site Dose Projection for Radiological Emergency," procedure after it was revised to include the Uranium Fire Dose Estimation Table. No issues were identified.

The inspectors confirmed that there had not been any events resulting in an alert or site area emergency since the last inspection. The inspectors reviewed a random sample of previous unusual incident analyses, PIRCS # 26609, 26598, and 24166, and determined the analyses to be adequate. The inspectors reviewed SYS-50-16-10 Rev 2, "Standard Operating Guidelines for the Evaluation of Unusual Incidents," and determined the guidance to be appropriate.

The inspectors randomly selected individuals from the ERO who should have received emergency response training and determined that the required training had been completed was consistent with the requirements of the Emergency Plan. The inspectors noted that qualification and training were posted on each of the lockers belonging to fire brigade members. The inspectors compared the postings to qualification and training records and found no discrepancies.

While interviewing two staff members qualified as ECD, the inspectors postulated a criticality scenario that exercised each of the staff members in their capacity as an ECD. The staff members walked through procedures NFS-HS-E-03 Rev 2, "Emergency Response Organization," and NFS-HS-E-02 Rev 36, "Emergency Criticality Evacuation." The inspectors noted that the ECDs properly classified the scenario and gave evidence that their training and instruction had been consistent. The inspectors discussed the activation of the ECC during back shifts and did not identify any issues of significance.

The inspectors reviewed the Tier Two Emergency and Hazardous Chemical Inventory maintained at the facility. The inventory was in compliance with the 29 CFR 1910.1200 Hazard Communication Standard and the Hazardous Chemical Right-to-Know law and the emergency plan.

The inspectors reviewed emergency monitoring equipment storage areas and determined that the equipment was present, readily accessible, and calibrated. The inspectors independently inventoried alpha contamination equipment, beta/ gamma contamination monitors, neutron radiation monitors, gamma detectors, and dosimeters. The inspectors determined the equipment stored in Buildings 220, 345, and 350 was adequate, accessible, and ready for use. The inspectors also reviewed the October 2009 calibration certificates for the weather tower and determined that the calibrations were adequate.

The inspectors verified that the equipment, as listed on the checklists in NFS-HS-B-08 Rev 8, was available in the Fire Brigade Response Building and the Medical Response Golf Cart. The inspectors toured the Fire Brigade Rescue Building, Fire Brigade Storage Facility, and the Fire Brigade Hazardous Material Response Building and noted that the equipment was accessible in case of an emergency. The inspectors observed the inventory of the Fire Brigade Response Truck and determined that the equipment, as listed on the checklists NFS-HS-B-08 Rev. 8, was available. The inspectors observed the inventory of the fire brigade firefighting personal protective equipment and noted improvements in the NFS bunker gear which had been replaced and upgraded.

The inspectors verified that the first aid room was equipped with standard first aid equipment and supplies, a decontamination sink, and an Automated External Defibrillator (AED). The inspectors ensured that the back-up facility for first aid application and decontamination in Building 350 met the criteria set in Section 6.3 of the Emergency Plan. The inspectors used checklist, NFS-HS-B-40 Rev. 23, to verify the correct supplies were present in the First Aid Room Jump Box Inventory Kit.

The inspectors verified the communication equipment, as required by the Emergency Plan, was located in the ECC. The inspectors verified that the Emergency Notification System (ENS) telephone line, which connects directly to the NRC, was located in the ECC, Building 350, and the Entry Exit Control Point (EECP) as specified in the Plan. The inspectors noted that communication equipment had been tested on a routine basis to ensure operability.

The inspectors verified that the emergency call list communication test was conducted quarterly in accordance with section 7.3.2 of the license application. The inspectors independently verified the call list by conducting a communication test and identified that the list was current.

The inspectors reviewed the Report for the 2009 Emergency Preparedness Audit, QA-09-30, dated March 31, 2010 and determined that the licensee was in compliance with Section 7.5 of the Emergency Plan which mandated that an annual audit is conducted. The inspectors determined that the audit report was adequate.

(2) Conclusions

No violations of NRC requirements were identified.

5. Event Follow-up

a. Event Notification 46284

(1) Inspection Scope and Observations

In NRC inspection report 70-143/2010-003, the inspectors evaluated NFS' response to Event Notification (EN) 46284 which was reported to the NRC Headquarters Operations Officer (HOO) on Sep 28. This EN dealt with the buildup of solid material in the U-Aluminum centrifuge bowl jacket. Following an extensive review of the system, NFS attributed the buildup to "dryout" conditions that occurred as a result of extended operations of the spinning centrifuges without sodium hydroxide feed. The practice of running the system (i.e. spinning the centrifuges) without a liquid feed was previously allowed by operations procedures. The root cause team deemed this a contributing cause to the event. The system remained shut down until a thorough review of the system operation was performed. Following completion of all corrective actions, the system was restarted on October 14. One corrective action included the requirement that the system not be run in the dry condition for more than four hours. However, on October 20, a small buildup of solid material was again noted in the centrifuge bowl. NFS reconvened the root cause team and decided to modify the drains from the centrifuges such that a water seal was installed in each drain to reduce the drying out of the bowl jackets. Following installation of the water seals, the system was restarted on November 8. No further buildup of solid material was noted for the remainder of the inspection period. Licensee Event Report (LER) 70-143/2010-003-01 is considered closed.

(2) Conclusions

No findings of significance were identified.

b. Event Notification 43090

(1) Inspection Scope and Observations

On January 11, 2007 while attempting to perform a routine calibration of the 333 Condensate Discard ILMS, the system failed all calibration efforts and was determined to be non-functional. The system was immediately shut down, the flow control valves closed, and NCS, NCMS management was notified. All waste discharges were subsequently suspended. The licensee is performing a complete review of recent discharges and receiving tank contents to ensure that all discharges were within limits. This issue was entered into the corrective action program as PIRCS #9016 and Investigation #5732.

NFS personnel performed a root cause investigation and determined that the voltage regulator to the condensate in-line monitor was not functioning properly due to deterioration in output voltage on the multi-channel analyzer (MCA) board to the photomultiplier (PM) tube. Modules were installed on all MCA boards to monitor the output of the high voltage power supplies and actuate alarms if the output voltage exceeded calibration limits. Existing 905 MCA's in the effluent monitors providing

protection for the Downblending, Commercial Development, and Navy Fuels lines were replaced with 935 MCA boards. Post-installation functional tests and Safety Related Equipment (SRE) tests were successfully performed and the systems were subsequently returned to service. The inspectors had no further questions. This item LER 2007-001 is closed.

(2) Conclusions

No findings of significance were identified.

6. Exit Meeting

The inspection scope and results were presented to members of the licensee's staff at various meetings throughout the inspection period and were summarized on January 10 with the licensee's management. No dissenting comments were received from the licensee. Proprietary information was discussed but not included in the report.

ATTACHMENT

1. Key Points of Contact

<u>Name</u>	<u>Title</u>
Joseph Henry	President
Tracy Coates	Electrical & Instrumentation Engineering Section Manager
Rik Droke	Senior Regulatory Advisor
Mark Elliott	Quality, Safety, & Safeguards Director
Marie Moore	Environmental Protection & Industrial Safety Section Manager
Randy Shackelford	Nuclear Safety & Licensing Section Manager
Michael Tester	Radiation Protection Unit Manager
Robert Holley	Manager Environmental Protection

2. List of Items Opened, Closed, and Discussed

Opened

70-143/2010-004-01	IFI	Negative Values Used In Semi-Annual Effluent Report
70-143/2010-004-02	URI	Technical Basis Document for Plant Stack Isotopic Ratios Not Updated

Closed

70-143/2010-003-01	LER	EN 46284: Unanalyzed Buildup of Material in U-Aluminum Centrifuge
70-143/2007-001	LER	EN 43090: Failure of Gamma Spectrometer Waste Monitor

3. List of Inspection Procedures Used

86740	Inspection of Transportation Activities
88030	Radiation Protection
88035	Radioactive Waste Management
88045	Effluent Control and Environmental Protection
88050	Emergency Preparedness
88135	Resident Inspection Program For Category I Fuel Cycle Facilities