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

July 24, 2009

Nuclear Fuel Services, Inc.
ATTN: Mr. David L. Kudsin
President
P.O. Box 337, MS 123
Erwin, TN 37650

SUBJECT: NRC INSPECTION REPORT NO. 70-143/2009-009

Dear Mr. Kudsin:

This letter refers to the operational readiness review team inspection conducted from June 1 through July 8, 2009, at the Nuclear Fuel Services, Inc. (NFS) facility in Erwin, TN. The purpose of the inspection was to assess your readiness to begin operation of the commercial development line pursuant to License Condition S-54 to the NFS license issued on May 11, 2009. A final exit meeting open for public observation was conducted on July 22, 2009, during which the findings were discussed with you and members of your staff.

The inspection 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 inspection are identified in the enclosed report. Within these areas, the inspection consisted of a selective examination of procedures and representative records, observations of activities in progress, and interviews with personnel.

Based on the results of this inspection, no cited violations or deviations were identified.

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/readingrm/adams.html.

Should you have any questions concerning this inspection, please contact me at 404-562-4711 or Manuel Crespo at 404-562-4733.

Sincerely,

/RA/ M. Crespo for

D. Charles Payne, Chief
Fuel Facility Inspection Branch 1
Division of Fuel Facility Inspection

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

Enclosure: NRC Inspection Report No. 70-143/2009-009

cc w/encl:
Timothy Lindstrom
Vice President, Operations
Nuclear Fuel Services, Inc.
P.O. Box 337, MS 123
Erwin, TN 37650

B. Marie Moore
Director, Safety and
Regulatory Management
Nuclear Fuel Services, Inc.
P.O. Box 337, MS 123
Erwin, TN 37650

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

cc w/encl: (Cont'd on page 3)

(cc w/encl: cont'd)
Johnny Lynch
Mayor
Town of Unicoi
Unicoi, TN 37692

Distribution w/encl:
PUBLIC
M. Tschlitz, NMSS
P. Habighorst, NMSS
K. Ramsey, NMSS
C. Payne, RII
M. Crespo, RII
S. Burris, RII
G. Smith, RII
nmed@inl.gov

☑ PUBLICLY AVAILABLE ☐ NON-PUBLICLY AVAILABLE ☐ SENSITIVE ☑ NON-SENSITIVE

ADAMS: ☑ Yes

ACCESSION NUMBER:_____

OFFICE	RII:DFFI	RII:DFFI	RII:DFFI	RII:DFFI	NMSS	RII:DFFI
SIGNATURE	MC for 7/16/09	MC for 7/16/09	RP 7/16/09	MC for 7/16/09	MC for 7/16/09	DH 1/16/09
NAME	OLopez	CCramer	RPrince	MMiller	TMarenchin	DHartland
DATE	7/ /2009	7/ /2009	7/ /2009	7/ /2009	7/ /2009	7/ /2009
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY DOCUMENT NAME: G:\REPORTS\DRAFT INSPECTION REPORT FOLDER\NFS\NFS IR 2009-009.DOC

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.:	70-143
License No.:	SNM-124
Report No.:	70-143/2009-009
Licensee:	Nuclear Fuel Services, Inc.
Facility:	Erwin Facility
Location:	Erwin, TN 37650
Dates:	June 1 through July 8, 2009
Inspectors:	D. Hartland, Senior Fuel Facility Inspector, Team Leader, Region II R. Prince, Senior Fuel Facility Inspector, Region II M. Miller, Senior Resident Inspector, Region II O. López, Fuel Facility Inspector, Region II C. Cramer, Fuel Facility Inspector, Region II T. Marenchin, Criticality Safety Inspector, NRC Headquarters
Approved by:	D. Charles Payne, Chief Fuel Facility Inspection Branch 1 Division of Fuel Facility Inspection

Enclosure

EXECUTIVE SUMMARY

Nuclear Fuel Services, Inc.
NRC Inspection Report 70-143/2009-009

This inspection entailed a review of Nuclear Fuel Services Inc.'s (NFS) proposed operation of the commercial development line (CDL). The objectives of the operational readiness review (ORR) inspection were to determine whether the CDL facilities and systems, including Items Relied On For Safety (IROFS), were adequately constructed and tested, met regulatory and licensing requirements, and provided reasonable assurance of worker and public health, safety, and security.

The inspection evaluated the readiness of NFS to proceed with operation of the CDL and was structured around the CDL IROFS. The inspection assessed whether the controls used to mitigate or prevent accidents were available and reliable to perform their intended function in three key areas. The key areas were Safety Operations (operational safety, criticality safety, and fire safety), Radiological Controls (radiation protection, environmental protection, and waste management), and Facility Support (training, emergency preparedness, and management organization and controls).

In each of these areas, the inspection assessed whether management measures were in place to provide reasonable assurance that the IROFS were available and reliable to perform their intended functions when required. The inspection team also assessed whether the licensee had implemented the programs and commitments specified in the license application and Integrated Safety Analysis (ISA) Summary. The inspection identified the following aspects of the licensee's programs as outlined below:

Safety Operations

- The inspectors concluded there was reasonable assurance that the CDL would be safe to operate using the controls delineated in the ISA Summary. The field installation of safety equipment was as stated in license documents. The licensee made enhancements regarding the implementation of particular administrative IROFS in response to issues raised by the inspectors. (Section 2.a)

- The inspectors had reasonable assurance that the nuclear criticality safety (NCS) function would be adequate for maintaining acceptable levels of safety with one exception. One issue identified by the inspectors regarded an accident scenario that was not adequately examined by the licensee. During the course of the inspection, the licensee implemented modifications to the plant to adequately address this issue. No concerns were identified regarding Criticality Accident Alarm System (CAAS) coverage for the CDL operations. (Section 2.b)

- The inspectors determined that requirements in the licensee's ISA related to fire protection were implemented. The licensee's fire protection program provided reasonable assurance that workers and the public would be protected. (Section 2.c)

Radiological Controls

- The licensee established adequate radiological control measures in support of CDL operations. Adequate conservative assessments to evaluate potential radiological safety concerns associated with CDL operations were performed. Air monitoring stations and a local area continuous air monitor had been established and were available to support CDL operations. (Section 3.a)

- Ventilation and filtration systems to control and monitor airborne effluent releases were available and tested in accordance with approved procedures. Stack effluent monitoring systems were available and calibrated to perform their intended functions. Adequate process control measures had been established and incorporated into operational procedures to minimize airborne effluent releases. (Section 3.b)

- Systems and equipment to control and monitor liquid waste processing were available and tested in accordance with approved procedures. An in-line liquid waste monitoring system was adequately calibrated and available to perform its intended function. Licensee personnel were knowledgeable of their responsibilities and procedural requirements associated with waste processing operations. (Section 3.c)

Facility Support

- The licensee had established and administered a training program in support of CDL operations that met regulatory requirements. The training included classroom and on-the-job training on the equipment prior to introducing special nuclear material (SNM) into the CDL. Written evaluations of trainee knowledge and performance-based on-the-job demonstrations of trainee skills and abilities were performed. (Section 4.a)

- The licensee completed necessary changes to the emergency plan associated with the CDL. Medical supplies, both onsite and offsite, for treatment of hydrofluoric acid (HF) exposures were available. Training was provided to incident response personnel regarding treatment for HF exposures. (Section 4.b)

- The licensee implemented management controls in preparation for CDL operation including an internal ORR, planned enhanced oversight during start-up and operation, and safety culture and human performance evaluation training for plant staff. (Section 4.c)

Attachment:
Partial List of Persons Contacted
Inspection Procedures Used
List of Acronyms Used

REPORT DETAILS

1. Background

The NFS CDL is proposed to convert high-enriched uranium hexafluoride (UF_6) to uranyl nitrate (UN) to be fed to the Blended Low Enriched Uranium (BLEU) Preparation Facility (BPF), or converted to uranium oxide powder, containerized, and shipped offsite. The UF_6 will be introduced into the CDL from Type 5A cylinders or smaller containers.

2. Safety Operations

a. Operational Safety (Inspection Procedure (IP) 88020)

(1) Scope and Observations

The inspectors assessed implementation of IROFS associated with CDL systems that included a review of the ISA Summary, safety-related equipment (SRE) test records, piping and instrumentation diagrams (P&IDs), and nuclear criticality safety evaluations (NCSEs). The inspectors verified by field inspection that IROFS determined to be either active or passive engineered controls were properly installed as shown on the P&IDs.

Upon review of P&IDs, the inspectors discovered that IROFS SLEEVE-010, a wall penetration sleeve between the CDL and BPF processing areas, was shown on one of the P&IDs but had not yet been installed. The licensee indicated that the wall would not be penetrated until the CDL processing area was approved for the introduction of SNM. In response, the licensee changed the P&ID to show the conditional installation of SLEEVE-010.

The inspectors walked down the piping throughout the process which was designed to carry process material and HF. The piping was constructed using a material that was compatible with the material being processed and designed in such a way to reduce the likelihood of leakage. The inspectors also verified that passive overflow drains were located in enclosures as described in the ISA Summary and no impediments to the flow of material existed.

The inspectors assessed the adequacy of management measures for assuring the continued availability and reliability of safety-significant controls relied upon by the licensee for controlling criticality, chemical, and radiological risks to acceptable levels. Procedures and records were reviewed to verify that the IROFS were tested to ensure that they would be available and reliable to perform their intended function.

The inspectors noted that engineers were knowledgeable and had good interaction with operators on the process floors. The inspectors verified by observations and discussions with process operators that they were aware and able to implement the administrative controls for the process.

The inspectors determined that the operating procedure for the sublimation stations had a step to take temperature readings, using a hand-held temperature probe, on the heat exchanger located after the process columns. The procedure step stated that the temperature reading was to be taken at the "designated location." In discussions with the licensee, the staff stated that the "designated location" would be pointed out to the operators during training. Upon further review, the licensee staff updated Procedure 55T-09-0291, "UF6 Sublimation Station 3," Revision 1, to give additional guidance regarding the specific location to take the temperature reading.

The inspectors determined that the licensee staff had established reflection controls for the enclosures and columns in the area by Procedure 21T-09-0088, "Nuclear Criticality Safety CDL Facility," Revision 0. The inspectors determined that the licensee staff had adequately trained the process operators on the requirement to limit the operator's access in the space around columns and enclosure to just their hands and arms.

The licensee had an administrative control for the enclosures in the CDL area that required an independently qualified person to verify that limits for the amount of SNM in an enclosure would not be exceeded prior to SNM being introduced into the enclosure. This independent verifier was required to check the enclosure and not be present in the area during the first verification. The inspectors determined that the process operators had been adequately trained to understand the procedure step. Station limit cards (SLCs) were present requiring this independent verification.

During a walk down of the area, the inspectors noted that a SLC was posted on one side of Enclosure 2A01. The enclosure was positioned in front of a calciner, and in the enclosure, material was either loaded into trays and fed into a calciner, or dissolved into solution. The enclosure was split into two sections and the sections were separated by a six-inch spacer. The NCSE treated each side of the enclosure separately even though the enclosure was assigned only one enclosure number. Because the SLC was only on one side of the enclosure, when the inspectors questioned a utility operator for the area who was not yet trained on the specific activity, the operator incorrectly stated that the limits on the SLC applied to the entire enclosure and not just one side of the enclosure. The licensee staff agreed clarification was needed and revised the SLC to ensure that limits were to be applied to just one side of the enclosure. The licensee also placed the new SLC on both sides of the enclosure.

The inspectors reviewed the implementation of sole IROFS CDG-11. This IROFS addressed procedures and training for operation of motorized vehicles to prevent an impact accident to Tank 5A01 or Tank 5A03. The inspectors reviewed Procedure NFS-GH-37, "Industrial Trucks," that implemented IROFS CDG-11. The inspectors noted that the procedure did not provide sufficient details to prevent an impact accident. Specifically, the procedure did not include the names and locations of the tanks and other equipment that needed to be protected. The licensee subsequently revised the procedure to ensure enough details were incorporated to preclude an impact accident.

The inspectors reviewed the implementation of sole IROFS CDPV-28. This IROFS addressed verification that the solution level in Column-5A04 due to normal condensation did not exceed 17 liters. The inspectors questioned whether the sole IROFS was reliable enough to ensure that 10 CFR 70.61 performance requirements were maintained. The licensee reevaluated this condition and determined a need to implement an independent verification, IROFS CDPV-35, to provide an additional safety margin.

(2) Conclusions

The inspectors concluded there was reasonable assurance that the CDL would be safe to operate using the controls delineated in the ISA Summary. The field installation of safety equipment was as stated in license documents. The licensee made enhancements regarding the implementation of specific administrative IROFS in response to issues raised by the inspectors.

b. Criticality Safety (IPs 88015, 88016 and 88017)

(1) Scope and Observations

The inspectors reviewed NCSEs to determine if criticality safety of risk-significant operations was assured through engineered and human performance controls with adequate safety margin/certainty, preparation, and review by capable staff. The inspectors reviewed the current ISA Summary and NCSEs prepared in support of CDL processes to verify that the evaluations represented the existing configuration of the equipment, the controls specified by the NCSEs were appropriate and adequate to assure safety, and the ISA data supported a finding that the risk of a criticality accident was sufficiently low.

The inspectors determined that the evaluations of the existing CDL equipment and intended operation of the equipment were performed by capable NCS engineers, independent reviews were completed for the evaluations by other qualified NCS engineers, subcriticality of the operations was assured through appropriate limits on controlled parameters, and double contingency was assured for each credible accident sequence leading to an accidental criticality.

The inspectors determined that NCS controls for equipment and processes assured the safety of the operations. The inspectors reviewed the accident sequences for the CDL process. The inspectors determined that the identification of the IROFS and the use of valid assumptions in the NCSEs assured subcriticality under credible abnormal conditions with one exception, as discussed below.

The inspectors determined that the licensee did not adequately examine an accident scenario associated with the sublimation stations. The licensee had established IROFS to prevent overheating of three transparent polyvinyl chloride (TPVC) process columns

to ensure they would not deform into an unfavorable geometry which could lead to an accidental criticality. The controls were based on heat generated by the pump used to circulate and cool solution in the column.

However, the licensee did not consider that, in the event that pump flow was lost, warm process gas could continue to be fed to the columns. The reaction of the process gas with the water in the columns is exothermic and, without circulation provided by the pump, could possibly result in overheating and subsequent deformation of the columns. In response, the licensee implemented a plant modification that included: (1) the installation of three new process columns that were constructed of a material that was rated at a higher temperature, (2) additional IROFS to prevent exceeding the temperature limits in material control and accountability (MC&A) columns downstream of the process columns, and (3) new scenarios that evaluated the potential accidents with the new configuration.

Following discussion with the inspectors, the licensee performed an extent of condition review to determine if TPVC columns used elsewhere in the plant could potentially deform from exposure to a high temperature solution. The licensee identified another TPVC column in the CDL process that could have been affected and elected to isolate sources of solution that could have potentially deformed the column. The inspectors reviewed the licensee's actions and had no further issues. Other columns were identified elsewhere in the plant (beyond the CDL process) that could have been impacted, and the disposition of those issues are being reviewed by the NRC under a separate inspection.

The inspectors noted the licensee's initial investigation of the column issue did not include root causes or proposed long-term corrective actions. The inspectors discussed their observations with the licensee. The licensee revised the investigation report and documented deficiencies with its design control process (e.g., different processes for implementing original design and subsequent changes). The licensee added the deficiencies into its corrective action system for disposition.

The inspectors reviewed CAAS detector placement analyses to determine the adequacy of models, assumptions, and calculation results used to demonstrate adequate coverage of the CDL facility. The inspectors visually assessed detector placement configuration to verify that dual detector coverage of risk significant operations was being maintained. The inspectors reviewed the calculated results for the CDL facility and observed that detectors located in the adjacent building provided adequate coverage of risk-significant operations. The inspectors noted that the licensee also took credit for detector pairs in two other adjacent buildings to cover the entire CDL facility. The inspectors noted that, if one of the detector pairs was not functioning, all operations in the CDL facility would be halted according to procedure.

The detector pairs for the CDL facility were in service and functional tests had been performed according to the licensee's procedures. Calculations indicated that the 20 mr/hr alarm setpoint established for the three detector pairs would effectively detect and alert personnel of all analyzed criticality scenarios. Based on the conservatism of the source term, the inspectors determined that the CDL facility had adequate detector coverage.

(2) Conclusions

The inspectors determined that the CDL facility had adequate detector coverage. An issue identified by the inspectors regarding an accident scenario that was not examined by the licensee was subsequently addressed. No safety concerns were identified regarding CAAS coverage for the CDL operations.

c. Fire Safety (IP 88055)

(1) Scope and Observations

The inspectors toured the CDL process area and reviewed the Fire Hazard Analysis to assess the installation of active and passive fire protection equipment and to verify its operational line-up and readiness. The inspectors also reviewed the inspection, testing, and maintenance (ITM) of fire protection systems to verify that they were in accordance with the ISA requirements. The fire protection systems that were reviewed include: fire alarms, detection devices, fire barriers, and fire extinguishers.

The inspectors walked down the fire detection system and noted that the system was properly installed, detection devices were not obstructed, and an adequate acceptance test was performed. The inspectors verified that the CDL processing area was separated by two-hour rated firewalls and that penetrations were properly sealed as required by IROFS FIRE-29. The inspectors verified that fire doors and dampers were provided with the required fire rating to ensure the integrity of the firewalls. The inspectors also verified that fire dampers were tested after installation to ensure proper operation. The inspectors noted a fire door in one of the IROFS FIRE-29 firewalls that did not latch when closed. The licensee repaired the fire door before the end of the inspection. The inspectors verified that the CDL facility was provided with a lightning protection system in accordance with the applicable National Fire Protection Association (NFPA) code. No significant issues were identified.

The inspectors verified that the licensee had an ITM program in place to ensure that fire protection equipment remained operable. The inspectors also noted that the ITM program for the fire alarm system, fire doors, fire dampers, fire barriers, and fire extinguishers, implemented the requirements of applicable NFPA codes. The inspectors verified that access to the fire extinguishers was unobstructed by plant equipment or other work related activities. The inspectors also noted that portable fire extinguishers were charged to the normal operating zones and no visible damage was noted.

The inspectors reviewed the pre-fire plan for the CDL and compared the plan with the current plant conditions. The inspectors noted that the plan did not include ammonia and aluminum nitrate as potential chemical hazards. The inspectors also noted that the plan included two fire extinguishers that were not available in the CDL process area. In response, the licensee revised the plan to include the two chemical hazards and installed the two fire extinguishers in the process area.

The inspectors reviewed the implementation of the following administrative IROFS:

- FIRE-02: monthly surveillance to ensure compliance with the combustible control program
- CDG-12: limit on the number of UF_6 cylinders that were allowed in Enclosure B301 to prevent a significant release due to fire
- CDG-14: verification using a calibrated density indicator that 5A/5B and 2S cylinders were empty except for solid "heel" material prior to removal from the sublimation stations
- CDS3-24: full time fire watch must be in place prior to removing a non-processed 5A/5B cylinder

No significant issues were identified.

(2) Conclusions

The inspectors determined that requirements in the licensee's ISA related to fire protection were being implemented. The licensee was implementing a fire protection program that provided reasonable assurance that workers and the public would be protected.

3. Radiological Controls

a. Radiation Protection (IP 88030)

(1) Scope and Observations

The inspectors reviewed the radiation protection (RP) aspects associated with the implementation of the CDL. The inspection included a review of radiation monitoring equipment and stations, contamination control measures, and provisions for the monitoring of occupational exposure. The evaluation included interviews with RP personnel, walk downs of the CDL facility, and a review of documentation.

The inspectors discussed the radiological assessments, evaluations, and preparation activities performed by the RP group associated with the CDL. The inspectors noted that the CDL facility required no new access control points. The existing control points were equipped with contamination monitoring stations and protective clothing supplies adequate to support the CDL facility.

The inspectors noted that the licensee had calculated source term estimates for various CDL processes in the event of a loss of containment. Source terms were provided for items such as the sodium fluoride/alumina traps and for hoke tube processing. Based on a review of documentation and interviews with responsible individuals, the inspectors noted that source terms were based upon accepted industry standards and that appropriate conservatisms were incorporated into the hazard assessments. For instance, even though the CDL process systems were equipped with both local and building filtration, no credit was taken for filtration when estimating either occupational or offsite dose consequences.

The inspectors reviewed the location of air monitoring stations established for the CDL. Stations were provided at all the major work locations and were operable. The inspectors noted that the licensee was currently in the process of obtaining background values at the various monitoring stations. Based on interviews with responsible personnel, the inspectors noted that the monitoring locations were selected based on anticipated ventilation flow patterns determined by testing. The licensee planned to provide operators with lapel air samplers for a period of time until sufficient data was obtained to ensure that the fixed air monitoring stations were representative of airborne concentrations present at designated work stations.

A local area continuous air monitor (CAM) with local alarm capability was located adjacent to the major CDL enclosures. The CAM was positioned to provide early indication to operators when work area airborne concentration levels exceeded established values. The inspectors reviewed calibration and operational check documentation and determined that the CAM was calibrated and operable. Based on discussions with responsible personnel, the inspectors found that individuals were knowledgeable of the calibration and functional check requirements associated with proper operation of the CAM unit.

The inspectors reviewed selected procedures associated with the handling and control of radioactive material in the CDL facility and enclosures. Appropriate controls were included in various procedures when opening access ports to enclosures to ensure that airflow direction would be maintained into the enclosure during these evolutions. The inspectors also noted that the licensee had specified the use of specially designed apparatus to collect radioactive material from various process enclosures during clean-out activities. The inspectors noted that the use of collection apparatus would minimize potential contamination control issues during the performance of these evolutions.

(2) Conclusions

The licensee had established adequate radiological control measures in support of CDL operations. Adequate conservative assessments to evaluate potential radiological safety concerns associated with CDL operations were performed. Air monitoring stations and a local area continuous air monitor had been established and were available to support CDL operations.

b. Environmental Protection (IP 88035)

(1) Scope and Observations

The inspectors reviewed the potential environmental aspects associated with the implementation of the CDL. The inspection included a review of gaseous waste handling, processing operations, and measures to control and monitor airborne effluent releases. The evaluation included interviews with responsible personnel, walk downs of the CDL facility, and a review of documentation.

Airborne effluents from CDL operations will be routed through process off-gas and building ventilation systems. The inspectors noted that these systems include various filters and "traps" to remove radioactive particulates, HF, and UF_6. The inspectors reviewed documentation associated with the initial testing of the ventilation/filtration systems. Based upon a review of documents and interviews with responsible individuals, the inspectors found that the systems were properly tested.

The inspectors observed the physical condition of the ventilation systems and performed a detailed system walk down. Gauges were noted to be present and operable to measure differential pressure across filter housings. Based on interviews with responsible personnel, the inspectors found that individuals were knowledgeable of the type and function of filter media and associated operational parameters.

The inspectors noted that some CDL process enclosures were equipped with various interlocks to prevent the inadvertent opening of enclosure access doors. The inspectors reviewed the most recent SRE test for two process ventilation isolation dampers and noted that it adequately tested the design features. No significant issues were identified.

A new effluent monitoring system consisting of a stack and airborne effluent detection system was established for the CDL facility. The inspectors observed the new stack configuration and placement of associated effluent monitors on the roof of the CDL facility. Based upon a review of design documents and discussions with responsible personnel, the inspectors found that the effluent stack monitor was designed and installed in accordance with industry standards to ensure proper monitoring of effluents prior to release via the stack.

The inspectors observed the physical condition and operation of the in-line stack monitor and the fixed-head effluent sampling stations. The in-line stack effluent monitor was equipped with a remote readout, including alarm functions, in the central processing area of the CDL. In the event that stack effluent concentration exceed established values, an audible alarm will annunciate. Under these circumstances, the inspectors noted that operators are instructed to secure CDL operations to minimize any potential airborne releases. No significant issues were identified.

(2) Conclusions

Ventilation and filtration systems to control and monitor airborne effluent releases were available and tested in accordance with approved procedures. Stack effluent monitoring systems were available and calibrated to perform their intended functions. Adequate process control measures had been established and incorporated into operational procedures to minimize airborne effluent releases.

c. Waste Management (IP 88045)

(1) Scope and Observations

The inspectors reviewed liquid waste processing activities associated with the implementation of the CDL. The inspection included a review of liquid waste handling and processing operations and measures to control and monitor the transfer of liquid waste to the Waste Water Treatment Facility (WWTF). The evaluation included interviews with responsible personnel, tours of the CDL facility, and a review of documentation.

Liquid waste generated by CDL operations will be processed, sampled, and analyzed, prior to transfer to the existing WWTF. The CDL facility was equipped with monitoring tanks, liquid waste hold-up tanks, and auxiliary equipment necessary to process and control the transfer of liquid waste. The inspectors noted that a series of favorable geometry liquid waste collection columns were available for the collection and hold-up of liquid wastes generated by CDL operations.

The inspectors noted that the columns were designed and constructed to allow adequate mixing of their contents to obtain representative samples for analysis. Various sampling and analysis requirements will be performed to confirm that liquid wastes are within acceptable limits prior to transferring these wastes from the favorable geometry waste collection columns to unfavorable geometry waste discard tanks. The inspectors performed a field walk down of the collection columns, pumping stations, and associated piping. No significant issues were identified.

Auxiliary operators demonstrated procedures associated with system line-ups to perform mixing of the contents of the columns, sampling procedures, and overall operation of the waste column system. The inspectors found that individuals were knowledgeable of their responsibilities and procedural requirements. The inspectors reviewed associated operating procedures and noted that sampling requirements were adequately specified along with acceptance criteria. Procedures also specified actions to take in the event that sample results exceeded established values.

Liquid transferred to the CDL facility liquid waste discard tanks will be monitored by an in-line radiation detection system. The radiation monitor was interlocked with two automatic isolation valves. In the event that waste water transferred from the collection columns exceeded established concentration limits, the in-line radiation monitor would alarm causing the isolation valves to close.

The inspectors reviewed records associated with the calibration and operation of the in-line radiation monitor. The inspectors reviewed the most recent SRE test for the two isolation valves and noted that the design features were adequately tested. The inspectors found that calibration records were current and that the monitor was calibrated in accordance with approved procedures with a suitable calibration standard. The inspectors observed the physical condition and operational status of the monitor and noted that the monitor was operable and available to perform its intended function.

The inspectors observed utility operators while they performed dry-run activities associated with the transfer of liquid waste to the waste discard tanks and from the waste discard tanks to the WWTF. Based on observations and interviews, the inspectors found that operators were knowledgeable of their responsibilities, procedural requirements, and IROFS associated with liquid waste processing and handling.

(2) Conclusions

Systems and equipment to control and monitor liquid waste processing were available and tested in accordance with approved procedures. An in-line liquid waste monitoring system was available and calibrated to perform its intended function. Responsible personnel were knowledgeable of their responsibilities and procedural requirements associated with waste processing operations.

4. Facility Support

a. Training (IP 88010)

(1) Scope and Observations

The inspectors reviewed the training aspects associated with the implementation of the CDL. The inspection included a review of license requirements for training, training program requirements, training materials, examinations administered to the trainees for CDL training and qualification, and training provided in-plant using the equipment prior to the introduction of SNM. The inspection included interviews with: trainees, trainers, operations supervisors, and training/plant management, and observations of classroom training sessions and in-plant training at the CDL facility.

The inspectors noted that the licensee was using a phased approach for training personnel to operate the process. Specifically, operators were being trained to operate the front-end of the batch process first and would not begin training for the next phase until that operation was complete. Operators would be required to perform each phase initially under observation by trainers and would not be fully qualified until they demonstrated successful performance of the task.

The inspectors reviewed written tests administered to the CDL process and utility operator trainees. The inspector noted that the written tests were based on program requirements of NFS-TN-008, "NFS Training Procedure," Revision 7, and training material content. The inspectors noted that tests administered included questions from pre-requisite training materials.

The inspectors interviewed the training manager and the training instructors for the CDL operators. The inspectors observed the delivery of classroom training on different topics for the process operator trainees. The inspectors observed the trainers when they conducted equipment familiarization walk downs of UF_6 Sublimation Stations 1 and 2 and review of off-normal conditions with the process operator trainees. The inspectors found that the trainers were very knowledgeable of the CDL design and operation. The inspectors observed the trainers evaluating the trainees as they demonstrated simulated operation of UF_6 Sublimation Station 1 and 2 equipment in the plant.

(2) Conclusions

The licensee had established and administered a training program in support of CDL operations that met regulatory requirements. The training included classroom and on-the-job training on the equipment prior to introducing SNM into the CDL. Written evaluations of trainee knowledge and performance-based on-the-job demonstrations of trainee skills and abilities were performed.

b. Emergency Preparedness (IP 88050)

(1) Scope and Observations

The inspectors reviewed changes to the Emergency Plan, Revision 13, and emergency preparedness activities associated with the implementation of the CDL. The inspection included a review of documentation, field observations, and interviews with responsible personnel.

The inspectors interviewed responsible personnel to evaluate changes made to the Emergency Plan. The inspectors noted that Emergency Plan changes were primarily administrative in nature and included a clarification regarding the maximum amount of uranium in a 5A cylinder. The most significant impact on the Emergency Plan was accounting for the use of HF and the associated medical aspects in the event of HF exposure to a worker. The licensee utilized a qualified medical consultant to provide training to offsite medical response personnel in the treatment of HF exposures. The inspectors reviewed associated training documentation and discussed the material with responsible personnel. No significant issues were identified.

The inspectors noted that the licensee had made arrangements to ensure that HF medical response supplies were available at the offsite medical facilities that would be used in the event of an HF exposure incident. The licensee confirmed with the primary

offsite medical provider during the inspection that the necessary medical supplies were available and in stock. During field walk downs the inspectors noted that HF exposure medical kits were located at various locations in the CDL facility.

(2) Conclusions

The licensee completed necessary changes to the Emergency Plan associated with the CDL. Medical supplies, both onsite and offsite, for treatment of HF exposures were available. Training was provided to incident response personnel regarding treatment for HF exposures.

c. Management Organization and Controls (IP 88005)

(1) Scope and Observations

The inspectors reviewed management organization and control aspects associated with the implementation of the CDL. The inspection included an evaluation of the licensee's internal ORR, the scheduled management oversight of process startup and operations, and the use of safety culture and human performance evaluation tools. The inspection included a review of documentation, field observations, and interviews with responsible personnel.

The inspectors reviewed the licensee's ORR documentation. The inspectors determined that the licensee's ORR was adequate and noted that an additional independent verification and validation was performed by contractor staff. The findings identified by the licensee's ORR were appropriately addressed. The inspectors also noted that the licensee created a watch bill that will provide around-the-clock coverage by senior management and technical staff during initial start-up and operation.

The inspectors interviewed licensee staff and reviewed lesson plans associated with human performance, procedure use, safety culture, and safety conscious work environment. The intent of the training was to provide guidance for the staff to continually evaluate human performance so that process deficiencies could be corrected and human errors reduced. The training also emphasized the need for staff to report problems using the corrective action system. The inspectors determined that the training was comprehensive, and the staff understood the importance of a healthy safety culture.

(2) Conclusions

The licensee implemented management controls in preparation for CDL operation including an adequate internal ORR, planned enhanced oversight during start-up and operation, and safety culture and human performance evaluation training for plant staff.

5. Exit Meeting

The inspection scope and results were summarized during an interim exit meeting on June 5, 2009, with Mr. D. Kudsin and other members of his staff as indicated in the attachment. A final public exit meeting was conducted on July 22, 2009, with licensee staff and members of the public. Although proprietary documents and processes were reviewed during this inspection, the proprietary nature of these documents or processes have not been included in this report. No dissenting comments were received from the licensee.

ATTACHMENT

1. PARTIAL LIST OF PERSONS CONTACTED

Nuclear Fuel Services, Inc.

R. Bond, Operations Management
B. Carmak, CDL Project Manager
R. Droke, Licensing and Compliance Director
D. Kudsin, President, NFS
T. Lindstrom, Vice President, Operations
M. Moore, Director, Safety and Regulatory
S. Sanders, Training Manager
J. Wheeler, Licensing and ISA Manager

2. INSPECTION PROCEDURES (IP) USED

IP 88005	Management Organization and Controls
IP 88010	Operator Training/Retraining
IP 88016	Nuclear Criticality Safety Evaluations and Analyses
IP 88017	Criticality Alarm Systems
IP 88020	Operational Safety
IP 88030	Radiation Protection
IP 88035	Effluent Control and Environmental Protection
IP 88045	Radioactive Waste Management
IP 88050	Emergency Preparedness
IP 88055	Fire Protection (Annual)

3. LIST OF ACRONYMS USED

ADAMS	Agency Documents Access and Management System
BLEU	Blended Low Enriched Uranium
BPF	BLEU Preparation Facility
CAAS	Criticality Accident Alarm System
CAM	continuous air monitor
CDL	commercial development line
CFR	Code of Federal Regulations
DFFI	Division of Fuel Facility Inspection
HF	hydrofluoric acid
IP	inspection procedure
IR	inspection report
IROFS	item(s) relied on for safety
ISA	integrated safety analysis
ITM	inspection, testing, and maintenance
MAA	material access area
MC&A	material control and accountability
NCS	nuclear criticality safety
NCSE	nuclear criticality safety evaluation
NFPA	National Fire Protection Association

NFS	Nuclear Fuel Services, Inc.
NRC	U.S. Nuclear Regulatory Commission
ORR	operational readiness review
PARS	publicly available records
P&ID	piping and instrumentation diagram
RP	radiation protection
SLC	station limit card
SNM	special nuclear material
SRE	safety-related equipment
TPVC	transparent polyvinyl chloride
UF_6	uranium hexafluoride
UN	uranyl nitrate
WWTF	waste water treatment facility