



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

April 17, 2015

EA-15-016
EN 50208
EN 50577

Mr. Joel W. Duling
President
Nuclear Fuel Services, Inc.
P. O. Box 337, MS 123
Erwin, TN 37650

**SUBJECT: NUCLEAR REGULATORY COMMISSION INTEGRATED INSPECTION REPORT
NUMBER 70-143/2015-002 AND NOTICE OF VIOLATION**

Dear Mr. Duling:

This refers to the inspections conducted from January 1, 2015, to March 31, 2015, 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 Nuclear Regulatory Commission (NRC) requirements. The enclosed report presents the results of the inspections. The findings were discussed with members of your staff at exit meetings held on February 12 and April 9, 2015.

During the inspections, NRC staff examined activities conducted under your license as they related to public health and safety and to confirm compliance with the Commission's rules and regulations and with the conditions of your license. Areas examined during the inspections are identified in the enclosed report. Within these areas, the inspections consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel.

Based on the results of these inspections, the NRC has determined that two Severity Level IV violations of NRC requirements occurred. The violations were evaluated in accordance with the NRC Enforcement Policy. The current Enforcement Policy is available on the NRC's Web site at <http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>.

The violations are cited in the enclosed Notice of Violation and the circumstances surrounding them are described in detail in the subject inspection report. One of the violations was identified as a result of an investigation conducted by the NRC Office of Investigations (OI) to determine if an NFS production operator willfully violated approved procedures requirements regarding the circumvention of the safety function of two hazardous chemical isolation valves. In summary, based upon the documentation and testimony developed during the investigation, the NRC concluded that the operator willfully violated procedure requirements associated with the circumvention of the safety-related components.

The consequence of the violation, absent of the willful aspect, was determined to be minor because, even though the circumvention of the safety function of the valves resulted in a reduction in safety margin, the applicable high consequence chemical exposure and nuclear criticality accident sequences continued to remain highly unlikely in accordance with 10 CFR 70.61 performance requirements and an acceptable safety margin was maintained. However, willful violations are a particular concern to the NRC. In this case, the operator was knowledgeable of the procedure requirements, yet chose to proceed contrary to procedural requirements. Based on the underlying significance and the willful aspects, the NRC has concluded that this violation should be characterized at Severity Level IV in accordance with the NRC Enforcement Policy. In accordance with Section 2.3.2.b.4 of the Enforcement Policy, based on the failure to promptly provide the information concerning the violation to appropriate NRC personnel (i.e., failure to report the event in a timely manner as documented in Special Inspection Report 70-143/2014-006, NCV 70-143/2014-006-02), this is being documented as a cited violation.

The second violation associated with the failure to evaluate and limit the risk of a nuclear criticality accident involving the accumulation of fissile material in unfavorable geometry electrical boxes is being cited in the Notice because it is considered self-revealing.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notices when preparing your response. If you have additional information that you believe the NRC should consider, you may provide it in your response to the Notices. The NRC review of your response to the Notices will also determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

If you contest the violations, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001, with copies to: (1) the Regional Administrator, Region II; (2) the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and (3) Charlie Stancil at the Nuclear Fuel Services facility.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice and Procedure," 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>. To the extent possible, your response should not include any personal privacy or proprietary, information so that it can be made available to the Public without redaction.

J. Duling

3

Should you have any questions concerning these inspections, please contact me at 404-997-4628.

Sincerely,

/RA/

James A. Hickey, Chief
Projects Branch 1
Division of Fuel Facility Inspection

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

Enclosures:

1. Notice of Violation
2. NRC Inspection Report 70-143/2015-002
w/Attachment: Supplementary Information

cc: (See page 4)

J. Duling

3

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Sincerely,

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 ADAMS: Yes ACCESSION NUMBER: ML15107A039 SUNSI REVIEW COMPLETE FORM 665 ATTACHED

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NOTICE OF VIOLATION

Nuclear Fuel Services (NFS)
Erwin, TN

Docket Number (No.) 70-143
License No. SNM-124

During Nuclear Regulatory Commission (NRC) inspections conducted from July 10-17, 2014, and February 9-12, 2015, violations of NRC requirements were identified. In accordance with the NRC Enforcement Policy, the violations are listed below:

- A. NFS Special Nuclear Materials License SNM-124, Safety Condition S-1 requires, in part, that procedures are used in accordance with the statements, representations, and conditions in the application.

Chapter 11 of the license application, Management Measures, Section 11.4, "Procedure Development and Implementation," requires, in part, that activities involving the handling of special nuclear material (SNM) and items relied on for safety (IROFS) are conducted in accordance with written procedures as defined in Section 11.4.1, "Operating Procedures."

Section 11.4.1, "Operating Procedures, defines, in part, operating procedures as documents written to authorize the processing of radioactive material; and within these documents, detailed instructions for limits and controls established for safety purposes, including IROFS, are identified.

Licensee procedure SOP 401-22-302, Building 302 Area B, Step 4.2.8 Note states "self-closing valves must never be held open by any means other than an individual holding the valve handle."

Contrary to the above, on June 17, 2014, an operator willfully violated licensee procedure SOP 401-22-302, Building 302 Area B, Step 4.2.8 Note when he held open self-closing valves 302-BA-0B01 and 302-BA-0B85 by means other than holding the valve handle. The circumvention of the self-closing isolation function of both valves resulted in unavailability of IROFS and reduction in IROFS controls, respectively, for two potential high consequence events: chemical exposure and nuclear criticality safety.

This is a Severity Level IV violation (Section 6.2.d.2).

- B. Title 10 of the *Code of Federal Regulations* (10 CFR) 70.61(a) states, in part, that each licensee shall evaluate, in the integrated safety analysis (ISA) performed in accordance with § 70.62, its compliance with the performance requirements in paragraphs (b), (c), and (d) of this section.

10 CFR 70.61(d) requires, in part, that the risk of nuclear criticality accidents must be limited by assuring that under credible abnormal conditions all nuclear processes are subcritical.

Contrary to the above, prior to October 29, 2014, the licensee failed to evaluate the risk of a nuclear criticality accident in the ISA to assure that under credible abnormal conditions all nuclear processes remained subcritical. Specifically, the licensee failed to evaluate and limit the risk of a nuclear criticality accident involving the accumulation of fissile material in unfavorable geometry electrical boxes.

This is a Severity Level IV Violation (Section 6.2.d.1).

Pursuant to the provisions of 10 CFR 2.201, Nuclear Fuel Services, Inc., is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555, with copies to the Regional Administrator, Region II, and a copy to the NRC Resident Inspector within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation with a required response: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken to avoid further violations; and (4) the date when full compliance will be achieved.

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

Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an Order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agency wide Document Access and Management system (ADAMS), accessible from the NRC Web Site at <http://www.nrc.gov/reading-rm/adams.html> to the extent possible, it should not include any personal privacy, proprietary, classified, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

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

Dated this 17th day of April, 2015

U. S. NUCLEAR REGULATORY COMMISSION
REGION II

Docket No.: 70-143

License No.: SNM-124

Report No.: 70-143/2015-002

Licensee: Nuclear Fuel Services, Inc.

Facility: Erwin Facility

Location: Erwin, TN 37650

Dates: January 1 through March 31, 2015

Inspectors: C. Stancil, Senior Resident Inspector
N. Pitoniak, Acting Resident Inspector
G. Goff, Acting Resident Inspector
D. Hartland, Senior Fuel Facility Project Inspector
T. Sippel, Fuel Facility Inspector
C. Tripp, Nuclear Criticality Safety Inspector
D. Anderson, Fuel Facility Inspector
C. Read, Fuel Facility Inspector

Approved by: J. Hickey, Chief
Projects Branch 1
Division of Fuel Facility Inspection

EXECUTIVE SUMMARY

Nuclear Fuel Services (NFS), Inc.
NRC Integrated Inspection Report 70-143/2015-002
January 1 – March 31, 2015

Inspections were conducted by resident and regional inspectors during normal and off-normal hours in safety operations, radiological controls, facility support, and other areas. The inspectors performed a selective examination of licensee activities that were accomplished by direct observation of safety-significant activities and equipment, tours of the facility, interviews and discussions with licensee personnel, and a review of facility records.

Safety Operations

- Aside from the violations referenced below, plant operations were performed safely and in accordance with license requirements. The items relied on for safety (IROFS) were properly implemented and maintained in order to perform their intended safety function. (Paragraph A.1)
- The licensee adequately implemented the Nuclear Criticality Safety Program, conducted audits and investigations, reviewed events and maintained and implemented appropriate Nuclear Criticality Safety Controls. (Paragraphs A.2 and A.3)
- The site's Fire Protection program and systems were adequately maintained in accordance with the license and regulatory requirements. (Paragraphs A.4 and A.5)

Radiological Controls

- The licensee adequately implemented the Radiation Protection program consistent with the license and regulatory requirements. (Paragraph B.1)

Facility Support

- The post maintenance testing and surveillance programs were implemented in accordance with the license and site guidance for work control and safety related equipment testing. (Paragraphs C.1 and C.2)
- Adverse conditions were adequately identified, evaluated, and entered into the corrective action program. (Paragraph C.3)
- The Emergency Preparedness program was implemented in accordance with the Emergency Plan and regulatory requirements. (Paragraphs C.4 and C.5)

Other Areas

- During closure of Licensee Event Report (LER) 70-143/2014-004-0 and Apparent Violation (AV) 70-143/2014-006-01, the inspectors identified a Severity Level (SL) IV violation for the licensee's circumvention of safety-related components. (Paragraphs D.1.a and D.1.b)

- During closure of LER 70-143/2014-007-0, the inspectors identified a SL IV violation for the failure to evaluate and limit the risk of a nuclear criticality accident involving the accumulation of fissile material in unfavorable geometry electrical boxes. (Paragraph D.1.c)
- Violation 70-143/2014-003-01, Failure to make a report required by 10 CFR 70.50(b)(3), and LER 70-143/2014-006-0 (EN 50260), Transport of Potentially Contaminated Individuals, were closed. (Paragraph D.1.d)

Attachment:

Key Points of Contact

List of Items Opened, Closed, and Discussed

List of Inspection Procedures Used

Documents Reviewed

REPORT DETAILS

Summary of Plant Status

The facility began the inspection period with the following process areas operating: Naval fuel manufacturing facility (FMF) and the Blended Low Enriched Uranium (BLEU) Preparation Facility (BPF) which includes the Uranium (U)-Metal, U-Oxide, Solvent Extraction (SX), and the down-blending (DB) lines.

A. Safety Operations

1. Plant Operations Routine (Inspection Procedures (IPs) 88135 and 88135.02)

a. Inspection Scope and Observations

The inspectors performed routine tours of plant operating areas housing special nuclear material (SNM) and determined that equipment and systems were operated safely and in compliance with the license. Daily operational and shift turnover meetings were observed throughout the period to gain insights into process safety and operational issues. The inspectors reviewed selected licensee-identified issues and corrective actions for previously identified issues. These reviews focused on plant operations, safety-related equipment (valves, sensors, instrumentation, in-line monitors, and scales), and items relied on for safety (IROFS).

The routine tours included walk-downs of the BPF, commercial development line, FMF, storage areas, and the 234 Building. The inspectors verified that there was adequate staffing and that operators were attentive to their duties and knowledgeable of 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 functional to ensure proper control of SNM. The inspectors verified the adequacy of communications between supervisors and operators within the operating areas. The inspectors walked down portions of safety-significant operating systems and verified that IROFS were identified and operable. The inspectors reviewed operator log books, maintenance records, and Letters of Authorization (temporary procedures) to obtain information concerning operating trends and activities. The inspectors verified that the licensee actively pursued corrective actions for conditions requiring temporary modifications and compensatory measures.

The inspectors performed periodic tours of the outlying facility areas and determined that equipment and systems were operated safely and in compliance with the license. Inspectors focused on potential wind-borne missile hazards, potential fire hazards with combustible material storage and fire loading, hazardous chemical storage, storage of compressed gas containers, and potential degradation of plant security features. In addition, inspectors walked down the licensee's emergency response facilities for familiarization and to ensure the facilities were maintained in a readily available status.

During these tours, the inspectors also verified that required Notices to Employees were appropriately and conspicuously posted in accordance with 10 Code of Federal Regulations (CFR) Part 19.11.

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.

Safety System Walk-down (IP 88135.04)

The inspectors performed walk-downs of safety-significant systems involved with the processing of SNM. As part of the walk-downs, inspectors verified as-built configurations matched approved plant drawings. The inspectors interviewed operators to confirm that plant personnel were familiar with the assumptions and controls associated with the 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 Analyses (ISA) to verify system abilities to perform functions were not 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 degraded plant performance and the operability of IROFS, safety-related devices, or other support systems essential to safety system performance. The following process areas were specifically inspected:

- Building 302 Areas 700A and 700B
- Building 302 Recovery Areas F through J

To determine the correct system alignment, the inspectors reviewed procedures, drawings, related ISAs, and regulatory requirements such as 10 CFR Part 70.61. During the walk-downs, the inspectors verified all or some of the following as appropriate:

- Controls in place for potential criticality and chemical safety hazards
- Process vessel configurations maintained in accordance with Nuclear Criticality Safety Evaluations (NCSEs)
- Correct valve position and potential functional impacts such as leakage
- Electrical power availability
- Major system components correctly aligned, labeled, lubricated, cooled, and ventilated
- Hangers and supports correctly installed and functional
- Lockout/Tag-Out program appropriately implemented
- Cabinets, cable trays, and conduits correctly installed and functional
- Visible cabling in good material condition
- No interference of ancillary equipment or debris with system performance

b. Conclusion

No findings of significance were identified.

2. Criticality Safety (IP 88135)

a. Inspection Scope and Observations

During daily production area tours, the inspectors verified that various criticality controls were in place, that personnel followed criticality station limit cards, and that containers were adequately controlled to minimize potential criticality hazards. The inspectors reviewed a number of criticality-related IROFS for operability. The inspectors noted that operators were knowledgeable of the requirements associated with IROFS, specifically for Building 302 Recovery Areas F through J and Area 700.

The inspectors performed the tours inside various process areas when restrictions on SNM movements were in effect.

b. Conclusion

No findings of significance were identified.

3. Nuclear Criticality Safety (NCS) (IPs 88015, 88016, and 88017)

a. Inspection Scope and Observations

The inspectors evaluated the adequacy of the licensee's NCS program and analyses to assure the safety of fissile material operations. The inspectors reviewed selected NCS documents (listed in Section 4.0 of the Attachment) to determine whether criticality safety of risk-significant operations was assured through engineered and administrative controls with adequate safety margin, preparation, and review by qualified staff. The NCS evaluations and supporting documents reviewed demonstrated adequate identification and control of NCS hazards to assure operations within subcritical limits through appropriate limits on controlled parameters. The inspectors interviewed five licensee criticality engineers, two managers, and two operators regarding analyses, operations, equipment and controls. The inspectors reviewed selected NCS-related IROFS, including FA6-001, FA6-003, FA6-004, FA6-008, FA6-010, and FMF-014 to determine whether the performance requirements were met for selected accident sequences.

The inspectors reviewed the commitments for audits and walkdowns, and ensured that the licensee was meeting the commitments. The inspectors also reviewed the results of the most recent NCS audits and walkdowns to assure that appropriate issues were identified and resolved. The inspectors reviewed the four recorded walkdowns that were completed since the beginning of the year (NCS-2015-01 to NCS-2015-04), as well as NSA-RPT-14-02, "Independent Triennial Nuclear Criticality Safety Program Review for Nuclear Fuel Services, Inc. Erwin, Tennessee," dated September 19, 2014. The inspectors reviewed the observations listed in the Triennial Audit and verified that they were entered into the licensee's problem identification, resolution, and corrective system (PIRCS) and were being tracked (P46176-I18634). The inspectors verified that the licensee's NCS audits were conducted in accordance with written procedures, including the license commitment to audit all areas within a two-year period. The inspectors noted that the walkdowns were performed by NCS engineers who reviewed open NCS issues from previous audits; reviewed the adequacy of control implementation; reviewed plant

operations for compliance with license requirements, procedures and postings; and examined equipment and operations to determine that past evaluations remained adequate. The inspectors confirmed that deficiencies identified during audits were appropriately captured in PIRCS.

The inspectors interviewed a licensee manager and an engineer about the Criticality Accident Alarm System (CAAS). The inspectors reviewed CAAS coverage calculations and the design of the detectors, including examination of the internals of a disassembled detector, and interviewed the licensee engineer about their logic, setpoints, reliability, evacuation plans, procedures for imposing compensatory measures while the CAAS was down, and the licensee's use of storm mode. The inspectors verified that the design, detector type, and alarm signal were uniform across the site. The inspectors observed that the CAAS audibility was tested in order to confirm that the CAAS remained functional after maintenance activities.

The inspectors performed plant walkdowns of the 300 Complex focusing on Areas G, 600, and 700, as well as the 330 and 440 Buildings to determine whether risk-significant fissile material operations were being conducted safely and in accordance with regulatory requirements. The inspectors interviewed operations staff and NCS engineers both before and during walkdowns. The inspectors verified that controls identified in NCS analyses were installed or implemented and were adequate to ensure safety. The inspectors also verified that safety was maintained for observed facility operations. The cognizant NCS engineers were knowledgeable and interacted regularly with operators on the process floors.

The inspectors reviewed the licensee's response to a selection of recent internally-reported events identified in Section 4.0 of the Attachment, and a recent NCS-related event that the licensee reported to the NRC. The event, EN 50577, is discussed in detail below. The inspectors determined that the licensee adequately evaluated whether these events were reportable to the NRC. The inspectors reviewed the progress of investigations and interviewed licensee staff and observed that the events were investigated in accordance with procedures and appropriate corrective actions were assigned and tracked.

b. Conclusion

No findings of significance were identified.

4. Fire Protection Annual (IP 88055)

a. Inspection Scope and Observations

The inspectors reviewed NFS procedures and toured plant areas containing IROFS and other safety controls to assess the material condition of fire protection equipment, systems, and features. The inspectors verified that flammable materials were stored in marked cabinets as specified in approved procedures and that housekeeping and the control of combustible materials were adequate and consistent with the approved procedures. The inspectors also verified that the hot work program was implemented in accordance with approved procedures.

The inspectors reviewed records and interviewed NFS personnel to verify that the observed fire protection systems were maintained in an adequate state of readiness and had been properly tested to verify their ability to perform their safety function. The inspectors determined that fire dampers, doors, and penetration seals were being maintained in a condition that would ensure they were available and reliable to perform their safety function. Also, the inspectors determined that fire hoses and portable extinguishers were provided at their designated locations and access was unobstructed.

The inspectors reviewed the NFS fire protection system out-of-service records and observed out-of-service equipment and determined that adequate compensatory measures had been put in place for out-of-service, degraded, or inoperable fire protection equipment, systems, or features.

The inspectors reviewed the NFS PIRCS entries for the past 12 months to determine if issues related to safety controls and IROFS fire protection operability problems were being identified at an appropriate threshold and entered them into PIRCS. Also, the inspectors evaluated the corrective actions associated with a sample of the corrective action program entries and determined that the completed corrective actions were adequate.

On February 10, 2015, the inspectors observed the licensee's fire brigade response to a fire alarm. The inspectors determined that the licensee's staff and fire brigade personnel adequately demonstrated their ability to respond to a fire alarm. The inspectors observed fire brigade training and determined that the training was adequate.

b. Conclusion

No findings of significance were identified.

5. Fire Protection Quarterly (IP 88135.05)

a. Inspection Scope and Observations

During routine plant tours, the inspectors verified that transient combustibles were being adequately controlled and minimized in selected process areas. Various fire barriers and doors were examined and found to be properly maintained and functional in accordance with site procedures. The inspectors reviewed active fire impairments in selected process areas and determined they were implemented per site procedure. The following areas were specifically inspected:

- Building 333 Low Enriched Uranium
- Building 440 Blended Low Enriched Uranium

b. Conclusion

No findings of significance were identified.

B. Radiological Controls

1. Radiation Protection Quarterly (IP 88135.02)

a. Inspection Scope and Observations

During tours of the production areas, inspectors observed radiation protection controls and practices implemented during various plant activities including the proper use of personnel monitoring equipment, required protective clothing, and frisking methods for detecting radioactive contamination on individuals exiting contamination controlled areas. The inspectors noted that plant workers properly wore dosimetry and used protective clothing in accordance with applicable Special Work Permits (SWPs). The inspectors also 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 verified calibration due dates. Inspectors specifically reviewed the following SWP:

- SWP 15-03-004, Area G Heat Exchanger Replacement per Work Request (WR) 228527

b. Conclusion

No findings of significance were identified.

C. Facility Support

1. Post Maintenance Testing (IP 88135.19)

a. Inspection Scope and Observations

The inspectors witnessed and reviewed the post-maintenance tests (PMTs) listed below to verify that procedures and test activities confirmed safety systems and components (SSCs) operability and functional capability following the described maintenance. The inspectors reviewed the licensee's completed test procedures to ensure any of the SSC safety function(s) that may have been affected were adequately tested, that the acceptance criteria were consistent with information in the applicable licensing basis and/or design basis documents, and that the procedure had been properly reviewed and approved. The inspectors also witnessed and/or reviewed the test data to verify that test results adequately demonstrated restoration of the affected safety function(s). The inspectors verified that PMT activities were conducted in accordance with applicable work order (WO) instructions or licensee procedural requirements. Furthermore, the inspectors verified that problems associated with PMTs were identified and entered into PIRCS.

- PMT for Area 800 Vibration Clamp Installation, Engineering Change Request (ECR) 20141174, Drawing 307-F0304-D, WR 225284
- PMT for Replacement of Building 303 Area 600 Flow Indicators 303-FI-0609 and 303-FI-062 and Equipment Thermocouples, WRs 227109 and 227639
- PMT for Building 306 Area 800 H2 Detector A854 Replacement and Transmitter Calibration, WR 228302 and Special Work Instructions WM-SWI-14-003, Calibration of 306/307 Area 800 Hydrogen Detectors

- PMT for Building 302 Area G Heat Exchanger Replacement, WR 228527

b. Conclusion

No findings of significance were identified.

2. Surveillance (SRE) Testing (IP 88135.22)

a. Inspection Scope and Observations

The inspectors witnessed portions of and/or reviewed completed test data for the following surveillance tests of risk-significant and/or safety-related systems to verify that the tests met the requirements of the ISA, commitments, and licensee procedure requirements. The inspectors confirmed the testing effectively demonstrated that the SSCs were operationally capable of performing their intended safety functions and fulfilled the intent of the associated safety-related equipment test requirement.

- N303FRNCTIC0685 and 303N2INDFI0625, Building 303 Area 600 Thermocouple and Flow Indicators
- N306H2DETCR800, Building 306 Area 800 H2 Detector A845 Transmitter Calibration
- N302VALFCV0D14 & D13 and N302XXXXPSH0D02, Building 302 Area D, Plant Air Isolation, IROFS-302-DURECON, High Pressure Switch
- N302XXXXPSH0D03, N302VALVFCV0D15, and N302VALVFCV0D16, Building 302 Area D Overpressure Protection

b. Conclusion

No findings of significance were identified.

3. Corrective Action Program Review (IP 88135)

a. Inspection Scope and Observations

The inspectors reviewed the licensee's PIRCS to ensure that items adverse to safety were being identified and tracked to closure. The inspectors also performed daily screenings of items entered into the CAP to aid in the identification of repetitive equipment failures or specific human performance issues for follow-up. The inspectors reviewed CAP entries that occurred during the inspection period to assess and evaluate the safety significance of issues. Furthermore, the inspectors conducted periodic reviews of licensee audits and third-party reviews of safety significant processes to determine their effectiveness and whether the licensee entered results into PIRCS, specifically the licensee's PIRCS trending program.

b. Conclusion

No findings of significance were identified.

4. Emergency Preparedness Drill (IP 88135)

a. Inspection Scope and Observations

On March 24, 2015, the inspectors observed an Emergency Preparedness (EP) training drill associated with a simulated fire caused by diesel fuel in a breached laboratory area. This drill was intended to identify any licensee weaknesses and deficiencies in classification, notification, dose assessment, and protective action recommendation development activities. The inspectors observed emergency response operations in the Emergency Control Center (ECC) and on-scene to verify that event classification and notifications were done in accordance with NFS-GH-903, Emergency Plan, and licensee conformance with other applicable emergency plan implementing procedures. The inspectors also attended the post-drill critiques to compare any inspector-observed weaknesses with those identified by the licensee in order to verify whether the licensee was properly identifying EP-related issues and entering them into PIRCS, as appropriate.

b. Conclusion

No findings of significance were identified.

5. Emergency Preparedness (IP 88050)

a. Inspection Scope and Observations

The inspectors interviewed staff, reviewed records, and determined that any changes made to the Emergency Plan or within the facility had been properly coordinated within the EP program. The inspectors reviewed procedures with significant revisions since the last emergency preparedness inspection and determined that the changes were in compliance with the Emergency Plan. The inspectors reviewed and discussed with the licensee its emergency call list and verified that the list was current.

The inspectors reviewed training records and interviewed licensee staff regarding EP training in the past year. The inspectors determined that the EP requirements were in compliance with the Emergency Plan. The inspectors verified that the licensee provided training for their personnel as required by the Emergency Plan and that the individuals responsible for utilizing emergency equipment were qualified. The inspectors verified that the licensee provided training to hypothetical emergency situations which were effective and consistent with the frequency and performance objectives required in the Emergency Plan.

The inspectors reviewed the written agreements with the off-site agencies and verified that the organizations required by the Emergency Plan had up-to-date agreements. The inspectors interviewed representatives from the local hospital and government agencies and determined that they maintained an adequate understanding of the written agreements. The inspectors verified that the licensee invited the off-site organizations for training as required by the Emergency Plan and determined that the training given was appropriate.

The inspectors observed the storage of emergency equipment in the various on-site locations and verified that the inventory levels were maintained as required by the Emergency Plan. The inspectors toured the ECC and verified that it was readily

accessible and maintained the appropriate amount of communication equipment. The inspectors reviewed the accountability procedure and verified that accountability meeting points were accessible.

The inspectors verified that any problems or deficiencies associated with the Emergency Plan were corrected. The inspectors reviewed the program audit generated since the last inspection and verified that a system was in place for adequately tracking and resolving audit findings.

b. Conclusion

No findings of significance were identified.

D. Other Areas

1. Follow-up on Previously Identified Issues

a. (Closed) Licensee Event Report (LER) 70-143/2014-004-0, Event Notification (EN) 50208: Items Relied on for Safety (IROFS) Bypassed

1) Inspection Scope and Observations

The inspectors reviewed the LER, issued on July 18, 2014, for performance deficiencies and violations of regulatory requirements. The LER was associated with Apparent Violation (AV) 70-143/2014-006-01, Circumvention of Safety Related Components, as inspected and documented in NRC Special Inspection Report 70-143/2014-006, issued on August 29, 2014. On June 17, 2014, a licensee employee was observed by a licensee supervisor improperly operating two spring return valves identified as safety-related IROFS. The licensee determined that the spring return valves were wedged open by the operator. These spring return valves were intended to be manually operated as IROFS controls for two high consequence accident sequences.

The inspectors reviewed PIRCS including the root cause analysis and associated corrective actions, procedures, records, and drawings, and discussed the issue with appropriate members of plant staff. This condition was documented as PIRCS 44298.

2) Conclusion

This LER is closed with two findings identified. Licensee-identified finding, Non-Cited Violation (NCV) 70-143/2014-006-02, Failure to Make a Report Required by 10 CFR 70 Appendix A(a)(4), was documented in NRC Special Inspection Report 70-143/2014-006. The other finding is documented in Paragraph D.1.b below as closure to AV 70-143/2014-006-01.

b. (Closed) AV 70-143/2014-006-01, Circumvention of Safety Related Components

1) Inspection Scope and Observations

On June 17, 2014, a licensee employee was observed by a licensee supervisor improperly operating two spring return valves identified as safety-related IROFS. The spring return valves were wedged open by the operator. These spring return valves

were intended to be manually operated as IROFS controls for two high consequence accident sequences. The licensee reported the event associated with the AV in LER 70-143/2014-004-0, issued July 18, 2014. The AV was inspected and documented in NRC Special Inspection Report 70-143/2014-006, issued on August 29, 2014. The NRC assessed AV 70-143/2014-006-01, Circumvention of Safety Related Components, using guidance in the NRC Enforcement Manual and in accordance with the NRC Enforcement Policy.

2) Conclusion

The AV has been dispositioned and considered closed with one finding identified below:

Introduction: A Severity Level (SL) IV violation of the licensee's Standard Operating Procedure (SOP) 401-22-302, Building 302 Area B, was identified for an operator holding open safety-related self-closing valves with means other than physically holding the valve handles. The inspectors determined that the operator defeated the spring return closed function of the valves resulting in unavailability of IROFS and reduction in IROFS controls, respectively, for two potential high consequence accident sequences, chemical exposure and NCS.

Description: At approximately 1900, on June 17, 2014, a nuclear process operator, in Area B of Building 302, held open two self-closing spring return valves, 302-BA-0B01 and 302-BA-0B85, by means other than holding the valve handles with his hands. The two valves were sequentially located in a chemical supply line in the recovery stream of the manufacturing process. They were designed as spring-loaded isolation valves to be held open simultaneously by hand to fill a column with pure ammonium hydroxide. Both valves were designated by the licensee as IROFS (FAB-13) and Safety Related Equipment (SRE). The IROFS valves provided safety functions at the facility to prevent or mitigate a potential chemical exposure accident and potential spread of radioactive contamination and to prevent or mitigate a potential nuclear criticality accident. As SRE valves, they were periodically tested to ensure availability and reliability. The operator inappropriately operated the two valves simultaneously by mechanically holding open each of the valve handles with box end wrenches wedged into the system structure, one for each valve. The operator was observed removing the wrenches as his supervisor and another operator approached the process area. Once the wrenches were removed, the valves functioned as designed by immediately self-closing. The supervisor subsequently reported the incident to plant management.

The operator was relieved of shift operation responsibilities. The issue was entered into the licensee's CAP as PIRCS 44298 and reported to the NRC in a one hour safety event report, EN 50208. Additional corrective actions performed by the licensee included immediate shutdown and review of the operator's cognizant process areas, operational fact finding, valve lineups, selected SRE testing, site communications, and initiation of a human performance investigation and a safety culture review.

Both the high consequence chemical and nuclear criticality accident sequences were defined in the licensee's ISA. The chemical safety function of the spring return valves was to isolate the column to prevent overflow to the area floor and subsequent chemical exposure to personnel. The consequence of concern was the inhalation of the pure ammonium hydroxide by personnel in the area once the chemical became airborne. The valves were the only IROFS established to reduce the risk of the

chemical exposure accident sequence. The NCS function of the spring return valves was to isolate the bulk chemical supply to prevent material from back-flowing into the chemical supply lines and a possible unsafe geometry. The consequence of concern was a criticality accident. There were other available IROFS associated with the nuclear criticality accident sequence. Using risk indexing methodology to assess the ISA risk (in accordance with licensee procedures and guidance in NUREG 1520, Safety Review Plan for the Review of a License Application for a Fuel Cycle Facility), the licensee determined that the likelihood of the chemical accident sequence was an unacceptable increase and resulted in not meeting the performance requirements of 10 CFR 70.61. However, the licensee determined that the nuclear criticality accident sequence continued to meet the performance requirements of 10 CFR 70.61. The inspectors independently validated the licensee's calculations.

Several other barriers were present that could have potentially prevented a high consequence personnel chemical exposure and spread of radioactive contamination: normal chemical batch fill less than a minute, continued flow of the chemical required for at least 4.5 minutes prior to spillage to the floor, and approximately 2000 liters of chemical spillage required for a high consequence event which would have required 10 hours for the spill to reach this volume. Also, personnel sensitivity to ammonia, two required roving patrols and a normal complement of operators available to identify the spill, routine supervisor oversight in the field, and multiple emergency exits for personnel to evacuate away from the spill would have provided opportunity to identify and mitigate/minimize exposure to personnel.

NFS guidance, NFS-HS-A-68, ISA Risk Assessment, stated that a duration index may be credited for the failure of an IROFS to account for the maximum period that the IROFS could have been in a failed state without detecting its failure and taking action to mitigate its failure. Other upset conditions would have had to occur concurrently with the IROFS failure before an accident consequence can occur. For example, personnel would not act and/or evacuate upon sight or smell of the chemical. Taking into consideration that the approximate time needed for ammonium hydroxide to enter the system and start to spill was greater than three minutes, and that the spill would be easily detected, a Failure Duration Index equating to one hour was selected. This duration would have resulted in a spill of approximately 200 gallons of ammonium hydroxide which would have been easily detected by shift personnel. The inspectors independently calculated the risk index and determined that the likelihood of the high consequence chemical exposure accident sequence remained highly unlikely, therefore meeting the performance requirements of 10 CFR 70.61.

As previously stated, the nuclear criticality accident sequence continued to meet the performance requirements of 10 CFR 70.61. The sequence involved a backflow of fissile material into the chemical supply system. This sequence required a motive force to push the material and a loss of chemical supply pressure, neither of which occurred during this event. In addition, the effectiveness of protection for an IROFS overflow line was very high indicating that any potential backflow would likely have taken the path of least resistance, the overflow line to the floor, which was a safe geometry.

Analysis: The operator simultaneously inappropriately operated the handles for spring return valves 302-BA-0B01 and 302-BA-0B85 with box end wrenches wedged into the system structure, one for each valve. The inappropriate operation of these valves was contrary to the Note in Step 4.2.8 in licensee procedure SOP 401-22-302, Building 302

Area B, which stated, “self-closing valves must never be held open by any means other than an individual holding the valve handle.” With the self-closing isolation function of both valves defeated, IROFS FAB-13 was non-functional. There were no remaining IROFS available to prevent or mitigate a potential high consequence chemical exposure event and spread of contamination, but there were additional credited and analyzed IROFS for the nuclear criticality event.

The consequence of the violation, absent the willful aspect, was determined to be minor because, even though the circumvention of the safety function of the valves resulted in a reduction in safety margin, the applicable high consequence chemical exposure and nuclear criticality accident sequences continued to remain highly unlikely in accordance with 10 CFR 70.61 performance requirements and an acceptable safety margin was maintained. However, willful violations are a particular concern to the NRC. In this case, the operator was knowledgeable of the procedure requirements, yet chose to proceed contrary to procedural requirements. In accordance with Section 2.3.2.b.4 of the Enforcement Policy, based on the failure to promptly provide the information concerning the violation to appropriate NRC personnel (i.e., failure to report the event in a timely manner as documented in Special Inspection Report 70-143/2014-006, NCV 70-143/2014-006-02), this violation is being documented as a cited violation.

Enforcement: The inspectors determined the circumvention of the self-closing isolation function of both IROFS valves by the operator was a violation of NFS Special Nuclear Materials License SNM-124, Safety Condition S-1, which requires, in part, that procedures are used in accordance with the statements, representations, and conditions in the license application.

Chapter 11 of the license application, Management Measures, Section 11.4, “Procedure Development and Implementation,” required, in part, that activities involving the handling of SNM and IROFS are conducted in accordance with written procedures as defined in Section 11.4.1, “Operating Procedures.” Section 11.4.1, “Operating Procedures,” defined, in part, “operating procedures as documents written to authorize the processing of radioactive material; and within these documents, detailed instructions for limits and controls established for safety purposes, including IROFS, are identified.”

Licensee procedure SOP 401-22-302, Building 302 Area B, Step 4.2.8 Note stated “self-closing valves must never be held open by any means other than an individual holding the valve handle.”

Contrary to the above, the operator violated licensee procedure SOP 401-22-302, Building 302 Area B, Step 4.2.8 Note when he held open both IROFS valves by means other than holding the valve handle. The circumvention of the self-closing isolation function of both valves resulted in unavailability of IROFS and reduction in IROFS controls, respectively, for two potential high consequence accident scenarios, chemical exposure and nuclear criticality safety. This SLIV violation will be documented as VIO 70-143/2015-006-01, Circumvention of Safety Related Components.

c. (Closed) LER 70-143/2014-007-0, EN 50577: Unanalyzed Condition Due to Material in a Resistance Temperature Detector Housing

1) Inspection Scope and Observations

The inspectors reviewed the LER, issued on November 26, 2014, for performance deficiencies and violations of regulatory requirements. The inspectors reviewed PIRCS including the root cause analysis and associated corrective actions, procedures, records, and drawings, and discussed the issue with appropriate members of plant staff. This condition was documented in the licensee's CAP as PIRCS 46037.

Introduction: The inspectors identified a SL IV Violation of Title 10 of CFR 70.61(a) and 70.61(d) in which the licensee failed to evaluate the risk of a nuclear criticality accident in the ISA to assure that, under credible abnormal conditions, all nuclear processes remained subcritical. Specifically, the licensee failed to evaluate and limit the risk of a nuclear criticality accident involving the accumulation of fissile material in unfavorable geometry electrical boxes. As a result, the licensee's safety basis assumption that leaks would spill to the floor was not valid.

Description: Shortly before 0300 October 29, 2014, licensee staff was troubleshooting a resistance temperature detector (RTD) for IROFS FAG-06 in the first pass of the uranium recovery boildown system, which had been alarming and shutting down the system since the morning of October 28, 2014. When technicians opened the sealed junction box containing the wiring block for the RTD, they found 90 mL (three ounces) of solution inside the thermowell and junction box. The electrical conduit exiting the junction box provided a flow path for solution to enter an unfavorable geometry electrical box that had not been analyzed in the licensee's ISA. The licensee's analysis had assumed that leaking solution would spill to the floor.

When the junction box was opened, the licensee found extensive corrosion inside the junction box, including on and around the RTD connection. The connection block was found to have detached from the back wall of the junction box and fallen into the solution at the bottom of the junction box. In addition, the internals of the junction box appeared to be covered in condensation. The solution level had not reached the level of the conduit, and no solution was found in the conduit.

The integrity of the thermowell had failed, allowing solution to enter the junction box containing the RTD connections. When the licensee later removed the thermowell, it was found to have degraded due to pitting corrosion, allowing the formation of a pin-hole leak. The thermowell had been in service for 15 years. The RTD was serviced and the junction box opened every six months, most recently four months before the event in July, during which no solution was observed. However, the thermowell itself had not been removed for inspection or servicing since installation.

The failure to analyze the risk of a nuclear criticality accident in the ISA resulted in the likelihood of this high consequence event being Not Unlikely in accordance with existing IROFS documented in the licensee's ISA. However, using the existing ISA methodology, the inspectors reviewed additional controls that were available and reliable to mitigate this event. When appropriate risk credit was considered for these controls and processes the likelihood of this event was highly unlikely. These factors are discussed below.

- **Material of Construction:** The licensee's NCSE contained requirements controlling the material of construction of the process system, which included the thermowell, in order to limit leaks. This requirement stated "The process system is required to be constructed of material compatible with the chemistry, temperature, and environment of the material contained within it such that significant leakage of uranium bearing solution is prevented." Because of the failure that occurred after 15 years of service, reducing the risk credit for material of construction was consistent with the licensee's approved ISA methodology.
- **Response to System Abnormalities/Flow Path to Floor:** Given a leak of sufficient size and duration, enough solution could leak through the thermowell and into the conduit to fill up an unfavorable geometry electrical box downstairs from the thermowell. A conservative calculation in 21T-14-1806, "KENO Calculations for NFS Area G October 29, 2014 Event," showed that it would take the worst case leak at least 31 days of continuous operation to accumulate enough solution in the unfavorable geometry electrical cabinet for a criticality to occur ($k_{eff} > 0.95$, per their license requirements). In reality, a flow path to the floor existed at the time of the leak, which could have spilled solution to the floor if it did not become plugged. Also, in reality, the system was not operated continuously, and solution will only be above the thermowell when operated, so the solution would have to accumulate in the electrical box for more than a month for a criticality to occur.
- The electrical cabinets that were connected to process systems contained either electronics for IROFS (e.g., IROFS FAG-006) or for process systems (e.g., power supply, process monitoring and control). As such, degradation of the electronics via attack by corrosive vapors and solution, as well as 'shorting' caused by exposure to or immersion in conductive acidic solution, was expected to result in the shutdown of the process, as was the case for this event due to automatic controls associated with IROFS FAG-006. The disruption and loss of instrumentation caused by solution accumulating in an electrical box would likely have caused licensee personnel to shut down the process and investigate per procedure even if the system did not shutdown automatically. Therefore, crediting the licensee's response to system abnormalities and a flow path to the floor was consistent with the licensee's approved ISA methodology.
- **Response to Loss of Material:** The amount of material necessary to cause a criticality was also several times the system's mass discrepancy control limit used for material control and accounting (MC&A) purposes. These discrepancies were measured in multi-day periods and tracked and trended. Discovery of a mass discrepancy greater than the limit triggered an investigation of the discrepancy.

For a critical mass of solution to accumulate, the licensee would have had to miss multiple sequential monitoring periods. Therefore, crediting the licensee's response controlled by the MC&A Program would be consistent with the licensee's approved ISA methodology.

The licensee reported the event within 24 hours of discovery in accordance with 10 CFR Part 70 Appendix A (b)(1) as an unanalyzed event, in EN 50577. The 30-day licensee event report (ML14349A332), dated November 26, 2014, described the corrective actions taken by the licensee.

The licensee later completed a root cause analysis (P46073-I18607), an extent of condition (P46037-I18615), and an extent of cause (P46037-I18616). The licensee entered the corrective actions associated with these evaluations into PIRCS. There were no actual safety consequences resulting from this event. As an immediate corrective action, the licensee drilled holes in all unfavorable geometry electrical boxes that were connected to process equipment by conduit. As a longer term corrective action, the licensee had begun drilling holes in all unfavorable geometry electrical boxes regardless of whether or not the box was connected to process equipment by conduit. The licensee was revising its procedures to require that holes be drilled in all unfavorable geometry boxes before they were installed. Once the holes were drilled, the accident sequence of a leak through conduit was bounded by the leak sequence in the ISA.

Analysis: The licensee failed to analyze a credible abnormal condition that could have potentially led to criticality and assure subcriticality of leaks into electrical conduit. This failure was a violation of 10 CFR 70.61(a) which required, in part, that each licensee shall evaluate, in the integrated safety analysis its compliance with the performance requirements of (b), (c), and (d). In addition, 10 CFR 70.61(d) states, in part, that “the risk of nuclear criticality accidents must be limited by assuring that under normal and credible abnormal conditions, all nuclear processes are subcritical...” By failing to analyze this credible abnormal condition, the licensee failed to assure that the accumulation of fissile material in unfavorable geometry electrical boxes was adequately subcritical.

This issue was determined to be more than minor because it aligned with Inspection Manual Chapter (IMC) 0616, “Fuel Cycle Safety and Safeguards Inspection Reports,” Appendix B, “Examples of Minor Issues,” screening question 12, which asked, “Does the noncompliance result in the failure to assure that all nuclear processes are subcritical with an approved margin of sub-criticality for all normal and credible abnormal conditions as required by 10 CFR 70.61(d)?”

Section 6.2.b.1 of the NRC Enforcement Policy states that, for issues under 10 CFR Part 70, Subpart H, a high-consequence event that is “not unlikely” based on a licensee’s ISA, could be characterized at Severity Level II. Section 6.2 also notes that the NRC will determine the appropriate severity level for a specific violation by using licensee ISAs and other applicable risk information. The NRC’s independent risk assessment considered other applicable controls and process characteristics described above, such as the material of construction, response to system abnormalities, flow path to floor and the licensee’s response to loss of material. The NRC’s risk assessment concluded that when the available controls and process characteristics were appropriately considered per the licensee’s methodology, this accident was highly unlikely. Therefore, the safety significance of this failure is low because the likelihood of a criticality remained highly unlikely. Therefore, the NRC determined the failure to analyze event is a SL IV violation consistent with Section 6.2.d.1 of the enforcement policy, which stated, in part, “SL IV violations involve, for example: a licensee fails to meet the requirements of 10 CFR 70.61, “Performance Requirements,” ... and the failure does not result in a SL I, II, or III violation.”

Enforcement: Paragraph 70.61(a) stated, in part, that each licensee shall evaluate, in the integrated safety analysis performed in accordance with § 70.62, its compliance with the performance requirements in paragraphs (b), (c), and (d) of this section. Paragraph 70.61(d) of 10 CFR Part 70 stated, in part, that “the risk of nuclear criticality accidents must be limited by assuring that under normal and credible abnormal conditions, all nuclear processes are subcritical...”

Contrary to this requirement, prior to October 29, 2014, the licensee failed to evaluate the risk of a nuclear criticality accident in the ISA to assure that under credible abnormal conditions all nuclear processes remained subcritical. Specifically, the licensee failed to evaluate and limit the risk of a nuclear criticality accident involving the accumulation of fissile material in unfavorable geometry electrical boxes.

The NRC Enforcement Policy states, “An NOV is warranted when a licensee ... identifies a violation as a result of an event where the root cause of the event is obvious or the licensee had prior opportunity to identify the problem but failed to take action that would have prevented the event.” Therefore, this failure to assure that all credible abnormal conditions are subcritical as required by 10 CFR 70.61(d) constitutes a cited SL IV Violation of NRC requirements in accordance with Enforcement Policy Section 6.2.d.1 and will be documented as VIO 70-143/2015-002-02, “Failure to Analyze Credible Abnormal Condition.”

2) Conclusion

This LER is considered closed with one finding identified.

d. (Closed) VIO 70-143/2014-003-01 Failure to make a report required by 10 CFR 70.50(b)(3) and LER 70-143/2014-006-0, EN 50260, Transport of Potentially Contaminated Individuals

1) Inspection Scope and Observations

The inspectors reviewed the corrective actions and supporting documents associated with the SLIV Violation issued on July 30, 2014, and the LER, issued on July 31, 2014, and discussed the issue with appropriate members of plant staff. The licensee failed to notify the NRC of events that required unplanned medical treatment at medical facilities of individuals with spreadable radioactive contamination on their clothing or body. The licensee determined that it misinterpreted the reporting requirements and will now report events to the Headquarters Operation Officer at the time of occurrence and provide updates as additional information is obtained that could change the initial report. As corrective action, the licensee made the belated notifications and revised the applicable procedure to clarify the reporting requirements.

2) Conclusion

This VIO and LER are considered closed with no findings of significance.

E. 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 February 12 and April 9, 2015, to J. Duling and his staff. Proprietary and classified information was discussed but not included in the report.

SUPPLEMENTARY INFORMATION

1. KEY POINTS OF CONTACT

<u>Name</u>	<u>Title</u>
S. Barron	Emergency Preparedness Manager
C. Brown	MC&A Department Section Manager
N. Brown	NCS Department Section Manager
T. Coates	Senior Advisory Engineering Section Manager
R. Dailey	Engineering Director
R. Dotson	Quality Manager
R. Droke	Senior Regulatory Advisor
J. Duling	President
T. Evans	Security Section Manager
R. Freudenberger	Safety & Safeguards Director
J. Hagemann	Work Management Section Manager
R. Holley	Environmental Unit Manager
H. Jimenez	Waste Water Treatment Facility Manager
M. McKinnon	Operations Director
M. Moore	Environmental Protection & Industrial Safety Section Manager
J. Nagy	Nuclear Safety Officer Chief
A. Sabisch	Licensing and ISA Manager
S. Sanders	Training Manager
R. Shackelford	Nuclear Safety & Licensing Section Manager
M. Tester	Radiation Protection Unit Manager

2. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

70-143/2015-002-01	VIO	Circumvention of Safety Related Components (Paragraph D.1.b)
70-143/2015-002-02	VIO	Failure to Analyze Credible Abnormal Condition (Paragraph D.1.c)

Closed

70-143/2014-004-0 (EN 50208)	LER	IROFS Bypassed (Paragraph D.1.a)
70-143/2014-006-01	AV	Circumvention of Safety Related Components (Paragraph D.1.b)
70-143/2014-007-0 (EN 50577)	LER	Unanalyzed Condition Due to Material in a RTD Housing (Paragraph D.1.c)
70-143/2014-003-01	VIO	Failure to make a report required by 10 CFR70.50(b)(3) (Paragraph D.1.d)
70-143/2014-006-0 (EN 50260)	LER	Transport of Potentially Contaminated Individuals (Paragraph D.1.d)

3. INSPECTION PROCEDURES USED

88015	Nuclear Criticality Safety Program
88016	Nuclear Criticality Safety Evaluations and Analyses
88017	Criticality Alarm Systems
88050	Emergency Preparedness
88055	Fire Protection (Annual)
88135	Resident Inspection Program For Category I Fuel Cycle Facilities
88135.02	Plant Status
88135.04	ISA Implementation
88135.05	Fire Protection
88135.17	Permanent Plant Modifications
88135.19	Post Maintenance Testing
88135.22	Surveillance Testing

4. DOCUMENTS REVIEWED

Procedures:

EP-01, Standard Operational Guidelines for Evaluation of Unusual Incidents
 FMF-OA-10-39, Operator Aid, 2nd Pass Raffinate Conversion Chart Col J13/14
 IROFS 300-GENERAL
 IROFS 302-600700A
 IROFS 303-PSL600700A
 LOA-2238V-020-01, Handling of FRNCOV-0601 Material, dated November 20, 2014
 NFS-EC-1, Calibration of Weight or Mass Measuring Systems
 NFS-GH-25, Hot Work Procedure
 NFS-GH-27, Impairments to Fire Protection Systems
 NFS-GH-31, Compressed Gas Cylinders
 NFS-GH-43-01, Safety-Related Equipment Writer's Guide
 NFS-GH-62, Control of Combustibles
 NFS-GH-62-01, NFS Monthly Combustible Control Inspection
 NFS-GH-901, Configuration Management Program
 NFS-HS-A-16, Safety Audits, Assessment, and Inspections
 NFS-HS-A-58, Nuclear Criticality Safety Evaluations
 NFS-HS-A-62, Implementation of Nuclear Criticality Safety Evaluations
 NFS-HS-A-68, ISA Risk Assessment Procedure
 NFS-HS-A-104, Testing/Inspection of Fire Barrier Systems
 NFS-HS-B-18, Collection and Analysis of NFS Stack Samples
 NFS-HS-B-58, Fire Suppression System
 NFS-HS-B-95, Testing/Inspection of fire Barrier Systems
 NFS-HS-CL-28, Nuclear Criticality safety for the CDL Facility
 NFS-HS-E-04, Fire Reporting and Response
 NFS-M-17, Calibration System Manual
 NFS-NCSE-NCSAWG, Nuclear Criticality Safety Evaluation Writer's Guide
 NFS-NCS-AUDITWG, Nuclear Criticality Safety Audit Writer's guide
 NFS-OPS-001, Conduct of Operations
 NFS-SEC-31, Procedure for Safeguarding MAA Barrier Integrity
 NFS-WM-001, Control and Execution of Work
 NFS-WM-001-02, Work Control Process
 NFS-WM-001-04, Work Acceptance Process
 NWB-14-05, SRE Review During Performance of NCS Audits, dated June 2014

SOP 401-26, First Pass Solvent Extraction
 SOP 401-06-302, Area 600-Building 302
 SOP 401-7B, Area 700 Lot Preparation
 SOP 250, Maintenance Operations and Testing of UPS/Generator System Building 306
 SOP 411, Maintenance Operations and Testing of UPS/Generator System Building 480

Records:

2010 and 2012 Fire Damper Testing Records for SRE Dampers in Buildings 302 and 303
 2013 and 2014 Annual Beam Detector Testing Records
 2013 and 2014 Annual Horizontal Sliding and Roll-up Fire Door Inspections
 2013 and 2014 Smoke Detector Testing Records
 2014 Annual Swinging Fire Door Inspection
 2014 Licensee and vendor inspections of 302 and 303 buildings CO2 suppression systems
 2014 Manual Pull Station Test Records
 21T-14-1806, "KENO Calculations for NFS Area G October 29, 2014 Event," dated November 25, 2014
 21T-15-0448, "Assessment of the Change in Risk Resulting from the October 29, 2014 Area G Event at NFS (NFS Event No. 50577)," Revision (Rev.) 1, dated February 16, 2015
 21X-15-2, 300 Complex Recovery ISA Summary
 54T-13-0022, "Nuclear Criticality Safety Evaluation for 300 Complex Waste Handling," Rev.0
 54T-14-0033, "Nuclear Criticality Safety Evaluation for BPF Raffinate Solidification System," Rev.2
 54X-08-0004, "Nuclear Criticality Safety Evaluation for Area 700 of the Production Fuel Facility ISA Risk Assessment Procedure," Rev.4
 Control Flowdown and Field Verification for Area 600
 December 2014 Weekly Testing Records for Buildings 302/303 CO2 System
 ECR-20150134, dated January 29, 2015
 ECR-20140424, Building 302/303 Area 600/700 Procedure Revisions
 ECR-20140998, LOA-2245V-001 Area 700 Tool Modification
 FM-NFS-HS-A-50-01, Event Notification Report Summary for B-110B Fire
 FWP WR# 227109, Replace Flow Indicators for Equipment Gas Lines
 FWP WR# 227639, Replace Equipment Thermocouples
 NFS-HS-B-38 Att. A, Nasal and Saliva Survey Report for B-110B Fire
 NFS-HS-B-58 Att. A, Monthly Fire Extinguisher Inspection
 NFS-HS-B-58 Att. D, Sprinkler Alarm Valves – Qtrly. Flow Test/Qtrly. Main Drain
 NFS-HS-B-58 Att. G, Monthly PIV and Sectional Control Valve Inspection
 NFS-HS-B-58 Att. H, Annual PIV Inspection
 Nuclear Criticality Safety Evaluation for Area 600 of the Production Fuel Facility
 Pre-Fire Plans for Buildings 302 and 303
 Risk Index and IROFS Summary for Area 600 of the Production Fuel Facility
 SRE Test 303N2INDFI0625, Flow Indicator Testing
 SRE Test N303FRNCTIC0685, Thermocouple Testing
 Stack Sample Count Decay Worksheets, B-110B
 WR 228527, Heater 0G01 Element Replacement
 WR 228302, Replacement and Calibration of Hydrogen Detectors

Audits and Assessments/Investigations:

NCS-2015-01, NCS-2015-02, NCS-2015-03, NCS-2015-04,
 NSA-RPT-14-02, "Independent Triennial Nuclear Criticality Safety Program Review for Nuclear Fuel Services, Inc. Erwin, Tennessee," dated September 19, 2014
 2014 Criticality Evacuation Drill

Drawings:

302F0331-D, Area F P&ID
 302F0337-D, Area G P&ID
 302F0355-D, Area H P&ID
 302F0340-D, Area J P&ID
 333-A1125-C, Building 333 1st Floor Pre-Fire Plan
 333-A1130-C, Building 333 Discards Area Pre-Fire Plan
 333-A1129-C, Building 333 Mezzanine Level Pre-Fire Plan
 302-F0121-D, Area 700, Piping & Instrumentation Diagram Sheet 1
 302-F0122-D, Area 700, Piping & Instrumentation Diagram Sheet 2
 303-F0107-D, Area 700, Piping & Instrumentation Diagram
 B-440 Pre-Fire Plan

Problem Identification Resolution and Correction System (PIRCS):

P46037, P46058
 P46073-I18607, Area G Unanalyzed Condition Identified
 P46037-I18615, Extent of Condition Review, P46037-I18616, Extent of Cause Review
 P46567, P46586, P46187, CA23797, P46422, P46381, P46381-I18737, CA24003
 CA24004, P46176, P46176-I18634, CA23797, P47254, P46551, P46672, P7776, CA3431
 P35887, P30297, P47259, P46442, P46448, P46526, P46506, P46848, P46026, P46944
 P47062, P47115, P47049, P47233, P47027, P47326, P47405, P47416, P46551, P45379
 P45664, P45369, 45331, P45323, P45318, P47370, P47686, P47742, P47789, P47676
 P45668, P47420, P45978

PIRCS Written as a Result of the Inspection:

P47291, Water under Area 600
 P47292, Documented Comments Identified by NRC during IP 88055 inspection
 P46133, Emergency Light Wiring
 P46434, Questionable Modification
 P46838, Freeze Protection Checklist
 P47101, Enclosure Identifier
 P47160, Leak in Maintenance Cage
 P47339, Alternate ECD OJT
 P47436, Discrepancies in Area 700 Procedure
 P47437, Area G Procedure Compliance
 P47428, Water At RCA Boundary
 P47446, Area 700 Equipment Labelling
 P47449, Container Carrying Expectations
 P47495, Phonetics During Emergency
 P47504, Posted Station Limits
 P47505, Documentation of Critical Thinking
 P47571, Area 700A Walkdown Observations
 P47572, Scaffold Pole Fastened to Enclosure
 P47675, Barrier Penetrations
 P47678, Conduit Cover on Fire Penetration
 P47812, Drain Seal Fluid
 P47813, Pre-Fire Plan Door Identifier
 P47814, Housekeeping Emergency Egress
 P47815, 333 Building Mezzanine Storage and Housekeeping
 P47817, Grease/Oil Guidance
 P47824, Area G Short Term Shutdown Valve Position