



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II**

245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

February 13, 2017

EA-17-005
EN 52190
EN 52358

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

**SUBJECT: NUCLEAR FUEL SERVICES, INC. – U. S. NUCLEAR REGULATORY
COMMISSION INTEGRATED INSPECTION REPORT NUMBER 70-143/2016-005
AND APPARENT VIOLATIONS 2016-005-01 and 2016-005-02**

Dear Mr. Duling:

This letter refers to the inspections conducted from October 1 to December 31, 2016, at the Nuclear Fuel Services, Inc. (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 U.S. Nuclear Regulatory Commission (NRC) requirements. The enclosed report presents the results of the inspections. The findings were discussed with members of your staff at the exit meetings held on November 17, December 2, 2016, January 4, 2017, and January 24, 2017.

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. The inspections covered the following areas: safety operations, radiological controls, facility support, and other areas.

Based on the results of these inspections, two apparent violations were identified and are being considered for escalated enforcement action in accordance with the NRC Enforcement Policy. The current Enforcement Policy is included on the NRC's Web site at <http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>. The apparent violations are discussed in Paragraph A.4 of the enclosed inspection report, and involved the failure of a portion of the criticality accident alarm system speaker system in the Fuel Manufacturing Facility. The first apparent violation was identified for the failure to ensure the criticality accident alarm system was maintained to provide an audible alarm signal for an area which routinely handles, uses, and stores highly enriched uranium. The second apparent violation was identified for the failure to ensure the self-monitoring feature of the criticality accident alarm system was capable of detecting electronic component failures to provide a warning signal to personnel in the event of

such a failure. The circumstances surrounding these apparent violations and the significance of the issues were discussed with members of your staff at the inspection exit meeting on January 24, 2017.

Before the NRC makes its enforcement decision, we are providing you an opportunity to (1) respond to the apparent violations addressed in this inspection report within 30 days of the date of this letter, (2) request a Pre-decisional Enforcement Conference (PEC), or (3) request Alternative Dispute Resolution (ADR). If a PEC is held, it will be open for public observation and the NRC will issue a press release to announce the time and date of the conference. If you decide to participate in a PEC or pursue ADR, please contact Marvin Sykes at 404-997-4629 within 10 days of the date of this letter. A PEC should be held within 30 days and an ADR session within 45 days of the date of this letter.

If you choose to provide a written response, it should be clearly marked as a "Response to Apparent Violations in NRC Inspection Report 070-143/2016-005; EA-17-005 and should include: (1) the reason for each apparent violation or, if contested, the basis for disputing the apparent violation; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken; and (4) the date when full compliance will be achieved. Your response may reference or include previously docketed correspondence, if the correspondence adequately addresses the required response. Additionally, your response should be sent to the NRC's Document Control Center, with a copy mailed to Mark Lesser, Director, Division of Fuel Facility Inspection, Region II, 245 Peachtree Center Avenue, NE; Suite 1200, Atlanta GA 30303-1257, within 30 days of the date of this letter. If an adequate response is not received within the time specified or an extension of time has not been granted by the NRC, the NRC will proceed with its enforcement decision or schedule a PEC.

If you choose to request a PEC, the conference will afford you the opportunity to provide your perspective on these matters and any other information that you believe the NRC should take into consideration before making an enforcement decision. The decision to hold a predecisional enforcement conference does not mean that the NRC has determined that a violation has occurred or that enforcement action will be taken. This conference would be conducted to obtain information to assist the NRC in making an enforcement decision. The topics discussed during the conference may include information to determine whether a violation occurred, information to determine the significance of a violation, information related to the identification of a violation, and information related to any corrective actions taken or planned. In presenting your corrective action, you should be aware that the promptness and comprehensiveness of your actions will be considered in assessing any civil penalty for the apparent violations. The guidance in the enclosed excerpt from NRC Information Notice 96-28, "Suggested Guidance Relating to Development and Implementation of Corrective Action," may be helpful".

In lieu of a PEC, you may also request ADR with the NRC in an attempt to resolve this issue. ADR is a general term encompassing various techniques for resolving conflicts using a third party neutral. The technique that the NRC has decided to employ is mediation. Mediation is a voluntary, informal process in which a trained neutral (the "mediator") works with parties to help them reach resolution. If the parties agree to use ADR, they select a mutually agreeable neutral mediator who has no stake in the outcome and no power to make decisions. Mediation gives parties an opportunity to discuss issues, clear up misunderstandings, be creative, find areas of agreement, and reach a final resolution of the issues. Additional information concerning the NRC's program can be obtained at http://www.nrc.gov/about_nrc/regulatory/enforcement/adr.html. The Institute on Conflict Resolution (ICR) at Cornell

University has agreed to facilitate the NRC's program as a neutral third party. Please contact ICR at 877-733-9415 within 10 days of the date of this letter if you are interested in pursuing resolution of this issue through ADR.

In accordance with Title 10 of the *Code of Federal Regulations* Section 2.390 of the NRC's "Rules of Practice and Procedure," a copy of this letter and its enclosure will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agency wide Documents Access and Management 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 proprietary or safeguards information so it can be made available to the Public without redaction.

Should you have any questions concerning these inspections, please contact Marvin Sykes of my staff at 404-997-4629.

Sincerely,

/RA/

Mark S. Lesser, Director
Division of Fuel Facility Inspection

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

Enclosure:
Inspection Report 70-143/2016-005
w/Attachment: Supplementary Information

cc: (See page 4)

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/RA/

Mark S. Lesser, Director
Division of Fuel Facility Inspection

Docket No. 70-143
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cc: (See page 4)

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U. S. NUCLEAR REGULATORY COMMISSION
REGION II

Docket No.: 70-143

License No.: SNM-124

Report No.: 70-143/2016-005

Licensee: Nuclear Fuel Services, Inc.

Facility: Nuclear Fuel Services, Inc.

Location: Erwin, TN 37650

Dates: October 1 through December 31, 2016

Inspectors: C. Stancil, Senior Resident Inspector
T. Sippel, Fuel Facility Inspector
N. Peterka, Fuel Facility Inspector
D. Anderson, Fuel Facility Inspector
R. Womack, Fuel Facility Inspector
G. Goff, Fuel Facility Inspector

Approved by: M. Lesser, Director
Division of Fuel Facility Inspection

Enclosure

EXECUTIVE SUMMARY

Nuclear Fuel Services, Inc.
NRC Integrated Inspection Report 70-143/2016-005
October 1 – December 31, 2016

Inspections were conducted by the 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 was 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. Three violations were identified during this inspection.

Safety Operations

- Plant operations were performed safely and in accordance with license requirements. Items relied on for safety were properly implemented and maintained in order to perform their intended safety function. (Paragraphs A.1 and A.2)
- The Nuclear Criticality Safety (NCS) program was properly implemented and maintained in order to assure that normal and credible abnormal conditions remained subcritical as required by license and regulatory requirements. Criticality analysis demonstrated double contingency and adequate control of NCS parameters. Two apparent violations were identified for a failure to maintain Criticality Accident Alarm System audibility. (Paragraphs A.3 and A.4)
- The Fire Protection program and systems were adequately maintained in accordance with the license application and regulatory requirements. (Paragraph A.5)

Radiological Controls

- The radiation protection program was implemented in accordance with the license application and regulatory requirements. (Paragraphs B.1 and B.2)
- Radioactive waste activities were performed in accordance with regulatory requirements and procedures. (Paragraph B.3)
- The environmental protection program was implemented in accordance with the license application and regulatory requirements. (Paragraph B.4)

Facility Support

- The post maintenance testing and surveillance testing programs were implemented in accordance with the License Application and regulatory requirements 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 drill program was implemented in accordance with the Emergency Plan and regulatory requirements. (Paragraph C.4)

- The permanent plant modifications and configuration management program were implemented in accordance with the license and regulatory requirements. (Paragraph C.5)

Other Areas

- A Non-Cited Violation was issued for the licensee's failure to treat waste containing hazardous material to reduce to the maximum extent practicable the potential hazard from the non-radiological materials. (Paragraph D.1)
- Licensee Event Report 70-143/2016-002-0 (EN 52190) was closed after reviewing the licensee's investigation and corrective actions related to the failure of a criticality accident alarm system speaker in Building 120. (Paragraph D.2)
- Licensee Event Report 70-143/2016-005-0 was closed to two Apparent Violations as discussed in Section A.4 of this report. (Paragraph D.3)

Attachment:

Supplementary Information

REPORT DETAILS

Summary of Plant Status

The facility began and continued through 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 and the down-blending 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 (SRE) (valves, sensors, instrumentation, in-line monitors, and scales), and items relied on for safety (IROFS) to determine whether the licensee appropriately captured off-normal events and implemented effective corrective actions to prevent recurrence.

The routine tours included walk-downs of the FMF, BPF, commercial development line, miscellaneous storage areas, Building 234, and Building 440. During routine tours, the inspectors verified that operators were knowledgeable of their duties and attentive to any alarms or annunciators at their respective stations. The inspectors observed activities during normal and upset conditions for compliance with procedures and material station limits. The inspectors noted that safety controls, including IROFS, were in place, properly labeled, 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 reviewed operator log books, standard operating procedures (SOPs), maintenance records, and Letters of Authorization (i.e., 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. The inspectors focused on potential wind-borne missile hazards, potential fire hazards with combustible material storage and fire loading, hazardous chemical storage, the physical condition of bulk chemical storage tanks and piping, storage of compressed gas containers, and potential degradation of plant security features. In addition, the inspectors periodically toured or inspected the licensee's emergency response facilities for familiarization and to ensure the facilities were maintained in a readily available status.

The inspectors attended various plan-of-the-day meetings, including the Safety and Safeguards Review Council (SSRC), and met daily with the Plant Shift Superintendent 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 during these meetings.

b. Conclusion

No findings of significance were identified.

2. Safety System Inspection (IP 88135.04)

a. Inspection Scope and Observations

The inspectors performed walk-downs of safety-significant systems involved with the processing of SNM. As part of the walk-downs, the 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 Analysis (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 fuel manufacturing facility enclosure area ventilation was specifically inspected.

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

- Controls in place for potential criticality, chemical, radiological, and fire safety hazards
- Process vessel configurations maintained in accordance with Criticality Safety Analyses (CSAs)
- 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.

3. Nuclear Criticality Safety (IP 88135.02)

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

As part of routine day-to-day activities on-site, the inspectors reviewed corrective action program (CAP) entries associated with criticality safety aspects. The inspectors evaluated the licensee's response to such entries and, if needed, had discussions with Nuclear Criticality Safety (NCS) engineers to determine safety significance and compliance with procedures.

b. Conclusion

No findings of significance were identified.

4. Nuclear Criticality Safety (IP 88015)

a. Inspection Scope and Observations

Criticality Analysis

The inspectors reviewed selected CSAs to determine whether properly reviewed and approved CSAs were in place and were of sufficient detail and clarity to permit independent review. The inspectors reviewed selected CSAs to determine whether calculations were performed within the validated area of applicability and consistent with the validation report. The inspectors reviewed the selected CSAs and associated assumptions and calculations to verify consistency with the commitments in the License Application, including the consideration of the Double Contingency Principle, assurance of subcriticality under normal and credible abnormal conditions with the use of subcritical margin, technical practices and methodologies, and treatment of NCS parameters. The CSAs were selected based on factors such as risk-significance, whether or not they were new and/or revised CSAs, the use of unusual control methods, and operating history. The CSAs reviewed included 54X-07-0021 and 54T-10-0039, which covers the licensee's process off-gas systems for the Fuel Manufacturing Facility, Laboratory, and Commercial Development Line. In addition, the CSAs listed in Section 4 of the Attachment were also reviewed.

The inspectors reviewed the licensee's generation of accident sequences to verify whether the CSAs systematically identified normal and credible abnormal conditions for the analysis of process upsets in accordance with the commitments and methodologies in the License Application. This effort included the review of accident sequences that

the licensee determined to be not credible in order to determine whether the bases for incredibility were consistent with the commitments, definitions, and methodologies in the License Application, and were documented in sufficient detail to permit an independent assessment of credibility. This review was conducted for the following CSAs: 54X-07-0021 and 54T-10-0039.

Criticality Implementation

The inspectors performed walk-downs of the Fuel Manufacturing Facility, Commercial Development Line, and Blended Low Enriched Uranium Production Facility to determine whether existing plant configuration and operations were covered by, and consistent with, the process description and safety basis in the CSA. The inspectors reviewed process and system descriptions, and setpoint analyses to verify that engineered controls established in the CSAs were included. The inspectors reviewed operating procedures and postings, to verify that selected administrative controls established in the CSAs were included. The inspectors interviewed operators and engineers to verify that administrative actions established in the CSAs were understood and implemented properly in the field.

The inspectors reviewed the ISA Summary and supporting ISA documentation to determine whether the controls identified in the ISA were supported by technical basis in the CSAs.

Criticality Operational Oversight

The inspectors reviewed NCS-related training records to determine whether operator training included instruction in criticality hazards and control methods, whether the licensee's established NCS-related operator training was consistent with commitments in the License Application, and whether NCS staff was involved in the development of operator training. The inspectors interviewed operations staff to determine whether they were cognizant of NCS hazards and control methods related to their specific job function. The NCS-related training records reviewed included annual refresher training for operators.

The inspectors accompanied the licensee's NCS Manager on a general walk-down of the facility to determine whether NCS staff routinely inspected fissile material operations to ascertain that criticality requirements were being satisfied. Additionally, the inspectors interviewed NCS engineers and reviewed audit records that had been documented since the last NCS inspection.

Criticality Programmatic Oversight

The inspectors reviewed selected CSAs to verify that they were performed in accordance with NCS program procedures and received appropriate independent review and approval.

The inspectors reviewed selected NCS-related CAP entries contained in the Problem, Identification, Resolution, and Correction System (PIRCS) to verify whether anomalous conditions were identified and entered into PIRCS, whether proposed corrective actions were sufficiently broad, whether they were prioritized on a

schedule commensurate with their significance, and whether they were completed as scheduled and addressed the problem identified. The PIRCS entries reviewed are listed in Section 4 of the Supplementary Information Attachment.

Criticality Incident Response and Corrective Action

The inspectors reviewed documentation to determine whether the criticality accident alarm system (CAAS) was properly tested and maintained according to license and regulatory requirements. Two Apparent Violations (AVs) of NRC requirements were identified. The first AV is for the failure to ensure the CAAS was maintained to provide an audible alarm signal if an accidental criticality occurs.

Unavailability of Criticality Accident Alarm System Audibility

Introduction: An AV of 10 CFR 70.24 was identified for the failure to ensure the CAAS was maintained to provide an audible alarm signal if an accidental criticality occurred within the Fuel Manufacturing Facility which routinely handles, uses, and stores highly enriched uranium (HEU).

Description: On November 9, 2016, a series of public address announcements were made pertaining to a "Stop Movement" of SNM within the FMF. Personnel involved with the "Stop Movement" noted that speakers within the FMF did not provide an audible signal. The speakers are a component of the CAAS to provide an audible alarm to plant personnel to evacuate in the event of an accidental criticality to minimize the potential exposure to radiation. The CAAS is required by regulation under 10 CFR 70.24, "Criticality Accident Requirements". Additionally, the severity and duration of the event were increased due to a failure of the self-monitoring feature of the system. Due to the loss of the safety system with no redundant backup, the licensee made a 24 hour event notification on November 9, 2016 under 10 CFR 70.50(b)(2).

The NFS site currently employs a CAAS that is comprised of gamma ray detectors and speakers placed throughout the facility to provide appropriate coverage to detect an accidental criticality and audibly alarm upon detection of a criticality event. The speakers used for the CAAS are not exclusive to it, but are part of a much larger system that includes annunciation capability for the site fire alarm, shelter in place, and public address system. In the event of an accidental criticality or valid test signal, the criticality alarm panel will send a signal to the fire alarm control panel, then through amplifiers, and to the speaker modules/surge suppressors which contain multiple speakers. The speaker modules/surge suppressors are set up into speaker zones numbered one through twenty-six. In addition, the fire alarm control panel has a self-monitoring feature, which upon detection of a fault will issue a trouble alarm.

Routine scheduled surveillances on the alarm system speakers involves monthly detection and audibility tests during which the CAAS alarm is sounded and employees are trained to report inoperable speakers or difficulty in hearing the alarms. The licensee does not conduct any other scheduled maintenance/surveillances on the speakers or the self-monitoring feature of the fire alarm control panel.

As discussed in the first paragraph of this section, licensee personnel identified audibility issues with the speaker system on November 9, 2016 within the FMF. Upon investigation, the licensee determined that speakers in B302, B303, and B306 West were inoperable. It was estimated by the licensee that the last time the speakers were

audible was on October 19, 2016 when the system was last tested following the replacement of a gamma ray detector in Building 310. This estimate was based on no reports of audibility related issues following the completion test on October 19th. The inspectors reviewed NFS-HS-A-21, Operation and Testing of the Criticality, Fire, and CO₂ Alarm Systems, to determine the adequacy of the procedure used to perform the monthly testing. Based on their review of the procedure, the inspectors noted that the licensee does not positively verify speaker audibility (e.g., station personnel in various areas of the facility to verify speaker operation) during the test; however, workers are trained to listen for announcements and warning signals and to report any audibility related issues to supervision. This was identified as a weakness in the procedure since it was unclear to the inspectors if inoperable speakers would be effectively identified.

The licensee completed a preliminary investigation of the event and noted that the probable cause included degradation of two components. The first is a degradation of a portion of the speaker cable due to age or insulation breakdown. The second is a failure of the self-monitoring capability of the system to identify all circuit faults on the affected speaker zone. With regards to the failure of the self-monitoring capability, the most probable cause was a degraded circuit board contact or surge suppressor. The exact cause will be determined by the licensee as part of their ongoing investigation.

Analysis: As required by 10 CFR 70.24(a), the licensee failed to maintain in each area in which such licensed special nuclear material is handled, used, or stored, a monitoring system which will energize clearly audible alarms signals if accidental criticality occurs.

The noncompliance is more than minor based on the screening criteria question #7 of Inspection Manual Chapter 0616 Appendix B, which asks, in part, "Does the noncompliance adversely affect the ability of an IROFS or safety related component to perform its intended safety function?" Specifically, the failure of the CAAS audibility had the potential to adversely impact (prevent and/or delay) the ability of personnel to evacuate the FMF in the event of an accidental criticality with a resultant increase in postulated dose.

The inspectors determined that because no accidental criticality occurred, there was no actual safety consequence due to the loss of the CAAS speakers for Buildings 302, 303, and 306 West. The inspectors concluded that the issue had high regulatory significance to protect worker safety in the event of a highly unlikely criticality accident given the areas of the plant where the speaker failures occurred. Specifically, the areas affected covered a large area of the facility which contained significant quantities of SNM where an accidental criticality could occur. Other considerations included (1) an identified weakness in the licensee's test procedure with respect to positive verification of speaker audibility and (2) the failure of the self-monitoring feature of the system to detect circuit faults. With respect to failure duration, the inspectors could not independently verify the licensee's estimate of 20 days because the licensee's test procedure did not require positive verification of speaker audibility.

In the 30 day event follow-up report (EN 52358), the licensee made a reference to strobes being available when an announcement or alarm sounds and that employee's would treat the strobes the same way as a criticality evacuation alarm. The inspectors questioned this statement because employees may not immediately evacuate the affected area and could go to an area with a higher potential for radiation exposure. At this time, the inspectors determined that the strobe was not an equivalent replacement for a speaker with respect to regulatory compliance with 10 CFR 70.24(a).

Enforcement: 10 CFR 70.24(a) states, in part, that “Each licensee shall maintain in each area in which such licensed special nuclear material is handled, used, or stored, a monitoring system meeting the requirements of either paragraph (a)(1) or (a)(2), as appropriate, and using gamma- or neutron-sensitive radiation detectors which will energize clearly audible alarm signals if accidental criticality occurs.”

Contrary to the above, on or before November 9, 2016, the licensee failed to maintain in each area in which such licensed SNM is handled, used, or stored, a monitoring system which will energize clearly audible alarms if accidental criticality occurs. Specifically, CAAS speakers within the B302, B303, and B306 West were unavailable for a substantial time period where HEU was being handled, used, and stored. This is an AV of NRC requirements and is documented as AV 70-143/2016-005-01, “Failure to Maintain CAAS Audibility.”

The licensee’s immediate compensatory measures to restore compliance following discovery of the unavailable speakers involved implementing a plant wide stop movement of SNM, limiting access to the affected areas of the FMF, and the establishment of radio communications between the personnel still within the FMF and personnel at the alarm control panel. The licensee initiated an investigation under PIRC #55588 and as an interim action is testing all speakers for audibility daily until final corrective actions are in place. Temporary repairs included a satisfactory, but undesirable wiring configuration. The licensee’s long term corrective actions are to replace the affected wiring.

The second AV is for the failure of the self-diagnostic feature to detect system fault as follows:

Failure of Self-Monitoring Feature to Detect System Fault

Introduction: An AV of the License Application, Section 4.7.12.4, “Criticality Detection System”, was identified for the failure to ensure the self-monitoring feature of the CAAS was capable of detecting electronic component failures to provide a warning signal to personnel in the event of such a failure.

Description: On November 9, 2016, NFS employees identified inoperable CAAS speakers within the Fuel Manufacturing Facility when they could not hear announcements pertaining to a “Stop Movement” of Special Nuclear Material within the FMF. Further investigation by the licensee identified that the self-monitoring feature of the system did not detect an apparent wiring fault which resulted in a loss of speaker function.

The NFS site currently employs a CAAS that is comprised of gamma ray detectors and speakers placed throughout the facility to provide appropriate coverage to detect an accidental criticality and audibly alarm upon detection of a criticality event. In the event of an accidental criticality or valid test signal, the criticality alarm panel will send a signal to the fire alarm control panel, then through amplifiers, and to the speaker modules/surge suppressors which contain multiple speakers. The speaker modules/surge suppressors are set up into speaker zones numbered one through twenty-six. In addition, the fire alarm control panel has a self-monitoring feature, which upon detection of a fault will issue a trouble alarm so that personnel can respond and troubleshoot the system.

As discussed in the first paragraph of this section, licensee personnel identified audibility issues with the speaker system on November 9, 2016 within the FMF. It was estimated by the licensee that the last time the speakers were audible was on October 19, 2016 when the system was last tested following the replacement of a gamma ray detector in Building 310. This estimate was based on no reports of audibility related issues following the completion test on October 19th. Per procedure, the licensee is not required to positively verify speaker audibility; however, workers are trained to listen for announcements and warning signals and to report any audibility related issues to supervision. This was identified as a weakness in the test procedure by the inspectors. Upon investigation by the licensee, the fire alarm control panel did not identify the fault condition through its self-monitoring feature. The licensee has yet to definitively identify the failure mode for the self-monitoring feature which led to its inability to detect the wiring fault. The most probable component was a degraded circuit board contact for a surge suppressor. The inspectors also noted that the licensee does not conduct any routine scheduled testing on the self-monitoring feature of the system, therefore, the duration of the failure could not be determined.

Due to the loss of a safety system with no redundant backup, the licensee made a 24 hour event notification on November 9, 2016, under 10 CFR 70.50(b)(2).

Analysis: The inspectors determined that the licensee failed to ensure the self-monitoring feature of the CAAS was capable of detecting electronic component failures and providing a warning signal to personnel in the event of such a failure.

The noncompliance is more than minor based on the screening criteria question #7 of Inspection Manual Chapter 0616 Appendix B, which asks, in part, "Does the noncompliance adversely affect the ability of an IROFS or safety related component to perform its intended safety function?" Specifically, the inability of the self-monitoring feature to identify the speaker failures resulted in the CAAS audibility feature becoming unavailable for Buildings 302, 303, and 306 West in the FMF where HEU was being handled, used, and stored at the time of the failure. As a result, prompt evacuation of personnel was unavailable in the event of an accidental criticality.

The inspectors determined that because no accidental criticality occurred, there was no actual safety consequence due to the loss of the self-monitoring capability of the CAAS system for Buildings 302, 303, and 306 West. The inspectors concluded that the issue had high regulatory significance to protect worker safety in the event of a highly unlikely criticality accident given the areas of the plant where the speaker failures occurred. Specifically, these areas of the FMF cover a large area of the facility and contain significant quantities of SNM where an accidental criticality could occur. The inspectors concluded that the failure of the self-monitoring feature to detect a system fault significantly impacted the severity and the length of time associated with the CAAS speaker outage in B302, B303, and B306 West. This had the potential to result in delays in personnel evacuation and increased radiation exposure for workers. Other contributing factors that were considered include (1) the failure to test the self-monitoring capability of the system which resulted in an indeterminate failure duration and (2) an identified weakness in the licensee's test procedure with respect to positive verification of speaker audibility.

Enforcement: Safety Condition S-1 of Special Nuclear Material License SNM-124 requires that material be used in accordance with the statements, representations, and conditions in the application.

Section 4.7.12.4, Criticality Detection System, of the License Application dated May 13, 2011, states “Detector or other electronic component failure will result in a warning signal. This signal will initiate contingency measures which may include evacuation of personnel, suspension of operations, deployment of auxiliary monitoring equipment, and/or immediate system repair.”

Contrary to the above, prior to November 9, 2016, the failure of a detector or other electronic component failed to result in a warning signal. Specifically, the wiring fault associated with the failure of the B302, B303, and B306 West speakers failed to result in a warning signal on the combined CAAS/fire alarm control panel due to a separate failure of the self-monitoring feature. This is an AV of NRC requirements and is documented as AV 70-143/2016-005-02, “Failure of CAAS Self-Monitoring Feature.”

The licensee’s immediate compensatory measures to restore compliance following discovery of the unavailable speakers involved implementing a plant wide stop movement of SNM, limiting access to the affected areas of the FMF, and establishment of radio communications between the personnel still within the FMF and the personnel at the alarm control panel. The licensee initiated an investigation under PIRC #55588 and as an interim action is testing all speakers for audibility daily until final corrective actions are in place. The licensee’s long term corrective actions are to replace the affected zone wiring.

b. Conclusion

Two AVs were identified for the failure to ensure the criticality accident alarm system was maintained to provide an audible alarm signal if in case of an accidental criticality and for the failure to ensure the warning signal (self-monitoring) feature of the criticality alarm system was capable of detecting electronic component failures.

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. Building 302 Fuel Manufacturing Facility was specifically inspected.

The inspectors conducted a walk-down of the FMF and determined that the Pre-Fire plan drawing matched the as-found condition for various fire protection components like extinguishers, sprinkler systems, and postings. The material condition of fire protection components was adequate. The inspectors noted the fire water supply to the surrounding area fire hydrants was properly aligned for operational status.

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, the 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.

The inspectors performed numerous partial reviews of SWPs during the inspection period in different operational areas, but conducted a more thorough review for the following SWP and posted radiologically controlled area:

- SWP 16-52-20, 800D Valve 306-TW-D843 Replacement per WR 249996

b. Conclusion

No findings of significance were identified.

2. Radiation Protection (IP 88030)

a. Inspection Scope and Observations

The inspectors discussed with radiation protection management and reviewed six procedures listed in Section 4 of the Supplementary Information Attachment of this report to ensure that the licensee was complying with 10 CFR 20.1101(a). The inspectors reviewed the license application and six program implementation documents and records to verify the radiation protection program's responsibilities as well as its independence from operations. The inspectors reviewed ten recently changed procedures to verify that changes made since the last inspection were consistent with regulations and license requirements.

The inspectors reviewed the 2015 Radiation Protection Program Evaluation to verify that the radiation protection program was being reviewed periodically by management for effectiveness as required by the License Application. The inspectors also reviewed the 4th Quarter 2015 through 3rd Quarter 2016 As Low As Reasonably Achievable (ALARA) Performance Report for Occupational Exposures to verify that the program performance was being reviewed, at least annually, to comply with 10 CFR 20.1101(c).

The inspectors reviewed NFS-GH-919, Rev. 3, "Radiological Safety Training Program," NFS-HS-A-12, Rev. 11, "Radiation Technician Training Procedure," and training material and records of the two most recently trained and qualified radiation protection technicians to verify compliance with 10 CFR 19.12 and the license application.

The inspectors reviewed NFS-HS-A-05, Rev. 20, "Calibrating Radiation Monitoring Instruments" and multiple instrumentation calibration records to verify that the performance of radiation protection instruments and equipment were in accordance with license requirements and licensee procedures.

The inspectors reviewed the Total Effective Dose Equivalent results to verify that they were less than the regulatory limit of 5 rem/yr. The inspectors reviewed the 2015 personnel dosimeter results as submitted to the licensee by their contractor to verify that the Lens Dose Equivalent and Shallow Dose Equivalent results were less than the regulatory limit of 15 rem and 50 rem/yr, respectively. The inspectors verified that records were maintained in accordance with 10 CFR 20.2106.

The inspectors toured the material access area to verify that radiological signs and postings accurately reflected radiological conditions within the posted area. The inspectors verified that the Notice to Employees, NRC Form 3, was posted in a high traffic area in accordance with 10 CFR 19.11.

The inspectors observed operator and radiation technician activity in various areas to verify that surveys adequately evaluated the magnitude and extent of radiation levels in accordance with 10 CFR 20.1501.

b. Conclusion

No violations of NRC requirements were identified.

3. Radioactive Waste Processing, Handling, Storage and Transportation (IP 88035)

a. Inspection Scope and Observations

The inspectors evaluated whether the licensee has established and maintained procedures in accordance with license requirements and quality assurance programs to ensure compliance with the requirements of 10 CFR Part 20 and 10 CFR Part 61 applicable to low-level radioactive waste form, classification, stabilization, and shipment manifests/tracking.

The inspectors reviewed procedures and observed performance of tasks related to radioactive waste. The procedures were clearly written and delineated responsibilities related to radioactive waste management. The operators were familiar with their responsibilities and performed their tasks in accordance with facility procedures.

The inspectors reviewed the quality assurance program for radioactive waste management and verified that the licensee was performing the required audits. The findings from these audits were entered into the licensee's CAP for resolution.

The inspectors reviewed the licensee's program for classifying low-level radioactive waste. The inspectors reviewed the procedures for classifying waste as well as records relating to waste. The inspectors reviewed the licensee's program for ensuring that waste was properly packaged to ensure the waste form met the requirements of 10 CFR 61.56.

The inspectors reviewed the licensee's procedures for labeling waste shipments and tracking radioactive waste. The procedures were in accordance with license requirements to ensure that radioactive waste was properly labeled and specified actions to be taken should the shipments not reach the intended destination in the time specified. Additionally, the inspectors reviewed the procedures for placement, inspection, and repackaging of radioactive waste.

The inspectors performed walk-downs of selected radioactive material storage areas including the 310 Warehouse and 306 East Waste Packaging Area. The storage areas had required postings to ensure that the proper material was being stored in the area and the material was safely stored in accordance with the nuclear criticality safety requirements. The containers were properly labeled to reflect their contents and were in good physical condition.

b. Conclusion

No violations of NRC requirements were identified.

4. Effluent Control and Environmental Protection (IP 88045)

a. Inspection Scope and Observations

The inspectors interviewed licensee staff on program and personnel changes and reviewed the licensee's organization charts to verify that there were not any significant program or personnel changes within the last 12 months. The inspectors reviewed documentation to determine that the program functions remained independent from operations and, thus, in accordance with license requirements. The inspectors reviewed procedures revised since the last inspection to verify that any changes made were in accordance with licensee requirements.

The inspectors reviewed recent internal and external self-assessments and audits to determine that these activities were performed in accordance with licensee requirements to verify that identified corrective actions were implemented in accordance with the license application. The inspectors reviewed the second 2015 and first 2016 biannual effluent reports to determine that the licensee was in compliance with 10 CFR 70.59 and 10 CFR 20 Appendix B, Table 2 levels. The inspectors reviewed records and reports to verify that the licensee was in accordance with retention requirements stated within 10 CFR 20.2101 and 20.2106.

The inspectors reviewed records of airborne effluents over the last 12 months to verify they were in compliance with 10 CFR 20 Appendix B Table 2 effluent concentration values limits. The inspectors observed air filter collections for stacks and off-site ambient air monitors and off-site liquid sample collections to verify that licensee actions were in compliance with approved procedures. The inspectors verified that air monitoring equipment was calibrated and functional.

The inspectors reviewed records of liquid effluents discharges to verify all results were below 10 CFR 20 Appendix B effluent concentration values. The inspectors also reviewed monthly averages for Waste Water Treatment Facility (WWTF) liquid effluent discharges to the Nolichucky River for 2015 and 2016, in order to determine that the radiological content in these discharges was less than federal regulatory limits and licensee action levels.

The inspectors observed sewer water sampling at the West Ditch and Banner Spring storm/surface water run-off sluices in order to determine the licensee's activities were in accordance with procedures. Inspectors also reviewed the sewer results from reports over the last 12 months to determine the results were below 10 CFR 20.2003 limits.

The inspectors reviewed the public dose assessment to verify that the total dose to the hypothetical, public individual likely to receive the highest dose from licensed operations did not exceed the 10 CFR 20.1301(a)(1) limit for 2016. The inspectors reviewed the airborne portion of the public dose assessment to verify that the result was in compliance with the ALARA constraint required by 10 CFR 20.1101(d).

The inspectors reviewed the radiological results for soil, surface water, sediment/silt, and vegetation to determine that the results were in compliance with license requirements and procedures.

The inspectors reviewed several corrective actions related to the environmental program entered into the licensee's CAP since November 2016 to determine that the licensee was entering issues and correcting them in accordance with the site procedures

b. Conclusion

No violations of NRC requirements 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 instructions or licensee procedural requirements. Furthermore, the inspectors verified that problems associated with PMTs were identified and entered into the licensee's PIRCS.

- PMT per SRE Test N303XFLAREX0602; Work Request (WR) 249040, Building 303 Area 600, Replace BE-0641 & BS-0641; DWG 303-F0100-D, Area 600 Piping and Instrument Diagram
- PMT per SRE Test N302FURDOOR600A and Work Request 250304, Building 302 Area 600 Proximity Switch Replacements

b. Conclusion

No findings of significance were identified.

2. Surveillance 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 procedures. 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 SRE test requirement.

The inspectors discussed surveillance testing requirements with operators performing the associated tasks and determined that their procedural knowledge was adequate. The inspectors verified that any test equipment or standards used to conduct the test were within calibration. The inspectors determined that effective communications between personnel performing these tests were used to complete each activity.

- SRE Test N303XFLAREX0602, Building 303 Area 600 Following Replacement of BE-0641 & BS-0641
- SRE Test N302FURDOOR600A, Following Building 302 Area 600 Proximity Switch Replacements
- SRE Test N302XCONCEN0201, Area 200 Condenser Leak Check

b. Conclusion

No findings of significance were identified.

3. Corrective Action Program (CAP) Review (IP 88135)

a. Inspection Scope and Observations

The inspectors reviewed the PIRCS to ensure that items adverse to safety were being identified and tracked to closure in accordance with program procedures. The inspectors routinely attended daily PIRCS screening committee meetings and periodic Corrective Action Review Board meetings to evaluate site management's response and assignment of corrective actions or investigations to various issues. 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. For items identified to be more safety significant, the inspectors conducted an additional evaluation to verify the licensee was adequately addressing and correcting the issues to prevent recurrence.

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 inspectors reviewed the following:

- NFS Biannual Effluent Monitoring Report January to June 2016

b. Conclusion

No findings of significance were identified.

4. Emergency Preparedness Drill (IP 88135)

a. Inspection Scope and Observations

On November 14, 2016, the inspectors observed portions of the licensee-provided NFS Offsite Agency Orientation and Training. The training was conducted at the NFS Training Center. The observed training consisted of emergency response guidelines and the spill plan, emergency plan updates, criticality safety for emergency responders, and radiation protection for emergency responders.

b. Conclusion

No findings of significance were identified.

5. Permanent Plant Modifications (IP 88135.17)

a. Inspection Scope and Observations

The inspectors reviewed records, work packages, and supporting documentation associated with a design modification and a developmental material transition, against system design bases documentation to verify that the changes had not affected system operability or availability. The inspectors reviewed licensee procedures NFS-CM-001, Configuration Management, and NFS-WM-001, Control and Execution of Work, and selected ongoing and completed work activities to verify that the change was consistent with the design control documents and requirements. The inspectors verified that operational details associated with the changes had been incorporated into appropriate operating procedures. The inspectors performed field observations with licensee personnel to verify that the as built configuration was in accordance with design documents. The inspectors observed testing activities associated with the change and assessed the impact on interfacing operating systems. The inspectors observed the systems in operation and verified control panel displays including process and alarm status. Local and remote instrumentation were verified to be operable and clearly visible to personnel. Licensee personnel demonstrated the operational features of the systems

and were knowledgeable of alarm settings and system functions. The inspectors verified that training had been provided to operators concerning the purpose and function of the systems and alarm response actions. Specifically, the inspectors reviewed the following:

- LOA 2289X-042, Auxiliary High Level Alarm for TANKXX-CWS01

b. Conclusion

No findings of significance were identified.

D. Other Areas

1. (Opened and Closed) Non-Cited Violation 70-143/2016-005-03, "Failure to Treat Mixed Waste."

a. Inspection Scope and Observations

10 CFR 20 Appendix G, Section III (A)(1) requires the licensee to prepare all wastes so that the waste meets the waste characteristic requirements in 10 CFR 61.56 of the chapter. 10 CFR 61.56(a)(8) states, in part, "waste containing hazardous material must be treated to reduce to the maximum extent practicable the potential hazard from the non-radiological materials." Contrary to the above, on August 2015 the licensee failed to treat waste containing hazardous material to reduce to the maximum extent practicable the potential hazard from the non-radiological materials. Specifically, the licensee failed to process waste through its approved waste water treatment facility and subsequently shipped mixed hazardous solid waste containing corrosive liquid as low level radioactive waste. The licensee identified the violation, notified Nevada National Security Site, Tennessee Department of Environment and Conservation, and NRC in a timely manner, and implemented immediate and long-term corrective actions as captured in PIRCS # 53194 to prevent reoccurrence. Although a Non-Cited Violation (NCV) was issued in October 2015 for failing to treat mixed waste, this violation and the violation from 2015 involved different causes which led to the licensee shipping untreated mixed hazardous waste. The NRC does not consider this violation a result of inadequate corrective actions from the October 2015 NCV. Therefore, this licensee-identified and corrected violation is being treated as a NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy.

b. Conclusion

A NCV of NRC requirements was identified. This violation is considered closed.

2. (Closed) Licensee Event Report (LER) 70-143/2016-002-0 (EN 52190) "Failure of Speaker in Building 120"

a. Inspection Scope and Observations

On August 17, 2016, licensee employees identified a non-operational speaker in Building 120 during a speaker system functional test. Building 120 does not handle, process, or store special nuclear material, but the speaker is required for evacuation purposes in the event of a criticality accident per the emergency plan. Licensee management initiated NRC Event Notification # 52190 on August 18, 2016, in accordance with 10 CFR 70.50(b)(2) and was documented in their CAP as

PIRC # 21504. The licensee replaced the speaker and returned the area to compliance on August 18, 2016. NRC inspectors reviewed the licensee's investigation which found the speaker failed due to age resulting in the speaker becoming mechanically bound. No violations of regulatory requirements were identified during the review in part because the failure was self-identified and no nuclear material handling, processing, or storage occurs in Building 120.

b. Conclusion

No violations of NRC requirements were identified.

3. (Closed) LER 70-143/2016-005-0, FMF Loss of Criticality Accident Alarm System

a. Inspection Scope and Observations

LER 70-143/2016-005-0 was reported to the NRC as EN 52358 and involved the failure of speakers resulting in a loss of audibility for the CAAS. Audibility is a requirement of 10 CFR 70.24 for the CAAS. This LER is being closed to two AVs. Please see Section A.4 of this report for the circumstances surrounding the violations.

b. Conclusion

This LER was closed to two apparent violations discussed in Section A.4 of this report.

E. Exit Meetings

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 November 17 and December 2, 2016, January 4, 2017, and January 24, 2017, to J. Duling and his staff. No dissenting comments were received from the licensee. 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 Program Manager
C. Brown	MC&A Department Section Manager
N. Brown	NCS Department Unit Manager
T. Cloyd	Fire Protection Engineer
R. Dailey	Engineering Director
R. Dotson	Quality Section Manager
J. Duling	President
M. Eiken	Senior NCS Engineer
T. Evans	Security Director
J. Faddis	Environmental Unit Manager
R. Freudenberger	Safety & Safeguards Director
M. Fritts	Operations Director
S. Gizzie	Senior NCS Engineer
J. Hagemann	Operations Section Manager
C. Lewis	Senior NCS Engineer
R. Mauer	Acting Licensing & ISA Manager
J. May	Transportation and Waste Operations Unit Manager
B. McKeehan	Transportation and Waste Unit Manager
M. Moore	Environmental Protection & Industrial Safety Section Manager
A. Morie	Acting Licensing Manager
J. Nagy	Assurance Director
R. Rice	Radiation Protection Unit Manager
D. Rogers	Waste Management & Decommissioning Section Manager
S. Sanders	Training Unit Manager
R. Shackelford	Nuclear Safety & Licensing Section Manager
S. Skiles	Senior NCS Engineer

2. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

70-143/2016-005-01	AV	Failure to Maintain CAAS Audibility (Paragraph A.4)
70-143/2016-005-02	AV	Failure of CAAS Self-Monitoring Feature (Paragraph A.4)

Opened & Closed

70-143/2016-005-03	NCV	Failure to Treat Mixed Waste (Paragraph D.1)
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Closed

70-143/2016-005-0 (EN 52358)	LER	FMF Loss of Criticality Accident Alarm System (CAAS) Notification Capability (Paragraph D.2)
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70-143/2016-002-0 (EN 52190) LER Building 120 CAAS Speaker Non-Functional
(Paragraph D.3)

3. **INSPECTION PROCEDURES USED**

88015	Nuclear Criticality Safety
88030	Radiation Protection
88035	Radioactive Waste Processing, Handling, Storage, and Transportation
88045	Effluent Control and Environmental Protection
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
88135.22	Surveillance Testing

4. **DOCUMENTS REVIEWED**

Drawings:

302-A0016-C, Fire Plan (Bldg. 302)
302-A1196-D, Solvent Extraction (Bldg. 302)
90643-M02, Low Pressure CO2 Fire System, Solvent Extraction (Bldg. 302)

Procedures:

NFS-GH-01, Contamination Control, Rev. 34
NFS-GH-21, Process Enclosure and Exhaust Ventilation Systems, Rev 6
NFS-GH-66, Operations and Maintenance of the Building 302/303 Carbon Dioxide Fire
Suppression System
NFS-GH-28, Personal Monitoring, Rev. 13
NFS-GH-908, Radiation Protection Program, Rev. 7
NFS-GH-919, Radiological Safety Training Program, Rev. 3
NFS-GH-925, Radiation Monitoring Program, Rev. 3
NFS-HS-A-05, Calibrating Radiation Monitoring Instruments, Rev. 20
NFS-HS-A-12, Radiation Technician Training Procedure, Rev. 11
NFS-HS-A-29, Inspection Checklist for Radiation Producing Machines, Rev. 10
NFS-HS-A-73, Control of Calibration Standards, Rev. 2
NFS-HS-A-85, Certification of the ANTECH Segmented Gamma Scan System, Rev. 1,
dated August 11, 2014
NFS-WST-007, Classification of Radioactive Material Shipments, Rev. 4, dated
December 21, 2014
NFS-WST-010, Waste Certification Program Plan, Rev. 4, dated June 24, 2015
NFS-WST-019, Quality Assurance Program Plan for the NNSS, Rev. 10, dated August 19,
2015
NFS-WST-021, NFS Waste Characterization Implementation Plan, Rev. 08, dated
February 29, 2016
SOP 335J, Waste Packaging for NNSS Disposal, Rev. 12, dated September 27, 2013
NFS-GH-40, Gaseous Effluent Action Points, Rev. 8, dated January 25, 2016
NFS-GH-909, Environmental Protection Program, November 16, 2015, Rev. 9
NFS-GH-917, Quality Assurance Plan for Environmental Safety, July 27, 2015, Rev. 7

NFS-HS-A-27, Routine Estimation of Offsite Dose from Radioactive Gaseous Effluents, Rev. 9, dated November 3, 2014
 NFS-HS-A-82, Routine Estimation of Offsite Dose From Ambient Radiation, Rev. 2, dated August 6, 2015
 NFS-HS-B-03, Routine Dose Rate Surveys, Rev. 10, dated December 15, 2014
 NFS-HS-B-09, Dosimeter Use and Exchange, Rev.16, dated June 18, 2012
 NFS-HS-B-16, Routine Sampling of Sanitary Sewer and Groundwater Treatment Facility Effluent, Rev. 31, dated November 11, 2015
 NFS-HS-B-18, Collection and Analysis of NFS Stack Samples, Rev. 24, dated January 25, 2016
 NFS-HS-B-20, Routine Sampling of Environmental Media, Rev. 23, dated November 11, 2015
 NFS-HS-B-70, Fire Detection
 NFS-HS-B-73, Analysis of Environmental Liquid and Environmental Air Samples, January – May 2016 (Revision # Absent)
 NFS-HS-B-85, Portable Fire Extinguishers
 NFS-HS-B-95, Testing/Inspection of Fire Barrier Systems
 NFS-NCSE-NCSAWG, Nuclear Criticality Safety Evaluation/Analysis Writer's Guide, Rev. 0, dated April 2, 2014
 NFS-NCS-AUDITWG, Nuclear Criticality Safety Audit Writer's Guide, Rev. 5, dated May 27, 2016
 NFS-HS-A-16, Safety Audits, Assessments, and Inspections, Rev. 15, dated November 3, 2014
 NFS-HS-A-21, Operation and Testing of Criticality, Fire, and CO2 Alarm Systems

Records:

4th Quarter 2015 ALARA Performance Report for Occupational Exposures
 1st Quarter 2015 ALARA Performance Report for Occupational Exposures
 2nd Quarter 2015 ALARA Performance Report for Occupational Exposures
 3rd Quarter 2015 ALARA Performance Report for Occupational Exposures (Draft)
 Radiation Protection Program Evaluation (2015)
 First Quarter 2015 Health Physics Audit of the Radiation Protection Program
 HEA-01-03, Proposed Minimum Inward Air Flow for Process Containment Enclosures
 HEA-01-06, Continued Use of Pu²³⁹ Source S/N L2-222 as a Calibration Standard
 HEA-05-05, Key Area Status Reports
 HEA-15-02, ALARA Goals for January 1, 2016 through December 31, 2016
 HEA-15-02, Addendum to ALARA Goals 2016
 HRA-15-03, ALARA Goal Setting Guide – 2016
 LOA-WST-16-003 Letter of Authorization - Interim Corrective Actions – NFS Waste Shipment Suspension
 FM-WST-022 Att. A, Rad Waste Package Certification Record, Rev. 15b
 Manifest #NFL16022, Package of Shipment to Nevada National Security Site (NNSS)
 Manifest #NFL16005, Package of Shipment to NNSS
 Manifest #FWF-8308-16001, Shipment to Waste Control Specialist
 Manifest #NFL16025, Package of Shipment to NNSS
 QA-16-11, Transportation Quality Assurance Program Quality Assurance Audit, dated June 7, 2016
 QA-16-09, QA Plans for Class A & Class C Wastes (All disposal sites) Audit Report, dated May 26, 2016
 RWAP-S-16-17, Radioactive Waste Acceptance Program Surveillance Report, Nuclear Fuel Services Waste Certification Report

DOE/NV-325, Nevada National Security Site Waste Acceptance Criteria, Rev. 10a, dated February 2015
 FM-WST-016, Container Inspection Checklist, Rev. 2
 FM-WST-020, Shipment Survey Release, Rev. 3
 FM-WST-041, NNSS Shipment Verification Checklist, Rev. 2
 FM-WST-046, 90-Day area Hazardous Waste Container Inspection, Rev. 3
 FM-WST-047, Container Storage 310 Warehouse Weekly Inspection Log, Rev. 3
 LOA-WST-16-0094, Interim Corrective Actions – NFS Waste Shipment Suspension, dated July 29, 2016
 Biannual Effluent Monitoring Report, July – December 2015, dated February 26, 2016
 Biannual Effluent Monitoring Report, January – June 2016, dated August 24, 2016
 11-04-14 Sewer Sample Results
 Discharge to Municipal Sewer (monthly composite of daily samples), Attachment D, January – October 2016
 Monthly Radioactive Airborne Effluent Reports, January – September 2016
 Environmental Safety- Quality Assurance Audit, QA-16-13, August 30, 2016
 Audit of Environmental Modeling and Dose Assessment Program, Third Quarter 2016, dated September 2, 2016
 SRE Test History for Valves #16, #41, and #43 at the Waste Water Treatment Facility
 Flow Meter Calibration Records: October and November 2016
 Velocity Meter Calibration Records, dated May 27, 2016 and March 24, 2016
 Micrometer Calibration Records, dated March 4, 2016
 NFS-HS-A-110, Flow Meter Calibration Record, dated February 5, 2016 and May 4, 2016
 NFS-HS-B-114, Banner Spring Current Flow Meter Readings, Attachment A-1, dated May 4, 2016 and November 11, 2016
 NFS-HS-B-114, West Ditch Current Flow Meter Readings, Attachment A-2, dated May 4, 2016 and November 11, 2016
 Background Reports, September – October 2016
 Organizational Chart
 Quarterly Assessment of Radioactive Liquid and Gaseous Effluents, 2nd Quarter 2016, 1st Quarter 2016, and 4th Quarter 2015
 Quarterly Assessment of Offsite Ambient Radiation, 2nd Quarter 2016, 1st Quarter 2016, and 4th Quarter 2015
 NFS ALARA Program – Performance Report for Environmental-Radiological, 3rd Quarter 2015, 4th Quarter 2015, 1st Quarter 2016, 2nd Quarter 2016
 NFS Triennial Audit Reports, dated September 22, 2015
 Meriam Laminar Flow Element, dated April 12, 2016
 Collection and Analysis of NFS Stack Samples, September 2016
 Lab Instrument Checks
 Pipette Checklist

PIRCS Reviewed:

52075, 53194, 53365, 53452, 53694, 53703, 53716, 54834, 54835, 54836, 55141, 55143, 55180, 55181, 55187, 55236, 55253, 55335, 55352, 55344, 55345, 55383, 55409, 55462, 55486, 55504, 55529, 55547, 55572, 55588, 55610, 55634, 55649, 55673, 55674, 55697, 55715, 55769, 55794, 55853, 55860, 55947, 55948, 55949, 55952, 55988, 56004, 56006, 56010

P55400, P55344, P55326, P5225, P54873, P54778, P55397, P53471, P52766, P52402, P51206, P50218, P49214, P47833, P45366, P44789, P53694, P55588

Other Documents:

21T-16-0795, Review of Ventilation/Scrubber Systems at NFS, dated September 9, 2016

21T-16-004, Nuclear Fuel Services, Inc. CD Line Integrated Safety Analysis Summary,
Rev. 8, dated January, 2016

Core Competency – Nuclear Criticality Safety

27T-12-0110, Overview of Nuclear Criticality Safety