



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

July 28, 2017

EA-17-005
EN-52308

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 70-143/2017-003

Dear Mr. Duling:

This letter refers to the inspections conducted from April 1 to June 30, 2017, 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.

During the inspections, NRC staff examined activities conducted under your license, as they relate 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 included safety operations, radiological controls, facility support, and other areas. Within these areas, the inspections consisted of elected examination of procedures and representative records, observations of activities, and interviews with personnel.

Based on the results of these inspections, no violations of more than minor significance were identified.

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 Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

J. Duling

2

Should you have any questions concerning these inspections, please contact Carmen Rivera-Crespo of my staff at 404-997-4515.

Sincerely,

/RA/ J. Rivera-Ortiz acting for

Marvin D. Sykes, Chief
Projects Branch 1
Division of Fuel Facility Inspection

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

Enclosure:
Inspection Report 70-143/2017-003
w/Attachment: Supplementary Information

cc: (See page 3)

cc:

Mike McKinnon
Operations Director
Nuclear Fuel Services, Inc.
Electronic Mail Distribution

Richard A. Freudenberger
Safety & Safeguards Director
Nuclear Fuel Services, Inc.
Electronic Mail Distribution

Debra G. Shults
Director, TN Dept. of Environment & Conservation
Electronic Mail Distribution

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

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

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

David W. Deming
Manager, Program Field Office – NFS
Naval Nuclear Laboratory
1205 Banner Hill Rd
Erwin, TN 37650

SUBJECT: NUCLEAR FUEL SERVICES, INC. – U. S. NUCLEAR REGULATORY
 COMMISSION INTEGRATED INSPECTION REPORT NUMBER 70-143/2017-003,
 JULY 20, 2017

DISTRIBUTION:

PUBLIC
 L. Cuadrado, NMSS
 M. Sykes, RII
 R. Johnson, NMSS
 K. Ramsey, NMSS
 L. Harris, RII
 L. Pitts, RII
 C. Rivera, RII
 NFS Website

PUBLICLY AVAILABLE NON-PUBLICLY AVAILABLE SENSITIVE NON-SENSITIVE
 ADAMS: Yes ACCESSION NUMBER:ML17209A017 SUNSI REVIEW COMPLETE FORM 665 ATTACHED

OFFICE	RII:DFFI	RII:DFFI	RII:DFFI	RII:DFFI	RII:DFFI	RII:DFFI
SIGNATURE	/RA/	/RA/	/RA/	/RA/	/RA/	/RA/
NAME	LHarrisI	NPeterka	CRivera-Crespo	JMunson	BAdkins	TSippel
DATE	7/19/2017	7/19/2017	7/28/2017	7/19/2017	7/19/2017	7/19/2017
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY DOCUMENT NAME: G:\DFFI\REPORTS\Final Reports\NFS\2017\2017-003.docx

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No: 70-143

License No.: SNM-124

Report No: 70-143/2017-003

Licensee: Nuclear Fuel Services, Inc.

Facility: Nuclear Fuel Services, Inc.

Location: Erwin, TN 37650

Dates: April 1 through June 30, 2017

Inspectors: B. Adkins, Senior Fuel Facility Inspector
T. Sippel, Fuel Facility Inspector
N. Peterka, Fuel Facility Inspector
J. Munson, Nuclear Process Engineer
L. Harris, Senior Resident Inspector

Approved by: M. Sykes, Chief
Projects Branch 1
Division of Fuel Facility Inspection

Enclosure

EXECUTIVE SUMMARY

Nuclear Fuel Services, Inc.
NRC Integrated Inspection Report 70-143/2017-003
April 1 - June 30, 2017

Inspections were conducted by the senior resident inspector, and regional inspectors during normal and off-normal hours in the areas of 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

- The items relied on for safety (IROFS) reviewed during this period were properly maintained in order to perform their intended safety function in accordance with the license application and regulatory requirements. (Paragraphs A.1, A.2 and A.3)
- 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 (Paragraphs A.3 and A.4).
- For the areas reviewed, fire protection systems and area housekeeping were maintained in accordance with fire safety requirements for special nuclear material processing areas and storage areas. (Paragraph A.5)

Radiological Controls

- The Radiation Protection program elements reviewed were implemented in accordance with the license and regulatory requirements. (Paragraph B.1)

Facility Support

- The post maintenance testing, preventive maintenance and surveillance testing observed for IROFS and other safety controls were implemented in accordance with the license and applicable procedure requirements. (Paragraphs C.1 and C.2)
- Reports for tracking and resolution of safety-related issues included corrective actions to prevent recurrence. Extent of condition and extent of cause reviews were conducted when required by the governing corrective action program procedure. (Paragraph C.3)
- The Plant Modifications program was implemented in accordance with the license application and regulatory requirements. (Paragraph C.4)

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

The inspectors performed routine tours of the fuel manufacturing areas housing special nuclear material (SNM), reviewed log sheets, and interviewed operators, front-line managers, maintenance mechanics, radiation protection (RP) staff, and process engineering personnel regarding issues with plant equipment and to verify the status of the process operations. The inspectors observed operational and shift turnover meetings throughout the inspection period to gain insight into safety and operational issues.

During the inspection period, the inspectors interviewed operators, front-line managers, maintenance technicians, engineers, RP technicians (RPTs), and nuclear materials control technicians to verify that each of the individuals demonstrated adequate knowledge of the NCS posting requirements, hazards, and the operations procedures associated with their assigned duties.

The routine tours included walk-downs of the FMF, BPF, commercial development line (CDL), miscellaneous storage areas, the Waste Water Treatment Facility (WWTF), 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 to verify that operators complied 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 to determine 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.

The inspectors attended various plan-of-the-day meetings and met routinely with the Plant Shift Superintendent throughout the inspection period in order to monitor 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 violations of more than minor significance were identified.

2. Safety System Walk-down (IP 88135.04)

a. Inspection Scope

The inspectors performed a walk-down of a safety-significant system 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. As part of the walk-down, inspectors reviewed the NCS postings associated with the handling of SNM. The inspectors verified that IROFS were available and reliable to perform their intended functions when needed to comply with the performance requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) Section 70.61, "Performance Requirements." The inspectors reviewed the related Integrated Safety Analysis (ISA) to verify that the system abilities to perform functions were not affected by outstanding design issues, temporary modifications, operator workarounds, adverse conditions, or other system-related issues. Specifically, the inspection covered Areas 300 through 500 in Building 302.

To determine the correct system alignment, the inspectors reviewed procedures, drawings, related ISAs, and regulatory requirements including, 10 CFR 70.61. During 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 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.
- 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 violations of more than minor significance were identified.

3. Nuclear Criticality Safety (IP 88135.02)

a. Inspection Scope

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. During these observations, the inspectors verified that selected IROFS were properly implemented and that operators were knowledgeable of the requirements associated with IROFS.

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 NCS engineers to determine safety significance and compliance with procedures.

b. Conclusion

No violations of more than minor significance were identified.

4. Nuclear Criticality Safety (IP 88015)

a. Inspection Scope

The inspectors reviewed selected NCSEs to determine whether properly reviewed and approved NCSEs were in place prior to conduct of new or changed operations and were of sufficient detail and clarity to permit independent review. The inspectors reviewed the selected NCSEs to determine whether calculations were performed within their validated area of applicability and consistent with the validation report. The inspectors reviewed the selected NCSEs and associated assumptions and calculations to verify that they were consistent with the commitments in Chapter 5 of 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 NCSEs were selected based on factors such as risk-significance, whether or not they were new and/or revised, and operating history. The NCSE review focused on the new Pump, Disassembly Station/ Rinse Station in the 300 complex and revised 105 Laboratory Storage of Mounts and Discs.

The inspectors reviewed the licensee's generation of accident sequences in the above NCSEs to determine whether normal and credible abnormal conditions were systematically identified in accordance with the commitments and methodologies in the License Application for the analysis of process upsets. This included the review of accident sequences that the licensee determined to be not credible 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.

The inspectors reviewed the licensee's validation report and verified that no significant changes were made since the last NCS inspection.

The inspectors performed walk-downs in Areas 200 – 900, Area LA, the BPF, the CDL, and the 105 Lab to determine whether existing plant configuration and operations were covered by, and consistent with, the process description and safety basis in the NCSEs. The inspectors verified that selected engineered controls established in the NCSEs, including physical barriers, spacing controls, and safety related valves, were appropriately included in process and system descriptions, drawings, as appropriate. The inspectors reviewed operating procedures and postings to verify that selected administrative controls established in the NCSEs were included. The inspectors interviewed operators and laboratory analysts to verify that selected administrative controls established in the NCSEs, especially those related to concentration control and sampling, were understood and implemented as intended.

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 NCSEs. The inspectors reviewed the licensee's implementation of NCS-related procedures and controls to verify that the licensee had appropriately considered sources of common cause failures such that the controls remained sufficiently reliable to meet the performance requirements of 10 CFR 70.61. The inspectors also reviewed control flowdowns to verify that selected passive engineered controls that were relied on in the NCSE were identified and tracked as Configuration Controlled Equipment in accordance with IROFS NFS-1.

The inspectors accompanied an NCS engineer on a walk-down of Areas 300 - 500 to determine whether the NCS function assesses field compliance with established NCS controls as required by Section 5.3.4 of the License Application. The inspectors conducted interviews and reviewed records to determine whether NCS staff reviewed new and/or revised fissile material operations and procedures, including maintenance plans, consistent with program procedures and at a level commensurate with their significance.

The inspectors reviewed the selected NCSEs listed above to verify that they were performed in accordance with NCS program procedures and received appropriate independent review and approval. The inspectors reviewed NCS program audits to verify that they were conducted at a frequency consistent with license requirements and with appropriate thoroughness. The inspectors reviewed the licensee's Problem Identification, Resolution, and Correction System (PIRCS) through review of NCS-related entries to verify that audit observations and findings were communicated to licensee management and were appropriately followed up on.

The inspectors reviewed emergency procedures to determine whether the procedures specify that personnel evacuate to accountability points in the event of a Criticality Accident Alarm System (CAAS) alarm, whether evacuation routes and accountability points are designed to minimize the potential for exposing evacuating personnel to radiation, and whether evacuation drills were conducted consistent with license commitments and whether lessons learned were appropriately entered into the licensee's CAP. The inspectors conducted interviews to verify that the licensee had monitoring instrumentation to promptly assess dose to potentially exposed individuals and to aid in safe re-entry and recovery, and whether provisions were in place for the prompt decontamination and medical treatment of exposed individuals.

b. Conclusion

No violations of more than minor significance were identified.

5. Fire Protection Quarterly (IP 88135.05)

a. Inspection Scope

During routine plant tours, the inspectors verified that transient combustibles were being controlled and minimized in the observed process areas. The inspectors conducted specific fire safety tours in Building 306 and reviewed the fire detection and suppression capabilities in those 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 Building 302 to verify that they were implemented per site procedure.

The inspectors conducted a walk-down of Building 306 building and determined that the Pre-Fire plan drawing matched the as-found condition for various fire protection components like fire extinguishers 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.

The inspectors reviewed a sampling of fire-related PIRCS entries to verify that corrective actions were appropriate and that appropriate compensatory actions were implemented as applicable. The following PIRCS were reviewed: 58352, 58354, 58556, and 58584. The inspectors observed an emergency criticality exercise on May 2, 2017 that included a fire brigade response. The inspectors reviewed the post drill fire brigade written debrief and critique. Additionally, the inspectors attended and reviewed selected training materials used for Firestop Installers training.

b. Conclusion

No violations of more than minor significance were identified.

6. Fire Protection Annual (IP 88055)

a. Inspection Scope

The inspectors reviewed licensee procedures and toured plant areas containing fire protection related safety controls and IROFS to verify that the material condition of fire protection equipment, systems, and features was as required. The inspectors observed flammable materials stored in the 300 Complex to verify that the material was stored in marked cabinets as specified in approved procedures. The inspectors also reviewed NFS-GH-62, Control of Combustibles, and used NFS-GH-62-1, NFS Monthly Combustible Control Inspections, Revision (Rev.) 6 to walk-down selected areas of the 300 complex to verify that housekeeping and the control of combustible materials were adequate and consistent with the approved procedures. The inspectors walked down the hot work area in Building 306 and interviewed fire protection engineers to verify that the hot work program was implemented in accordance with NFS-GH-25, Hot Work Procedure.

The inspectors observed licensee staff conducting fire protection related inspections and testing of the fire alarm system, the wet pipe sprinkler system, and repairs of fire barrier penetration seals. The inspectors reviewed inspection and test records (see Section 4 of the Attachment) and interviewed licensee fire protection staff 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 also observed equipment and reviewed maintenance records to verify 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 walked down locations where fire hoses and portable extinguishers were provided to verify that they were at their designated locations and access was unobstructed.

The inspectors reviewed selected licensee fire protection impairment records and interviewed licensee fire protection engineers to verify 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 selected licensee CAP entries for the past year to verify that the licensee was identifying safety control and IROFS fire protection operability problems at an appropriate threshold and entering them into the corrective action program. Also, the inspectors evaluated the corrective actions associated with the PIRCS listed in Section 4 of the Attachment to verify that the corrective actions were adequate per the licensee's corrective action procedure.

b. Conclusion

No violations of more than minor significance were identified.

B. Radiological Controls

1. Radiation Protection Quarterly (IP 88135.02)

a. Inspection Scope

During tours of the production areas, the inspectors verified that radiological signs and postings accurately reflected radiological conditions within the posted areas. The inspectors observed RP controls and practices implemented during various plant activities including the proper use of personnel monitoring equipment, required protective clothing, bagging of contaminated trash, and frisking methods for detecting radioactive contamination on individuals exiting contamination controlled areas. The inspectors observed plant personnel as they removed protective clothing at controlled area step-off pads. The inspectors observed plant personnel as they performed various tasks in different areas of the facility and verified that the proper protective equipment was used to prevent contamination. The inspectors monitored the operation of RP instruments and verified calibration due dates.

The inspectors performed numerous partial reviews of Special Work Permits (SWPs) during the inspection period in different operational areas. The inspectors verified that these SWPs contained appropriate work instructions, were posted in the work areas for employees' review, and that workers signed the SWP. The inspectors noted that for the

portions of work activities observed, pre job briefs were performed, plant workers performed tasks in accordance with the SWP requirements including, proper use of dosimetry and protective clothing. The inspectors conducted a more thorough review for the following SWPs and posted radiologically controlled areas:

- SWP 16677, Building 303 Area 600
- SWP 17-09-011, Building 302 Area 100-200
- SWP 16642, Mass Spec Lab
- SWP 16712, 301 Calciner

b. Conclusion

No violations of more than minor significance were identified.

C. Facility Support

1. Post Maintenance Testing (IP 88135.19)

a. Inspection Scope

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.

- SRE Test N302XFLMARRD01, IROFS 302-DURECOV
- SRE Test N302XX600MAXONS, IROFS 302-600700A
- SRE TEST N306XXXXPCVCW13, IROFS 000- FACILITYSUPPORT
- SRE TEST N303FURDOOR600A, IROFS 303-600700A

b. Conclusion

No violations of more than minor significance were identified.

2. Surveillance Testing (IP 88135.22)

a. Inspection Scope

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 test requirement.

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

- SRE Test N333VALPSHL7N01, IROFS 303-UGENER
- SRE Test N302VALVPCVA302, IROFS 302-300400500
- SRE Test N302MVXXXXA301, IROFS 302 300-400-500

b. Conclusion

No violations of more than minor significance were identified.

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

a. Inspection Scope

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.

b. Conclusion

No violations of more than minor significance were identified.

4. Plant Modifications (IP 88070)

a. Inspection Scope

The inspectors interviewed senior managers, managers, supervisors, and engineers to verify that the licensee had established an effective configuration management program to evaluate, implement, and track modifications to the site which could affect safety.

The inspectors verified that the licensee's work control program had provisions to ensure the adequate pre-job planning and preparation of plant modification design packages. The inspectors verified that the configuration management program had provisions to ensure that plant modifications did not degrade the capabilities of items relied on for safety or other safety controls that are part of the safety design basis.

The inspectors reviewed a sampling of plant modifications packages including major modifications, minor modifications, administrative modifications, temporary modifications, and Letters of Authorization (LOA) that were completed since the last plant modifications inspection to verify that the change packages were prepared, reviewed, and completed in accordance with approved change management procedures. The following plant modifications were reviewed:

- ECR-20150304-04, Add a Stationary Air Sampler to Upper Edge of 306 Rinse Station Hood
- ECR-20150304-05, Addition of 2L Bottle Holder and Trash Tube to Legs of 306 Rinse Station
- ECR-20150304-07, The Inner Reducing Disk Orifice Would Not Seat in Housing Due to Material of Construction
- ECR-20160253, LOA is Needed for Tie-ins for the New Pump Rinse Station
- ECR-20160275, Extension of Temporary Change Expiration Date – (Relocation of Bldg. 130 Criticality Detectors) from 3-11-2016 to 3-11-2017
- ECR-20160314, Area 800 SS & Alloy C-276 Gas Tubing Minimum Acceptable Wall Thicknesses
- ECR-20160325, Remove 302-600 Pit Alarm
- ECR-20161399, Equipment Equivalency for AMRI Isoria Butterfly Valve 330-BF-WO11
- IAC-884, Pump Disassembly Station/Rinse Station
- LOA-ENG-016-003, Authorization to Tie-In and Test the 300 Complex Rinse Station

The selected plant modifications were reviewed to verify that applicable post maintenance installation and testing requirements were identified and performed prior to turnover to operations. The inspectors reviewed design information to determine if instrument set points accurately reflected the protection of safety limits taking into account instrument and calibration uncertainties. The inspectors also reviewed the licensee's process for making changes to their functional test instructions, which are used to perform post maintenance testing.

The inspectors verified that the licensee addressed the impacts of both facility changes and document modifications on the ISA, ISA Summary, and other safety program documentation developed in accordance with 10 CFR 70.62. The qualification records of three licensee ISA Reviewers were reviewed to ensure they met the requirements of the license application. The inspectors reviewed completed 10 CFR 70.72 evaluations to determine if the licensee adequately determined whether NRC pre-approval of the change was required.

The inspectors performed walk-downs of selected modifications to determine if they were installed in accordance with approved design documents such as drawings and technical reports. The inspectors reviewed calibration records to determine if measuring

and test equipment used to perform functional testing of IROFS was properly calibrated at the time of use. The inspectors reviewed training records to determine if operators received training on modifications to IROFS prior to turnover to operations.

The inspectors reviewed changes to the licensee's change management program procedures since the last inspection to verify that the changes were in compliance with the requirements of the license application.

The inspectors reviewed the licensee's CAP to verify that issues related to the preparation of change requests and the installation of facility changes were entered into the CAP and the assigned appropriate corrective actions in accordance with licensee commitments and procedures.

b. Conclusion

No violations of more than minor significance were identified.

D. Other Areas

1. Follow-up on Previously Identified Issues

a. Apparent Violations (AVs) 70-143/2016-005-01 and 2016-005-02, "Unavailability of Criticality Accident Alarm System"

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. 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 licensee's root cause determined the wiring fault was due to wire degradation which resulted in enough current passing to meet the continuity check of the self-monitoring feature. In addition, the licensee identified a weakness in their CAAS speaker audibility testing for a lack of positive verification of the speaker's audibility. The licensee updated the applicable procedure to correct the issue. The inspectors verified that the revised CAAS speaker audibility testing procedure (NFS-HS-A-21-01, Testing of Criticality Alarm Speakers, Rev. 0, dated June 1, 2017), contained the addition of positive verification of the speakers being operational and increased the frequency of the testing to every two weeks. The licensee's long term corrective actions being tracked in PIRCS #55579 include replacing the annunciation system for areas that process or contain SNM. The inspectors did not identify any issues with the licensee's corrective actions or management of this issue. Please see inspection report 70-143/2016-005 for additional background on the issues and the original AV dispositions.

Following the review of the licensee's response to the two AVs, the NRC determined that only one violation of NRC requirements existed, the failure to meet the requirements of 10 CFR 70.24 (a) for the unavailability of the speaker portion of the CAAS. This violation would be dispositioned as a Non-Cited Violation (NCV) in accordance with section 2.3.2 of the Enforcement Policy (The reason for NRC conclusions are detailed in paragraph (b) below.)

AVs 70-143/2016-005-01 and 2016-005-02, "Unavailability of Criticality Accident Alarm System" are being closed in this report to one NCV 70-143/2017-003-01, "Unavailability of Criticality Accident Alarm System" for the failure to meet the requirements of 10 CFR 70.24 (a).

b. NCV 70-143/2017-003-01, "Unavailability of Criticality Accident Alarm System"

AVs 2016-005-01 and 02 were closed in the above paragraph to one NCV 70-143/2017-003-01, "Unavailability of Criticality Accident Alarm System" for the failure to meet the requirements of 10 CFR 70.24 (a).

After considering the additional information provided by the licensee in their Response to Apparent Violations for EA-17-005, dated March 17, 2017, the NRC determined that self-identification credit is warranted because this issue was identified by a licensee operator during normal operations and this operator was trained by the licensee to identify these types of failures as part of their annual training. In addition, the failure of the speaker system was determined to be an isolated issue due to wire degradation and one for which the fire alarm control panel self-diagnostic feature was not designed to identify. Investigation by the licensee determined that the self-diagnostic feature was functioning properly.

The licensee entered the CAAS speaker failure into their corrective action system and have developed short and long term corrective as described in the AVs closeout paragraph and the referenced documents. As stated previously, the inspectors did not identify any issues with the licensee's corrective actions or management of this issue.

NCV 70-143/2017-003-01 is considered closed.

c. Violation (VIO) 70-143/2013-003-01: Failure to comply with NFPA 101 required 1.5 hours emergency lighting system test in accordance with licensee commitments in the License Application

On June 12, 2013, the licensee discovered that the 1.5 hours functional test of the emergency lights required by NFPA 101, Life Safety Code, 2009 edition, was not being performed. The licensee authorized a deviation from the code. The inspectors reviewed the licensee's documentation and concluded that requisite testing had not been performed and that the licensee did not have the authority to make a code deviation decision. Additionally, the licensee failed to identify an equivalency for the test in which it is demonstrated that the lights will work as intended. While the licensee originally identified they were not performing the test, the licensee failed to restore compliance with the code. Details of the violation are documented in NRC Inspection Report 70-143/2013-003, and are discussed in NRC Inspection Report 70-143/2016-002.

In 2016, the licensee conducted a 90-minute power outage test of the emergency lights using LOA-HS-16-006, Emergency Light Testing. This test required that power be cut off for at least 90 minutes and that the emergency light status be checked at 10 and 90 minutes to verify operability. This test was performed for all SNM areas and the results summarized in P53316 and P54823. The licensee also noted that even at 90 minutes sufficient light was available to exit. The licensee issued corrective actions to replace emergency lights that had failed by the 10 minute mark, and replace batteries in

lights that had failed by the 90 minute mark. The test procedure was later incorporated into Rev. 11 of NFS-HS-B-11, Inspection of Emergency Lights, which now requires an annual 90 minute test. The inspectors reviewed test records documented in NFS-HS-B-11-C, Annual 90 Minute Emergency Lights (Functional Testing), Buildings 301, 311, & 333 Only, dated May 30, 2017, to verify that the licensee continued to conduct the annual 90 minute test as required by NFPA 101 and implement corrective actions.

This item is considered closed.

d. VIO 70-143/2016-002-01: Failure of the Fire Protection Program to Maintain Records of Inspection Testing and Maintenance of Fire Protection Systems and Components.

During an inspection documented in Inspection Report 70-143/2016-002, NRC inspectors identified a SL IV violation of Special Nuclear Material License SNM-124, Chapter 7, "Fire Safety," Section 7.2.3 "Inspection, Testing, and Maintenance of Fire Protection Systems," for failure to have required records available for all inspections, tests, and maintenance of the fire protection systems and components, and Section 7.4.1 "Facility Design Criteria," for failure to record follow-up actions in accordance with referenced NFPA 801, Section 4.4 "Testing, Inspection and Maintenance." Specifically, the licensee could not produce and did not have complete records for Fire Protection systems surveillance, testing, inspection results, and follow-up actions. Additionally, during a review of the available inspection, testing and maintenance records, the NRC inspectors identified multiple instances where fire protection system deficiencies had been identified, but no follow-up actions had been recorded indicating that these issues had been evaluated or addressed (e.g. corrective action documents, work requests, or other resolutions).

The inspectors reviewed Rev. 3 of NFS-HS-A-53-03, Fire Protection Program, Summary of Routine Inspections, Testing, and Maintenance, to verify that the licensee had procedures in place to use a coversheet to track how deficiencies identified during inspections, tests, and maintenance were addressed with follow-up actions. The inspectors also reviewed numerous inspection and test records (listed in Section 4 of the Attachment) to verify that any identified deficiencies were being listed in the coversheets and assigned a follow-up action. Typical follow-up actions included the issuance of corrective action items (e.g., P55762, P58606, P58699), a Fire System Impairment Permit, and/or a work request to fix the item. The inspectors also interviewed licensee fire protection engineers and management to verify that the new coversheets were effective in assuring the licensee was able to track what follow-up actions had been taken in response to deficiencies.

This item is considered closed.

E. Exit Meeting

On June 29, 2017, and July 25, 2017, the inspectors presented the inspection results to J. Duling and members of the licensee staff. No dissenting comments were received from the licensee. Proprietary information was discussed but not included in the report.

SUPPLEMENTARY INFORMATION

1. KEY POINTS OF CONTACT

<u>Name</u>	<u>Title</u>
L. Armstrong	Configuration Management Specialist
S. Barron	Emergency Preparedness Manager
C. Brown	MC&A Department Section Manager
N. Brown	NCS Department Section Manager
J. Buckles	Fire Protection Engineer
T. Cloyd	Fire Protection Engineer
T. Coates	Engineering Section Manager for Advisory Engineering
R. Dotson	Quality Manager
R. Droke	Senior Regulatory Advisor
J. Duling	President
T. Evans	Security Section Manager
R. Freudenberger	Safety & Safeguards Director
K. Givens	Engineering Director
S. Gizzie	Fire Brigade Leader
J. Hagemann	Operations Director
R. Maurer	ISA and Fire Protection Manager
M. McKinnon	Director of Program Management
M. Moore	Environmental Protection & Industrial Safety Section Manager
A. Morie	Safety & Safeguards Program Manager & Licensing Manager
J. Nagy	Nuclear Safety Officer Chief
B. Rice	NCS Engineer
R. Rice	Radiation Protection Unit Manager
D. Rogers	Waste Management & Decommissioning Section Manager
S. Sanders	Training Manager
E. Senter	ISA and Fire Protection
R. Shackelford	Nuclear Safety & Licensing Section Manager
S. Skiles	NCS Engineer
D. Stack	Project Engineer
R. Storey	Configuration Management Unit Manager

2. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Closed

70-143/2016-005-01	AV	Unavailability of Criticality Accident Alarm System. (Paragraph D.1.a)
70-143/2016-005-02	AV	Unavailability of Criticality Accident Alarm System. (Paragraph D.1.a)
70-143/2013-003-01	VIO	Failure to comply with NFPA 101 required 1.5 hours emergency lighting system test in accordance with licensee commitments in the License Application. (Paragraph D.1.c)

70-143/2016-002-01 VIO Failure of the Fire Protection Program to Maintain Records of Inspection Testing and Maintenance of Fire Protection Systems and Components. (Paragraph D.1.d)

Opened/Closed

70-143/2017-003-01 NCV Unavailability of Criticality Accident Alarm System. (Paragraph D.1.b)

3. LIST OF INSPECTION PROCEDURES USED

88015	Nuclear Criticality Safety
88055	Fire Protection Annual
88070	Plant Modifications
88135	Resident Inspection Program For Category I Fuel Cycle Facilities
88135.02	Plant Status
88135.04	ISA Implementation
88135.05	Fire Protection
88135.19	Post Maintenance Testing
88135.22	Surveillance Testing

4. DOCUMENTS REVIEWED

Records:

302/303 CO₂ System 1st Semi-Annual, dated March 10, 2017
 310 Dry Chemical Fire Suppression System 1st Semi-Annual, dated March 27, 2017
 365 CO₂ System 1st Semi-Annual, dated March 27, 2017
 Backflow Device Test Report, Various dates
 CAS Halon 1st Semi-Annual, dated March 27, 2017
 21G-16-0089, Revised Reply to Notice of Violation (VIO 70-143/2013-003-01), dated May 26, 2016
 21T-13-0984, Justification for Continued Operation (JCO) – Fire Barrier Integrity, dated June 12, 2013
 21T-16-0564, 1st Quarter 2016 ISA Audit Checklist- ISA Fire Protection, dated May 20, 2016
 21T-16-0606, 2nd Quarter NFS-HS-A-116 2016 ISA Audit Checklist – ISA Fire Protection, dated June 1, 2016
 21T-16-0834, 3rd Quarter 2016 ISA Audit Checklist – ISA Fire Protection, dated September 29, 2016
 21T-16-1057, 4th Quarter 2016 ISA Audit Checklist – ISA Fire Protection, dated December 21, 2016
 21T-17-0512, 1st Quarter 2017 ISA Audit Checklist – ISA Fire Protection, dated May 30, 2017
 JA0411-ECN-01, 306 Pump Rinse Station Smoke detection – Scope Removal, dated September 4, 2015
 N302XXCO2SYSTEM, Rev. 5, dated January 14, 2017
 NFS-HS-62-01-A, NFS Monthly Combustible Control Inspection Form, Various dates
 NFS-HS-A-21-D, Fire Alarm Control Panel Test, Rev. 1, dated June 27, 2017
 NFS-HS-A-104-B, Annual Horizontal Sliding and Roll-Up Fire Door Inspection, Rev. 1, dated April 27, 2017

NFS-HS-A-104-C, Annual Horizontal Sliding and Roll-Up Fire Door Test, Rev. 1, dated April 27, 2017

NFS-HS-A-116-A, Sprinkler Inspection Form for Wet Pipe Systems, Rev. 0, Various dates

NFS-HS-B-58-05-A, Fire Department Connections (FDC) – Quarterly Inspection, Various dates

NFS-HS-B-58-11, CAS Halon System, Rev. 0, Various dates

NFS-HS-B-58-12, CO₂ System Inspection (Visual), Rev. 0, Various dates

NFS-HS-B-58-13, CO₂ System B-365 Visual, Rev. 0, Various dates

NFS-HS-B-58-14, Fire Trace Systems, Rev. 0, Various dates

NFS-HS-B-70-A, Manual Pull Station Test – Annual, dated January 20, 2017

NFS-HS-B-70-B, Annual Smoke Detector Test, dated March 8, 2017

NFS-HS-B-70-C, Annual Beam Detector Test, Various dates

NFS-HS-B-70-D, Annual Heat Detector Test, dated January 25, 2017

NFS-HS-B-70-E, Battery Operated Smoke Detector Test/Inspection, Various dates

NFS-HS-B-70-H, Annual VESDA Test, dated March 28, 2017

NFS-HS-B-70-I, Annual Duct Detector Test, dated March 10, 2017

NFS-HS-B-87-B, Hose House Inspection, dated June 23, 2017

NFS-HS-B-87-C, Fire Hose Hydrostatic Test and Visual Inspection, dated January 2, 2017

NFS-HS-B-95-A, Annual Swinging Fire Door Inspection, dated June 21, 2017

NFS-HS-B-95-B, Annual Fire/Smoke Wall/Barrier Inspection, dated March 2, 2017

WO 1030767, 300-FRDAMP-0001, 4 Years – Test Fire Damper Movemen – Fire Damper 200-FRDAMP-0001

WO 1045938, Fire Alarm Panel – Annual – Battery Inspection and Load Test

WO 1045957, Fire Alarm Panel – Semi-Annual – Power Test

IROFS 333-USVXTR, N333XCONDEN2P21 test conducted on June 29, 2017

NCS-03-02-12, Nuclear Criticality Safety Evaluation for the Storage of Mounts and Discs 105 Laboratory Stations 20, 21A, 21B, 22, 79, 108, and 109 (U), Rev. 1, dated March 8, 2017

NCS-05, Addendum 1 to the Nuclear Criticality Safety Evaluation 310 Warehouse Storage of Single Stacked 55 gallon drums, Rev. 0, dated March 21, 2017

27T-16-0186, “Pump Maintenance Using the 306 Pump/Rinse Station (Enclos-0002)”

NCS-01-01-04, “Validation of Computer Codes for Uranium Systems with Enrichments up to 100 wt.% ²³⁵U: SCALE6.1 WITH THE V7-238 Library from ENDF/B-VII, and SCALE4.4a with the 27GROUPNDF4 Library from ENDF/B-IV”

21T-16-0781, Utilities/Bulk Chemical and Uranium Storage Vaults/Racks, Rev. 6, dated January 15, 2017

306 Pump Rinse Station Installation Qualification, dated July 28, 2016

306 Pump Rinse Station Operational Qualification, dated July 9, 2016

306 Pump Rinse Station Performance Qualification, dated July 9, 2016

Configuration Management Quality Assurance Audit Report (QA-16-04), dated March 18, 2016

Configuration Management Triennial Assessment Report for 2015, dated December 18, 2015

ECR-20160253, LOA is Needed for Tie-ins for the New Pump Rinse Station

ECR-20160275, Extension of Temporary Change Expiration Date – (Relocation of Bldg. 130 Criticality Detectors), dated March 11, 2016

ECR-2016-0304-04, Add a Stationary Air Sampler to Upper Edge of 306 Rinse Station Hood, dated July 14, 2016

ECR-20160304-05, Addition of 2L Bottle Holder and Trash Tube to Legs of 306 Rinse Station, dated July 14, 2016

ECR-20160304-07, The Inner Reducing Disk of the Orifice Would Not Seat in Housing Due to Material of Construction
 ECR-20160314, Area 800 SS & Alloy C-276 Gas Tubing Minimum Acceptable Wall Thicknesses, dated March 14, 2016
 ECR-20160325, Remove 302-600 Pit Alarm, dated March 15, 2016
 ECR-20160828, Install Door Stop on Fire Door 338, dated July 26, 2016
 ECR-20161-399, Equipment Equivalency for AMRI Isoria Butterfly Valve 330-BF-WO11
 HS-CHANGE-REVIEWER List of Qualified Individuals, dated June 28, 2017
 NFS-HS-CL-10-19, Nuclear Criticality Safety Building 306 Pump Rinse Station, Rev. 0, dated November 15, 2016
 Work Request Number 244749 Change Authorization Addendum ECR-20150304-07, dated August 2, 2016
 Project JA0411, Scope Document, Rev. 0, dated February 20, 2015
 Readiness Assessment Checklist Project No. JA0411, dated August 3, 2016

Procedures:

LOA 2293Y-027
 NFS-SOP-401-24, Rev. 27, Area D, BLDG 302
 NFS-HS-A-50, Guidelines for Government Agency Notification Form
 NFS-SOP-401-04-303, BLDG 303 Area 400/500
 NFS-GH-43, Rev. 27
 NFS-SOP 409 Sec. 71, 301 Receipt Calciner
 NFS CAP-009, Section 4.6, The NFS Corrective Action Program
 LOA 2293Y-022
 NFS-GH-25, Hot Work Procedure, Rev. 12
 NFS-GH-62, Control of Combustibles, Rev. 10
 NFS-GH-62-1, NFS Monthly Combustible Control Inspections, Rev. 6
 NFS-GH-66, Operation and Maintenance of the Building 302/303 Carbon Dioxide Fire Suppression System, Rev. 6
 NFS-GH-96, Fire Barrier Program, Rev. 0
 NFS-GH-910, Fire Protection Program, Rev. 6
 NFS-HS-A-21, Operation and Testing of the Criticality, Fire, and CO₂ Alarm Systems, Rev. 32
 NFS-HS-A-104, Testing/Inspection of Fire Barrier Systems, Rev. 3
 NFS-HS-A-115, Emergency Lights Replacement Procedure, Rev. 0
 NFS-HS-A-116, Sprinkler Inspection Procedure, Rev. 0
 NFS-HS-B-11, Inspection of Emergency Lights, Rev. 11
 NFS-HS-A-21, Operation and Testing of the Criticality, Fire, and CO₂ Alarm Systems, Rev. 32, dated June 1, 2017
 NFS-HS-A-21-01, Testing of Criticality Alarm Speakers, Rev. 0, dated June 1, 2017
 NFS-HS-E-02, Emergency Criticality Evacuation, Rev. 44, dated June 30, 2017
 NFS-HS-A-68, Rev. 6
 NFS-HS-E-07, On-Site Radiological Emergency Assessment, Rev. 32, dated December 7, 2016
 NFS-HS-A-93, Rev. 3
 NFS-NCS-Design, Rev. 4
 NFS-HS-A-108, "NDA Portable Instrument Handling and Measurement," Rev. 1
 ENG-EPS-A-001, Engineering Practices and Standards, Rev. 9, dated January 23, 2017
 NFS-CM-002, Identification and Control of Configuration Items, Rev. 08, dated September 26, 2016
 NFS-CM-004, NFS Change Control Process, Rev. 18, dated September 26, 2016

NFS-ENG-001, Engineering Project Design Control, Rev. 14, dated August 1, 2016
 NFS-GH-901, Configuration Management Program, Rev. 20, dated December 30, 2016
 NFS-TS-009, Configuration Management of Process Change, Rev. 7, dated April 18, 2016
 Runsheet 44A-A, Cheese Cloth Rinse Solution Log, Rev. 0, dated October 19, 2016
 SOP-401-44A, Rinse Station (Operations), Rev. 0, dated November 15, 2016
 SOP-401-44B, Rinse Station (Maintenance), Rev. 0, dated November 15, 2016

Audits:

NCS-2017-09
 NCS-2017-10
 NCS-2017-11
 NCS-2017-12
 NCS-2017-13
 NCS-2017-14

PIRCS written as a result of inspection activities:

58310, 58460, 58555, 58624, 58724, 58812

PIRCS:

58115, 58127, 58325, 58403, 58443, 58493, 58584, 58589, 58561, 58556, 58572, 58735,
 58803, 58804, 58817, 58853

Condition Reports Reviewed (fire):

P52790, P52927, P53067, P53316, P54823, P55162, P55762, P58556, P58584, P58586,
 P58589, P58817

Condition Reports Reviewed (criticality):

55579, 56578, 57944, 58834, 58305, 58325, 58672, 56765, 58571, 58531, 58491, 58461,
 58434, 58432, 58019

Condition Reports Reviewed (Plant Modifications):

52319, 52320, 52321, 52322, 52323, 52324

Other Documents:

Safety and Safeguards Review Council (SSRC), April 27, 2017 Agenda.
 Safety and Safeguards Review Council (SSRC), May 4, 2017 Agenda.
 Safety and Safeguards Review Council (SSRC) May 11, 2017 Agenda.
 Safety and Safeguards Review Council (SSRC) May 25, 2017 Agenda.
 Safety and Safeguards Review Council (SSRC) June 1, 2017 Agenda.
 Safety and Safeguards Review Council (SSRC) June 8, Agenda.
 Safety and Safeguards Review Council (SSRC) June 15, 2017 Agenda.
 Pre-Fire Plan 38, Building 306, Rev. O
 306-A1020-C, Bldg. 306 East Pre-Fire Plan, Rev. A
 Fire System Impairment Permits 2016-018, 2017-021, 2017-023, 2017-024, 2017-056
 WR# 262056
 10 CFR 70.72 Qualification Records for A. Morris
 21T-15-2724, Safety and Safeguards Review (SSRC)/Change Control Board (CCB) Minutes
 for ECR-20150304 for IAC-884: Pump Disassembly Station/Rinse Station
 IAC-884, Pump Disassembly Station/Rinse Station, 21T-16-1027, LIC-13, dated July 11,
 2016
 NFS Engineering Organization Chart, dated May 24, 2017

References:

Response to Apparent Violations in Inspection Report 70-143/2016-005; EA-17-005, dated March 17, 2017

30-Day Written Notification of Event (NRC Event No. 52358), dated December 9, 2016

NFS-HS-A-21-01, Testing of Criticality Alarm Speakers, Rev. 0, dated June 1, 2017