



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
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ATLANTA, GEORGIA 30303-1257

January 30, 2019

Mr. B. Joel Burch
Vice President and General Manager
BWXT Nuclear Operations Group, Inc.
P.O. Box 785
Lynchburg, VA 24505-0785

**SUBJECT: BWXT NUCLEAR OPERATIONS GROUP – NUCLEAR REGULATORY
COMMISSION INTEGRATED INSPECTION REPORT 70-27/2018-005**

Dear Mr. Burch:

This letter refers to the inspections conducted from October 1 through December 31, 2018, at the BWXT Nuclear Operations Group, Inc. (NOG) facility in Lynchburg, VA and includes one supplemental inspection as discussed in inspection report 2018-001 (ADAMS Accession No. ML18067A146). The purpose of the inspections was to determine whether activities authorized under the license and implementation of programs and procedures in the areas of Safety Operations, Radiological Controls, and Facility Support were conducted safely and in accordance with Nuclear Regulatory Commission (NRC) requirements. The enclosed report presents the results of these inspections. The results were discussed with you and members of your staff at exit meetings held on October 25, December 13, 2018, and January 15, 2019.

Based on the results of this inspection, the NRC has determined that one Severity Level IV violation of NRC requirements occurred. This non-repetitive, licensee-identified, and corrected violation is being treated as a non-cited violation (NCV), consistent with Section 2.3.2.b of the Enforcement Policy. The NCV is described in the subject inspection report. If you contest the violation or significance of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-001, with copies to: (1) the Regional Administrator, Region II; (2) the Director, Office of Enforcement; and (3) the Resident Inspector at the BWXT NOG facility.

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, its enclosure, and your response, if you choose to provide one, 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>. To the extent possible, your response should not include any personal privacy or proprietary information so that it can be made available to the public without redaction.

If you have any questions concerning these inspections, please contact Noel Pitoniak of my staff at 404-997-4634.

Sincerely,

/RA/

Eric C. Michel, Chief
Projects Branch 2
Division of Fuel Facility Inspection

Docket No. 70-27
License No. SNM-42

Enclosure:
NRC Inspection Report 70-27/2018-005
w/Attachment: Supplementary Information

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SUBJECT: BWXT NUCLEAR OPERATIONS GROUP – NUCLEAR REGULATORY
COMMISSION INTEGRATED INSPECTION REPORT 70-27/2018-005

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No: 70-27

License No: SNM-42

Report No: 70-27/2018-005

Licensee: BWX Technologies, Inc. (BWXT)

Facility: Nuclear Operations Group, Inc. (NOG)

Location: Lynchburg, VA 24505

Dates: October 1 through December 31, 2018

Inspectors: C. Stancil, Senior Resident Inspector
B. Adkins, Senior Fuel Facility Inspector (Paragraph A.6)
L. Cooke, Fuel Facility Inspector (Paragraphs A.4, B.1, C.1, C.2)
P. Glenn, Fuel Facility Inspector (Paragraphs A.3, A.7, D.3, D.4, D.5)
K. McCurry, Fuel Facility Inspector (Paragraphs C.1, C.2, C.4, D.2)
N. Pitoniak, Senior Project Inspector (Paragraphs A.3, D.3, D.4, D.5)
M. Ruffin, Fuel Facility Inspector (Paragraph C.5)
T. Sippel, Fuel Facility Inspector (Paragraphs A.3, D.3, D.4, D.5)

Approved by: E. Michel, Chief
Projects Branch 2
Division of Fuel Facility Inspection

Enclosure

EXECUTIVE SUMMARY

BWXT Nuclear Operations Group, Inc.
NRC Integrated Inspection Report 70-27/2018-005
September 1 – December 31, 2018

Inspections were conducted by the senior resident inspector 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 BWXT activities that were accomplished by direct observation of safety-significant activities and equipment, tours of the facility, interviews and discussions with BWXT personnel, and a review of facility records.

Safety Operations

- No violations of more than minor significance were identified related to Plant Operations and Operational Safety walkdowns. (Paragraphs A.1, A.2, and A.3)
- No violations of more than minor significance were identified related to the Fire Protection Program. (Paragraphs A.4 and A.5)
- Non-Cited violation NCV 70-27/2018-05-01, Charge Jar Mass Overload, was identified related to the Nuclear Criticality Safety Program. (Paragraphs A.6 and A.7)

Radiological Controls

- No violations of more than minor significance were identified related to the Radiation Protection Program. (Paragraph B.1)

Facility Support

- No violations of more than minor significance were identified related to Post-Maintenance and Surveillance Testing Programs. (Paragraphs C.1 and C.2)
- No violations of more than minor significance were identified related to items entered into the Corrective Action Program. (Paragraph C.3)
- No violations of more than minor significance were identified related to the Plant Modifications Program. (Paragraphs C.4 and C.5)

Other Areas

- No violations of more than minor significance were identified related to observations of security personnel and activities. (Paragraph D.1)
- Unresolved Item 2017-006-02, Evaluate Management Measures Applied to Chemical Detector IROFS, was closed. (Paragraph D.2)
- Violation 2018-006-01, Failure to Ensure that High Consequence Accident Sequences Remain “Highly Unlikely” as required by 10 CFR 70.61(b), was closed. (Paragraph D.3)

- Violation 2018-006-02, Failure to Assure that Under Normal and Credible Abnormal Conditions, the UAI_x Glovebox Air Purifier System was Subcritical as Required by 10 CFR 70.61(d), was closed. (Paragraph D.4)
- Violation 2018-006-03, Failure to Maintain Adequate Process Safety Information for Process Systems Associated with the UAI_x Glovebox Systems as required by 10 CFR 70.62(b), was discussed and remains open. (Paragraph D.5)

Attachment

Key Points of Contact
List of Items Opened, Closed, and Discussed
Inspection Procedures Used
Documents Reviewed

REPORT DETAILS

Summary of Plant Status

During the inspection period, routine fuel manufacturing operations and maintenance activities were conducted in the fuel processing areas, Uranium Recovery (UR) facility, and in the Research and Test Reactors (RTR) facility.

A. Safety Operations

1. Plant Operations (Inspection Procedures 88135 and 88135.02)

a. Inspection Scope

The inspectors performed routine tours of plant operating areas housing special nuclear material (SNM) to verify that equipment and systems were operated safely and in compliance with the license and 10 CFR 70. Daily operational and shift turnover meetings were observed throughout the period to gain insights into process safety and operational issues. The inspectors reviewed selected BWXT-identified issues and corrective actions (CAs) for previously identified issues. These reviews focused on plant operations, safety-related equipment (valves, sensors, instrumentation, in-line monitors, and scales), and items relied on for safety (IROFS) to determine whether BWXT captured off-normal events and implemented effective CAs as required.

The inspectors conducted routine tours to verify that operators, front-line managers, maintenance mechanics, radiation protection staff, and process engineering personnel were knowledgeable of their duties and attentive to any alarms or annunciators at their respective stations as required. The routine tours included walkdowns of the RTR, filler, UR areas, and other manufacturing areas where SNM was being processed. The inspectors observed activities during normal and upset conditions to verify compliance with procedures and material station limits. The inspectors reviewed selected safety controls, including IROFS, to verify that they were in place, available, and functional to ensure proper control of SNM. The inspectors reviewed operator log sheets, operating procedures, maintenance records, and equipment and process changes to obtain information concerning operating trends and activities. The inspectors reviewed CAs to verify that BWXT actively pursued CAs for conditions requiring temporary modifications and compensatory measures.

The inspectors performed periodic tours of the outlying facility areas to verify 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 BWXT's emergency response facilities to verify that the facilities were maintained in a readily available status as required.

The inspectors attended various BWXT meetings, including the Change and Safety Review Boards, and met periodically with plant senior management and licensing personnel throughout the inspection period to determine the overall status of the plant. The inspectors evaluated BWXT's response to significant plant issues and their

approach to solving various plant problems in accordance with Quality Work Instruction (QWI) 2.1.3, "Integrated Safety Analysis Methodology;" QWI 14.1.4, "Reporting Unusual Incidents;" and QWI 14.1.10, "Safety Evaluation of Unusual Incidents."

b. Conclusion

No violations of more than minor significance were identified.

2. Operational Safety (Inspection Procedure 88135.04)

a. Inspection Scope

The inspectors inspected the RTR and targets fuel powder and compact processes, safety-significant systems involved with the processing of SNM to verify compliance with the license and procedures. As part of the walkdowns, the inspectors verified as-built configurations matched approved plant drawings. The inspectors interviewed operators to verify that plant personnel were familiar with the assumptions and controls associated with the IROFS systems and instrumentation for maintaining plant safety as required. The inspectors also reviewed IROFS assumptions and controls to verify proper implementation 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 reviewed the selected system to verify that there were no conditions that degraded plant performance including the operability of IROFS, safety-related devices, or other support systems essential to safety system performance.

The inspectors reviewed procedures, drawings, related ISAs, and regulatory requirements such as Title 10 of the *Code of Federal Regulations* (10 CFR) 70.61, "Performance Requirements," to determine the correct system alignment and to verify the following as appropriate during the walkdowns:

- 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
- hangers and supports correctly installed and functional
- lockout/tagout program implemented per HS-11-01, "Lockout/Tagout/Testing of Hazardous Energy Sources"
- 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. Operational Safety (Inspection Procedure 88020)

a. Inspection Scope

The inspectors evaluated the operational safety of the facility in order to verify that BWXT operates the plant safely and in accordance with 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material," the license, and the License Application. The inspectors interviewed operators and engineers and reviewed records associated with RTR UAl_x process area to verify compliance with License Application Chapter 3, "Integrated Safety Analysis." The inspectors reviewed license requirements, quantitative risk assessments, criticality safety evaluations, and operating procedures associated with RTR area to verify that the requirements for the UAl_x process line were consistent within BWXT's documents. The inspectors evaluated IROFS to verify that they were being implemented as described in the ISA and that BWXT was in compliance with BWXT License Application Chapter 11, "Management Measures" requirements.

The inspectors performed field walkdowns of RTR UAl_x processing line with approved piping and instrumentation drawings (P&IDs) and procedures to verify the field configurations were maintained in accordance with the configuration control requirements of the Chapter 11. The inspectors walked down the UAl_x processing line to confirm the associated IROFS were present and capable of performing their intended safety functions as required by 10 CFR 70.62. The inspectors evaluated engineered and administrative safety controls to verify they were capable of preventing or mitigating associated accident scenarios. The inspectors reviewed operator training records and interviewed four operators to verify training was completed in accordance the License Section 11.3, "Training and Qualification," and QWI 18.1.2, "On-The-Job Training (OJT)," requirements and that operators were knowledgeable of administrative controls and limits, in accordance with OP-0006505, "Crushing and Blending UAl_x." The inspectors observed UAl_x processing line operations to verify procedure use and compliance requirements in accordance with the License Section 11.4, "Procedures," and ADM-NOG-L-0051, "Conduct of OPS."

The inspectors observed nuclear material control personnel conducting non-destructive analysis (NDA) surveys of RTR ductwork in accordance with E41-134, "Annual Ductwork Survey." The inspectors reviewed calibration records of the Ludlum survey instruments to verify they were within the calibration periodicity. The inspectors reviewed NDA ductwork survey records for 2018, to verify identified ductwork was accurately characterized by size and material type and that the system operating status was documented and evaluated against the acceptance criteria established per procedure E41-134. The inspectors reviewed nuclear material control training records for three nuclear material control personnel to verify training was conducted in accordance with QWI 18.1.2, "Training and Qualification for Material Control and Accounting Functions," in order to conduct the annual ductwork surveys.

The inspectors reviewed BWXT's corrective action program (CAP) entries since the last operational safety inspection to determine that deviations from procedures and unforeseen process changes affecting nuclear criticality, chemical, radiological, or fire safety were documented and investigated promptly, per the License Section 11.6, "Corrective Action Program." The inspectors reviewed the root cause analysis (RCA)

report CA-2017-00895 associated with material accumulation in the UAI_x glovebox line desiccant vessels and the corrective actions associated with operating changes as a result of the event.

b. Conclusion

No violations of more than minor significance were identified.

4. Fire Protection Quarterly (Inspection Procedure 88135.05)

a. Inspection Scope

The inspectors performed an inspection of Shop Bay 3T, manufacturing and storage of components and materials, to verify compliance with the license, National Fire Protection Association (NFPA) 801, "Standard for Fire Protection for Facilities Handling Radioactive Materials," and NFPA 13, "Standard for the Installation of Sprinkler Systems." The inspectors performed fire safety walkdowns and reviewed the fire detection and suppression capabilities in those areas, as applicable. The inspectors also reviewed relevant portions of the Pre-Fire Plan before and during the walkdowns to verify that key features identified in the Plan (e.g., sprinkler control valves) were in place in the field and that fire hazards that existed in the field were reflected in the Pre-Fire Plan. The inspectors reviewed the type of manual firefighting equipment that was provided to verify that it was appropriate for the type of fire that could occur. Various fire barriers and doors were examined for proper maintenance and function and fire impairments reviewed for adequate compensatory actions as required.

Routine plant tours were conducted for other areas of the plant to verify that housekeeping in the areas was sufficient to minimize the risk of fire and that transient combustibles were being adequately controlled and minimized as required.

c. Conclusion

No violations of more than minor significance were identified.

5. Fire Protection Annual (Inspection Procedure 88135.05)

a. Inspection Scope

On November 3, 2018, the inspectors observed Emergency Medical Services training as part of BWXT's annual emergency team training program to verify compliance with the License and NFPA 600, "Standard on Industrial Fire Brigades." The inspectors specifically observed skills drills associated with the application and use of LUCAS, traction splints and tourniquets, intravenous drip, and the pelvic girdle.

b. Conclusion

No violations of more than minor significance were identified.

6. Nuclear Criticality Safety (Inspection Procedure 88135.02)

a. Inspection Scope

The inspectors reviewed the nuclear criticality safety (NCS) program to verify compliance with License Chapter 5, "Nuclear Criticality Safety;" the Nuclear Criticality Safety Manual; and implementing procedures. The inspectors conducted daily production area tours to verify various criticality controls, including the implementation of criticality station limit cards and container sizing to minimize potential criticality hazards as required. The inspectors reviewed a number of criticality-related IROFS to verify operability. The inspectors also interviewed and observed operators to verify knowledge of requirements associated with NCS IROFS.

As part of routine day-to-day activities onsite, the inspectors reviewed CAP entries associated with criticality safety. The inspectors evaluated BWXT's response to such entries and, if needed, had discussions with NCS engineers to determine safety significance and to verify compliance with procedures.

b. Conclusion

One Severity Level IV non-cited violation (NCV) was identified.

BWXT NOG License SNM-42 Safety Condition S-1 states that the licensee will operate in accordance with the License Application. License Application, Section 5.1.2, "Nuclear Criticality Safety (NCS) Procedures and Postings," states, in part, that NCS postings shall describe controls for an area as appropriate for providing workers a ready reference for verifying compliance and safe operation. Contrary to the above, NCS postings and/or procedures did not describe controls for the U3O8 room as appropriate to provide operators guidance for safely complying with U235 mass limits during operation. The mass limits on NCS postings 15-22-01, "blending station," and 15-22-24, "storage location," were expressed as "grams U235". The operator charge weights prescribed by operating procedure were expressed as "grams U3O8". A calculation using percent uranium and U235 was necessary to check compliance with the postings. The noncompliance occurred on August 22, 2018, when the charging station operator erroneously added more U3O8 powder to a charge jar than required by procedure. The operator notified engineering of the error, but because there was no guidance for rejecting a charge jar at the powder stage, the operator was directed to move the charge along the process for later rejection. When the charge jar was moved to the blending station, the U235 charge jar mass overload occurred. The posting violation was discovered during the engineering review of the rejected charge. The violation was entered into BWXT's CAP as CA-2018-1103. Subsequently, the operating procedures were updated with the calculation for U235 mass and handling of deviated fuel charges. The violation was characterized as a Severity Level IV violation because question #3 of Inspection Manual Chapter 616, Appendix B, was applicable in that the violation was indicative of a programmatic deficiency if left uncorrected. The licensee failed to implement adequate management measures resulting in a condition where an IROFS was less reliable than assumed in the ISA. This non-repetitive, licensee-identified, and corrected violation is being treated as NCV 70-27/2018-05-01, "Charge Jar Mass Overload," consistent with Section 2.3.2.b of the NRC Enforcement Policy.

7. Nuclear Criticality Safety (Inspection Procedure 88015)

a. Inspection Scope

The inspectors reviewed the nuclear criticality safety (NCS) program to verify compliance with License Chapter 5, "Nuclear Criticality Safety." Specific areas of the NCS program reviewed are detailed below.

Criticality Analysis

The inspectors reviewed selected NCSEs to verify that they were consistent with the commitments in the License Application including consideration of the double contingency principle, assurance of sub-criticality under normal and credible abnormal conditions with the use of subcritical margin, technical practices and methodologies, and treatment of NCS parameters. The criticality safety analyses reviewed are listed in Section 4 of the Attachment and primarily focused on two recent plant modifications in the Filler area. The inspectors also reviewed a sampling of NCS safety concerns analyses to ensure that NCS-related violations were properly analyzed for NRC reportability and compliance with the performance requirements of 10 CFR 70.61.

The inspectors reviewed BWXT's generation of accident sequences to determine whether the analyses systematically identified normal and credible abnormal conditions in accordance with the commitments and methodologies in the license application for the analysis of process upsets. This included the review of accident sequences/upsets that BWXT 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. Additionally, the inspectors reviewed selected accident sequences designated as not credible to determine whether the bases for incredibility rely on any items which should be identified as formal NCS controls or IROFS. The inspectors also reviewed selected NCSEs and conducted walkdowns to determine whether IROFS were needed for selected accumulation sequences related to ventilation and desiccant systems.

The inspectors verified no changes were made to the validation report since the last NCS inspection.

Criticality Implementation

The inspectors performed walkdowns of the High Performance-Advanced Core Technology and sample room areas to determine whether existing plant configuration and operations were consistent with the process description and safety basis in the selected criticality analyses listed in the Attachment. The NCS controls reviewed included mass logs, moderator logs, piece count, geometry, and spacing. The inspectors reviewed operating procedures and postings to verify that selected administrative controls were properly implemented. The inspectors interviewed operators, engineers, and maintenance personnel to verify that controls established in the criticality analyses were understood and properly implemented. The inspectors reviewed the ISA summary and supporting ISA documentation (e.g., SAR 15.33, "Vault Operations," and Safety Analysis Report (SAR) Appendix 15.34) to determine whether the controls identified in the ISA were supported by technical bases in the NCS

analyses. The inspectors also reviewed selected IROFS credited with preventing accumulation sequences (e.g., NDAs) to verify that controls were implemented consistent with the NCS analyses as required.

Criticality Operational Oversight

The inspectors reviewed training completion records and exams to determine if personnel who handle SNM received specialized NCS training as required by Section 5.1.4.2, "Specialized Instruction" of the License.

The inspectors reviewed the applied management measures for selected NCS controls to determine whether the management measures were sufficient to ensure the availability and reliability of NCS controls. The management measures and NCS controls reviewed were selected from the NCSEs and included controls on geometry, spacing, piece count, and moderation as well as selected management measures for these controls such as maintenance and calibration, procedures, postings, and configuration control. The inspectors also reviewed recent changes to systems and processes (e.g., the removal of the desiccant system from the UAl_x glovebox line), walkdown changed systems, and reviewed configuration control documentation (e.g., drawings, penetration lists, manuals, specifications) to verify that the configuration control information related to NCS was being maintained.

Criticality Programmatic Oversight

The inspectors interviewed operations staff to determine whether they were cognizant of NCS hazards and control methods as they relate to their specific job function. The inspectors reviewed records of recent NCS audits and accompanied a BWXT NCS engineer on a weekly inspection of portions of the filler area to determine whether NCS staff routinely assesses field compliance with established NCS controls. The inspectors reviewed quarterly audit reports of the NCS program to verify that the audits met the requirements of the license with respect to frequency, scope, and area management participation. The inspectors verified that audit findings were entered into BWXT's CA system for resolution. The inspectors reviewed the results of weekly NCS inspections to verify they were conducted at the prescribed frequency including backshifts and weekends. The inspectors verified that NCS staff performing the audits were qualified in accordance with NCS staff qualification requirements, NCSE-03, "Nuclear Criticality Safety Audits and Inspections."

The inspectors reviewed selected NCS analyses to verify that they were performed in accordance with NCS program procedures and received appropriate independent review and approval. The inspectors reviewed records to verify that NCS staff members only performed those functions for which they were qualified. The inspectors reviewed changes made to applicable NCSE procedures since the last NCS inspection.

Criticality Incident Response and Corrective Action

The inspectors observed calibration of the criticality accident alarm system (CAAS) detectors for the panel located in the radiation control office and reviewed test records to verify that BWXT performed periodic testing of the CAAS and howlers as required by Section 4.3.2, "Instrumentation," and Section 5.1.5, "Nuclear Criticality Monitoring System" of the License Application.

Specifically, the inspectors reviewed various aspects of the CAAS to determine whether the features met regulatory requirements and license application commitments. The inspectors reviewed test records to determine whether alarm signals were audible within the areas required to be evacuated. The inspectors observed performance of the quarterly test of the building evacuation system howlers. The inspectors reviewed records and interviewed cognizant BWXT staff to determine whether CAAS detector operability was maintained including whether detectors were calibrated, whether all components were functionally tested, whether alarm set points were set to promptly actuate upon detecting the minimum accident of concern, and whether access to alarm set points was strictly controlled.

The inspectors reviewed selected NCS-related CAP entries to determine whether anomalous conditions were promptly identified and entered into the CAP, whether they received the appropriate level of investigation consistent with license commitments and procedures, whether proposed CAs were sufficiently broad, whether they were prioritized on a schedule commensurate with their significance, and whether they were completed as scheduled and were adequate to prevent recurrence as required.

b. Conclusion

No violations of more than minor significance were identified.

B. Radiological Controls

1. Radiation Protection Quarterly (Inspection Procedure 88135)

a. Inspection Scope

The inspectors performed a review and observation of posted radiologically controlled areas for Radiation Work Permit (RWP) 18-0082, "Installation of Recovery Drum Dryer," to verify compliance with License Application Chapter 4, "Radiation Safety;" the Radiation Protection Manual; and implementing procedures. The inspectors reviewed the RWP to verify that it contained required work instructions, was posted in the work area for employee review, and that workers signed the RWP. In addition, the inspectors performed partial reviews of select RWPs during the inspection period in different operational areas to verify RWP compliance.

The inspectors reviewed BWXT's radiation protection program to verify compliance with 10 CFR 20, "Standards for Protection Against Radiation," and license requirements. The inspectors toured the controlled areas to verify that radiological signs and postings accurately reflected radiological conditions within the posted areas. The inspectors observed plant personnel as they removed protective clothing at controlled area step-off pads and as they performed various tasks to verify that proper protective equipment was used to prevent contamination. The inspectors also observed plant employees as they performed exit monitoring at the controlled areas' exits to verify that monitoring instructions were followed at the exit point.

b. Conclusion

No violations of more than minor significance were identified.

C. Facility Support

1. Post-Maintenance Testing (Inspection Procedure 88135.19)

a. Inspection Scope

The inspectors witnessed and reviewed the post-maintenance tests (PMTs) listed below to verify compliance with License Application Chapter 11, "Management Measures," and test procedures to confirm functional capability of safety systems and components (SSCs) following the described maintenance. The inspectors reviewed BWXT's completed test procedures to verify that 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. The inspectors reviewed PMT activities to verify that they were conducted in accordance with applicable work order (WO) instructions or licensee procedural requirements. Furthermore, the inspectors verified that problems associated with PMTs were identified and entered into BWXT's CAP.

- Evaporator 3 Upgrade, Post Modification Test Plan in accordance with Safety Evaluation Request (SER) 17-26 Phase 2, Recovery Evaporator Upgrades
- Maintenance Plan (MP) 3404, "Drain and Flush the Annular Organic Tank" in accordance with WO 20247373, "Drain/Flush Annular Org Tank"
- High-Level Dissolver 3 and 4 Handheld LEL Test Plan dated December 19, 2018, in accordance with CA 20181654, "Failures of HLD Troughs 2 and 3 South LEL Detectors"

b. Conclusion

No violations of more than minor significance were identified.

2. Surveillance Testing (Inspection Procedure 88135.22)

a. Inspection Scope

The inspectors witnessed and reviewed completed test data for the surveillance tests listed below to verify compliance with License Application Chapter 11, "Management Measures," and that risk-significant and safety-related systems met the requirements of the ISA. The inspectors verified the testing effectively demonstrated that the SSCs were operationally capable of performing their intended safety functions and fulfilled the intent of the associated safety-related equipment test requirement.

The inspectors discussed surveillance testing requirements with operators and maintenance personnel performing the associated tasks to verify that test equipment or standards used to conduct the test were within calibration.

- Maintenance Plan (MP) 3161, "Semi-Annual Evaporator Cooling Condenser Integrity Test," as a post modification test for SER 17-026 Phase 02, "Recovery Evaporator Upgrades – Evaporator 3 Upgrade"

- MP 811, "Primary Scrub Tank 06-3, High-Level Probe, Quarterly Test," in accordance with WO 20251233
- MP 3924, "Quarterly Recovery Furnace HEPA Bank System Interlock Check," in accordance with WO 20252581

b. Conclusion

No violations of more than minor significance were identified.

3. Corrective Action Program (Inspection Procedure 88135)

a. Inspection Scope

The inspectors reviewed a sample of items entered into BWXT's CAP during the inspection period to verify that entries pertinent to safety, security, and non-conforming conditions were identified, investigated, and tracked to closure as required in accordance with implementing procedure, QWI 14.1.1, "Preventive/Corrective Action System." The inspectors conducted interviews with BWXT staff and reviewed documents to verify that issues of high-safety significance were identified and reviewed for apparent causes as required. The inspectors reviewed issues requiring extent-of-condition and/or extent-of-cause reviews to verify that the reviews were completed and documented in the applicable CA. The inspectors also reviewed CAs to prevent recurrence of previous issues to verify that they were identified in the CAP and were reviewed and tracked to completion.

Additionally, the inspectors conducted periodic reviews of BWXT audits and third party reviews of safety-significant processes to verify effectiveness and alignment with requirements of the CAP. Specifically the inspectors reviewed the following:

- Physical Inventory Summary Report, April/September 2018
- LMS-2018-003, "RP Audits, Inspections 3rd Quarter 2018"
- NCS Violation and Observation Summary 3rd Quarter 2018
- BWXT NOGL and LTC Radiation Safety Triennial Audit, October 2018

b. Conclusion

No violations of more than minor significance were identified.

4. Permanent Plant Modifications (Inspection Procedure 88135.17)

a. Inspection Scope

The inspectors reviewed the risk-significant plant modification SER 17-026, Phase 02, "Recovery Evaporator Upgrades – Evaporator 3 Upgrade," to verify compliance with the license and the requirements of 10 CFR 70. Specifically, the inspectors evaluated the impacts to associated IROFS and ISA accident sequences in the selected modifications. The inspectors conducted field walkdowns of portions of the modification to validate that the as-found plant configurations were in alignment with the change request documentation and to evaluate the material condition of any associated IROFS. In addition, the inspectors reviewed updates and changes to the ISA/SAR and procedures affected by the modifications, as applicable.

The inspectors reviewed the change request packages for accuracy and to verify adherence to BWXT's change management process, QWI 5.1.12, "Change Management." The inspectors also reviewed the packages to verify that applicable post-maintenance installation and testing requirements were identified in the change request documentation as required; and to verify that BWXT identified and addressed any impacts to the ISA/SAR resulting from modifications as required.

b. Conclusion

No violations of more than minor significance were identified.

5. Plant Modifications (Annual) (Inspection Procedure 88070)

a. Inspection Scope

The inspectors reviewed BWXT's configuration management program to verify compliance with Chapter 11.1, "Configuration Management," of the License and 10 CFR 70.72 requirements. The inspectors reviewed configuration management program documents, performed walkdowns of modifications, and conducted interviews with BWXT managers and engineers to verify BWXT had established an effective configuration management program in accordance with the aforementioned requirements. The inspectors reviewed BWXT's method to evaluate, implement, and track permanent and temporary modifications which could affect safety.

The inspectors reviewed BWXT's change management program procedures and several change request packages and Safety Evaluation Report (SER) packages to verify BWXT instituted adequate pre-job planning and preparation of plant modification packages. The inspectors reviewed QWI 5.1.12, "Change Management," to verify the configuration management system included stipulations that prevented plant modifications from degrading the performance capabilities of IROFS or other safety controls part of the safety design basis.

The inspectors reviewed a selection of plant modification packages that were implemented since the last plant modification inspection, including packages that were completed as a result of the 2017 desiccant vessel accumulation event. The inspectors reviewed these packages and interviewed BWXT staff to verify that the change packages were prepared, reviewed, and completed in accordance with QWI 5.1.12. A temporary change, SER 16-012, was reviewed to verify BWXT followed their process for implementing temporary modifications per QWI 5.1.12 and to determine whether BWXT returned the system to its previous state at the expiration of the change or initiated a SER to make the change permanent.

The inspectors reviewed the change packages to verify BWXT adequately conducted evaluations to determine whether NRC pre-approval was necessary as required by 10 CFR 70.72.

The inspectors performed walkdowns of the RTR UAI_x process area gloveboxes; gloveboxes with prior history of desiccant systems in the Filler, Recovery, and Speciality Fuel Facility (SFF) areas; Sample Room gloveboxes, the Filler area; and Pickling Building to determine if modifications made in the area were installed in accordance with

the approved design drawings and technical reports. The inspectors also observed a change review board meeting to determine whether the meeting was conducted in accordance with QWI 5.1.20, "Change Review Boards."

b. Conclusion

No violations of more than minor significance were identified.

D. Other Areas

1. Observations of Security Personnel and Activities

a. Inspection Scope

During both normal and off-normal plant working hours, the inspectors conducted observations of security force personnel and activities to verify that the activities were consistent with BWXT security procedures and regulatory requirements relating to nuclear plant security.

The inspectors observed a tactical response exercise conducted on October 17, 2018, to verify compliance and assess the effectiveness of BWXT's implementation of protective strategies in accordance with the NRC-approved security plan and procedures. The inspectors also observed the critique process to verify that BWXT identified and captured weaknesses noted during the exercise as required.

These quarterly resident inspectors' observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status reviews and inspection activities.

b. Conclusion

No violations of more than minor significance were identified.

2. (CLOSED) Unresolved Item 2017-06-02: Evaluate Management Measures Applied to Chemical Detector IROFS

In NRC Inspection Report (IR) 70-27/2017-006 (ML17233A035), the NRC identified an unresolved item (URI) associated with the adequacy of management measures applied to chemical detector IROFS in the SFF, which were relied on to detect unsafe chemical conditions related to SNM processes and initiate actions to mitigate or prevent hazards.

BWXT conducted a review to address the open questions and documented their response in "BWXT NOG-L Review of Gas Valve Behavior during Normal Operation and Loss of Power Sequences in the Specialty Fuel Facility (SFF) Facility Alarm System (FAS)." The inspectors reviewed the response to determine whether BWXT complied with regulatory requirements and industry standards regarding the testing of IROFS fail safe features specifically upon loss of power. No issues were identified associated with BWXT's response. This URI is considered closed.

3. (CLOSED) Violation 2018-006-01: Failure to Ensure that High Consequence Accident Sequences Remain “Highly Unlikely” as Required by 10 CFR 70.61(b)”

In NRC IR 70-27/2018-006 (ML18067A098), a violation (VIO) was issued for the failure to ensure that high consequence accident sequences related to the desiccant system on the RTR UAl_x glovebox line remained “highly unlikely” as required by 10 CFR 70.61(b). This regulation requires, in part, that the risk of each credible high consequence event must be limited. Engineered controls, administrative controls, or both, shall be applied to the extent needed to reduce the likelihood of occurrence of the event so that, upon implementation of such controls, the event is *highly unlikely*. Whereas, prior to July 4, 2017, BWXT had failed to limit the risk of a credible high consequence event by applying controls to the extent needed to reduce the likelihood of occurrence so that, upon implementation of such controls, the event was *highly unlikely*. Specifically, BWXT failed to apply sufficient controls to limit the likelihood of an inadvertent criticality to highly unlikely in two unfavorable geometry desiccant vessels located in the RTR area.

The events surrounding this VIO were reported to the NRC as Event Notification (EN)-52840, and discussed in detail in NRC IR 70-27/2017-007 (ML17251A001). BWXT discussed their completed and planned CAs in “60-Day Written Report for Event Notification Number 52840,” dated August 9, 2017, (ML17226A037); and “60-Day Report Additional Information,” dated October 16, 2017, (ML19007A047).

During this inspection, the inspectors reviewed completed CAs related to VIO 2018-006-01. Specifically, the inspectors walked down the UAl_x glovebox line, its inerting system, its filter arrangement, and the associated NDA points. The inspectors reviewed procedures E41-134, “Annual Ductwork Survey,” and OP-0006506, “Crushing and Blending UAl_x,” which incorporated revisions to address the material accumulation event. Additionally, the inspectors observed the operation of the UAl_x glovebox line and interviewed operators and engineers concerning the modifications to the system, safety features, operation, and maintenance of the system. The inspectors reviewed the extent of condition identified in the RCA report CA-2017-00895 and conducted walkdowns of similar glovebox systems identified where the filter arrangement had been changed or where desiccant systems had been removed in response to this event. The inspectors also reviewed NDA reports (including RPTWR 18-043, “Ductwork Surveillance of the HEU UAl_x Box Line”) that documented the performance of the new filter arrangement and filter maintenance plans that specified change out frequencies.

These activities were done to verify that the current system design and operations were as analyzed in the existing ISA and applicable NCS evaluations and to verify that the controls applied by the licensee to limit the risk of a credible high consequence event were implemented in accordance with the specified management measures (e.g., E41-134, “Annual Ductwork Survey”) to limit the likelihood of an inadvertent criticality to highly unlikely. This item is considered closed.

4. (CLOSED) Violation 2018-006-02: Failure to Assure that Under Normal and Credible Abnormal Conditions, the UAI_x Glovebox Air Purifier System was Subcritical as Required by 10 CFR 70.61(d)

In NRC IR 70-27/2018-006 (ML18067A098) a VIO was issued for the failure to assure that under normal and credible abnormal conditions, all nuclear processes are subcritical, as required by 10 CFR 70.61(d). Whereas, BWXT failed to assure that two unfavorable geometry desiccant vessels located in the RTR area remained subcritical under normal and credible abnormal conditions.

The events surrounding this VIO were reported to the NRC as EN-52840 and discussed in detail in NRC IR 70-27/2017-007 (ML17251A001). BWXT discussed their completed and planned CAs in "60-Day Written Report for Event Notification Number 52840," dated August 9, 2017 (ML17226A037); and "60-Day Report Additional Information," dated October 16, 2017 (ML19007A047).

The inspectors walked down the UAI_x glovebox line to verify that the desiccant system, including the unfavorable geometry desiccant vessels, had been removed. The inspectors observed operators conduct activities within the gloveboxes and interviewed operators to verify that they had been trained on the changes on the system and that operations input was considered in making changes to the system. The inspectors also conducted walkdowns and reviewed the new P&IDs for the system to verify that the system configuration and components in the system were controlled by BWXT and matched what was analyzed in the SAR and NCSEs in order to assure that they remain subcritical under normal and credible abnormal conditions. This is also supported by the inspection activities discussed above for VIO 70-27/2018-006-01. Therefore, VIO 70-27/2018-006-02 is considered closed.

5. (DISCUSSED) Violation 2018-006-03: Failure to Maintain Adequate Process Safety Information for Process Systems Associated with the UAI_x Glovebox Systems as Required by 10 CFR 70.62(b)

In NRC IR 70-27/2018-006 (ML18067A098), a VIO was issued for the failure to maintain adequate process safety information to enable the performance and maintenance of the ISA. Specifically, BWXT failed to maintain process safety information pertaining to the hazards, and information pertaining to the technology and equipment, of an air purification system servicing a glovebox line in the RTR area. This failure resulted in a failure to identify potential accumulation of fissile material in two unfavorable geometry desiccant vessels, an inability to adequately perform and maintain BWXT's ISA, and a failure to identify the potential accumulation in the desiccant vessels as a credible accident sequence in the development of BWXT's ISA.

The events surrounding this VIO were reported to the NRC as EN-52840 and discussed in detail in NRC IR 70-27/2017-007 (ML17251A001). BWXT discussed their completed and planned CAs in "60-Day Written Report for Event Notification Number 52840," dated August 9, 2017 (ML17226A037); and "60-Day Report Additional Information," dated October 16, 2017 (ML19007A047).

The inspectors interviewed cognizant BWXT personnel and reviewed records related to the implementation of the BWXT's CAs related to the failure to maintain adequate process safety information. BWXT has completed, or is working on, a number of

activities related to improving their safety basis information. Specifically, developing P&IDs for the UAI_x glovebox line, ensuring the NCS and nuclear material control functions (with input from operations) work together to conduct improved NDAs, conducting surveys for material accumulations to verify the performance of IROFS filters, creating glovebox penetration lists, improving the specifications and procedural requirements related to filters, and identifying and addressing ancillary systems that were not part of an existing safety basis (e.g., removing unanalyzed desiccant systems). However, CAs to establish a set of single NCS evaluations containing the safety basis for all processes have not been officially started, although planning has been completed and some initial work performed. Due to the fact that this CA is still in an early stage, this item will remain open.

E. Exit Meeting

On October 25, December 13, 2018, and January 15, 2019, the inspectors presented the inspection results to Mr. B. J. Burch and members of the BWXT staff. No dissenting comments were received from BWXT. Proprietary information was discussed, but not included in the report.

SUPPLEMENTAL INFORMATION

1. KEY POINTS OF CONTACT

Licensee Personnel

<u>Name</u>	<u>Title</u>
J. Burch	Vice President and General Manager
J. Calvert	Environmental, Safety, Health and Security Program Manager
K. Conway	Manager, Radiation Protection
M. Edstrom	Fire Protection Engineer
D. Faidley	Nuclear Criticality Safety Manager
R. Harvey	Manager, Waste Operations
J. Howard	Manager, Waste Treatment Facility
V. Mauney	UPRR Department Manager
L. Morrell	Environmental Protection and Industrial Safety Manager
L. Ragland	Unit Manager, Recovery and Maintenance
A. Rander	Security Department Manager
C. Reed	Operations Department Manager
H. Shaffer	Engineering Department Manager
D. Spangler	Section Manager, Nuclear Safety and Licensing
C. Terry	Unit Manager, Licensing and Safety Analysis
D. Ward	Environmental, Safety, Health, and Safeguards Department Manager

2. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened/Closed

NCV	2018-05-01	Charge Jar Mass Overload (Paragraph A.5)
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Closed

URI	2017-006-02	Evaluate Management Measures Applied to Chemical Detector IROFS (Paragraph D.2)
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VIO	2018-006-01	Failure to Ensure that High Consequence Accident Sequences Remain "Highly Unlikely" as Required by 10 CFR 70.61(b) (Paragraph D.3)
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VIO	2018-006-02	Failure to Assure that Under Normal and Credible Abnormal Conditions, the UAI _x Glovebox Air Purifier System was Subcritical as Required by 10 CFR 70.61(d) (Paragraph D.4)
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Discussed

VIO	2018-006-03	Failure to Maintain Adequate Process Safety Information for Process Systems Associated with the UAI _x Glovebox Systems as Required by 10 CFR 70.62 (b) (Paragraph D.5)
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3. **INSPECTION PROCEDURES USED**

88015	Nuclear Criticality Safety
88020	Operational Safety
88070	Plant Modifications
88135	Resident Inspection Program for Category I Fuel Cycle Facilities
88135.02	Plant Status
88135.04	Operational Safety
88135.05	Fire Protection (Quarterly / Annual)
88135.17	Permanent Plant Modifications
88135.19	Post-Maintenance Testing
88135.22	Surveillance Testing

4. **DOCUMENTS REVIEWED**

Records

BWXT NOG-L Review of Gas Valve Behavior during Normal Operation and Loss of Power Sequences in the Specialty Fuel Facility (SFF) Facility Alarm System (FAS), dated June 9, 2017

CAS Logs, December 12 to 17, 2018

CHG-00003703, Delete Ventilation Water Trip IROFS from SAR 15.34

LMS-2018-003, RP Audits, Inspections 3rd Quarter 2018, dated November 7, 2018

LTC M23-1993 Laboratory Analysis Leakage – Station 8 Glovebox

N-79 Form for CA-2018-0679, Evaluation of Unusual Incidents, dated May 28, 2018

N-79 Form for CA-2018-0754, Evaluation of Unusual Incidents, dated June 19, 2018

N-79 Form for CA-2018-0913, Evaluation of Unusual Incidents, dated August 15, 2018

NCS Posting 15-22-32, Dessicator Racks and Carts, Revision (Rev.) 1

NCS Organization 2018, NCS Annual Training and Computer Validation, dated October 17, 2018

NCS-03-3, Weekly Inspection Form for May, June, July, August, September, and portions of October 2018

NCS-1983-019, RTRFE – Aluminum Shop License, dated April 5, 1983

NCS-1983-42, Arc Melt Furnace – NRC Question, dated October 25, 1983

NCS-1983-52, License Change Evaluation Request #190 High-Enriched Uranium Fuel Powder Processing (Phase II, dated August 5, 1983)

NCS-1984-053, RTRFE Compacting Room, dated August 3, 1984

NCS-1995-052, NCS Evaluation of the General Purpose Area in Fuel Recovery – LER 95-28, dated August 24, 1995

NCS-2016-048, NCS Safety Analysis Supporting SER 16-012 Phase 01 – Fuel Filler Trial, dated June 29, 2016

NCS-2017-110, Safety Concern Analysis for RTR UAIX Glovebox Purification System - Desiccator Unit Uranium Accumulation, dated July 6, 2017

NCS-2017-111, NCS Justification Analysis to Remove Filtration Media from Purification Units per RWP 17-054, dated July 11, 2017

NCS-2017-029, NCS Safety Analysis Supporting SER 17-003, Phase 01, HP-ACT Filler with Type N7, February 21, 2017

NCS-2017-120, RTR Desiccant Unit U235 Accumulation Flow Path Review, dated August 9, 2017

NCS-2017-143, Safety Concern Analysis for Improperly Fitted Pre-Filter on a Pharmacy Area Glovebox, dated August 24, 2017

NCS-2017-144, Safety Concern Analysis for Improperly Fitted Pre-Filter in Recovery and RTR gloveboxes, dated September 5, 2017
 NCS-2017-178, NCS Safety Analysis to Delete the Ventilation Water Trap from SAR 15.34 and Scenarios, dated October 24, 2017
 NCS-2017-193, Extent of Condition Review of 9-Inch Donaldson Prefilters, dated December 1, 2017
 NCS-2018-039, NCS Safety Analysis Supporting SER 18-005 Phase 01 – Virginia Technology Core (VTC) Development Phase 1(0), dated March 8, 2017
 NCS-2018-075, Safety Concern Analysis for Moderation Mass Log Error at the RTR HEU Compact Press Glovebox Line – Posting 15-22-017 (CA-2018-00679)
 NCS-2018-016, REVISED NCS Justification Analysis to Support RTR HEU Powder Glovebox System Upgrade per SER 17-038 Phase 1 and 2, dated February 5, 2018
 NCS-2018-017, Nuclear Safety Release for SER 17-038 Phase 2; Support RTR HEU Powder Glovebox System Update, dated February 15, 2018
 NCS-2018-045, NCS Justification Analysis Supporting the Removal of Desiccant Container from the AGR Compacting Facility Glovebox, dated March 14, 2018
 NCS-2018-052, NCS Justification Analysis Supporting the Removal of Desiccant Container from the RTR Pharmacy Glovebox per RWP 18-011, dated March 30, 2018
 NCS-2018-081, Technical Work Record–Extent of Condition Review Associated with Root Cause #1 for July 4, 2017, RTR Event, dated May 31, 2018
 NCS-2018-084, Evaluation of Drawing and P&ID Requirements Supporting QWIs 5.1.12 and 2.1.03, dated May 31, 2018
 NCS-2018-093, Safety Concern Analysis for Wet Vacuum Pump System High-Level Probe Failure (CA-2018-0754), dated June 18, 2018
 NCS-2018-099, Review of NCS Assumptions for HEU Gloveboxes, dated June 28, 2018
 NCS-2018-114, Safety Concern Analysis
 NCS-2018-129, NCS Safety Evaluation for Pickle Room, dated August 29, 2018
 NMC-112818 FINAL, 2018 Annual Plant Ductwork Survey Final Report, dated November 28, 2018
 Qualification Records for NCS Staff (senior NCS engineer)
 Recovery Foremen’s Daily Shift Activity Logs, October 19 to 24, 2018
 RP-07-103 Form 1, Sounding of the Building Evacuation System, January 24, April 9, and July 26, 2018
 RP-07-104 Form 1, NOG-L CIDAS MkXI Criticality System Calibration, dated December 27, 2017
 RP-10-06 Form 1, Review and Approval of Nuclear Safety Training Scripts, Outlines, or Tests, dated August 27, 2018
 RPTWR 18-043, Ductwork Surveillance of the HEU UAix Box Line, dated November 26, 2018
 RWP 18-0082, Installation of Recovery Drum Dryer
 SER 11-05, Phase 01, New Bay 3T Building for Manufacturing/Storage of NR Components/Materials, dated February 25, 2013
 SER 16-010, Phase 01, Automated Dispenser Relocation, dated April 27, 2016
 SER 16-012, Phase 01, HP-ACT Filler Trial, dated June 15, 2016
 SER 16-018, Phase 01, Storage Locations, August 30, 2016
 SER 17-003, Phase 01, HP-ACT Filler with Type N7 Fuel Fabrication Study, February 24, 2017
 SER 17-026, Phase 02, Recovery Evaporator Upgrades – Evaporator 3 Upgrade, October 22, 2018
 SER 17-038, Phase 1 and Phase 2, RTR Fuel Fabrication Glovebox Upgrades

SER 17-048, Phase 01, Recovery Drum Dryer and Weigh/Sample Glove Box
 Replacement approved August 30, 2018
 SER 18-030, Phase 01, Bay 7A Pickle Process, Infrastructure, and Utilities, dated
 August 9, 2018
 Solumina Move Ticket (SMT)-0040149-001
 SMT-0040149-003
 SMT-0040149-005

Procedures

A62-01, Safety Evaluation Requests (SERs), Rev. 37
 E41-134, Annual Ductwork Survey, Rev. 16
 E46-96, Operation of the Inspector 1000, Rev. 0
 NCS-05, Moderation Control, Rev. 09
 NCSE-02, Nuclear Criticality Safety Analysis and Quality Assurance Reviews, Rev. 45
 and Rev. 46
 NCSE-03, Nuclear Criticality Safety Audits and Inspections, Rev. 28
 NCSE-07, Qualification and Training Requirements for a Nuclear Criticality Safety
 Engineer, Rev. 17
 OP-61137, General Purpose Area A/B, Rev. 46
 OP-61146, Deep Well Gamma Counter Operation, Rev. 16
 OP-61246, Filling Circulation Sampling and Draining Solution in Columns and Tanks,
 Rev. 26
 OP-0006505, Crushing and Blending UAlx, Rev. 13
 QWI 2.1.2, Preparation and Maintenance of Safety Analysis Reports, Rev. 17
 QWI 2.1.3, Integrated Safety Analysis Methodology, Rev. 18
 QWI 2.2.1, Preparation of Quality System Procedures, Instructions, and Other
 Documents, Rev. 20
 QWI 4.1.4, Design Reviews, Rev. 4
 QWI 4.1.5, Design Criteria for NRC Licensed Activities, Rev. 18 and Rev. 19
 QWI 5.1.7, Safety Evaluation Requests, Rev. 35
 QWI 5.1.12, Change Management, Rev. 33
 QWI 5.1.12, Attachment 3, Technical Review Board Definition, Rev. 3
 QWI 5.1.12, Attachment 5, Flow Diagram of Change Request Routing, Rev. 7
 QWI 5.1.20, Change Review Board, Rev. 10
 QWI 9.1.17, Solumina Work Order Alterations, Rev. 10
 QWI 14.1.1, Preventive/Corrective Action System, Rev. 39
 QWI 14.1.4, Reporting Unusual Incidents, Rev. 12
 QWI 14.1.10, Safety Evaluation of Unusual Events, Rev. 17
 QWI 17.1.1, Environmental, Safety, Health, and Safeguards Audit Program, Rev. 12
 QWI 18.1.1, Safety Training, Rev. 10
 QWI 18.1.2, Training and Qualification for Material Control and Accounting Functions,
 Rev. 12
 QWI 18.1.3, On-The-Job Training, Rev. 08
 RP-06, Radiation Work Permit, Rev. 14
 RP-07-103, Maintaining and Testing of the CIDAS MkXI Criticality Monitoring System,
 Rev. 7
 RP-07-104, CIDAS MkXI Detector Calibration, Rev. 02
 Safeguards Procedure SP.18, Security Equipment Testing, Rev. 34

Other Documents

10 CFR 70.72 Change Evaluation Checklist N-517, Rev. 10
 2018 Annual Ductwork Survey, conducted October 1 to 18, 2018
 2018 SER Originator Training
 Change Review Board Meeting Minutes, dated January 19 and February 9, 2017
 Change Review Board Meeting Minutes, dated August 23, 2018
 Internal Audit Summary Report, February 2018
 MP 811, Primary Scrub Tank 06-03, High-Level Probe, Quarterly Test
 MP 3161, Semi-Annual Evaporator Cooling Condenser Integrity Test
 MP 3404, Drain and Flush the Annular Organic Tank
 MP 3924, Quarterly Recovery Furnace HEPA Bank System Interlock Check
 N-50 Employee Review of Area Document Posting 15-34-015, Rev. 2
 N-50 Employee Review of Area Document Posting 15-34-016, Rev. 1
 N-50 Employee Review of Area Document Posting 15-34-018, Rev. 1
 N-50 Employee Review of Area Document Posting 15-34-020, Rev. 0
 N-50 Employee Review of Area Documents, Rev. 6
 N-50 Employee Review of Area Documents (sample room training), dated June 12, 2017
 NCS Training 2018 Annual Refresher, dated July 9, 2018
 NCS Violation and Observation Summary 3rd Quarter 2018, dated November 12, 2018
 Physical Inventory Summary Report, April/September 2018
 Radiation Safety Triennial Audit, October 2018
 Records and Information Management, Rev. 3
 SAR 15.12, Liquid and Solid Waste Handling Processes in Uranium Recovery, Rev. 79
 SAR 15.22, RTRT (Research Test Reactor and Targets) Fuel Powder and Compact Processes, Rev. 87
 SAR 15.33, Vault Operations, Rev. 41
 SAR Appendix 15.34, Rev. 24, Rev. 25, and Rev. 27
 SMT-0040149-003, Filler Fuel Development Job 720 and Filler Dummy Development Job 720, dated January 11, 2017
 Status of Temporary SERs, dated October 24, 2018
 Taproot Root Cause Report for CA-2017-0895
 Vendor Manual Purge and Pressure Control System Model PPC-2 User Guide
 Weekly Inspection Schedule 4th Quarter 2018, dated September 24, 2018

Change Packages

3807, 3822, 4215, 4250, 4361, 4372

Maintenance Plans

2265, 4334

Work Orders

20247373 20251233 20252122 20252581

Corrective Actions

2015-1256	2017-0895	2017-1238	2017-1288	2017-1491	2018-0076
2018-0474	2018-0552	2018-0561	2018-0659	2018-0665	2018-0679
2018-0754	2018-0896	2018-0913	2018-1103	2018-1227	2018-1234
2018-1352	2018-1454	2018-1473	2018-1481	2018-1654	COM 61923
COM 64663	COM 64668	COM65028	COM 65135	COM 65772	COM 69917