



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

EN 54117  
EN 52840

January 24, 2020

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 70-27/2019-005

Dear Mr. Burch:

This letter refers to the inspections conducted from October 1 through December 31, 2019, at the BWXT Nuclear Operations Group, Inc. (NOG) facility in Lynchburg, VA. The purpose of the inspection was to determine whether activities authorized under the license related to the implementation of programs and procedures in the areas of safety operations, radiological controls, and facility support were conducted safely and in accordance with U.S. Nuclear Regulatory Commission (NRC) requirements. The results were discussed with you and members of your staff at exit meetings held on October 24 and 30, 2019; and January 16, 2020.

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, 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 70-27/2019-005  
w/Attachment: Supplemental Information

cc w/encl: Distribution via LISTSERV

SUBJECT: BWXT NUCLEAR OPERATIONS GROUP – NUCLEAR REGULATORY  
 COMMISSION INTEGRATED INSPECTION REPORT 70-27/2019-005 dated  
 January 24, 2020

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 ADAMS: ☒ Yes ACCESSION NUMBER: **ML20024F642** ☒ SUNSI REVIEW COMPLETE ☒ FORM 665  
 ATTACHED

OFFICE	RII/DFFI	RII/DFFI	RII/DFFI	RII/DFFI	RII/DFFI	RII/DFFI
NAME	A. Alen	T. Sippel	P. Glenn	N. Peterka	P. Startz	N. Pitoniak
DATE	1/13/2020/	11/28/2019	11/21/2019	11/29/2019	1/20/2020	11/28/2019
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

  

OFFICE	RII/DFFI	RII/DFFI	RII/DFFI	RII/DFFI
NAME	K. Womack	B. Adkins	R. Gibson	E. Michel
DATE	11/19/2019	11/29/2019	12/11/2019	01/21/2020
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO

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**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION II**

Docket No: 70-27

License No: SNM-42

Report No: 70-27/2019-005

Enterprise Identifier: I-2019-005-0031

Licensee: BWX Technologies, Inc. (BWXT)

Facility: Nuclear Operations Group, Inc. (NOG)

Location: Lynchburg, VA 24505

Inspection Dates: October 1 through December 31, 2019

Inspectors: A. Alen, Senior Resident Inspector  
P. Glenn, Fuel Facility Inspector (Section A.6)  
N. Peterka, Fuel Facility Inspector (Section A.6)  
N. Pitoniak, Senior Fuel Facility Inspector (Section C.5)  
T. Sippel, Fuel Facility Inspector (Section C.5)  
P. Startz, Fuel Facility Inspector (Section C.4)  
K. Womack, Fuel Facility Inspector (Section C.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 70-27/2019-005  
October 1 – December 31, 2019

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

### **Safety Operations**

- No violations of more than minor significance were identified related to Plant Operations and Operational Safety walkdowns. (Sections A.1 and A.2)
- No violations of more than minor significance were identified related to the Fire Protection Program. (Sections A.3 and A.4)
- No violations of more than minor significance were identified related to the Nuclear Criticality Safety Program. (Sections A.5 and A.6)

### **Radiological Controls**

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

### **Facility Support**

- No violations of more than minor significance were identified related to Post-Maintenance and Surveillance Testing. (Sections C.1 and C.2)
- No violations of more than minor significance were identified related to the Identification and Resolution of Problems. (Section C.3)
- No violations of more than minor significance were identified related to the Plant Modifications Program. (Section C.4)
- No violations of more than minor significance were identified related to the Evaluation of Exercises and Drills Program. (Section C.5)

### **Other Areas**

- No violations of more than minor significance were identified related to observations of security personnel and activities. (Section D.1)
- Violation 2018-006-03, Failure to Maintain Adequate Process Safety Information for Process Systems Associated with the UAI<sub>x</sub> Glovebox Systems as Required by 10 CFR 70.62(b), was discussed and remains open. (Section D.2)

### **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 Title 10 of the *Code of Federal Regulations* (10 CFR) 70, "Domestic Licensing of Special Nuclear Material." Daily operational and shift turnover meetings were observed throughout the period to gain insights into process safety and operational issues. The inspectors reviewed selected licensee-identified issues and corrective actions (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 the licensee 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 the licensee 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 the licensees' emergency response facilities to verify that the facilities were maintained in a readily available status as required.

The inspectors attended various meetings, including the Change Review Board, Safety Review Board, 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 the licensee'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." In particular, the inspectors reviewed Event Notification (EN) 54117 submitted on June 13, 2019, following the discovery of potentially degraded toxic and flammable gas detector IROFS in the specialty fuel facility (SFF) area of UR. Specifically, during a calibration methodology review, the licensee identified that calibration surveillances for the detectors were not being conducted in accordance with written instructions nor vendor recommendations. This EN was subsequently withdrawn on June 27, 2019, after licensee staff gained a better technical understanding of the issue and determined that the performance requirements of 10 CFR 70.61 were still met. The inspector reviewed the licensee's evaluation supporting the EN withdrawal to confirm that the circumstances and effects of the identified performance issues did not require reporting under 10 CFR 70.

b. Conclusion

No violations of more than minor significance were identified.

2. Operational Safety (Inspection Procedure 88135.04)

a. Inspection Scope

The inspectors reviewed safety-significant systems, structures, and components involved with the processing and handling of SNM in the pickling and element stacking areas associated with safety analysis reports (SARs) 15.37, "Higher Tier Assemblies" to verify compliance with the license and procedures. The inspectors conducted walkdowns of selected process areas to verify the as-built configurations matched approved plant drawings and to verify that there were no conditions which could degrade equipment performance including the operability of IROFS, safety-related devices, or other support systems required for safety. The inspectors observed operator performance at selected processes to verify they complied with safety controls associated with the IROFS systems and instrumentation for maintaining plant safety. The inspectors also reviewed IROFS assumptions and controls to verify proper implementation in the field. The inspectors reviewed the related integrated safety analyses (ISA) to verify the availability, reliability, and capability of the systems to perform their safety functions were not affected by outstanding design issues, temporary modifications, operator workarounds, adverse conditions, or other system-related issues.

The inspectors reviewed procedures, drawings, and related ISAs to verify the following, as appropriate, during the walkdowns:

- controls were in place for potential criticality, chemical, radiological, and fire safety hazards
- process and transport configurations were maintained in accordance with nuclear criticality safety evaluations (NCSEs)
- supporting structures, systems, and components were correctly aligned, labeled, lubricated, cooled, and ventilated
- hangers and supports were correctly installed and functional
- cabinets, cable trays, and conduits were correctly installed and functional
- material condition of visible cabling
- no interference of ancillary equipment or debris with system performance



b. Conclusion

No violations of more than minor significance were identified.

3. Fire Protection Quarterly (Inspection Procedure 88135.05)

a. Inspection Scope

The inspectors performed an inspection of bays 4A, 5A, 7A, and 8A to verify compliance with license application Chapter 7, "Fire Safety," and the National Fire Protection Association (NFPA) 801, "Standard for Fire Protection for Facilities Handling Radioactive Materials," as required. 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 plans before and during the walkdowns to verify that key fire-fighting features and information identified in the plans were in place in the field and that fire hazards that existed in the field were reflected in the pre-fire plans. 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. Fire barriers 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 controlled and minimized as required.

b. Conclusion

No violations of more than minor significance were identified.

4. Fire Protection Annual (Inspection Procedure 88135.05)

a. Inspection Scope

The inspectors reviewed the licensee's fire protection (FP) program to verify compliance with selected portions of 10 CFR 70, "Domestic Licensing of Special Nuclear Material;" License Application Chapter 7, "Fire Safety;" Chapter 11, "Management Measures;" and applicable procedures. Specific areas of the FP program reviewed are detailed below. Documents reviewed are listed in the Attachment.

Fire Brigade Drill/Readiness

The inspectors observed various annual emergency team (i.e., fire brigade) training activities to verify compliance with NFPA 600, "Standard on Industrial Fire Brigades," and applicable emergency team procedures. On October 19, 2019, the inspectors observed classroom and practical training sessions, including a 'live-fire' exercise, for the use of self-contained breathing apparatus (SCBA), use of forcible entry tools (e.g., halligan bar and flat-head axe) for gaining facility access, and conduct of search and rescue operations. The inspectors also observed fire brigade members conduct an inventory of fire brigade equipment associated with both the white and red emergency response vehicles (i.e., fire engine trucks) designed and intended for fire suppression, rescue, and other specialized functions. On October 30, 2019, the inspectors observed

fire brigade performance during a 'live-fire' emergency exercise drill. The drill consisted of an onsite transportation accident event involving a fire, mixed waste spill, and airborne hazardous chemical release. The inspectors observed fire brigade leader command and control, donning and use of turnout gear and SCBA, availability of firefighting equipment, clear and effective radio communications, coordination of unnecessary personnel, investigation of the incident, and implementation of pre-planned strategies.

#### Identification and Resolution of Problems

The inspectors reviewed a sample of items entered into the licensee's CAP since the last annual inspection to ensure that entries pertinent to fire-related events and non-conforming conditions (e.g., FP equipment, human performance, and program issues) were identified, investigated, and tracked to resolution in accordance with implementing procedure QWI 14.1.1, "Preventive/Corrective Action System." 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 records. The inspectors reviewed the 2019 second- and third-quarter general safety audit reports performed by Industrial Health and Safety (IH&S) personnel to ensure that the facility was being audited quarterly, as required by the license and that identified issues were entered into the CAP. Additionally, the inspectors reviewed FP system out-of-service/impairment records to verify that compensatory measures had been put in place for out-of-service, degraded, or inoperable fire protection equipment, systems, or features as required by HS-03-10, "Control of Fire Protection System Impairments."

The inspectors conducted a broad review of FP program procedures to verify they contained requirements for routine FP equipment and system inspections. The inspectors conducted an in-depth review of inspection procedures HS-FP-006, "Portable Fire Extinguishers Inspection," and HS-FP-018, "Fire Barrier/Fire Damper Inspection," to verify inspection requirements were consistent with applicable NFPA standards. Additionally, the inspectors interviewed and accompanied IH&S technicians while performing monthly portable fire extinguisher inspections to verify inspections were being conducted in accordance with the implementing procedure. The inspectors also conducted independent walkdowns of all portable fire extinguishers and fire dampers credited as IROFS in the container storage building (CSB) and bay 17 storage area and reviewed recent inspection records to verify they were maintained and capable of performing their intended safety function. Additionally, the inspectors conducted walkdowns of other credited IROFS, such as the CSB fire suppression systems, fire water storage tanks, and distribution system, to evaluate their material condition and verify that their configuration was consistent with system drawings.

#### Training Compliance

On December 19, 2019, the inspectors observed a portable fire extinguisher 'hands-on' training session for new and current operators working in areas which relied on fire extinguisher as IROFS (i.e., CSB and bay 17 storage area) and other fire-sensitive areas (i.e., RTR and UR facilities). The inspectors reviewed a sample of portable fire extinguisher hands-on training records and discussed the training with operators to confirm their participation. Additionally, the inspectors reviewed the annual read-and-sign FP training material, RTP-OCT-2019: Fire Protection, required for all BWXT site employees, vendors, and contractors to ensure it communicated expected fire prevention and fire response techniques as well as relevant information specific to

fires and fire hazards that could be expected at the facility. The inspectors also reviewed training records to verify that offsite responders received annual training in the areas of nuclear criticality safety (NCS), radiological safety, and site emergency response.

b. Conclusion

No violations of more than minor significance were identified.

5. Nuclear Criticality Safety (Inspection Procedure 88135.02)

a. Inspection Scope

The inspectors reviewed the NCS program to verify compliance with license application Chapter 5, "Nuclear Criticality Safety;" the Nuclear Criticality Safety Manual; and implementing procedures. The inspectors conducted routine 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 observed operator performance to verify compliance with requirements associated with NCS-related IROFS.

As part of routine day-to-day activities onsite, the inspectors reviewed corrective action program (CAP) entries associated with criticality safety. The inspectors evaluated the licensee'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

No violations of more than minor significance were identified.

6. Nuclear Criticality Safety (Inspection Procedure 88015)

a. Inspection Scope

The inspectors reviewed the NCS program to verify compliance with selected portions of 10 CFR 70, "Domestic Licensing of Special Nuclear Material;" License Application Chapter 2, "Organization and Administration;" Chapter 5, "Nuclear Criticality Safety;" and applicable procedures. Specific areas of the NCS program reviewed are detailed below.

Criticality Analysis

The inspectors reviewed selected NCSEs and technical reports to verify that they were consistent with the commitments in the license application. These commitments included the double contingency principle, assurance of sub-criticality under normal and credible abnormal conditions with the use of sub-critical margin, having properly reviewed and approved NCSEs in place prior to conducting new or changed operations, as well as technical practices and methodologies outlined in Section 5.2.5, "Safety Factors," of the license application as applicable to moderator control, fixed absorbers, and structural integrity. The inspectors reviewed the selected NCSEs to determine whether calculations were performed within their validated area of applicability, applied

the appropriate margin of sub-criticality, and were consistent with the validation report. The NCS documents reviewed are listed in the Attachment.

The inspectors reviewed the licensee's generation of accident sequences to determine whether the NCSEs systematically identified normal and credible abnormal conditions in accordance with the commitments and methodologies in the license application for the

analysis of process upsets. The inspectors reviewed assumptions made for upset conditions to verify they were clearly described, appropriately conservative, and matched the calculation input files. The inspectors also reviewed the protection and prevention scores assigned in the accident sequences to determine whether they were consistent with procedural guidance and resulted in the scenario being highly unlikely.

#### Criticality Implementation

The inspectors performed walkdowns in UR, pharmacy/filler areas, and RTRT to determine whether existing plant configuration and operations were covered by and consistent with the process description and safety basis in the selected NCSEs. The inspectors reviewed process and system descriptions, test results, and specifications to verify that engineered controls established in the NCSEs were included and being implemented as specified. The engineered controls reviewed included fixed absorbers, barriers to moderator, geometry and mass restraints, and controls on spacing. The inspectors reviewed operating procedures and postings to verify that selected administrative controls established in the NCSEs were included. The administrative controls reviewed included spacing, mass, material, and moderator controls. The inspectors interviewed operations management and engineers to verify that administrative actions established in the NCSEs were implemented as specified.

The inspectors reviewed portions of the ISA summary (specifically SAR 15.22, "RTRT Fuel Powder and Compact Processes") and supporting ISA documentation (SAR Appendices) to determine whether the controls identified in the ISA were supported by technical bases in the NCSEs. These controls included fixed absorber, spacing, geometry, mass, and moderation controls in the highly enriched uranium (HEU) powder glovebox line, as well as selected controls in other areas where NCSEs were reviewed or walkdowns were conducted. The inspectors also reviewed the IROFS documented in the NCSEs and ISA.

#### Criticality Operational Oversight

The inspectors reviewed records of quarterly NCS audits and accompanied an NCS engineer on a weekly walkdown of the SFF, to determine whether NCS staff routinely assessed field compliance with established NCS controls. Additionally, the inspectors interviewed NCS engineers and reviewed records to verify that the NCS engineers prepared for the walkdowns, maintained records of walkdowns and audits, and findings were communicated to management as required. The records of NCS audits and records of weekly walkdowns reviewed included those listed in the Attachment.

#### Criticality Programmatic Oversight

The inspectors reviewed NCSE-07, "Qualification & Training Requirements for a Nuclear Criticality Safety Engineer," Rev. 18, to determine whether the revisions to the procedure

were in accordance with the requirements in Section 2.1.6, "Nuclear Criticality Safety Engineers," of the license application.

The inspectors reviewed NCS staff qualification records to verify that licensee staff who were qualifying as NCS auditors and senior NCS engineers were qualified in accordance with license requirements.

#### Criticality Incident Response and Corrective Action

The inspectors reviewed selected NCS-related CAP entries and safety concern analyses to verify that anomalous conditions were promptly identified and entered into the CAP, that they received the required level of investigation, and that an extent of condition was performed when required by licensee procedures. The inspectors reviewed selected associated CAs to verify that they were sufficiently broad, completed, and fixed the condition. Additionally, the inspectors reviewed the selected CAP entries to assess whether licensee personnel followed regulatory requirements and procedures with regards to reporting plant conditions to the NRC. The safety concern analyses and CAP entries reviewed are listed in the Attachment.

#### b. Conclusion

No violations of more than minor significance were identified.

### **B. Radiological Controls**

#### 1. Radiation Protection Quarterly (Inspection Procedure 88135)

##### a. Inspection Scope

On October 31, 2019, the inspectors reviewed and observed radiologically controlled areas for radiation work permit (RWP) 19-0055, "Deconstruction and Disposal Activities in Bays 1A/2A/3A - Task 4: Plasma Cutting of Large Metals," to verify compliance with license application Chapter 4, "Radiation Safety;" the Radiation Protection Manual; and implementing procedures. The inspectors verified the RWP 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 selected RWPs during the inspection period in different operational areas. Documents reviewed are listed in the Attachment.

The inspectors reviewed the 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 required protective equipment was used to prevent contamination. The inspectors also observed plant employees as they performed exit monitoring at the controlled area 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 test (PMT) listed below to verify compliance with license application Chapter 11, "Management Measures," and test procedures and/or work order (WO) instructions to confirm functional capability of safety systems and components (SSCs) following maintenance. The inspectors reviewed the licensee's completed test procedures to verify that SSC safety function(s) that may have been affected by the maintenance activity 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 reviewed and approved, as required. The inspectors also witnessed and/or reviewed the test data to verify that test results adequately demonstrated restoration of the affected safety function. Furthermore, the inspectors verified that issues associated with the PMT were identified and entered in the licensee's CAP. Additional documents reviewed are listed in the Attachment.

- Maintenance Plan (MP) 11-P-029, "Pickling Tank 3-10 Automatic Dump Valve (IROFS) Testing Following Valve Disassembly to Replace Tank Drain Flange," on October 3, 2019. WO 20271384, "Replace Flange on Tank 3-10"
- OP-1014662, "Functional Test 'Dry-Run' (i.e., without fuel) of Workstation 260 – ADUN Dissolver Number 2 Solution Preparation for TRISO Fuel," December 10 and December 11, 2019

#### 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/or reviewed completed test data for the surveillance test 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. Additional documents reviewed are listed in the Attachment.

- E41-134, "Annual Ductwork Survey in RTR," on October 9, 2019

#### b. Conclusion

No violations of more than minor significance were identified.

3. Identification and Resolution of Problems (Inspection Procedure 88135.02)

a. Inspection Scope

The inspectors reviewed a sample of items entered into the CAP during the inspection period to ensure that entries pertinent to safety, security, and non-conforming conditions were identified, investigated, and tracked to resolution in accordance with implementing procedure QWI 14.1.1, "Preventive/Corrective Action System." The inspectors conducted interviews with licensee 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 records. 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 licensee 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:

- 1<sup>st</sup> Quarter 2019 Health Physics Audit dated March 28, 2019
- 2<sup>nd</sup> Quarter 2019 Health Physics Audit dated June 27, 2019
- 3<sup>rd</sup> Quarter 2019 Health Physics Audit dated September 30, 2019

b. Conclusion

No violations of more than minor significance were identified.

4. Plant Modifications (Inspection Procedure 88070)

a. Inspection Scope

The inspectors reviewed the configuration management program and associated change management programmatic procedures to verify that facility modifications were implemented in compliance with Chapter 11.1, "Configuration Management," of the license application and 10 CFR 70.72 regulatory requirements.

The inspectors reviewed samples of configuration management program documents, performed walkdowns of equipment modifications, and conducted interviews with licensee managers and engineers to verify that the licensee was implementing plant facility changes in accordance with the above configuration management requirements. The inspectors performed selected walkdowns of facility and equipment modifications to evaluate compliance with associated work instructions and supporting documentation as required by the configuration management program. The inspectors focused on changes and related analysis methods and processes used to evaluate, implement, and track temporary and permanent facility modifications which could affect operational safety.

The inspectors reviewed samples of the change management program procedures and safety evaluation reports (SERs) to verify that they contained the required pre-job planning and that the preparation of plant modification packages were in compliance with the requirements listed above. The inspectors reviewed QWI 5.1.12, "Change Management," to verify that the configuration management system addressed

preventing plant modifications from degrading the performance capabilities of IROFS or other safety controls as bounded by the safety design basis.

The inspectors reviewed a selection of plant modification work packages that were implemented since the last plant modification inspection, listed in the Attachment, including some ongoing long-term projects that had been initiated within the previous 24 months. The inspectors reviewed the packages and interviewed staff to verify that the change request work packages were prepared, reviewed, and completed in accordance with QWI 5.1.12. The inspectors reviewed a facility process change, SER 16-322, "U-Metal Dissolution, Phase 1," to verify that licensee personnel followed approved processes for implementing modifications per QWI 5.1.12 and to determine whether licensee personnel returned the systems to their previous states at the expiration of the change or initiated a SER to make the change permanent. The inspectors reviewed the nuclear safety release for U-metal dissolution in conversion facility dissolver #2 dated July 31, 2018, to verify that equipment modification was implemented in accordance with the associated NCS requirements.

The inspectors reviewed samples of additional change packages listed in the Attachment, to verify that the licensee conducted evaluations to determine whether NRC pre-approval was necessary as required by 10 CFR 70.72.

The inspectors performed walkdowns of the filler area to determine if modifications being made in the area were being performed in accordance with the approved work plans and did not negatively impact the safety requirements of adjacent operations. The inspectors also attended a change review board meeting to determine whether the meeting was conducted in accordance with QWI 5.1.20, "Change Review Board."

b. Conclusion

No violations of more than minor significance were identified.

5. Evaluation of Exercises and Drills (Inspection Procedure 88051)

a. Inspection Scope

The inspectors observed and evaluated the licensee's graded biennial exercise conducted on October 30, 2019, as well as briefings and critiques involving both onsite and offsite participants to verify compliance with 10 CFR 70.22(i)(3)(xii), the licensee's Emergency Plan, and applicable procedures. The scenario involved a transportation accident at the entrance to the site involving a truck delivering propane, a passenger vehicle, and a tractor trailer carrying mixed waste and hazardous material from the site. In the scenario, this accident lead to a fire, a mixed waste spill, and a hazardous airborne chemical release near the site boundary causing contamination and injuries to site personnel and members of the public. The scenario's hazardous chemical release had the potential to impact businesses and public roads.

Before the exercise, the inspectors walked down the plant, observed the evaluation briefing, and the player briefing to verify that personnel were informed of their duties and responsibilities for the exercise while maintaining the exercise scenario's confidentiality. The inspectors reviewed the exercise scenario to verify that the offsite agencies were invited to participate and that the accident scenario of a fire involving radioactive material was among those most probable for the facility. The inspectors also reviewed the



scenario objectives and observed the emergency exercise to verify that the exercise scenario tested the licensee's emergency response organization's (ERO) ability to execute the Emergency Plan.

At the initiation of the emergency exercise, the inspectors observed the licensee's communications and emergency response decision making to verify that ERO personnel assessed the accident scenario, analyzed the plant conditions, and classified the event as a site area emergency. The inspectors observed the activation of the emergency operations center (EOC) and emergency response organization to verify that all required positions were staffed and that the emergency organization responded to their assigned locations. The inspectors observed the licensee's initial assessment of the event to verify that it was performed. The inspectors observed communication and coordination by players at the incident command post and the EOC during development of protective action recommendations to verify that the recommendations communicated by the EOC were appropriate for the accident scenario.

The inspectors observed the timing and content of offsite notifications to verify that the notifications were made within the period specified in Section 7.8, "Notification of Government Agencies," of the Emergency Plan. The inspectors reviewed the press releases developed by the EOC communicators to verify that they were reviewed, approved, and coordinated.

The inspectors observed communications into and out of the EOC and briefings by the emergency director to verify that the emergency director maintained command and control of the EOC. The inspectors observed the reports of simulated survey results being made to the emergency management organization to verify that the emergency director used the survey results to assess the accident scenario.

The inspectors observed members of the licensee's emergency response team assemble at the designated assembly area and the arrival of the offsite emergency responders, including fire and emergency medical technician, at the event location to verify that the incident commander maintained command and control of the emergency response team and coordinated action with the offsite emergency responders. The inspectors observed the emergency response team's search and rescue activities, assessment of the affected area and hazards, fire-fighting activities, and response to additional emerging situations to verify that the emergency response team activities were appropriate for the exercise scenario and were appropriate in meeting the exercise objectives.

The inspectors observed the staff critiques of the emergency exercise to verify that the licensee conducted critiques to evaluate appropriateness of the facilities, equipment, personnel, training, and overall effectiveness of the emergency organization. The inspectors observed licensee personnel identify and discuss deficiencies and areas of improvement during the critiques to verify that the licensee documented and tracked deficiencies identified by the critiques in the CA and commitment tracking program for timely correction.

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 security procedures and regulatory requirements relating to nuclear plant security.

The inspectors observed a force-on-force drill on October 16, 2019, to verify compliance and assess the effectiveness of the licensee's implementation of protective strategies in accordance with NRC-approved security plan and procedures. The inspectors verified that the licensee's critique process 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. (DISCUSSED) Violation 2018-006-03: Failure to Maintain Adequate Process Safety Information for Process Systems Associated with the UAl<sub>x</sub> Glovebox Systems as Required by 10 CFR 70.62(b)**

This VIO was opened in NRC Inspection Report (IR) 70-27/2018-006 (ML18067A098) and was discussed in NRC IRs 70-27/2018-005 (ML19030A138), 70-27/2019-002 (ML19107A163), and 70-27-2019-003 (ML19211D562). 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). Licensee staff 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 progress toward completion of the CAs to establish a set of revision-controlled NCS evaluations containing the safety basis for all processes. Licensee staff briefed the inspectors on the progress made as of the inspection stating they were on track to complete 10-process analyses this year and that the long-term CAs remained on schedule. Additionally, the inspectors reviewed NCS-PA-30-00002, "Nuclear Criticality Safety Evaluation of the Shipping and Receiving Container Operations," which was recently completed as part of the licensee's CAs. This item remains open.

**E. Exit Meeting**

The inspectors verified no proprietary information was retained or documented in this report.

- On October 24, 2019, regional inspectors presented nuclear criticality safety and plant modifications inspection results to the licensee's Environmental, Safety, Health, and Safeguards Department Manager, Mr. D. C. Ward, and other members of the licensee staff.
- On October 30, 2019, the regional inspectors presented the exercise and drill inspection results to Mr. D. C. Ward and other members of the licensee staff.
- On January 16, 2020, the resident inspector presented the quarterly inspection results to Mr. D. Ward and other members of the licensee staff.

## SUPPLEMENTAL INFORMATION

### 1. KEY POINTS OF CONTACT

#### Licensee Personnel

<u>Name</u>	<u>Title</u>
J. Burch	Vice President and General Manager
D. Ward	Department Manager, Environmental, Safety, Health, and Safeguards
W. Richardson	Department Manager, Uranium Processing and Research Reactor
A. Rander	Department Manager, Security
D. Spangler	Section Manager, Nuclear Safety and Licensing
L. Morrell	Section Manager, Environmental Protection and Industrial Safety
D. Faidley	Unit Manager, Nuclear Criticality Safety Manager
L. Ragland	Unit Manager, Recovery and Maintenance
C. Terry	Unit Manager, Licensing and Safety Analysis
K. Conway	Unit Manager, Radiation Protection
J. Calvert	Environmental, Safety, Health and Security Program Manager
M. Edstrom	Fire Protection Engineer

### 2. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

#### Discussed

VIO	2018-006-03	Failure to Maintain Adequate Process Safety Information for Process Systems Associated with the UAl <sub>x</sub> Glovebox Systems as Required by 10 CFR 70.62(b) (Paragraph D.2)
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### 3. INSPECTION PROCEDURES USED

88015	Nuclear Criticality Safety
88051	Evaluation of Exercises and Drills
88070	Plant Modifications (Annual)
88135	Resident Inspection Program for Category I Fuel Cycle Facilities
88135.02	Plant Status
88135.04	Operational Safety
88135.05	Fire Protection (Quarterly / Annual)
88135.19	Post-Maintenance Testing
88135.22	Surveillance Testing

#### 4. LIST OF DOCUMENTS REVIEWED

##### SAFETY OPERATIONS

##### 88135 and 88135.02 – Plant Operations

###### Corrective Action Program Records

2019-0459, RTRT Operators Failed to Log Fuel Bearing Material in the Electronic Mass Log, Report Date August 22, 2019

2019-0493, Electronic Mass/Moderator Log Template Errors Identified from Extent of Condition for to Corrective Action No. 19-0459, Report Date August 22, 2019

2019-0779, Recovery Dry Vacuum System Trap Column Hi-Hi Probe Failed MP, Report Date

2019-0789, Recovery Vacuum Traps Overflow Drain Hole IROFS Obstructed with Duct Tape, Report Date June 10, 2019

2019-0779, Recovery Dry Vacuum System Trap Column Hi-Hi Probe Failed MP

2019-0828, FAS Sensor Span Calibrations, Report Date January 2, 2019

2019-0906, Operators Identified Electronic Mass/Moderator Log Template Errors for RTR Fuel Fabrication Line, Report Date August 22, 2019

2019-1022, Fillers Stacked in Exceedance of NCS Posting Slab Height Limit, Report Date July 24, 2019

2019-1077, Incorrect SNM Mass/Moderator Log Entry for RTR Fuel Fabrication Line, Report Date October 22, 2019

2019-1588, SFF Waste Inline Monitor No. 2 Failed the 'Loss-of-Power' Test, Report Date January 2, 2020

###### Corrective Action Written as a Result of Inspection Activities

COM-80191, Develop a New Form to Track the "As-Found" Status of Each FAS Detector, December 17, 2019

###### Drawings

13AE4\_1017E, CFR Inline Monitor System No. 2, Rev. 3

###### Nuclear Criticality Safety Records

NCS Posting 15-32-19, Filler Area Fuel Transport Cart, Rev. 1

NCS-2019-064, Safety Concern Analysis for Software Configuration Error in the Mass Log for the RTR HEU Powder Glovebox Line - (CA201900493), May 13, 2019

NCS-2019-089, Safety Concern Analysis for Obstructed Overflow on Phase Separator Column in Recovery - (CA201900789), July 8, 2019

NCS-PA-00001, Nuclear Criticality Safety Evaluation of the Filler Area Fuel Transport Cart, Rev. 0

###### Procedures/Instructions

OP-1001828, FAS Interlocks and Furnace Testing (CRD), Rev. 35

OP-1045536, U-35 Mass/Moderator Control Spreadsheet in RTRT, Rev. 0

###### Work Order

20251257, Replacement and Calibration of LEL Detector A6-ACPR-T-02, January 4, 2019

#### Other Documents

CHG-00004252, Event Notification 54117

Document No. 06-3009.004, Functional Input-Output Matrix for Facility Alarm System, Rev. 0

Document to File from D. Ashworth, IH&S, SFF FAS - CA201900828, Dated June 26, 2019

Dräger Polytron 7000, Transmitter for Electrochemical Sensors Instructions for Use

Dräger Sensor Organic Vapors Technical Data Sheet

Dräger Sensor Cl<sub>2</sub> - 68 09 665 Instructions for Use

Dräger Sensor CO - 68 09 605 Data Sheet

M35-037, SFF Checklist, Rev. 53

Memo from Mark Rehak, Draeger Safety, RE: Cross Cal Factors, dated May 13, 2008

Memo from Steve Slavutsky, Draeger Safety, RE: New Contact Request: USA, Safety, Jones, BWX Technologies, dated April 26, 2019

MP 2538, Semi-Annual Calibration Instructions for Class B IROFS CO Detectors

MP 2539, Semi-Annual Calibration Instructions for Class B IROFS Oxygen Detectors

MP 2540, Semi-Annual Calibration Instructions for Class B IROFS Organic Vapor (OV) Detectors

MP 2541, Semi-Annual Calibration Instructions for Class B IROFS Chlorine Detectors

MP 2542, Semi-Annual Calibration Instructions for Class B IROFS HCL Detectors

MP 2544, Semi-Annual Calibration Instructions for Class B IROFS (Hydride) Silane Detectors

MP 2550, Semi-Annual Calibration Instructions for Class B IROFS LEL Sensor Replacement

Nexus Report No. 06-3009.01, Facility Alarm System Design Basis Document, Rev. 0

SAR 15.32, Pharmacy Operations, Rev. 40

SAR Appendix 15.32, Rev. 14

SER 07-057, Phase 01 - New Facility Alarm System for the 13A SFF Processing Area - Installation, Testing, and Startup of New System, January 5, 2009

Stinson, Todd W., "FW: S1B Filler Lab Height (U)," Message to Faidley, Dave W., July 24, 2019, Email

Withdrawal of Event Notification 54117 dated June 27, 2019

#### **88135.04 – Operational Safety**

##### Corrective Action Program Records

2013-0180, End-to-End Spacing Between Components in High-Rise Storage not within Posted Limit, Report Date December 13, 2019

2015-1573, Fuel Component Extended 3 Feet from Edge of Transport Cart, Report Date December 13, 2019

2016-0539, Bubbling of Pickle Poison Fixtures during Submersion, Incident Date, April 2016; Report Date December 13, 2019

2017-0877, Leak on Acid Clean Line Pipe Elbow, Incident Date July 26, 2017; Report Date December 13, 2019

2018-0318, SAR 15.37 Criticality Safety Table Needs Revision, Report Date December 13, 2019

2018-0631, Revise Management Measure Listed for Pickle Poison Fixture in SAR 15.37, Report Date December 13, 2019

2018-1704, Pickle Drain Line Isolation Not Locked Open, Incident Date December 6, 2018; Report Date December 13, 2019

### Drawings

5AE4\_1003C, Bay 5A, Pickle Acid Automated Dump System Schematic, Rev. 1  
5AE4\_1005E, Pickle House 2003 Refurbishment Control Schematic, Pickle House  
Line 2, Rev. 2  
5AE4\_1006E, Pickle House Control Schematic, Pickle House Line 1, Rev. 2  
5AE4\_1007E, Pickle House 2003 Refurbishment Control Schematic, Pickle House  
Line 3, Rev. 2  
5AM2\_1004D, Bay 5A Pickle Nil-Cor Butterfly Valve Installation Tanks: 1-2, 1-22, 2-6,  
3-10, Rev. 0  
5AM7\_1011E, Bay 5A Pickle House Details & Tank Volumes / Drains, Rev. 3

### Procedures/Instructions

OP-0021001, Operating Procedure for Pickling, Rev. 88

### Work Orders

20225427, Bay 5A Tank 3-10 Acid Valve Leaking Where It Goes in Tank, Completed on  
July 12, 2017  
20225909, Bay 5A Tank 3-10 Acid Valve Leaking at Valve When Turned On, Completed  
on July 24, 2017  
20235498, Bay 5A Tank 2-6 Replace Bulb for Green Dump Indicator, Completed on  
January 16, 2018  
20252296, Bay 5A Tank 3-10 Check Regulator Pickle, Completed on October 31, 2018  
20254998, Bay 5A Tank 1-2 Acid Valve Wrap Replacement, Completed on  
January 2, 2019  
20254999, Bay 5A Tank 1-11 Acid Valve Wrap Replacement, Completed on  
January 2, 2019  
20255000, Bay 5A Tank 2-6 Acid Valve Wrap Replacement 1Y, Completed on  
January 2, 2019  
20255005, Bay 5A Tank 3-10 Acid Valve Wrap Replacement 1Y, Completed on  
January 2, 2019  
20258159, Bay 5A Tank 1-2 Acid Dump System 6-Month Inspection, Completed on  
July 3, 2019  
20258160, Bay 5A Tank 1-11 Dump System 6-Month Inspection, Completed on  
July 3, 2019  
20258161, Bay 5A Tank 2-6 Dump System 6-Month Inspection, Completed on  
July 3, 2019  
20258162, Bay 5A Tank 3-10 Acid Dump System 6-Month Inspection, Completed on  
July 3, 2019  
20259211, Bay 5A Tank 1-2 Timer Button Not Working, Completed on March 4, 2019  
20263280, Bay 5A Tank 3-10 Air Leak at Valve, Completed on May 9, 2019  
20266847, Bay 5A Tank 1-11 Leaking Around Valve, Completed on July 15, 2019  
20271966, Bay 5A Tank 1-11 Valve Not Closing, Completed on October 15, 2019

#### Other Documents

Bay 5A Pickle Lines 1, 2, and 3 Corrective and Preventive Maintenance List Between October 2016 and October 2019  
Pickle Area Quality and Safety Checks, Weeks of October 24 thru 30, 2016; December 5 thru 11, 2016; July 16 thru 22, 2018; October 22 thru 28, 2018; September 30 thru October 6, 2019; October 7 thru 13, 2019; October 14 thru 20, 2019; and October 21 thru 27, 2019; October 28 thru November 3, 2019; November 4 thru 10, 2019  
SAR 15.37, Higher Tier Assemblies, Rev. 133  
SAR 15.37 Appendix, Rev. 58  
SER 09-056 Phase 01, Butterfly Drain Valves

#### **88135.05 – Fire Protection Quarterly**

##### Other Documents

Pre-Fire Plan, Map Section 16, Bay 8A, 9A, and 10A South and First Floor dated March 3, 2005  
Pre-Fire Plan, Map Section 18, Bay 5A, 6A, 6AA, and 7AA North End dated March 3, 2005  
Pre-Fire Plan, Map Section 19, Bay 6A and 7A (South End) dated December 10, 2016  
Pre-Fire Plan, Map Section 20, Bay 4A and 5A (South End) dated February 17, 2010  
Pre-Fire Plan, Map Section 21, Bay 4A dated September 9, 2014

#### **88135.05 – Fire Protection Annual**

##### Corrective Action Program Records

2018-0668, NRC Inspectors Identified Electrical Power Strips Daisy Chained in RTR Controlled Area, Report Date October 15, 2019  
2018-0684, NRC Minor Violation Regarding Training Records on Fire Extinguishers, Report Date November 4, 2019  
2018-1056, Small Fire Outside of Bay 8AA due to Vacuum Pump Failures, Report Date October 15, 2019  
2018-1083, Small Fire in Bay 1T Restroom, Report Date October 15, 2019  
2018-1283, NRC Inspectors Identified Daisy Chained Electrical Power Strips in the RTR Sample Room, Report Date October 15, 2019  
2018-1284, NRC Inspectors Identified Minor Deficiencies During Quarterly Fire Protection Inspection 3rd Quarter 2018, Report Date October 15, 2019  
2018-1538, Brief Flash and Smoke Crane Hoist Area, Report Date October 15, 2019  
2019-0044, Natural Gas Line Mistakenly Cut during Demolition of Electrical Conduit, Report Date November 4, 2019  
2019-0121, Poor Housekeeping Conditions in RTR Aluminum Powder Room, Report Date November 4, 2019  
2019-0332, Documentation and Records of Semi-Annual Inspection of Smoke Detectors, Report Date October 15, 2019  
2019-0384, NRC Inspectors Identified Minor Deficiencies during Quarterly Fire Protection Inspection, 1st Quarter 2019, Report Date October 15, 2019  
2019-0385, NRC Inspectors Identified Deficiencies during Quarterly Fire Protection Inspection, 1st Quarter 2019, Report Date October 15, 2019  
2019-0387, NRC Identified Extension Cord used in Excess of 90 Days, Report Date November 4, 2019  
2019-0848, Water Flow Alarm Signal for Bay 14A Sprinkler System, Report Date November 4, 2019  
2019-0910, Old Gatehouse Being Used for Storage, Report Date November 4, 2019



2019-1054, Testing of Fire Hose not Completed within Required Time Limits, Report Date October 15, 2019

2019-1490, RTR Scale and Blender not Installed in Accordance with Manufacturer Instructions or NEC, Report Date November 4, 2019

Corrective Action Written as a Result of Inspection Activities

2019-1688, Carbon Dioxide Fire Extinguishers not Weighted or Hefted during Monthly Inspection, Report Date December 11, 2019

2020-0047, Outstanding Work Request to Install Relief Valve on Container Storage Building Sprinkler System, Report Date 1/9/2020

Procedures/Instructions

HS-03-02, Fire Prevention, Rev. 7

HS-03-10, Control of Fire Protection System Impairments, Rev. 18

HS-ET-003, Attachment 2, Inventory of Red Truck, Rev. 12

HS-ET-003, Attachment 3, Inventory of White Truck (Engine 18-1), Rev. 12

HS-FP-006, Portable Fire Extinguishers Inspection, Rev. 12

HS-FP-008, Sprinkler System, Standpipes, & Control Valve Inspection, Test & Maintenance, Rev. 021

HS-FP-018, Fire Barrier / Fire Damper Inspection, Rev. 11

Drawings

STEC5\_1003E, Site Plan - BWXT Lynchburg, VA, Fire Valve & Hydrant Locations, Sheet 1 of 7, Rev. 7

STEC5\_1003E, Pump House and Water Storage Tanks, Sheet 2 of 7

STEC5\_1003E, Site Plan - BWXT Lynchburg, VA, Fire Valve & Hydrant Locations, Sheet 3 of 7, Rev. 7

Other Documents

2<sup>nd</sup> Quarter 2019 Industrial Health & Safety Audit Summary Report

3<sup>rd</sup> Quarter 2019 Industrial Health & Safety Audit Summary Report

BWXT Emergency Team Roster and Qualifications dated October 17, 2019

CHG-00003977, Install Relief Valve on CSB Sprinkler System, Approved on January 10, 2018

HS-2019-052, Fire Extinguisher Training Requirements, May 6, 2019

HS-2019-119, Annual Offsite Responder Training, dated October 1, 2019

Inspect and Track Inside Electronic Report for Bay 17 Storage Area Fire Dampers 'IROFS' (Equipment ID 246N7 and 246N8), Report Range January 2015 to November 2019

Inspect and Track Inside Electronic Report for Bay 17 Storage Area Fire Extinguishers 'IROFS' (Equipment ID 246Z6 and 424DK), Report Range June 2019 to November 2019

Inspect and Track Inside Electronic Report for Bay 17 Storage Area Fire Walls 'IROFS' (Equipment ID 24789), Report Range January 2017 to November 2018

NFPA 10, Standard for Portable Fire Extinguishers, 2002 Edition

RTP-OCT-2019, Fire Prevention

Training Report Log for RTRT, Recovery, and NMC Operators on Annual Fire Extinguisher Training, Report Date December 17, 2019

Training Report Log for Container Storage Building Operators on GP08 Hands-On Fire Extinguisher Training, Report Date December 18, 2019

### Fire Protection Impairment Reports

19-001, Bay 2T, and 1T Mezzanine Fire Main CDC Work, February 7, 2019  
19-002, Bay 2T East Warehouse, 2T Mezzanine Sprinklers, & CDC Sprinklers, February 21 to February 28, 2019  
19-003, Install Additional Sprinklers in Electronics Shop, BC Bay, March 12 to 13, 2019  
19-004, Follow-Up Work on Wet Pipe System, LTC Building B, March 18, 2019  
19-005, Isolate Sprinklers Above MM2 Grinder Storage in support of MM3 Sprinkler System, June 4, 2019  
19-007, Wet Pipe System Sprinkler Replacement, Bay 5A Basement, April 24, 2019  
19-008, Install Sprinklers in Room 563 & High Bay, LTC Building B, May 30, 2019  
19-009, Wet Pipe System Replacement, June 12 to 13, 2019  
19-010, Install Sprinkler in Room 563 Enclosure, LTC Building B, June 21, 2019  
19-011, Isolate Water Line from EECF to Bay 1, Main Plant Entrance, June 22, 2019  
19-012, Isolate Water Line from EECF to Bay 1, Main Plant Entrance, July 1 to 2, 2019  
19-013, County Water Supply to Site Supply Line (12 inches) to Pump House, June 29, 2019  
19-015, Install Sprinkler in Room 563 Enclosure, LTC Building, July 25, 2019

### **88015 – Nuclear Criticality Safety**

#### Corrective Action Program Records

2019-0406    2019-0801    2019-0928    2019-1022    2019-1077    2019-1346

#### Corrective Action Written as a Result of Inspection Activities

2019-1494, Moderating Materials Removed from RTR Bulk Weigh Box Without Updating Moderator Log, October 22, 2019

#### Nuclear Criticality Safety Records

NCS-2016-063, NCS Safety Analysis to Support HEU U-Mo Foil Fabrication per SER 15-001 Phase 2 to Support HEU Mini-Plate Manufacture, dated May 23, 2019  
NCS-2019-013, NCS Analysis Supporting SER 19-003 Phase 2 - Install Replacement TM Vacuum Furnace and SER 19-021 Phase 1- RTR Furnace Fur038 Inner Shelf and NCS Posting Change, dated September 23, 2019  
NCS-2019-052, NCS Violation and Observation Report for 2014-2018, dated April 8, 2019  
NCS-2019-059, NCS Violation and Observation Summary - 1<sup>st</sup> Quarter 2019, dated April 25, 2019  
NCS-2019-060, Safety Analysis to Create a New NCS Posting for PDL Sink, dated August 21, 2019  
NCS-2019-088, Safety Concern Analysis for Stack Height Violation on Element Table - CA201900801, dated July 9, 2019  
NCS-2019-098, Safety Concern Analysis Assumption of an Analysis Not Incorporated in the Desiccator Rack Control Table – CA201900928, dated July 11, 2019  
NCS-2019-101, NCS Violation & Observation Summary - 2<sup>nd</sup> Quarter 2019, dated July 31, 2019  
NCS-2019-105, Safety Concern Analysis for S1B Filler Stack Height Upset, dated July 25, 2019  
NCS-2019-108, Safety Concern Analysis for Plate Stack Height Violation in RTR Reject Plate Caged Area - CA201901046, dated August 9, 2019  
NCS-2019-109, Safety Concern Analysis for Mass Moderator Log Error in RTR HEU Powder Glovebox Line - CA201901077, dated August 8, 2019

NCS-2019-112, Safety Concern Analysis for Plate Stack Height Violation in RTR Reject Plate Caged Area - CA201901157, dated August 26, 2019  
NCS-2019-241, Safety Concern Analysis for Overloaded A1B Filler - CA201901346, dated September 23, 2019  
NCS-2019-247, Safety Analysis Supporting SER 19-030 Phase 1 - Redesign of RTRT Pickle Room, dated October 1, 2019  
NCS-TR-00003, Engineering Analysis of the Credible Levels of Hydrogenous Moderation, Rev. 0

#### Procedures/Instructions

NCSE-02, Nuclear Criticality Safety Analyses & Quality Assurance Reviews, Rev. 46  
NCSE-02, Attachment 1, NCS Process Analysis Writer's Guide, Rev. 1  
NCSE-03, NCS Audits and Inspections, Rev. 28 and Rev. 29  
OP-1041242, Operating Procedure for Pharmacy Operations, Rev. 7

#### Other Documents

NCS Weekly Inspection Forms (NCSE-03-03) for December 2018; January, March, July, and August 2019

### **RADIOLOGICAL CONTROLS**

#### **88135.02 – Radiation Protection Quarterly**

##### Procedures

RP-05, Respiratory Protection, Rev. 15  
RP-06, Radiation Work Permit, Rev. 14

##### Other Documents

N-458, Ignition Sources Permit for Plasma Cutting of Large Metal Frame inside Bay 3A Radiation Controlled Area, issued October 31, 2019

### **FACILITY SUPPORT**

#### **88135.19 – Post-Maintenance Testing**

##### Procedures

OP-0021001, Operating Procedure for Pickling, Rev. 88  
OP-1014602, ADUN Dissolver#2 Solution Preparation for TRISO Fuel (U), Rev. 23

##### Other Documents

SAR 15.17, SFF Wet-End Processing in SFF Operations, Rev. 80  
Work Request for TRISO Workstation 260 (ADUN 2 Dissolver System) System Check, October 17, 2019  
WS-260 Restart Procedure, October 17, 2019

#### **88135.22 – Surveillance Testing**

##### Other Documents

LUD-3000 Counter Limits for Area NMC-MC, Memo to NMC Cal File from Jason McNeel dated April 30, 2019  
NMCTWR No. 19-013, 2019 Annual Ductwork Survey, Rev. 0

## **88070 – Plant Modifications (Annual)**

### Corrective Action Program Records

2018-1704	2018-1734	2018-1746	2019-0012	2019-0082	2019-0202
2019-0261	2019-0467	2019-0522	2019-0590	2019-0591	2019-1105
2019-1161					

### Nuclear Criticality Safety Record

NCS-2016-111, Nuclear Safety Release for U-Metal Dissolution in Conversion Facility  
Dissolver #2, July 31, 2018

### Procedures/Instructions

QWI 2.1.02, Preparation and Maintenance of Safety Analysis Reports, Rev. 18  
QWI 2.1.03, 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. 21  
QWI 5.1.7, Safety Evaluation Requests, Rev. 35  
QWI 5.1.7, Appendix A, Acceptable Methods of Implementation Control, Rev. 35  
QWI 5.1.11, Drawing Control System, Rev. 15  
QWI 5.1.12, Change Management, Rev. 33  
QWI 5.1.12, Attachment 1, Risk Level Definition, Rev. 17  
QWI 5.1.12, Attachment 3, Technical Review Board Definition, Rev. 3  
QWI 5.1.12, Attachment 4, Change Document Help Information, Rev. 3  
QWI 5.1.12, Attachment 5, Flow Diagram of Change Request Routing, Rev. 7  
QWI 5.1.12, Attachment 8, Guidelines for Training Plans, Rev. 3  
QWI 5.1.14, Attachment 2, Software Quality Process for Category 'A' Programs, Rev. 9  
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. 40  
QWI 14.1.4, Reporting Unusual Incidents, Rev. 12  
QWI 14.1.10, Safety Evaluation of Unusual Incidents, Rev. 18  
QWI 17.1.1, Environmental, Safety, Health, & Safeguards Audit Programs, Rev. 12  
QWI 18.1.1, Safety Training, Rev. 10  
QWI 18.1.3, On-The-Job (OTJ) Training, Rev. 8

### Records

2019 NCS Training Annual Refresher, August 2019  
2019 SER Originator Training dated February 2, May 15, August 29, and October 4, 2019  
Annual Summary of Changes and Revised ISA (2018), License Application No. SNM-42, dated January 24, 2019  
Audits 256-B (Waste Handling, Vacuum System & Ventilation for SFF Operations), 256-1C (ISA), 256-1D (Management Measures), 257-2D (NCS Training & Qualification), and 259-4E (Chemical & Fire Safety), dated February 2019  
Change Packages 4228, 4344, 4486, 4593  
Internal Audit Summary Report, February 2019  
N-517, 10 CFR 70.72 Change Evaluation Checklist, Rev. 10  
SER 16-322, U-Metal Dissolution, Initiated October 5, 2016, Revised January 7, 2019

SER 18-002, Increase U235 Limits on LEU Target Glovebox Line, Phase 1, Completed November 7, 2018

Other Documents

Change Review Board Agenda, October 24, 2019

Change Review Board Meeting Minutes dated April 4 and 25; May 3, 9, 17, 23, and 31; June 20; July 12 and 18; September 9, 22, and 29; October 12 and 20, 2019

SAR 15.5, High-Level Dissolution Process in Uranium Recovery, Rev. 141

SAR 15.6, Low-Level Dissolution Process in Uranium Recovery, Rev. 74

SAR 15.7, General Purpose Reclamation Area Processes in Uranium Recovery, Rev. 52

SAR 15.9, Main Extraction and Drum Dryer Processes in Uranium Recovery, Rev. 104

SAR 15.17, SFF Wet-End Processing in SFF Operations, Rev. 80

SAR 15.22, Research Test Reactor and Targets Fuel Powder and Compact Processes, Rev. 93

SAR 15.32, Pharmacy Operation, Rev. 40

SAR 15.34, Conventional Filler Operations, Rev. 72

**88051 – Evaluation of Exercises and Drills**

Procedures

EPR-02-01, Initial Emergency Incident Assessment, Rev. 10

EPR-02-02, Industrial Safety Assessment for Hazmat Response, Rev. 5

EPR-02-04-01, Report of Emergency Worksheet, Rev. 4

EPR-02-04-02, Emergency Notification Worksheet, Rev. 20

Other Documents

2019 Biennial Drill, Nuclear Operations Group-Lynchburg, dated October 7, 2019

BWXT Nuclear Operations Group-Lynchburg Emergency Plan, Rev. 32