



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

January 29, 2018

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 70-27/2017-005**

Dear Mr. Burch:

This letter refers to the inspections conducted from October 1 through December 31, 2017, at the BWXT Nuclear Operations Group, Inc. (NOG) facility in Lynchburg, VA. The inspections were conducted to determine whether activities authorized under the license were conducted safely and in accordance with U.S. Nuclear Regulatory Commission (NRC) requirements. The enclosed report presents the results of these inspections. The results were discussed with you and members of your staff at exit meetings held on October 26 and November 15, 2017, and January 10, 2018.

During the inspections, NRC staff examined activities conducted under your license, as they related to public health and safety, to confirm compliance with the Commission's rules and regulations and with the conditions of your license. Areas examined during the inspections are identified in the enclosed report. Within these areas, the inspections consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel. Based on the results of these inspections, 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 70-27/2017-005  
w/Attachment: Supplemental Information

cc:  
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SUBJECT: BWXT NUCLEAR OPERATIONS GROUP – NUCLEAR REGULATORY  
COMMISSION INTEGRATED INSPECTION REPORT 70-27/2017-005

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**U. S. NUCLEAR REGULATORY COMMISSION**

**REGION II**

Docket No: 70-27

License No: SNM-42

Report No: 70-27/2017-005

Licensee: BWX Technologies (BWXT)

Facility: Nuclear Operations Group, Inc. (NOG)

Location: Lynchburg, VA 24505

Dates: October 1 through December 31, 2017

Inspectors: C. Stancil, Senior Resident Inspector, RII/DFFI/PB2  
D. Anderson, Fuel Facility Inspector, RII/DFFI/SB  
L. Cooke, Fuel Facility Inspector, RII/DFFI/PB1  
N. Peterka, Fuel Facility Inspector, RII/DFFI/PB1  
L. Pitts, Senior Fuel Facility Inspector, RII/DFFI/PB1  
T. Sippel, Fuel Facility Inspector, RII/DFFI/SB  
K. Womack, Fuel Facility Inspector, RII/DFFI/SB

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 70-27/2017-005  
October 1 – December 31, 2017

Inspections were conducted by the senior resident inspector and regional inspectors during normal and off-normal hours in safety operations, radiological controls, and facility support. 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 Safety System Walkdowns. (Paragraphs A.1 and A.2)
- No violations of more than minor significance were identified related to the Fire Protection Program. (Paragraph A.3)
- No violations of more than minor significance were identified related to the Nuclear Criticality Safety Program. (Paragraphs A.4 and A.5)

### **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)
- No violations of more than minor significance were identified related to the Emergency Preparedness Program including the graded biennial emergency drill. (Paragraph C.6)

### **Attachment**

Supplemental Information

## 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. 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 appropriately captured off-normal events and implemented effective CAs.

The routine tours included walkdowns of the RTR, filler, UR areas, and other manufacturing areas where SNM was being processed. During routine tours, the inspectors verified 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. The inspectors observed activities during normal and upset conditions for compliance with procedures and material station limits. The inspectors verified that selected safety controls, including IROFS, were in place, available, and functional to ensure proper control of SNM. The inspectors verified the adequacy of communications between supervisors and operators within the operating areas. The inspectors reviewed operator log sheets, operating procedures (OPs), maintenance records, and equipment and process changes to obtain information concerning operating trends and activities. The inspectors verified that BWXT actively pursued CAs for conditions requiring temporary modifications and compensatory measures.

The inspectors performed periodic tours of the outlying facility areas and determined that equipment and systems were operated safely and in compliance with the license. The inspectors focused on potential wind-borne missile hazards, potential fire hazards with combustible material storage and fire loading, hazardous chemical storage, the physical condition of bulk chemical storage tanks and piping, storage of compressed gas containers, and potential degradation of plant security features. In addition, the inspectors periodically toured or inspected BWXT's emergency response facilities to ensure the facilities were maintained in a readily available status.

The inspectors attended various BWXT meetings, including the Change 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 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," Revision (Rev.) 16; QWI 14.1.4, "Reporting Unusual Incidents," Rev. 12; and QWI 14.1.10, "Safety Evaluation of Unusual Incidents," Rev. 16.

b. Conclusion

No violations of more than minor significance were identified.

2. Safety System Walkdown (Inspection Procedure 88135.04)

a. Inspection Scope

The inspectors inspected the site generator and uninterruptable power supply systems, safety-significant systems involved with the processing of SNM. As part of the walkdowns, the inspectors verified as-built configurations matched approved plant drawings. The inspectors interviewed operators to confirm that plant personnel were familiar with the assumptions and controls associated with the IROFS systems and instrumentation for maintaining plant safety. The inspectors also verified that IROFS assumptions and controls were properly implemented in the field. The inspectors reviewed the related integrated safety analysis (ISA) to verify system abilities to perform functions were not affected by outstanding design issues, temporary modifications, operator workarounds, adverse conditions, or other system-related issues. The inspectors also verified that there were no conditions that degraded plant performance and the operability of IROFS, safety-related devices, or other support systems essential to safety system performance for the inspected system.

To determine the correct system alignment, 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." During the walkdowns, the inspectors verified all or some of the following as appropriate:

- controls in place for potential criticality, chemical, radiological, and fire safety hazards
- process vessel configurations maintained in accordance with nuclear criticality safety evaluations (NCSEs)
- correct valve position and potential functional impacts such as leakage
- electrical power availability
- major system components correctly aligned, labeled, lubricated, cooled, and ventilated
- hangers and supports correctly installed and functional
- lockout/tag-out program appropriately implemented
- cabinets, cable trays, and conduits correctly installed and functional
- visible cabling in good material condition
- no interference of ancillary equipment or debris with system performance

b. Conclusion

No 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 the Lynchburg Technical Center Building 'B' to verify compliance with the license and National Fire Protection Association (NFPA) 801, "Standard for Fire Protection for Facilities Handling Radioactive Materials." 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 on 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 confirm 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.

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

b. Conclusion

No violations of more than minor significance were identified.

4. Nuclear Criticality Safety (Inspection Procedure 88135.02)

a. Inspection Scope

During daily production area tours, the inspectors observed various criticality controls, including the implementation of criticality station limit cards and container sizing to minimize potential criticality hazards. The inspectors reviewed a number of criticality-related IROFS for operability. The inspectors observed that operators were knowledgeable of the requirements associated with IROFS.

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

b. Conclusion

No violations of more than minor significance were identified.



5. Nuclear Criticality Safety (Inspection Procedure 88015)

a. Inspection Scope

*Criticality Analysis*

The inspectors reviewed selected NCSEs to determine whether properly reviewed and approved evaluations were in place prior to conduct of new or changed operations and were of sufficient detail and clarity to permit independent review. The inspectors reviewed the selected NCSEs and associated assumptions and calculations to verify that they were consistent with the commitments in the License Application, including the consideration of the Double Contingency Principle, assurance of subcriticality under normal and credible abnormal conditions with the use of subcritical margin, technical practices and methodologies, and treatment of nuclear criticality safety (NCS) parameters. The NCSEs were selected based on factors such as risk significance, whether or not they were new and/or revised, and operating history. The evaluations reviewed included those listed in Section 4 of the Attachment.

The inspectors reviewed BWXT'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. 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 relied on any items which should be identified as IROFS. This review focused on NCSE-PA-21-00001, "Nuclear Criticality Safety Evaluation of the Low-Level Radioactive Waste Processing Activities," and supporting documents.

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

*Criticality Implementation*

The inspectors performed walkdowns of the retention tank building and portions of the hot waste drain to determine whether existing plant configuration and operations were covered by, and consistent with, the process description and safety basis in the selected NCSEs listed in the Attachment. The inspectors reviewed process and system descriptions to verify that engineered controls established in the NCSEs were included. The engineered controls reviewed included inline monitors, racks, and pipe diameter. 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 controls, vessel controls, controls on sampling concentration, and controls on solution transfers. The inspectors interviewed operators and engineers to verify that administrative actions established in the NCSEs were understood and implemented properly.

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

#### *Criticality Operational Oversight*

The inspectors reviewed NCS-related training records and material (including initial training, annual refresher, and 5-year refresher) to determine whether operator training included instruction in criticality hazards and control methods, whether BWXT's established NCS-related operator training was consistent with commitments in Section 5.1.4 of the License Application, and whether NCS staff were involved in the development of operator training. Additionally, 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 training records reviewed included a front line manager, a maintenance employee, an engineer, and five operators.

The inspectors reviewed records of NCS audits and weekly inspections and accompanied a BWXT NCS engineer on a weekly inspection of the Spent Fuel facility (SFF) to determine whether staff routinely assess field compliance with established NCS controls. Additionally, the inspectors interviewed NCS management and reviewed procedures and schedules to verify that the NCS function performed these assessments as required by Section 5.1.3 of the License Application.

#### *Criticality Programmatic Oversight*

The inspectors reviewed revised NCS program procedures to determine whether BWXT implemented license requirements and whether the NCS program was enacted in accordance with them. The inspectors conducted interviews and reviewed records to determine whether NCS staff reviewed new and/or revised fissile material operations and procedures consistent with program procedures and at a level commensurate with their significance. This included the review of NCSEs that evaluated changes to the facility.

The inspectors reviewed selected NCSEs to verify that they were performed in accordance with NCS program procedures by appropriately qualified staff and received appropriate independent review and approval.

The inspectors reviewed NCS staff qualification records and conducted interviews to verify that NCS engineers and senior NCS engineers have the necessary education and experience and were qualified in accordance with license requirements. The inspectors also interviewed BWXT's new NCS engineer to verify the engineer had the required education and experience and was being qualified in accordance with license requirements. Additionally, the inspectors reviewed records to verify that NCS staff members only performed those functions for which they were qualified.

#### *Criticality Incident Response and Corrective Action*

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 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. Additionally, the inspectors reviewed NCS-related CAP entries to assess NRC reportability.

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) 17-75, "Remove the DRI-Train Atmospheric Control System and Support Piping from the RTR HEU (Highly Enriched Uranium) Fuel Fabrication Box Line." 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 to the detailed review noted above, the inspectors performed numerous partial reviews of RWPs during the inspection period in different operational areas.

The inspectors reviewed BWXT's radiation protection program to verify compliance with 10 CFR 20, "Standards for Protection Against Radiation," and License Application 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 the inspectors observed plant personnel 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 that procedures and test activities confirmed safety systems and components (SSCs) operability and functional capability following the described maintenance. The inspectors reviewed BWXT's completed test procedures to ensure any of the SSC safety function(s) that may have been affected were adequately tested, that the acceptance criteria were consistent with information in the applicable licensing basis and/or design basis documents, and that the procedure had been properly reviewed and approved.

The inspectors also witnessed and/or reviewed the test data to verify that test results adequately demonstrated restoration of the affected safety function. The inspectors verified that PMT activities were conducted in accordance with applicable work order (WO) instructions or licensee procedural requirements. Furthermore, the inspectors verified that problems associated with PMTs were identified and entered into BWXT's CAP.

- WO 20231148, Primary Scrubber Column Replacement
- WO 20231847, Cleanout Horizontal Primary Feed Columns
- Change (CHG) 3212 and WO 20229259, Desiccant Filter Removal

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 Maintenance Plan 3872, "Wet Ring Vacuum Pump Liquid Level Sensor on SFF Gas Exhaust Pipe," including WO 20231329. The test was conducted to verify that this risk-significant and safety-related system met the requirements of the ISA, commitments, and procedures. 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. The inspectors verified that test equipment or standards used to conduct the test were within calibration. The inspectors determined that effective communications between personnel performing these tests were used to complete each activity.

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 ensure that entries pertinent to safety, security, and non-conforming conditions were identified, investigated, and tracked to closure. The inspectors verified through interviews with BWXT staff and document reviews that issues of high-safety significance were identified and reviewed for apparent causes as required. The inspectors verified that, for those issues requiring extent-of-condition and/or extent-of-cause reviews, the reviews were completed and documented in the applicable CA. The inspectors verified that CAs to prevent recurrence were identified in the CAP and were reviewed and tracked to completion in accordance with implementing procedure, QWI 14.1.1, "Preventive/Corrective Action System," Rev. 33.

Furthermore, the inspectors conducted periodic reviews of BWXT audits and third-party reviews of safety-significant processes to determine their effectiveness and necessary entries into the CAP. Specifically the inspectors reviewed the following:

- Nuclear Safety Culture Assessment of BWX Technologies Nuclear Operations Group dated June 16, 2017, authored by Center for Executive Solutions
- Nuclear Safety Culture Focus Group for BWXT NOG dated August 28, 2017, authored by Center for Executive Solutions
- LMS-2017-004, "Radiation Protection Audits, Inspections 3<sup>rd</sup> Quarter 2017," dated October 26, 2017
- NCS-2017-113, "NCS Violation and Observation Summary 3<sup>rd</sup> Quarter 2017," dated November 10, 2017
- EH&S Audit-NOG-L&T, dated September 11 to 15, 2017
- BWXT-NOG Physical Inventory Summary Reports April/September 2017, dated November 3, 2017

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 Change Request 3212, "Remove the Desiccant System from Recovery Drum Dryer Glove Box" per WO 20229259, for compliance with the License Application 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 [safety analysis report] and procedures affected by the modifications, as applicable.

The inspectors reviewed the change request packages for accuracy and adherence to BWXT's change management process, QWI 5.1.12, "Change Management," Rev. 31. The inspectors verified that applicable post-maintenance installation and testing requirements were identified in the change request documentation as required. The inspectors verified that BWXT identified and addressed any impacts to the ISA/SAR resulting from modifications.

b. Conclusion

No violations of more than minor significance were identified.

5. Plant Modifications (Inspection Procedure 88070)

a. Inspection Scope

The inspectors interviewed BWXT managers and engineers to verify that BWXT had established an effective configuration management program in accordance with license requirements to evaluate, implement, and track permanent and temporary modifications which could affect safety.

The inspectors reviewed BWXT's work control program procedures and work packages to verify that they had provisions to ensure adequate pre-job planning and preparation of plant modification packages. The inspectors reviewed QWI 5.1.12, "Change Management," Rev. 30, to verify that the configuration management system had provisions to ensure that plant modifications did not degrade the performance capabilities of IROFS or other safety controls that are part of the safety design basis.

The inspectors reviewed a selection of plant modification packages that were implemented since the last plant modification inspection. 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. Selected changes that involved more complex physical modifications (Safety Evaluation Request (SER) 14-032) were reviewed to verify that applicable post-maintenance installation and testing requirements were identified and performed prior to implementation of change packages.

The inspectors reviewed the change packages to verify that BWXT addressed the baseline design criteria stipulated in 10 CFR 70.64 in the designs of plant modifications, as applicable, and to verify that BWXT addressed the impacts of modifications to the safety analysis reports (SARs) and other safety program information developed in accordance with 10 CFR 70.62. The inspectors also reviewed the completed 10 CFR 70.72 evaluations associated with changes to determine if BWXT adequately determined whether NRC pre-approval of the change was required.

The inspectors performed walkdowns of the SFF workstation 130 and the recovery building scrubber to determine if they were installed in accordance with approved design documents such as drawings and technical reports.

b. Conclusion

No violations of more than minor significance were identified.

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

a. Inspection Scope

The inspectors observed and evaluated BWXT's graded biennial exercise conducted on November 15, 2017 in order to meet regulatory requirements. The scenario was initiated by alarms associated with a large fire in the protected area. The fire could not be immediately controlled and required evacuation of the facility. As part of the exercise, when the evacuation started, the site simulated rogue employees fleeing with SNM,

these rogue employees were then engaged by the site security force, during this engagement the SNM canisters were breached, and while responding to the scene an emergency responder was injured and became contaminated.

The inspectors reviewed the emergency drill scenario and discussed the exercise objectives with BWXT personnel before the exercise. The inspectors walked down the plant to assess the effectiveness of the visual aids used in the drill and verified that BWXT had not pre-staged equipment in anticipation of the exercise.

At the initiation of the emergency drill, the inspectors observed that BWXT personnel confirmed site accountability, assessed the accident scenario, analyzed conditions, and classified the event. The event was classified as an Alert in accordance with the Emergency Plan. The inspectors observed the activation of the emergency organization and Emergency Operations Center (EOC) and to verify that all required positions were staffed in accordance with the Emergency Plan. The inspectors reviewed that the protective action recommendations (PARs) determined by the emergency organization to verify they were appropriate for the accident scenario and in accordance with the Emergency Plan.

The inspectors verified that the initial offsite notifications were within the time period specified in the Emergency Plan and included the required information. The inspectors verified that the onsite communications to the occupational workers were consistent with the PARs implemented by the emergency organization. The occupational workers participated in the protective action and personnel accountability in accordance with approved procedures. The inspectors reviewed drafted press releases developed by the emergency organization communicators. The inspectors verified that the press releases would have been approved by the Emergency Director (ED) director had they been released and were in accordance with the Emergency Plan.

The inspectors verified that the ED maintained adequate command and control of the emergency organization. The inspectors verified that the ED director utilized the dose assessment, radiation survey results, environmental monitoring results, etc., during the assessment of the accident scenario.

The inspectors observed members of BWXT's emergency response team (ERT) and offsite emergency responders assemble at the fire scene and the scene where the rogue employees were confronted. The inspectors observed the ERT fight a live fire. Concurrently, inspectors observed the ERT secure the spilled SNM and transport the contaminated injured responder to the hospital. The inspectors verified that the ERT activities were appropriate for the exercise scenario and were appropriate in meeting the drill objectives.

The inspectors observed the staff critiques of the emergency exercise. The inspectors verified that the critiques were effective at identifying lessons learned or areas of improvement. The inspectors verified that BWXT initiated documentation of items discussed after the emergency exercise in the CAP.

b. Conclusion

No violations of more than minor significance were identified.

**D. Exit Meeting**

On October 26 and November 15, 2017, and January 10, 2018, 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 & Security Program Manager
D. Faidley	Nuclear Criticality Safety Manager
V. Mauney	Department Manager, UPRR
A. Rander	Security Manager
C. Reed	Operations Manager
H. Shaffer	Engineering Manager
D. Spangler	Section Manager, Nuclear Safety and Licensing
C. Terry	Unit Manager, Licensing and Safety Analysis
D. Ward	Department Manager, Environmental, Safety, Health, and Safeguards

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

None

### **3. INSPECTION PROCEDURES USED**

88015	Nuclear Criticality Safety
88051	Emergency of Exercises and Drills
88070	Plant Modifications
88135	Resident Inspection Program for Category I Fuel Cycle Facilities
88135.02	Plant Status
88135.04	ISA Implementation
88135.05	Fire Protection
88135.17	Permanent Plant Modifications
88135.19	Post-Maintenance Testing
88135.22	Surveillance Testing

### **4. DOCUMENTS REVIEWED**

#### Drawings

STEE-1000 12.47 KV Distribution System, Rev. 16  
 STEE7-1007 Security Generator Power Distribution (inside the PA), Rev. 0  
 STEE7 BC Bay Facility Generator Power Distribution, Rev. 0  
 STEE7 MM Building Facility Generator Power Distribution, Rev. 0

#### Records

Change Request CR-1035013, FMO Conventional Line Daily Operations Checks, Rev. 0  
 CHG-00001282, Process Water Line Valves to be Added to OP-0061115  
 CHG-00002924, Move Primary Evaporator Pump Location  
 CHG-00003436, RTRT Fuel Fabrication Glove Box Upgrade  
 E61-039, Uranium Recovery Duct Inspection Summary and Duct Clean-Out Form,  
 Rev. 25  
 E61-061, Scrubber Sampling Record, Rev. 6

ISA-05-00001 PHA Report: Generator Power and UPS Systems Rev. 0  
 NCS-2001-002, Nuclear Criticality Safety Release (NSR) for SER 99-104, Phase 3:  
 "Filler Area Lines 1 & 4 Safety Refurbishment"  
 NCS-2012-004, NCS Safety Analysis for the Hot Waste Drain Line – CA-200800449,  
 dated June 7, 2012  
 NCS-2016-087, Revised NCS Safety Analysis for a New Recovery Scrubber per  
 SER 14-032 dated October 10, 2016  
 NCS-2017-058, NCS Safety Analysis for SFF Area Workstation 130 for SER 15-012  
 NCS-2017-059, NCS Violation and Observation Summary – 1<sup>st</sup> Quarter 2017  
 NCS-2017-078, NCS Safety Evaluation Revising Appendix to SAR 15.42 in Response to  
 CA-201700268 dated September 28, 2017  
 NCS-2017-091, Safety Concern Analysis for RTR Bay 16 Roof Leak – Water Leaking  
 onto RTR ATR Fuel Plate Storage Boxes dated May 30, 2017  
 NCS-2017-106, Revised NCS Safety Analysis for a New Saw in the Recovery  
 Sectioning Facility per SER 17-010, Phases 01 and 02 dated June 27, 2017  
 NCS-2017-113, NCS Violation and Observation Summary – 3<sup>rd</sup> Quarter 2017  
 NCS-2017-135, NCS Justification Analysis for Use of Drip Tray/Catch Pan in SFF  
 Workstation 260 (ADUN Dissolver II) dated August 29, 2017  
 NCS-2017-139, Safety Concern Analysis for RTR 2-Foot Spacing Rack Event – Rack  
 Pushed out of Position by Fork Lift dated August 21, 2017  
 NCS-2017-140, Safety Concern Analysis for Vertical Spacing Violation on a Four  
 Quadrant Horizontal Element Cart dated August 21, 2017  
 NCS-2017-151, NCS Safety Analysis Supporting SER 17-034 Phase 01 and Phase 02 –  
 Install New LEU UAL<sub>x</sub> Target Press Glove Box dated September 20, 2017  
 NCS-2017-160, Safety Concern Analysis for a Degraded Management Measure for the  
 Conventional Lines (CA-201701191), dated September 29, 2017  
 NCS-2017-163, Safety Concern Analysis for a Water Trap System for Conventional  
 Lines 7 & 8 Ventilation (CA-201701288), dated October 4, 2017  
 NCS-2017-170, NCS Justification Analysis Supporting SER 17-049 Phase 01 – HIP  
 Controls Upgrade dated October 11, 2017  
 NCS-2017-171, NCS Justification Analysis to Implement COM-60631 per  
 CA-201601433; Review Safety Basis for the Chemistry Lab Scrubber System dated  
 October 11, 2017  
 NCS-2017-178, NCS Safety Analysis to Delete the Ventilation Water Trap from SAR  
 15.34 and Scenarios, dated October 24, 2017  
 NCS-2017-194, Safety Concern analysis for an Inadvertent Transfer of Solution to  
 Primary Feed Column #3 (CA-201701430), dated December 14, 2017  
 NCS-PA-21-00001, Nuclear Criticality Safety Evaluation of the Low-Level Radioactive  
 Waste Process, Rev. 1  
 NCS-TR-00020, NCS Calculations for Low-Level Radioactive Waste Processing  
 Activities, Rev. 0  
 NPDP WO 20226161, SC HLDT and LLD Airflow Checks 1M Record dated  
 August 15, 2017  
 SER 14-032, Phase 01 and Phase 02, Recovery Scrubber  
 SER 15-012, Phase 01, SFF WS130 Upgrade and Restart  
 SER 15-024, Phase 01, Universal Development Element Cart  
 SER 15-037, Phases 01 and 02, Construction of New Pickle Facility  
 SER 17-38, CHG 3436 RTRT Fuel Fab Glove Box Upgrade, Phase 1, RTR HEU Line  
 Purification System/Filter Disassembly

Procedures

NCSE-02, Nuclear Criticality Safety Analyses and Quality Assurance Reviews, Rev. 45

NCSE-03, Nuclear Criticality Safety Audits and Inspections, Rev. 28

NCSE-07, Qualification and Training Requirements for a Nuclear Criticality Safety Engineer, Rev. 7

OP-0000272, Liquid Handling at the Retention Tank Inline Monitor System, Rev. 8

OP-61129, Drum Dryer Collection of Uranyl Nitrate Crystals, Rev. 53

OP-0061150, Inspection and Cleaning of Recovery Ducts, Rev. 31

OP-61246, Filling, Circulating, Sampling and Draining Solution in Columns and Tanks, Rev.25

QWI 4.1.1, Design Input, Rev. 1

QWI 4.1.4, Design Reviews, Rev. 4

QWI 4.1.5, Design Criteria for NRC Licensed Activities, Rev. 18

QWI 5.1.7, Safety Evaluation Requests, Rev. 32.

QWI 5.1.12, Change Management, Rev. 30

QWI 5.1.12, Attachment 3, Technical Review Board Definition, Rev. 3

QWI 14.1.14, Reporting Unusual Incidents, Rev. 12

Other Documents

5-Year NCS Refresher Training dated July 22, 2015

Annual 2017 Refresher Training dated July 24, 2017

Annual Summary of Changes and Revised ISA dated January 30, 2017

BWXT Nuclear Operations Group Lynchburg Emergency Plan, Rev. 30

Emergency Preparedness Manual, Rev. 20

Facility Siting Review 7, Location of Focus: LTC, Rev. 4

General NCS Training dated June 22, 2011

LTC Pre-Fire Plan, dated September 20 and December 4, 2017

N-517, 10 CFR 70.72, Change Evaluation Checklist, Rev. 9

NFPA-600, Standard on Facility Fire Brigades, 2005 Edition

SAR 15.5, High Level Dissolution Process in Uranium Recovery, Rev. 133

SAR 15.34, Conventional Filler Operations, Rev. 61

SAR 15.36, Generator and UPS Power Systems, Rev. 16

SNM-42, BWXT Nuclear Operations Group, Amendment 26

Corrective Actions

17-0324, 17-0696, 17-0739, 17-0990, 17-1049, 17-1079, 17-1082, 17-1108, 17-1191, 17-1288, 17-1338, 17-1403, 17-1430, 17-1465, 17-1475, 17-1491, 17-1510, 17-1525, 17-1653, 17-1661

Work Orders

20229259, 20231148, 20231329, 20231847