UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
245 PEACHTREE CENTER AVENUE N.E., SUITE 1200
ATLANTA, GEORGIA 30303-1200

EN 54751

July 29, 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 70-27/2020-002

Dear Mr. Burch:

This letter refers to the inspections conducted from April 1, 2020, through June 30, 2020, at the BWXT Nuclear Operations Group, Inc. (NOG) facility in Lynchburg, VA. During this period, the U.S. Nuclear Regulatory Commission (NRC) implemented alternative ways to complete the core inspection program for your site in response to the public health emergency declared by the Secretary of Health and Human Services on January 31, 2020, and the National Emergency declared by the President of the United States on March 13, 2020, regarding the public health risks of the novel coronavirus (COVID-19) disease. On March 19, 2020, the NRC transitioned into a mandatory telework posture for all staff (including resident inspectors) consistent with social distancing and travel recommendations issued to Federal agencies. Consequently, the NRC Region II staff continues to evaluate how to best conduct inspections while balancing our determinations of reasonable assurance of adequate protection and ensuring the health and safety of inspectors and the public at large.

The enclosed report presents the results of the inspections, which were conducted through a combination of remote reviews and onsite observations. The inspectors reviewed activities as they relate to public health and safety, the common defense and security, and compliance with the Commission's rules and regulations, as well as the conditions of your license. The inspections covered the areas of safety operations, radiological controls, facility support, and other areas. Within these areas, regional and resident inspectors reviewed procedures and representative records remotely and conducted telephonic interviews with site personnel. The resident inspector also visited the facility on a weekly basis to monitor plant conditions and conduct focused inspection activities. The results of this inspection were discussed with you and members of your staff at exit meetings held on June 10 and July 23, 2020.

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

The NRC will continue evaluating the guidelines and recommendations from Federal and State authorities, along with the conditions of your facility, to determine when to resume inspection activities as normal. In the interim, the NRC plans to continue to conduct a combination of remote and onsite inspections as well as periodic resident inspector visits to the site and gradually increase presence as appropriate. The NRC will also maintain frequent communications with your staff to discuss regulatory compliance matters and gather information to inform the decisions about future inspections.

In accordance with Title 10 of the *Code of Federal Regulations,* Section 2.390 of the NRC's "Rules of Practice and Procedure," a copy of this letter and enclosure will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html.

Should you have any questions concerning these results during this modified inspection phase, please contact Noel Pitoniak of my staff at 404-997-4634.

Sincerely,

/RA/

Suzanne Dennis, Acting Chief
Projects Branch 2
Division of Fuel Facility Inspection

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

Enclosure:
NRC Inspection Report 70-27/2020-002
w/Attachment: Supplemental Information

cc: Distribution via LISTSERV®

SUBJECT: BWXT NUCLEAR OPERATIONS GROUP – NUCLEAR REGULATORY COMMISSION INTEGRATED INSPECTION REPORT 70-27/2020-002 dated July 29, 2020

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NAME	A. Alen	T. Sippel	N. Pitoniak	B. Adkins	K. McCurry	J. Ortiz	D. Edwards	S. Dennis
DATE	7/27/2020	6/24/2020	7/2/2020	6/24/2020	6/25/2020	6/25/2020	6/20/2020	7/29/2020

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

INSPECTION REPORT

Docket No:	70-27
License No:	SNM-42
Report No:	70-27/2020-002
Enterprise Identifier:	I-2020-002-0047
Licensee:	BWX Technologies, Inc. (BWXT)
Facility:	Nuclear Operations Group, Inc. (NOG)
Location:	Lynchburg, VA 24505
Inspection Dates:	April 1 through June 30, 2020
Inspectors:	A. Alen, Senior Resident Inspector B. Adkins, Fuel Facility Inspector (Section A.4) D. Edwards, Fuel Facility Inspector (Section A.6) K. McCurry, Fuel Facility Inspector (Section A.6) J. Rivera-Ortiz, Fuel Facility Inspector (Section A.4) T. Sippel, Fuel Facility Inspector (Section A.4)
Approved by:	S. Dennis, Acting Chief Projects Branch 2 Division of Fuel Facility Inspection

Enclosure

EXECUTIVE SUMMARY

BWXT Nuclear Operations Group, Inc.
NRC Integrated Inspection Report 70-27/2020-002
April 1 – June 30, 2020

Inspections were conducted by the senior resident inspector and regional inspectors during 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 Programs. (Sections A.3 and A.4)

- No violations of more than minor significance were identified related to the Nuclear Criticality Safety Program. One unresolved item was opened to further evaluate a material accumulation that occurred in the Research and Test Reactors and Targets (RTRT) arc melter ventilation system. (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 Emergency Preparedness. The licensee's emergency response organization properly responded to a fire in the waste compactor building. The event was appropriately classified, and the required offsite agencies were notified. All water and air sample results indicated no elevated airborne radioactivity levels due to the fire and confirmed that no licensed material was involved. (Sections C.4 and D.2)

Other Areas

- No violations of more than minor significance were identified related to observations of security personnel and activities. (Section D.1

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 and Targets (RTRT) facility.

A. Safety Operations

1. Plant Operations (Inspection Procedure 88135.02)

   a. Inspection Scope

   The inspectors performed weekly 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." The inspectors conducted daily communications (remotely and onsite) with area managers and reviewed area operations log sheets, when onsite, throughout the period to gain insights into process safety and operational issues. The inspectors reviewed selected licensee-identified issues and corrective actions for previously identified issues. These reviews focused on plant operations, safety-related equipment (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 corrective actions as required.

   The inspectors conducted weekly 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 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 corrective actions to verify that the licensee actively pursued corrective actions for conditions requiring temporary modifications and compensatory measures.

   The inspectors performed periodic tours of the outlying facility areas to verify that equipment and systems were operated safely and in compliance with the license application. 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 (remotely via telephone or physically during weekly site visits) various meetings, including the Change Review Board, Safety Committees (i.e., ALARA) 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."

b. Conclusion

No violations of more than minor significance were identified.

2. Operational Safety (Inspection Procedure 88135.04)

a. Inspection Scope

The inspectors interviewed staff and reviewed records associated with SNM-bearing solution sample collection, handling, and uranium-235 counting process operations in the UR facility (i.e., safety analysis report (SAR) 15.13, "U-235 Counting Process in Uranium Recovery"). The inspectors reviewed the related integrated safety analyses (ISA) to verify the availability, reliability, and capability of the IROFS 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 conducted walkdowns of the uranium 'deep well' counter rooms 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 verified that the administrative safety controls in these areas were being implemented and properly communicated as described in the ISA and were in compliance with the regulatory requirements of 10 CFR 70.61 and 10 CFR 70.62.

The inspectors reviewed procedures to verify that required actions as identified in the ISA were correctly transcribed into written operating procedures. The inspectors evaluated the content of procedures with respect to operating limits and operator responses for upset conditions and verified that limits required to assure safety were adequately described in the procedures. The inspectors interviewed various operators and observed several ongoing operations in the UR well counter room to verify that they were implementing the required safety controls. The inspectors observed operators' performance to verify that they were adhering to applicable safety procedures. The inspectors reviewed the postings applicable to the tasks being observed and verified that the postings were current, reflected safety controls, and were followed by the operators.

The inspectors reviewed the licensee's training program related to operations of the UR deep well gamma and interviewed several operators to verify that their training was adequately implemented.

Through interviews, document reviews, and observations, the inspectors verified that the licensee conducted calibrations and periodic surveillances as required by the ISA and operating procedures for the U-235 counting process equipment (i.e. deep well counter and sample measuring pipettes).

The inspectors reviewed the licensee's corrective action program (CAP) entries since the last operational safety inspection and determined that deviations from procedures and unforeseen process changes affecting nuclear criticality, chemical, radiological, or fire safety were documented and investigated promptly. In addition, the inspectors evaluated the corrective actions associated with selected CAP entries to verify that the completed corrective actions were adequate.

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 radiation control office and main bays 2 through 5 to verify compliance with license application Chapter 7, "Fire Safety," and the National Fire Protection Association 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 also verified that housekeeping in the areas reviewed was sufficient to minimize the risk of fire. 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.

Weekly 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 Triennial (Inspection Procedure 88054)

a. Inspection Scope

The inspectors reviewed selected aspects of the licensee's fire protection program to determine whether the licensee established an effective program capable of precluding or mitigating the consequences of a fire in accordance with the requirements of license application Chapter 7, "Fire Safety," and 10 CFR 70.61. The inspectors reviewed the safety basis and implementation of fire protection-related controls in the RTRT area and other areas to verify that controls were established and implemented in accordance with the license application and ISA. The inspectors reviewed ISA and fire hazard analysis records for these areas to verify that fire hazards were analyzed and IROFS had been established as required by Sections 7.2, "Fire Risk Identification," and 7.4, "Process Fire Safety," of the license application. The records reviewed are listed in Section 4 of the Attachment.

The inspectors reviewed licensee procedures related to the control of flammable and combustible liquids, combustible metals, and pyrophoric materials to verify that the licensee had measures in place in accordance with Section 7.1.4, “Fire Prevention,” of the license application. The inspectors also reviewed procedures for fire prevention practices and ignition source permits to verify compliance with Section 7.1.2, “Procedures,” of the license application.

The inspectors reviewed licensee procedures and testing and maintenance records for fire protection controls and IROFS to verify that the license had established an inspection and maintenance program to maintain fire dampers and walls in a condition that would ensure they were available and reliable to perform their safety function as required, in accordance with Section 7.1.5, “Inspection, Testing, and Maintenance,” of the license application. The inspectors interviewed licensee fire protection staff about the annual inspection and testing of barriers to verify that these activities ensured that the barriers would perform their safety function under fire conditions.

The inspectors reviewed samples of recent surveillance records and procedures for the inspection and level verification of the facility’s fire water tanks to verify that their function and capacity were maintained in accordance with Section 7.5.1, “Detection, Alarm, and Suppression,” of the license application.

The inspectors reviewed records and discussed with licensee staff a modification performed in the sprinkler system for the container storage building (CSB) to verify that the IROFS-related function of the system was not adversely affected by the modification and that configuration control management measures were applied as stated in Section 7.1.3, “Engineering Review,” of the license application.

The inspectors reviewed a sample of maintenance plans (MPs) for gaseous detection systems to verify that the licensee had measures in place to test the detectors in accordance with Section 7.5.1 of the license application.

The inspectors reviewed procedures and samples of recent records related to the inspection and testing of fire suppression systems for the RTRT and CSB areas. The inspectors reviewed records of completed surveillances to verify compliance with Sections 7.1.5 and 7.5.1 of the license application. The surveillance records covered the RTRT and CSB sprinklers (IROFS), RTRT fire water valve inspections, RTRT fire water main drain inspections, RTRT and CSB fire extinguisher inspections, fire water main valves turning and position verification, main water loops testing, and fire hydrant inspections.

The inspectors reviewed the licensee’s fire protection system impairment procedure and interviewed licensee staff to verify that the licensee establishes compensatory measures for out of service, degraded, or inoperable fire protection equipment, systems, or features and that impairments are tracked and reported in accordance with HS-03-10, “Control of Fire Protection System Impairments.”

The inspectors reviewed the licensee’s fire protection program, ISA, and supporting documents to determine whether the program considered the impact of fire suppression agents and activities on nuclear criticality safety (NCS); specifically, if activation of automatic fire suppression would cause an NCS safety hazard.

The inspectors reviewed licensee procedures and test records for the licensee's radio communication systems to verify that the licensee's programs and procedures were adequate to ensure that communications would be available, operable, adequate, and reliable for their required performance in fire response activities.

The inspectors conducted interviews and reviewed records to determine whether emergency lighting equipment in the RTRT area was being maintained in accordance with Section 3.7, "Other Emergency Equipment," of the Emergency Plan. The inspectors reviewed drawings to determine if battery-powered backup lighting units were provided throughout the RTRT area. The inspectors reviewed records to verify that the licensee performed monthly functional testing of the emergency lighting system as well as the annual 90-minute loss-of-power test to verify the means of egress has adequate illumination as required by HS-IS-002, "Inspection of Emergency Lights."

The inspectors reviewed records to verify that the emergency response team members received training and participated in drills on at least an annual basis. The inspectors reviewed records technical work records HS-2019-079, "2019 Semiannual Offsite Responders Training," and HS-2019-119, "Annual Offsite Responder Training," to verify that the offsite fire support organizations were offered an opportunity for site orientation and other required training.

The inspectors reviewed the licensee's CAP entries for the past year and interviewed licensee staff to verify that the licensee was identifying fire protection events and issues and entering them into the CAP in accordance with Section 11.6, "Corrective Action Program," of the license application. In addition, the inspectors interviewed licensee staff and reviewed records related to the corrective actions associated with CAP program entries to verify that corrective actions were taken. The inspectors reviewed the results of internal audits of the fire protection program to verify that the licensee conducted periodic audits as required by Section 7.1.4 of the license application.

The inspectors interviewed licensee staff and reviewed the BWXT organization chart to determine whether changes to the fire protection program's organizational structure, if any, were in accordance with Section 7.1.1, "Organization," of the license application.

The inspectors reviewed records to verify that the licensee provided IROFS training and fire safety training for IROFS associated with the CSB in compliance with Section 11.3, "Training and Qualification," of the license application.

b. Conclusion

No violations of more than minor significance were identified.

5. Nuclear Criticality Safety (Inspection Procedure 88135.02)

a. Inspection Scope

The inspectors conducted weekly 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 several NCS-related IROFS to verify operability. The inspectors also observed operator performance to verify compliance with requirements associated with NCS-related IROFS.

As part of the weekly onsite visits, the inspectors reviewed 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 evaluated selected aspects of the licensee's NCS program to verify compliance with selected portions of 10 CFR 70, "Domestic Licensing of Special Nuclear Material;" (primarily Parts 70.61 and 70.62), Chapter 5, "Nuclear Criticality Safety;" of the facility's license application, and applicable licensee procedures. Specific areas of the NCS program reviewed are detailed below.

Criticality Analysis

The inspectors reviewed selected nuclear criticality safety evaluations (NCSEs) and associated assumptions and calculations associated with high-flux isotope reactor (HFIR) fuel processing located in the RTRT area to verify that they were consistent with the commitments in the license application. These commitments included the double contingency principle, assurance of subcriticality under normal and credible abnormal conditions with the use of subcritical margin, having properly reviewed and approved NCSEs in place prior to conducting new or changed operations, and documenting NCSEs in sufficient detail and clarity to permit independent review. The inspectors reviewed the selected NCSEs to determine whether calculations were performed within their validated area(s) of applicability and consistent with the validation report. The NCSEs were selected based on the risk of the system, their ability to be inspected remotely, and time since they were last reviewed. The NCSEs reviewed were specifically for the HFIR plate program annealing furnace and cart, the HFIR element carts, and the HFIR lift carts and are listed in Section 4 of the Attachment.

The inspectors reviewed the licensee's generation of accident sequences outlined in SAR 15.23, "Fuel Plate and Element Fabrication Processes RTRT Operation," 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 process descriptions. 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. This review was also conducted for the three areas of HFIR processes listed above.

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

Criticality Implementation

The inspectors reviewed the criticality safety parameters, limits, and controls listed in SAR 15.23 to verify appropriate limits and controls were established for each parameter captured in the NCSEs referenced above. In addition, the inspectors reviewed the controls to verify they were appropriately designated as IROFS; properly identified as administrative, active, or passive; and had management measures adequately assigned to them. Specifically, the passive engineered controls reviewed included fixed separation between HFIR fuel plate stacks, the HFIR element carts, and reflection from the floor. Additionally, the inspectors reviewed an active engineered control for the over-temperature control to shut down the furnace. The administrative controls reviewed included operator action to control material type, piece count of plates, fuel spacing, and moderating materials.

The inspectors reviewed operating procedures and postings to verify they adequately captured the administrative controls established in the NCSEs and SAR and were effective management measures to ensure the availability and reliability of the control to perform its safety function.

The inspectors reviewed the appendix to SAR 15.23 to verify appropriate frequency and protection scores were assigned to each IROFS and the resulting overall accident likelihood for each scenario was highly unlikely.

Criticality Operational Oversight

The inspectors reviewed selected NCS safety analyses and justification analyses listed in Section 4 of the Attachment to verify that they were performed in accordance with NCS program procedures and received appropriate independent review and approval. Additionally, the inspectors conducted interviews with NCS management, reviewed NCS staff qualification levels, and records to verify that NCS staff were qualified perform NCS weekly walkdowns and/or quality assurance reviews of NCS analyses in accordance with NCSE-07, “Qualification and Training Requirements for a Nuclear Criticality Safety Engineer.”

The inspectors reviewed NCSE-03, “Nuclear Criticality Safety Audits and Inspections,” weekly inspection schedules, inspections records of NCS weekly inspections of RTR, waste operations, met lab, and specialty fuels facility (SFF) to verify that the NCS function performed weekly inspections as required by Section 5.1.3, “Nuclear Criticality Safety Audits and Inspections,” of the license application.

The inspectors reviewed procedures (RP-07-103, “Maintenance and Testing the CIDAS MkXI Criticality Safety Engineer,” Revision (Rev.) 18; and RP-07-104, “CIDAS MkXI Detector Calibration,” Rev. 2) that implement compensatory measures to verify that the procedures implemented the requirements of Section 5.1.5, “Nuclear Criticality Monitoring System.” The inspectors reviewed the most recent criticality accident alarm system test records to ensure that the radiation detectors and speakers were tested in accordance with license requirements.

The inspectors also interviewed staff and reviewed selected engineering change packages for the HFIR system to verify they were adequately reviewed by NCS staff to determine whether the SAR and any IROFS were affected by the proposed changes.

Criticality Corrective Action

The inspectors reviewed selected NCS-related CAP entries and safety concern analyses to verify that anomalous conditions were identified and entered into the CAP, that they received the required level of investigation, and that they were closed out consistent with license commitments and procedures. The inspectors reviewed the corrective actions and safety concern analyses listed in Section 4 of the Attachment to verify that they were sufficiently broad and adequate to prevent recurrence, if required.

The inspectors also reviewed the issues to determine whether they were appropriately dispositioned as non-reportable events in accordance with Appendix A, "Reportable Safety Events," of 10 CFR 70.

b. Conclusion

No violations of more than minor significance were identified. However, one unresolved item (URI) was opened to further evaluate a material accumulation that occurred in the RTRT arc melter ventilation system.

URI 70-0027/2020-002-01: Material Accumulation in the RTRT HEU Arc Melter Ventilation System

Introduction: During a review of CA 2020-0509, the inspectors identified a URI associated with an accumulation of fissile material that occurred in a RTRT arc melter pre-filter and its associated housing.

Description: On April 16, 2020, while performing the annual pre-filter replacement for RTRT's highly enriched uranium (HEU) arc melter no. 2 (equipment SAP no. 10000915), the nuclear material control (NMC) group recorded an initial count of greater than 50 grams of U-235 on the filter. Upon further investigation, NMC determined the filter contained 87.3 grams of U-235 and an additional accumulation of 111.45 grams of U-235 in the pre-filter housing for a total of 198.75 grams of U-235. Although this accumulation was greater than expected, the routine operating limit for the pre-filter is 350 grams of U-235, so no NCS limits were violated.

The design of the arc melter ventilation system is unique to others in the facility because the pre-filter is installed downstream, instead of upstream, of ductwork where accumulation of dispersible uranium is a potential. Specifically, the housing plenum below (i.e. upstream) the 22-inch by 22-inch pre-filter is 10 inches deep, unlike the typical 1-inch depth, creating a location that is not favorable geometry. Therefore, the primary concern is a long-term accumulation of fissile material in the housing with an added concern of interaction with the material on the filter. The inspectors questioned whether this was properly analyzed in SAR 15.22, "RTRT Fuel Powder and Compact Processes," and supporting NCSEs since it appeared the documents only addressed the potential for buildup of material on the pre-filter itself and in the favorable geometry ductwork. The licensee is conducting a new analysis to determine whether this is a credible condition, and if so, whether it is currently bounded by a pre-existing analysis.

Although the accident condition for build-up of material on the pre-filter is included in the SAR, it improperly credits an IROFS to perform an annual duct survey as additional protection in that sequence because the surveys do not include the pre-filter nor housing. Without that IROFS, the overall accident likelihood reduces from a minus 6 to a minus 4, remaining highly unlikely however having no margin with respect to the

performance requirements of 70.61(b). Additionally, the licensee stated the annual pre-filter replacement IROFS has a degraded management measure because the maintenance procedure does not include steps to inspect and cleanout the pre-filter housing. The licensee is currently investigating how the material accumulated and how quickly it is accumulating to determine whether the annual frequency of that IROFS and its existing management measures, ensured it would remain reliable to perform it's intended safety function under all credible abnormal conditions including the potential for equipment malfunction. The licensee is also performing a new safety concern analysis (SCA) to capture whether the duct surveys for other sequences are being performed properly. In the interim, the licensee is conducting bi-weekly surveys to aid in their investigation as well as ensure that an unacceptable mass of U-235 does not accumulate.

In summary, with the interim measures in place, the current condition in the plant is safe, and the NRC is awaiting further information from the licensee to determine whether controls were in place to ensure the existing condition of the system remained subcritical with an approved margin of subcriticality and all credible conditions remain highly unlikely to meet the performance requirements of 70.61. Specifically, the licensee plans to provide a new analysis of this accident condition, supporting pre-existing NCSEs, survey data of the filter and housing collected since the incident, new or revised SCAs related to this issue, and any other pertinent documents needed for the follow-up inspection. This issue is captured in the licensee's CAP as CA 2020-0509, and the NRC is tracking it as URI 70-0027/2020-002-01, "Material Accumulation in the RTRT HEU Arc Melter Ventilation System."

B. Radiological Controls

1. Radiation Protection Quarterly (Inspection Procedure 88135.02)

   a. Inspection Scope

The inspectors performed a review and observation of posted radiologically controlled areas to verify compliance with license application Chapter 4, "Radiation Safety;" the Radiation Protection Manual; and implementing procedures. The inspectors reviewed the following radiation work permits (RWPs) to verify that they contained required work instructions, were posted in the work area for employee review, and that workers signed the RWPs. In addition, the inspectors performed partial reviews of select RWPs during the inspection period in different operational areas to verify RWP compliance. Documents reviewed are listed in Section 4 of the Attachment.

- RWP 20-0014 for disassembly and inspection of furnace workstation no. 140 in the UR SFF area on April 23, 2020.
- RWP 20-0025 for plasma-cutting openings for new doors on workstation no. 300 in the UR SFF area on June 11, 2020.

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

The inspectors also observed plant employees as they performed exit monitoring at the controlled areas' exits to verify that monitoring instructions were followed at the exit point.

b. Conclusion

No violations of more than minor significance were identified.

C. Facility Support

1. Post-Maintenance Testing (Inspection Procedure 88135.19)

a. Inspection Scope

The inspectors 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 and that the procedure had been reviewed and approved, as required. The inspectors verified 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 Section 4 of the Attachment.

- WO 20284404, Post 'dry-run' (i.e., equipment run without fuel) inspection of furnace workstation no. 140 in UR SFF following replacement of furnace retort (IROFS) adapter coupling, conducted on June 1, 2020.

b. Conclusion

No violations of more than minor significance were identified.

2. Surveillance Testing (Inspection Procedure 88135.22)

a. Inspection Scope

The inspectors reviewed completed test records 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. Additional documents reviewed are listed in Section 4 of the Attachment.

- MP-3451, Replacement of Exhaust Ventilation Pre-Filter (IROFS) for the HEU Arc Melt Furnace Workstation in the RTRT Hot Shop Area, conducted on April 16, 2020.
- MP-2255, Annual Inspection of HEU Arc Melting Furnace No. 2 Coolant System (IROFS) Annual Integrity Inspection, conducted on June 4, 2020.

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 corrective action records. The inspectors also reviewed corrective actions 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:

- Radiation Protection Audit, January – March 2020

b. Conclusion

No violations of more than minor significance were identified.

4. Emergency Preparedness (Inspection Procedure 88135)

a. Inspection Scope

On June 19, 2020, at approximately 10:15 a.m., a fire occurred in the waste compactor building that resulted in an employee fatality. The licensee activated the emergency operations center (EOC) and its emergency management and emergency response organizations (EMO and ERO). The inspectors responded to the EOC and observed licensee EMO staff performance and implementation of the Emergency Plan and associated response procedures, including event classification, notification, and radiological assessment.

The Emergency Team (ET) responded and found a victim on the floor in the super compactor room, which was adjacent to the compactor equipment room or 'cell'. The victim was pronounced dead at the scene by ET paramedics. Although the fire was out before the ET could respond to the incident, the fire appeared to have started inside the compactor cell as the room's sprinklers were found discharging water. Due to the little observed fire damage and absence of eye witnesses, the cause and impact of the fire was unknown at the time; however, it was determined to not have involved licensed material because there was no licensed material in the compactor cell and the

compactor was found in a safe shutdown condition (i.e., was not in operation). The licensee obtained water samples and incident boundary and local/fixed air monitor samples and confirmed that radioactive material was not involved in the event. The inspectors reviewed sampling results and confirmed that radioactive activity levels were minimal and consistent with normal levels. Due to the fatality, access to the building was secured until investigations were conducted by the local fire marshal, Campbell County sheriff's department, and the Federal Occupational Safety and Health Administration (OSHA). The inspectors conducted a post-event walkdown of the area and noted that the extent of the damage from the fire was relatively small, limited to within the compactor equipment cell, and did not impact the compactor equipment.

The licensee entered this event in their CAP as CA 2020-0838 and formed an investigation team to determine the cause(s) of the event and implement corrective actions. Immediate corrective actions included shutdown of compaction operations until the cause of the fire is understood, and corrective actions are implemented.

b. Conclusion

The EMO and ERO staff properly responded to the event. The event was appropriately classified, and the required offsite agencies were notified. All water and air sample results indicated no elevated airborne radioactivity levels due to the fire and confirmed that no licensed material was involved.

D. Other Areas

1. Observations of Security Personnel and Activities

a. Inspection Scope

During weekly onsite visits, 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. 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. WER 70-27/2020-001: Fire and Associated Fatality in the Waste Compactor Building (EN54751)

As described in Section C.4, "Emergency Preparedness," on June 19, 2020, at approximately 10:15 a.m., a fire occurred in the waste compactor building that resulted in an employee fatality. The licensee entered this event in their CAP as CA 2020-0838 and formed an investigation team to determine the cause(s) of the event and implement corrective actions. Additionally, in response to the fatality, the Federal OSHA completed an onsite inspection of the fire scene and is investigating the matter. The inspectors will review the results of the licensee and OSHA investigations once they are completed to determine if there is any NRC noncompliance(s) associated with the event.

E. Exit Meeting

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

- On, June 10, 2020, regional inspectors presented the triennial fire protection and nuclear criticality safety inspection results to the licensee's Vice President and General Manager, Mr. J. Burch, and other members of the licensee staff.
- On July 23, 2020, the resident inspector presented the quarterly inspection results to the licensee's Environmental, Safety, Health, and Safeguards Department Manager, Mr. D. C. Ward, and other members of the licensee staff.

SUPPLEMENTAL INFORMATION

1. KEY POINTS OF CONTACT

Licensee Personnel

Name	Title
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

Opened

70-0027/2020-001-00	WER	Fire and Associated Fatality in the Waste Compactor Building (EN54751) (Section D.2)
70-0027/2020-002-01	URI	Material Accumulation in the RTRT HEU Arc Melter Ventilation System (Section A.6)

3. INSPECTION PROCEDURES USED

88015	Nuclear Criticality Safety
88050	Emergency Preparedness
88054	Fire Protection (Triennial)
88135	Resident Inspection Program for Cat I Fuel Cycle Facilities
88135.02	Plant Status
88135.04	Operational Safety
88135.05	Fire Protection (Quarterly)
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

2019-0358, Glove Unaccounted for in Entrance Box of RTRT Compact Line, Incident date March 12, 2019
2019-0459, Failure to Log Fuel in RTRT ATR Fuel Fab Glovebox, Incident date April 8, 2019
2019-0493, Software Configuration Error in the RTRT Mass/Moderator Log Spreadsheet for the ATR Fuel Fab Glovebox Line, Incident date April 8, 2019
2019-0906, Error in Cell Reference of One Line of Mass/Moderator RTRT Spreadsheet, Incident date June 18, 2019
2019-1077, Error in RTRT Mass/Moderator Log; Material Added Instead of Removed from Log, Incident Date August 5, 2019
2019-1381, Failure to Log Fuel in the RTRT Arc Melter, Incident date September 18, 2019
2019-1494, Moderating Materials Removed from RTRT Bulk Weight Box Without Updating Mass/Moderator Log, Incident date October 22, 2019
2019-1610, Improper Logging of Fuel in RTRT Pharmacy Glovebox Mass/Moderator Log Incident date, November 7, 2019
2019-1563, Level 2 Rollup for Adverse Trend Regarding Mass/Moderator Logs in RTRT, Created on November 7, 2019; Report date April 21, 2020
2020-0192, UIR-RP, Cluster of Stray Fuel Particles Identified in Non-Fuel Region of RTRT Fuel Plate, Incident February 6, 2020; Report date March 25, 2020
2020-0065, HVAC Ductwork Condensation Leaking Over Fuel Elements Stacked on Storage Table (Storage Area Bay 3), Incident date January 15, 2020; Report date January 15, 2020
2020-0509, Accumulation of Material in HEU Arc Melter HEPA Filter Housing in RTR Area, Incident date April 16, 2020; Report date May 13, 2020

Nuclear Criticality Safety Records

NCS-2005-272, Level Three Criticality Safety Analysis to Demonstrate the Safety of Ductwork in Area that Handle Dispersible Forms of Uranium, December 5, 2005
NCS-2020-060, NCS Safety Concern for Degraded Arc Melter Pre-Filter Maintenance Plan - CA202000509

Procedure

E41-134, Annual Ductwork Survey for RTRT HEU Arc Melter #2, (2017-2019)

Other Documents

NMCTWR 20-006, ISOCS Measurement of RTR Arc Melt #2 Filter, April 16, 2020
NMCTWR 20-007, ISOCS Measurement of RTR Arc Melt #2 Filter Housing, April 20, 2020
RTR HEU Arc Melter Baseline Survey conducted April 27, 2020
SAR 15.22, RTRT (Research Test Reactor and Targets) Fuel Powder and Compact Processes, Rev. 97
SAR Appendix 15.22, Rev. 32

88135.04 – Operational Safety

Corrective Actions Generated as a Result of Inspection

2020-0976, Volume Log in SFF Deep Well Counter Room not maintained, 6/17/2020
2020-1002, Inconsistent Sampling Instructions in UPRR, 7/22/2020

Corrective Action Program Records

2015-0254, NCS Audit Suggestion to Implement Volume Log for Well Counter Rooms, Incident date February 13, 2015; Report date May 19, 2020
2015-1318, Retainer Samples Not Pulled as Directed by Operating Procedure, Incident date August 7, 2015; Report date May 19, 2020
COM-52552, Commitment Associated with CA15-0254, Completed November 17, 2015

Nuclear Criticality Safety Records

NCS Posting 15-13-003, Well Counter Rooms, Rev. 01
NCS-2018-004, NCS Safety Analysis to Revise ≤2.5-liter Container SAR Tables per COM-63629, July 26, 2018.

Procedures/Instructions

E61-006, Deep Well Counter Calibration Record, Rev. 08
E61-008, Well Counter U-235 Peak Determination, Rev. 07
E61-009, Well Counter U-235 Peak High Voltage Settings, Rev. 07
E61-108, Well Counter Supervisors Parameter Setup Log, Rev. 08
E61-12, Gamma Well Counter Log, Rev. 14
E61-631, Dilution of Well Counter Samples, Rev. 02
E61-79, Pipette Calibration Check Log, Rev.3
OP-0061121, Operating Procedure for Primary Evaporation System, Rev. 30
OP-0061146, Deep Well Gamma Counter Operation, Rev. 17
OP-0061253, Operating Procedure for Sampling Containers in Uranium Recovery, Rev. 7

Other Documents

Change Request (CR), Deep Well Counter Data Automation, September 14, 2004
Recovery Deep Well Counters QA Calibration Check, QA Background Check, QA System, Background, conducted June 6 – June 15, 2020
TP-REC-0008, Training Plan for Recovery Primary Evaporator Area, Rev. 1
TP-REC-0010, Training Plan for Recovery Drum Dryer Area, Rev. 0
TP-REC-0003, Training Plan for Waste Handling, Rev. 0
TP-REC-0009, Training Plan for Contactor Area, Rev. 1
CHG-7385, Replace Recovery Well Counters with Osprey, April 2, 2020
E61-12, Gamma Well Counter Log, completed June 6 – June 15, 2020 in Recovery Count Room
Recovery Deep Well Counters 1, 2, and 3 Calibration Record, March 2020
CHG-5944, Change SARs 15.07, 15.12, 15.13, 15.14, 15.20; Appendix 15.14, 15.17, per Action Item 03080, 03218, and NCS-2018-004, April 1, 2019
SAR 15.13 Appendix, U-235 Counting Process in Uranium Recovery, Rev. 09
SAR 15.13, U-235 Counting Process in Uranium Recovery, Rev. 22

88135.05 – Fire Protection Quarterly

Corrective Actions Generated as a Result of Inspection

2020-0875, Extension Cord Used for Greater than 90 Days and Daisy Chained with Other Extension Cord Bay 2, July 1, 2020

2020-0876, Combustibles Stored in Electrical Room in Rad Con, July 1, 2020
2020-0881, Housekeeping and Electrical Deficiencies
2020-0882, Extension Cord and Power Strip Used Greater than 90 Days Bay 2, July 1, 2020

Procedure
HS-03-02, Fire Prevention, Revision 8

Other Documents
Facility Siting Review 5, Location of Focus: Bays 1A, 4A through 10A and 12A: Bays 2 through 13, Rev. 4
Pre-Fire Plan, Map Section 1, Bay 1, dated June 20, 2012
Pre-Fire Plan, Map Section 3, Bay 2 - Machine Shop, dated September 10, 2014
Pre-Fire Plan, Map Section 4, Machine Shop Bay 3 and 4, dated March 28, 2005
Pre-Fire Plan, Map Section 5, Bay 5 and 6 - Machine Shop, dated January 3, 2011
Pre-Fire Plan, Map Section 5M, Bay 5 Mezzanine, dated June 9, 2014
SAR 15.32, Pharmacy Operations, Rev. 40
SAR 15.28, Metallographic Laboratories, Rev. 49

88054 – Triennial Fire Protection

Corrective Action Program Records

2019-0044	2019-0121	2019-0141	2019-0167
2019-0332	2019-0449	2019-0655	2019-0848
2019-0910	2019-1054	2019-1490	2019-1688
2019-1747	2020-0054	2020-0345	2020-0358
2020-0577			

Modifications
CA 201701648, dated December 13, 2017
CHG-00003977, Relief Valve to CSB Sprinkler System, dated December 21, 2017

Procedures/Instructions
EPR-01-01, Emergency Plant Evacuation, Rev. 24
EPR-02-07, Emergency Shutdown of Facility, Rev. 6
EPR-03-28, Initial Response to Report of Smoke/Fire, Rev. 0
EPR-06-05, Inspection of Emergency Operation Center Readiness, Rev. 29
HS-03-03, Ignition Source Permits, Rev. 21
HS-03-06, Combustible Metals and Pyrophoric Materials, Rev. 13
HS-03-07, Control of Systems and Equipment for Fire Protection, Rev. 5
HS-03-08, Employee Fire Response & Firefighting, Rev. 7
HS-03-10, Control of Fire Protection System Impairments, Rev. 18
HS-FP-001, Monthly Inspection of Fire Hose Stations, Rev. 9
HS-FP-007, Fire Hydrant Testing and Maintenance, Rev. 6
HS-FP-008, Sprinkler System, Standpipes & Control Valve Inspection, Test & Maintenance, Rev. 21
HS-FP-009, Inspection of Fire Hydrants, Rev. 8
HS-FP-010, Monthly Inspection of Hose Houses, Rev. 9
HS-FP-016, Annual Service Testing of Fire Hose, Rev. 10
HS-FP-018, Fire Barrier/Fire Damper Inspection, Rev. 11
HS-FP-020, 5-Year Testing of the Water Loop, Rev. 7
HS-IS-002, Inspection of Emergency Lights, Rev. 8

Records

HS-2006-082, Severity Consequences for Fires, as related to SAR documents, dated March 13, 2006
ISAP 98-00046-01, Fire Safety Analysis Hazards Identification – Ignition Sources for PHA-14, dated April 24, 1998
ISAP 98-00076-00, Fire Safety Analysis Hazards Identification – Ignition Sources for PHA-15, dated June 1, 1998
SAR 15.22, RTRT Fuel Powder and Compact Processes, Rev. 97
SAR 15.23, Fuel Plate and Element Fabrication Processes RTRT Operation, Rev. 114
SAR 15.44, RTR (Research & Test Reactors) Uranium Molybdenum (U-Mo) Foil Production, Rev. 14

Other Documents

BWXT Primary Environmental Protection & Industrial Safety Organization Chart, May 15, 2020
CR-1042310, Preventive Maintenance on Service Water Tank #2, Rev. 0
CR-1042661, Preventive Maintenance on Service Water Tank #1, Rev. 0
Form WT-063, Water Storage Tanks Log Sheet, April 27 through May 24, 2020
Inspect & Track Inside History Report, CSB Fire Extinguishers – Monthly, April 2020
Inspect & Track Inside History Report, CSB Sprinkler Flow Alarms – 3 Months, Dec 2019 and March 2020
Inspect & Track Inside History Report, CSB Sprinkler Risers – Monthly, April and May 2020
Inspect & Track Inside History Report, Fire Hydrants – Monthly HS-FP-009, July 2019
Inspect & Track Inside History Report, Fire Main Drains - Yearly, Feb 2020
Inspect & Track Inside History Report, Fire Main Valves - Monthly, April 2020
Inspect & Track Inside History Report, Fire Main Valves, July 2017
Inspect & Track Inside History Report, Fire Main Valves, July 2018
Inspect & Track Inside History Report, Fire Main Valves, July 2019
Inspect & Track Inside History Report, Bay 17 Fire Dampers 4Y Inspection from 01/01/18 to 01/31/18, Report date May 28, 2020
Inspect & Track Inside History Report, CDC Fire Dampers 4Y Inspection from 01/01/18 to 01/31/18, Report date May 28, 2020
Inspect & Track Inside History Report, Fire Barriers 1Y Inspection from 01/01/18 to 05/28/20, Report date May 28, 2020
Inspect & Track Inside History Report, Fire Hydrants 1M Inspection from 07/01/19 to 07/31/19, Report date May 28, 2020
Inspect & Track Inside History Report, Fire Main Valves 1M Inspection from 01/01/20 to 04/30/20, Report date May 6, 2020
Inspect & Track Inside History Report, Fire Main Valves Annual Maintenance from 07/01/17 to 07/31/17, Report date May 28, 2020
Inspect & Track Inside History Report, Fire Main Valves Annual Maintenance from 07/29/18 to 7/31/18, Report date May 28, 2020
Inspect & Track Inside History Report, Maindrain7, Maindrain50, and Maindrain57 from 01/01/20 to 04/30/20, Report date May 6, 2020
Inspect & Track Inside History Report, Tests of Alternate and Offsite EOC Phones and Radios on 04/10/20 and 04/24/20, Report date May 11, 2020
Inspect & Track Inside History Report, Tests of EOC Phones and Radios, Report date May 11, 2020
Inspect & Track Inside History Report, RTRT Fire Extinguishers – Monthly, April 2020
Inspect & Track Inside History Report, Sprinkler Flow Alarms – 3 Months, March 2020

Inspect & Track Inside History Report, Sprinkler Risers – 5 Year, Nov 2019 and May 2018
Inspect & Track Inside History Report, Sprinkler Risers – Monthly, April 2020
MP 2540, Organic Vapor Detectors Vitality Check, (Semiannual Test)
MP 2541, Chlorine Detector Vitality Check (Semiannual Test)
MP 2544, (Hydride) Silane Detectors Vitality Check (Semiannual Test)
MP 2545, CO Detectors Vitality Check, (Semiannual Test)
MP 2546, Oxygen Sensor Vitality Check (6 Months)
MP 2548, HCL Detector Vitality Check, (Semiannual Test)
TWR HS-2019-079, 2019 Semiannual Offsite Responders Training 02/19/2019
TWR HS-2019-119, Annual Offsite Responder Training 10/01/2019
Underwater Robotic Inspection Report – Fire Protection Tank #1, May 24, 2019
Virginia Department of Health Office of Emergency Medical Services Detailed Continuing Education Report (3 Fire Brigade members), May 26, 2020

88015 – Nuclear Criticality Safety

Corrective Action Program Records

2020-0065	2020-0185	2020-0255	2020-0407
2020-0488	2020-0509	2020-0546	

Nuclear Criticality Safety Records

NCS-1983-008, NCS Safety Analysis for HFIR Plate Annealing, dated February 7, 1983
NCS-1994-123, HFIR Element Machining in the NR Shop, dated February 25, 1994
NCS-1999-127, Safety Concern: RTRFE/HFIR Program Annealing Cart and Furnace, dated January 12, 1999
NCS-2005-272, Level Three Criticality Safety Analysis to Demonstrate the Safety of Ductwork in Areas that Handle Dispersible Forms of Uranium, dated December 9, 2005
NCS-2017-097, NCS Safety Analysis Supporting Closure of CA201700771 – Improvement Suggestion to Add Non-Fuel Posting to SAR Control Tables for Racks and Carts on Bay 16 RTR Mezzanine, dated June 22, 2017
NCS-2020-012, NCS Safety Concern for Water on Elements on Two-Tier Table – CA202000065, dated February 24, 2020
NCS-2020-018, NCS Safety Analysis to Relocate Downblend Racks per CHG-7598 dated February 12, 2020
NCS-2020-024, Revised NCS Safety Concern for Inadequate Pressure Testing and Sampling of Condensate Cooling Heat Exchanger (CA202000041), dated February 11, 2020
NCS-2020-026, NCS Safety Concern for Piece Count Violation in Fuel Tray Storage Rack – CA202000185, dated February 17, 2020
NCS-2020-030, NCS Justification Analysis for SER 20-002 Phase 1, Installation of Hood for Density Gradient Column, dated February 26, 2020
NCS-2020-033, NCS Justification Analysis for SER 20-005 Phase 1 thru 3, Resume Normal Operations without RWP - Modify Ventilation and Cooling Air on WS401 Furnace, dated March 11, 2020
NCS-2020-036, NCS Safety Concern for Cluster on a Cart Not Posted for Clusters in the Photo Area – CA202000407, dated March 23, 2020
NCS-2020-040, NCS Justification Analysis for Additional Compact and Plate Type(s) for Belgium Reactor-2 (BR2) per SER 20-013, dated March 26, 2020
NCS-2020-060, NCS Safety Concern for Degraded Arc Melter Pre-Filter Maintenance Plan – CA202000509, dated May 20, 2020

NCS-2020-11, NCS Safety Analysis Supporting CHG-00007543-Generate and Revise BR2 Forms and Procedures for Piece Count (NCS Posting 15-22-019), dated January 21, 2020
NCSE-11, Verification and Validation of Computer Codes Used for Nuclear Criticality Safety Analyses, dated August 21, 2015

Procedures/Instructions
NCSE-02, Nuclear Criticality Safety Analyses and Quality Assurance Reviews, Rev. 47
NCSE-02, Attachment 1, NCS Process Analysis (PA) Writer's Guide, Rev. 1
NCSE-03, Nuclear Criticality Safety Audits and Inspections, Rev. 29
NCSE-07, Qualifications and Training Requirements for a Nuclear Criticality Safety Engineer, Rev. 18
RP-07-103, Maintaining and Testing the CIDAS MkXI Criticality Monitoring System, Rev. 7
RP-07-104, CIDAS MkXI Detector Calibration, Rev. 02, dated November 16, 2015

Other Documents
CHG-00006730, HF R Working Drawing Revisions (U), dated July 17, 2019
CHG-00006735, HF R OP Updates, dated July 17, 2019
CHG-00007751, HF R Clocking Bar Modification, dated January 29, 2020
CHG-00007805, HF R Fuel Plate OP Revisions, dated February 6, 2020
CHG-00008084, HF R Weld Test Adapter, dated March 16, 2020
LT-6401, HFIR Storage Cart, Rev. 2
NCS Weekly Inspection(s) dated January 20, February 24, March 2, March 9, and March 23, 2020
NOG-L CIDAS MKXI Criticality System Calibration Records, December 27, 2019
NOG-L NCS Staff Qualification Levels as of May 12, 2020
Posting 15-23-002, HFIR Plate Program Annealing Furnace, Rev. 01
Posting 15-23-008, RTRT HFIR Element Cart, Rev. 01
Posting 15-23-032, RTRT - HFIR Lift Cart, Rev. 01
Posting 15-23-038, HFIR Plate Program Annealing Cart, Rev. 01
RTR HEU Arc Melter Baseline Survey (Sketches and Duct Surveys), dated June 9, 2020
SAR 15.23, Fuel Plate and Element Fabrication Processes RTRT Operation, Rev. 114
Weekly Inspection Schedule for 1st Quarter and 2nd 2020

RADIOLOGICAL CONTROLS

88135.02 – Radiation Protection Quarterly

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

FACILITY SUPPORT

88135.19 – Post-Maintenance Testing

Drawing
45-0066, Hot Zone Retrofit Kit, dated October 19, 2006

Procedure
QWI 9.1.7, Preventive/Predictive Maintenance and Safety-Related Controls Testing Program, Rev. 11

Other Document
SAR 15.18, SFF Dry-End Processing SFF Operation, Rev. 127

88135.22 – Surveillance Testing

Corrective Action
2020-0509, Accumulation of Material in HEU Arc Melter HEPA Filter Housing in RTR Area, Incident date April 16, 2020; Report date June 4, 2020

Procedures
M42-027, Visual Inspection of RTRT Centorr ARC Melting #2 Furnace FUR041-SM 2395
OP-0006505, Operating Procedure for Arc Melting HEU Aluminide, Rev. 10
OP-1001097, Miscellaneous Safety Guidelines for Silicide Powder, Rev. 2
OP-10011021, Operating Procedure for RTRT HEPA and Air Conditioning Filter Changing Procedure, Rev. 4

Work Orders
20208262, Replaced Cooling Line in RTRT Arc Melter #2, September 5, 2016
20211935, Install New Coolant Line in RTRT Arc Melter #2, November 15, 2016
20216201, Replace Water Line for RTRT Arc Melter #2, February 13, 2017
20238700, Install Flowmeter in Coolant Line, February 26, 2018
20239855, Replaced Hose on Arc Melter #2, March 17, 2018
20239949, Annual Changeout of RTRT HEU Arc Melt Furnaces (MP-2255), conducted April 30, 2018
20249619, Replace RTRT Arc Melter #2 Coolant Lines, September 7, 2018
20255741, Replace RTRT Arc Melter #2 Coolant Lines, January 11, 2019
20260424, Annual Changeout of RTRT HEU Arc Melt Furnaces (MP-2255), conducted April 26, 2019
20280925, Annual Changeout of RTRT HEU Arc Melt Furnaces (MP-2255), conducted April 16, 2020
20284322, Arc Melter #2 Coolant System Inspection (MP-2255), June 5, 2020

Other Documents
MP-3451, Annual Changeout of RTRT HEU Arc Melt Furnaces
SAR 15.22, RTRT (Research Test Reactor and Targets) Fuel Powder and Compact Processes, Rev. 93
SAR 15.22, RTRT (Research Test Reactor and Targets) Fuel Powder and Compact Processes, Rev. 97

88135 – Emergency Preparedness

Procedures
EPR-06-04, Emergency Drills, Rev. 19
EPR-02-04, Notification of Off-Site Agencies During an Emergency, Rev. 33

Drawing
EOC_1004, Initial Emergency Assessment Flow Chart, Rev. 39

Other Document
BWXT NOG-L, Emergency Plan, Rev. 32