



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

November 13, 2024

EA-24-039

Howard Markle
Vice President and General Manager
BWXT Nuclear Operations Group, Inc.
P.O. Box 785
Lynchburg, VA 24505-0785

SUBJECT: BWXT NUCLEAR OPERATIONS GROUP, INC.- LYNCHBURG - NOTICE OF VIOLATION; NRC INSPECTION REPORT 07000027/2024008

Dear Mr. Markle:

This letter refers to the inspection conducted on March 28, 2024, at your BWXT Nuclear Operations Group facility in Lynchburg, VA (NOG-L) and the associated apparent violation (AV) of U.S. Nuclear Regulatory Commission (NRC) requirements documented in NRC Inspection Report No. 07000027/2024006; dated June 20, 2024 (accessible in the Agencywide Documents Access and Management System (ADAMS) via Accession Number [ML24151A460](#)). The purpose of the inspection was to follow up on an Event Notification (EN) submitted by BWXT-NOG-L on October 17, 2023 (EN 56800)¹ regarding the failure of the facility criticality accident alarm system (CAAS) to provide criticality accident detection capabilities as required under Title 10 of the Code of Federal Regulations, Section 70.24 (10 CFR 70.24).

On August 28, 2024, a predecisional enforcement conference (PEC) was conducted at the NRC Region II Office in Atlanta, Georgia with members of your staff to discuss the AV, its significance, the root causes, and your corrective actions (ADAMS Accession Number [ML24248A229](#)).

Based on the information developed during the inspection and the information that you provided during the PEC, the NRC has determined that a violation of NRC requirements occurred. The violation is cited in the enclosed Notice of Violation (Notice) and the additional circumstances surrounding the violation are described in detail in the above referenced inspection report 07000027/2024006, dated June 20, 2024.

The violation is related to the failure to maintain a monitoring system (i.e., the CAAS) capable of detecting a criticality in certain process areas of the facility as described in 10 CFR 70.24(a)(1). The violation was identified during the conduct of a Nuclear Criticality Safety (NCS) Process Analysis (PA) in October 2023, when BWXT staff determined that initial modeling parameters and assumptions used in October 2012 for the CAAS detector placement were incorrect for some areas of the facility. As a result, the CAAS as designed, could neither detect the minimum accident of concern nor meet the coverage requirements in 10 CFR 70.24. The violation documented in the enclosed Notice existed from October 25, 2012, through October 16, 2023.

¹ This event was initially assigned tracking number EN 56768 in error as referenced in your associated 30-day event report ([ML23325A040](#)). The correct event number is EN 56800.

At the PEC, BWXT-NOG-L presented the root causes of the violation to the NRC which involved: (1) *human error* by the original NCS engineer performing the design and analysis in 2011-2012 who misinterpreted the requirements leading to an inadequate selection of input parameters to the CAAS program, (2) *complexity/timing*, due to a single calculation preparer and a single calculation reviewer, while performing a first-of-a-kind (FOAK), large, and complex analysis contributing to a human error situation, and (3) *communication*, due to a lack of periodic oversight and communication before, during and after the implementation of the CAAS system.

The violation did not result in any actual consequences in that no criticality incidents occurred, and employees or members of the public were not exposed to radiation. Additionally, the violation also did not result in operational challenges since the safety controls required to reduce the likelihood of a criticality event remained in place while the violation existed. However, the potential consequence was of significant concern to the NRC because the CAAS is designed to alert personnel of a criticality accident occurrence and minimize direct exposure to personnel. Therefore, this violation has been categorized at Severity Level III in accordance with the NRC Enforcement Policy Section 6.2.c.7.

In accordance with the NRC Enforcement Policy, a base civil penalty in the amount of \$90,000 is considered for a Severity Level III violation.

Because your facility has been the subject of escalated enforcement actions within the last two years², the NRC considered whether credit was warranted for *identification and corrective action* in accordance with the civil penalty assessment process in Section 2.3.4 of the Enforcement Policy. The NRC staff acknowledges that the root cause of the previously issued violation in August 2023 and associated corrective actions are not related to this current CAAS violation.

The NRC determined that credit for *identification* was appropriate in this case because the problem requiring corrective action was identified through the questioning attitude of a BWXT-NOG-L NCS contracted engineer during a PA review for the Research Test Reactor autoclave located in Bay 5A. While the PA revision project was a corrective action for a previous event and violation issued by the NRC in 2018 (ADAMS [ML18067A098](#)), the engineer went beyond the normal scope of the analysis to review the CAAS placement calculations and discovered the error. Additionally, BWXT-NOG-L extended their corrective actions from the 2018 event and performed a complete re-baselining of their criticality safety analyses for the entire facility instead of limiting them to the event in question. This additional effort contributed to the discovery of the CAAS detector placement error.

The NRC also determined that credit for *prompt and comprehensive corrective actions* was appropriate because BWXT-NOG-L took the necessary actions to restore safety and compliance with the applicable requirements, and developed reasonable corrective actions to address the root causes of the violation and prevent occurrence of violations with similar root causes. Based on the information gathered during inspection activities and the PEC, short term corrective actions included: (1) immediate shutdown of the Bay 5 autoclave area, (2) extent of condition analysis which identified seven additional systems/components susceptible to the same problem, resulting in the immediate suspension of operations in these areas, (3) implemented compensatory measures to monitor exposure until a full analysis of potential areas

² A Severity Level III Notice of Violation and an \$87,500 civil penalty were issued to BWXT Nuclear Operations Group, Inc., Lynchburg on August 22, 2023 (EA-23-040).

impacted could be completed, (4) formal operations reviews prior to restarting any of the areas potentially impacted in accordance with the Conduct of Operations procedure, and (5) incorporate lessons learned into training requirements.

Long term corrective actions presented by BWXT-NOG-L to the NRC during the PEC included: (1) conducted a root cause analysis investigation, (2) developed new procedure for complex FOAK analyses to address the root causes to prevent similar significant errors and potential safety problems in future projects, (3) developed structured on the job training qualifications and training for NCS engineers, (4) benchmarked with other organizations/industry subject-matter-experts, (5) completed re-analysis of potentially affected areas (completion target: August 2025), (6) developed a capital improvement project for CAAS upgrade (completion target: August 2025), (7) continued PA revision project, (8) conducted formal review of additional CAAS analyses to validate compliance with license requirements (completion target: December 2025), and (9) reviewed infrequent NCS engineering analyses to validate adequate design interpretation in accordance with license requirements (completion target: December 2025).

Therefore, to encourage prompt identification and comprehensive correction of violations, I have been authorized, after consultation with the Director, Office of Enforcement, not to propose a civil penalty in this case. However, significant violations in the future could result in a civil penalty. In addition, issuance of this Severity Level III violation constitutes escalated enforcement action that may subject you to increased inspection effort.

Additionally, based on the latent characteristic of the violation, the NRC reviewed the inspection results and the information provided at the PEC against Section 3.2 of the NRC Enforcement Policy, "Violations Involving Old Design Issues," to evaluate whether enforcement discretion was applicable under this section of the Policy. The NRC determined that the circumstances of the violation did not meet all the criteria for an "old design issue" in that credit could not be granted for identifying the violation because of a licensee voluntary initiative. While the violation was identified during a PA review activity that started as a long term voluntary project prior to 2018, a material accumulation event in 2017 (ADAMS [ML18067A098](#)) and the resulting escalated enforcement actions led BWXT-NOG-L to incorporate the PA revision project as a corrective action, formally committing to reviewing and applying resources (both internal and external) to evaluate the process safety bases of all systems. Therefore, without the plant event and formal commitment to assign external resources in 2018 to conduct process safety bases reviews, the NRC staff is not confident that the condition would have been identified if the PA revision project had continued with its original scope, resources, and implementation schedule.

For administrative purposes, AV 07000027/2024-006-01, issued on June 20, 2024, will be closed to the violation in the enclosed Notice, designated as (NOV) 07000027/2024-008-01. The NRC has concluded that information regarding: (1) the reason for the violation, (2) the corrective actions that have been taken and the results achieved, and (3) the date when full compliance will be achieved is already adequately addressed on the docket in your presentation at the PEC conducted on August 28, 2024 and NRC Inspection Report 07000027/2024-006; dated June 20, 2024 (ADAMS Accession Numbers [ML24248A229](#) and [ML24151A460](#) respectively). Therefore, you are not required to respond to this letter unless the description therein does not accurately reflect your corrective actions or your position. In that case, or if you choose to provide additional information, you should follow the instructions specified in the enclosed Notice.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice and Procedure," a copy of this letter, its enclosure, and your response will be made available electronically for public inspection in the NRC Public Document Room and in the NRC's 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, proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such information, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). The NRC also includes significant enforcement actions on its Web site at (<http://www.nrc.gov/reading-rm/doc-collections/enforcement/actions/>).

Sincerely,



Miller, Mark signing on behalf
of Dudes, Laura
on 11/13/24

Laura A. Dudes
Regional Administrator

Docket No. 07000027
License No. SNM-0042

Enclosure:
Notice of Violation

SUBJECT: BWXT NUCLEAR OPERATIONS GROUP, INC. – LYNCHBURG - NOTICE OF VIOLATION; NRC INSPECTION REPORT 07000027/2024008 DATED NOVEMBER 13, 2024

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NOTICE OF VIOLATION

BWXT Nuclear Operations Group, Inc.
Lynchburg, Virginia

Docket No.07000027
License No. SNM-0042
EA-24-039

During an NRC inspection completed on March 28, 2024, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

10 CFR 70.24, Criticality accident requirements, states in part, that each licensee authorized to possess special nuclear material in a quantity exceeding 700 grams of contained uranium-235...shall maintain in each area in which such licensed special nuclear material is handled, used, or stored, a monitoring system meeting the requirements of either paragraph (a)(1) or (a)(2). Paragraph (a)(1) states that the monitoring system shall be capable of detecting a criticality that produces an absorbed dose in soft tissue of 20 rads of combined neutron and gamma radiation at an unshielded distance of 2 meters from the reacting material within one minute. Coverage of all areas shall be provided by two detectors.

Contrary to the above, from October 25, 2012, to October 16, 2023, the licensee failed to maintain in each area in which licensed special nuclear material is handled, used, or stored a monitoring system (i.e., the CAAS) with two detectors capable of detecting a criticality that produces an absorbed dose in soft tissue of 20 rads of combined neutron and gamma radiation at an unshielded distance of 2 meters from the reacting material within one minute. Specifically, during the conduct of a Nuclear Criticality Safety Process Analysis in October 2023, the licensee determined that initial modeling parameters and assumptions used in October 2012 for the CAAS detector placement in Bay 5A, pickling, annealing, UT clean, final clean, waste treatment operations, and water volume process areas to detect the minimum criticality accident of concern within large process vessels were incorrect. As a result, the CAAS as designed could neither detect the minimum accident of concern nor meet the coverage requirements in 10 CFR 70.24.

This is a Severity Level III violation (NRC Enforcement Policy Section 6.2.c.7).

The NRC has concluded that information regarding the reason for the violation, the corrective actions taken and planned to correct the violation and prevent recurrence, and the date when full compliance will be achieved, is already adequately addressed on docket in your presentation at the predecisional enforcement conference conducted on August 28, 2024 and NRC Inspection Report 07000027/2024006; dated June 20, 2024 (ADAMS Accession Numbers [ML24248A229](#) and [ML24151A460](#), respectively). However, you are required to submit a written statement or explanation pursuant to 10 CFR 2.201 if the description therein does not accurately reflect your corrective actions or your position. In that case, or if you choose to respond, clearly mark your response as a "Reply to a Notice of Violation, (EA-24-039)," and send it to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001 with a copy to the Regional Administrator, Region 2, and a copy to the NRC Senior Resident Inspector at BWXT NOG - Lynchburg within 30 days of the date of the letter transmitting this Notice of Violation.

Enclosure

If you choose to respond, your response will be made available electronically for public inspection in the NRC Public Document Room or in 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>. Therefore, to the extent possible, the response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days of receipt.

Dated this 13th day of November 2024