



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

August 22, 2023

EA-23-040  
EN56336

James J. Bittner  
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 AND PROPOSED IMPOSITION OF CIVIL PENALTY – \$87, 500; NRC INSPECTION REPORT NO. 07000027/2023007

Dear James J. Bittner:

This letter refers to two apparent violations (AVs) identified as a result of a U.S. Nuclear Regulatory Commission (NRC) inspection completed at your BWXT Nuclear Operations Group (NOG) Lynchburg, Virginia facility (BWXT) on March 16, 2023. The details of the AVs are documented in NRC inspection report 07000027/2023006, issued on May 5, 2023 (Agencywide Documents Access and Management System (ADAMS), Accession Number ML23115A020).

The AVs were related to the failure to meet the performance requirements in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 70.61(b), in that BWXT failed to adequately establish and maintain items relied on for safety (IROFS) to reduce the likelihood of occurrence of a high consequence event accident sequence documented within its integrated safety analysis (ISA) summary. The first AV involved the failure to ensure an air gap control was available and reliable to prevent a high consequence accident. Specifically, the air gap failed to prevent the overflow of liquid from the annular organic tank into the ventilation system. The second AV involved the failure to ensure an overflow line control was available and reliable to prevent a high consequence accident. Specifically, the annular organic tank overflow line incorrectly contained an intact rupture disc which blocked normal overflow from the tank to the floor. The air gap and overflow line are safety controls that provide protection against criticality events.

On June 21, 2023, the NRC conducted a predecisional enforcement conference (PEC) at the Region II Office in Atlanta, Georgia, with you and other members of your staff to discuss the apparent violations, their significance, their root causes, and your corrective actions (ADAMS Accession No. ML23180A135). During the PEC, BWXT did not dispute that the violations occurred as documented in the NRC's May 5, 2023, inspection report. BWXT provided additional details regarding the issues, including the reasons for the AVs, results from a root cause evaluation, and circumstances regarding identification of the apparent violations and corrective actions. BWXT's presentation stated the actual and potential safety significance of the event was low. BWXT provided additional information regarding safety controls (IROFS) that

were applicable to the ventilation and scrubber systems to ensure concentration levels were below the single-parameter limit, which in BWXT's view helped mitigate the safety significance of the AVs. These safety controls included ventilation system sampling, daily inspection of a T-duct collection column, and ventilation ductwork inspections, clean outs, and surveys. The NRC's assessment of and response to the major points documented in BWXT's presentation are provided in Enclosure 2.

Based on the information developed during the inspections, and the information that you provided during the conference held on June 21, 2023, the NRC has determined that two violations of NRC requirements occurred and is proceeding with enforcement action. The violations are cited in the enclosed Notice of Violation and Proposed Imposition of Civil Penalty (Notice) and additional circumstances surrounding the violations are described in detail in the above referenced inspection report dated May 5, 2023.

The first violation documented in the Notice (Violation No. 1) occurred beginning on April 11, 2012, after the facility completed the initial IROFS verification for the annular organic storage tank. NCS-2011-172, "Nuclear Safety Release for SER 11-024 Phase 1 – Annular Organic Tank," dated April 11, 2012, was the licensee's initial verification of the overflow line safety control associated with safety evaluation request (SER) 11-024, which converted a blend tank into a storage tank of organic waste. However, BWXT did not identify that a rupture disc was still installed inside the overflow line and ultimately relied on visual inspections to test system functionality, which increased the likelihood of occurrence of a high consequence event. The NRC concluded that this failure caused BWXT to be in violation of 10 CFR 70.61(b), "Performance requirements."

The second violation documented in the Notice (Violation No. 2) also occurred beginning on April 11, 2012, after the facility completed the initial IROFS verification for the annular organic storage tank. NCS-2011-172 was the licensee's initial verification of the air gap safety control associated with SER 11-024. NCS-2011-172 did not identify or perform a design analysis to ensure that the IROFS would be able to perform its intended safety function, since only a visual verification of the air gap was conducted. The NRC concluded that this failure caused BWXT to be in violation of 10 CFR 70.61(b), "Performance requirements."

The violations did not result in any actual consequences or operational challenges to the facility, in that no criticality incidents occurred in which employees were exposed to radiation, and plant system equipment was not damaged.

However, the potential consequences of the two violations, when viewed individually and together, are significant concerns to the NRC. The air gap and overflow line safety controls are in place to significantly decrease the likelihood of occurrence of high consequence events. For both violations documented within the Notice, these IROFS specifically reduce the probability of a criticality event from occurring which would impose serious radiological health risks to on-site employees. Additionally, both violations (Violation No. 1 and Violation No. 2) went undetected by BWXT for more than 10 years (April 11, 2012, to January 19, 2023) and included missed opportunities to identify. Considering the above, and because the violations are interrelated and concern the same credited IROFS controls, these violations have been categorized as a Severity Level III problem in accordance with the NRC Enforcement Policy.

In accordance with the Enforcement Policy, a base civil penalty in the amount of \$87,500 is considered for a Severity Level III violation or problem. Because your facility has been the subject of escalated enforcement actions within the last two years<sup>1</sup>, 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.

As discussed in the NRC's inspection report dated May 5, 2023, and by BWXT during the June 21, 2023, conference, both violations (Violation No. 1 and Violation No. 2) were identified through an event on January 19, 2023, when approximately 20 liters (L) of organic solution spilled to the floor. On January 20, 2023, licensee staff identified approximately 3.5L of organic solution in the ventilation system dropout column, which was later determined (through the licensee's investigation) to have originated from the annular organic tank. Although the licensee initiated an investigation to determine the root causes of the spill and applied an appropriate questioning attitude, the issues were initially self-revealed through the event (i.e., the spill of organic solution). The licensee also had several missed opportunities to identify that the overflow line still had a rupture disc installed (incorrect system configuration) and that the air gap safety control was inadequate dating back to the SER process for the annular organic tank in 2012. The annular organic tank system, and accompanying safety controls, remained in this configuration for over 10 years until the January 19, 2023, event. Therefore, credit is not warranted for the civil penalty assessment factor of *Identification* for both violations.

Regarding the civil penalty assessment factor of *Corrective Action*, in its presentation on June 21, 2023, BWXT identified several corrective actions taken in response to Violation No. 1 and Violation No. 2, including but not limited to: (1) issuing a lessons learned training detailing the importance of configuration management to include factors associated with this event; (2) shutting down the annular organic tank process; and (3) removing the rupture disc within the overflow line. Additionally, BWXT identified several corrective actions that will be implemented, including: (1) redesigning the air gap safety control and incorporating it in the field; (2) developing specification guidance for air gaps credited as IROFS; and (3) revising the SER acceptance process and process hazards identification practice to strengthen the quality of information provided in change packages with an emphasis on process flows and existing safety controls. The NRC concluded that these actions reflect an appropriate, graded approach to address causes known by BWXT to exist at that time and are commensurate with the significance of the issue. Based on the above, the NRC concluded that credit is warranted for the civil penalty assessment factor of *Corrective Action* for both violations, and for the Severity Level III problem.

Therefore, in recognition of the significant potential safety consequences of the two violations in failing to ensure that a high consequence event remained highly unlikely, your previous escalated enforcement action, and failure to receive credit for *Identification* within the civil penalty assessment process, I have been authorized, after consultation with the Director, Office of Enforcement, to issue the enclosed Notice of Violation and Proposed Imposition of Civil Penalty in the base amount of \$87,500 for the Severity Level III problem.

You may choose to pay the proposed civil penalty, or the cumulative amount of the civil penalties if more than one civil penalty is proposed, by submitting your payment, with the invoice enclosed to this letter, to the following address:

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<sup>1</sup> A Severity Level III Notice of Violation was issued to BWXT Nuclear Operations Group, Inc., Lynchburg on April 4, 2022 (EA-22-171).

Office of the Chief Financial Officer  
U.S. Nuclear Regulatory Commission  
P.O. Box 979051  
St. Louis, MO 63197

In addition, you may pay the proposed civil penalty in accordance with NUREG/BR-0254. When using NUREG/BR-0254 to pay the civil penalty, the invoice number should be used as the “enforcement action identifier” when submitting your payment through one of the approved methods listed in the brochure. The NRC may consider a request for additional time to pay the proposed civil penalty, including the option to enter into an installment agreement, if payment of the civil penalty as a lump sum in the required timeframe would pose a financial hardship. To request additional time to pay, you must submit a written request, with appropriate justification explaining your financial hardship, to [NRCCollections.Resource@nrc.gov](mailto:NRCCollections.Resource@nrc.gov). All requests should be submitted in sufficient time to allow the NRC the ability to review your request for additional time to pay before the 30-day payment period expires.

If you disagree with this enforcement sanction, you may deny the violation, as described in the Notice, or you may request alternative dispute resolution (ADR) with the NRC in an attempt to resolve this issue. ADR is a general term encompassing various techniques for resolving conflicts using a neutral third party. The technique that the NRC has decided to employ is mediation. Mediation is a voluntary, informal process in which a trained neutral party (the “mediator”) works with parties to help them reach resolution. If the parties agree to use ADR, they select a mutually agreeable neutral mediator who has no stake in the outcome and no power to make decisions. Mediation gives parties an opportunity to discuss issues, clear up misunderstandings, be creative, find areas of agreement, and reach a final resolution of the issues. Additional information concerning the NRC's ADR program can be found at <http://www.nrc.gov/about-nrc/regulatory/enforcement/adr.html>.

The Institute on Conflict Resolution (ICR) at Cornell University has agreed to facilitate the NRC's program as a neutral third party. If you are interested in pursuing this issue through the ADR program, please contact: (1) the ICR at (877) 733-9415; and (2) Mr. Eric C. Michel of the NRC at (404) 997-4555 within 10 days of the date of this letter. You may also contact both ICR and Mr. Michel for additional information. Your submitted signed agreement to mediate using the NRC ADR program will stay the 30-day time period for payment of the civil penalties and if you choose to provide a written response, as identified in the enclosed Notice, until the ADR process is completed.

The NRC has concluded that information regarding: (1) the reason for the violations; (2) the corrective steps that have been taken and the results achieved; and (3) the corrective steps that will be taken; and (4) the date when full compliance was achieved is already adequately on the docket in the presentation provided at the predecisional enforcement conference on June 21, 2023, ADAMS Accession Number ML23177A005). 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.

For administrative purposes, this letter is issued as NRC inspection report 07000027/2023007. AV 07000027/2023006-01 and AV 07000027/2023006-02 have been re-designated as Notice of Violation (NOV) 07000027/2023006-01 and NOV 07000027/2023006-02.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter, its enclosures, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room and from the NRC's Agencywide Documents Access and Management System, 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. The NRC also includes significant enforcement actions on its Web site at <http://www.nrc.gov/reading-rm/doc-collections/enforcement/actions/>.

If you have any questions concerning this matter, please contact Mr. Eric C. Michel of my staff at (404) 997-4555.

Sincerely,



Signed by Dudes, Laura  
on 08/22/23

Laura A. Dudes  
Regional Administrator

Docket No.: 07000027  
License No.: SNM-42

Enclosures:

1. Notice of Violation and Proposed Imposition of Civil Penalty
2. NRC Assessment of BWXT's Presentation
3. Civil Penalty Invoice (EA-23-040)
4. NUREG/BR-0254 Payment Methods

cc: Distribution via ListServ

SUBJECT: BWXT NUCLEAR OPERATIONS GROUP, INC. - LYNCHBURG – NOTICE OF VIOLATION AND PROPOSED IMPOSITION OF CIVIL PENALTY – \$87,500; NRC INSPECTION REPORT NO. 07000027/2023007 Dated August XX, 2023

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DATE	7/31/2023	7/31/2023	7/31/2023	7/31/2023	8/1/2023	7/31/2023
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DATE	8/17/2023	8/17/2023	8/17/2023	8/22/2023		

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NOTICE OF VIOLATION  
AND  
PROPOSED IMPOSITION OF CIVIL PENALTY

BWXT Nuclear Operations Group, Inc.  
Lynchburg, Virginia

Docket No.: 07000027  
License No.: SNM-0042  
EA-23-040

During an NRC inspection completed on March 16, 2023, violations of NRC requirements were identified. In accordance with the NRC Enforcement Policy, the NRC proposes to impose a civil penalty pursuant to Section 234 of the Atomic Energy Act of 1954, as amended (Act), 42 U.S.C. 2282, and 10 CFR 2.205. The violations and associated civil penalty are set forth below:

1. 10 CFR 70.61(b) requires, in part, that “the risk of each credible high-consequence event must be limited. Engineered controls, administrative controls, or both, shall be applied to the extent needed to reduce the likelihood of occurrence of the event so that, upon implementation of such controls, the event is highly unlikely...”

10 CFR 70.62(d) requires, in part, that “each licensee shall establish management measures to ensure compliance with the performance requirements of 70.61. The management measures shall ensure that engineered and administrative controls that are identified as IROFS, are designed, implemented, and maintained, as necessary, to ensure they are available and reliable to perform their function when needed, to comply with the performance requirements of 70.61.”

Contrary to the above, from April 11, 2012, to January 19, 2023, an item relied on for safety (IROFS) was not designed, implemented, and maintained as available and reliable to reduce the likelihood of occurrence of a high-consequence event so that, upon implementation of such controls, the event is highly unlikely. Specifically, an intact rupture disk was located in the overflow line for the annular organic tank, which blocked flow through the overflow line preventing the IROFS from performing its safety function of preventing a criticality event in the ventilation system.

2. 10 CFR 70.61(b) requires, in part, that “The risk of each credible high-consequence event must be limited. Engineered controls, administrative controls, or both, shall be applied to the extent needed to reduce the likelihood of occurrence of the event so that, upon implementation of such controls, the event is highly unlikely...”

10 CFR 70.62(d) requires, in part, that “each licensee shall establish management measures to ensure compliance with the performance requirements of 70.61. The management measures shall ensure that engineered and administrative controls that are identified as IROFS are designed, implemented, and maintained, as necessary, to ensure they are available and reliable to perform their function when needed, to comply with the performance requirements of 70.61.”

Contrary to the above, from April 11, 2012, to January 19, 2023, an IROFS was not designed, implemented, and maintained as available and reliable to reduce the likelihood of occurrence of a high-consequence event so that, upon implementation of such controls, the event is highly unlikely. Specifically, the air gap between the annular organic tank vent and the ventilation system was inadequately designed, such that it failed to prevent the overflow of liquid from the annular organic tank into the ventilation system which could lead to a criticality event in the ventilation system.

This is a Severity Level III problem (Enforcement Policy Section 6.2.c.1).  
Civil Penalty - \$87,500. (EA-23-040)

The NRC has concluded that information regarding the reason for each violation, the corrective actions taken and planned to correct each violation and prevent recurrence, and the date when full compliance was achieved is already adequately addressed on the docket in the presentation provided at the predecisional enforcement conference on June 21, 2023 (Agencywide Documents Access and Management System (ADAMS) Accession Number ML23177A005). However, if the description therein does not accurately reflect your position or your corrective actions, you are required to submit a written statement or explanation pursuant to 10 CFR 2.201 within 30 days of the date of the letter transmitting this Notice of Violation. In that case, or if you choose to respond, clearly mark your response as a Reply to a Notice of Violation, and send it to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, One White Flint North, 11555 Rockville Pike, Rockville, MD 20852-2738, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region 2, and the Document Control Desk, Washington, DC 20555-0001.

The Licensee may pay the civil penalty proposed above, through one of the following two methods:

1. Submit the payment with the enclosed invoice for Civil Penalty EA-23-040, issued to BWXT Nuclear Operations Group, Inc., to the following address:

Office of the Chief Financial Officer  
U.S. Nuclear Regulatory Commission  
P.O. Box 979051  
St. Louis, MO 63197

OR

2. Submit the payment in accordance with NUREG/BR-0254.

The Licensee may protest the imposition of the civil penalty in whole or in part, by a written answer addressed to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, within 30 days of the date of this Notice. Should the Licensee fail to answer within 30 days of the date of this Notice, the NRC will issue an order imposing the civil penalty. Should the Licensee elect to file an answer in accordance with 10 CFR 2.205 protesting the civil penalty, in whole or in part, such answer should be clearly marked as an "Answer to a Notice of Violation" and may: (1) deny the violation(s) listed in this Notice, in whole or in part; (2) demonstrate extenuating circumstances; (3) show error in this Notice; or (4) show other reasons why the penalty should not be imposed. In addition to protesting the civil penalty in whole or in part, such answer may request remission or mitigation of the penalty.

In requesting mitigation of the proposed penalty, the response should address the factors discussed in Section 2.3.4 of the Enforcement Policy. Any written answer addressing these factors pursuant to 10 CFR 2.205 should be set forth separately from the statement or explanation provided pursuant to 10 CFR 2.201 but may incorporate parts of the 10 CFR 2.201 reply by specific reference (e.g., citing page and paragraph numbers) to avoid repetition. The attention of BWXT is directed to the other provisions of 10 CFR 2.205 regarding the procedure for imposing a civil penalty.

Upon failure to pay any civil penalty which subsequently has been determined in accordance with the applicable provisions of 10 CFR 2.205 to be due, this matter may be referred to the Attorney General, and the penalty, unless compromised, remitted, or mitigated, may be collected by civil action pursuant to Section 234c of the Act, 42 U.S.C. 2282c.

The responses noted above, i.e., Reply to Notice of Violation, Statement as to Payment of Civil Penalty, and Answer to a Notice of Violation, should be addressed to: Mr. David Pelton, Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, One White Flint North, 11555 Rockville Pike, Rockville, MD 20852-2738, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region II, 245 Peachtree Center Avenue, N.E., Suite 1200, Atlanta, GA, 30303, and the Document Control Center, Washington, DC 20555-0001.

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, 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 personal privacy or proprietary information is necessary to provide an acceptable response, then 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 that such material is withheld from public disclosure, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim (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). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

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

Dated this 22<sup>nd</sup> day of August 2023

## **NRC ASSESSMENT OF BWXT'S RESPONSE TO APPARENT VIOLATIONS**

### **Summary of Licensee Response**

In its presentation at the June 21, 2023, predecisional enforcement conference (PEC) (Agency Documents Access and Management System (ADAMS) Accession Number ML23177A005), BWXT did not dispute that AV 07000027/2023006-01 and AV 07000027/2023006-02 occurred. In addition, the licensee presented a timeline of events, a summary of the causes for the apparent violations, the corrective actions taken and planned (for both violations), their perspective on the significance of the violations, and requested that the violations be grouped into a single problem. The applicability of Accident Sequence 12-14 of the Licensee's Safety Analysis Report (SAR) Appendix 15.12 was not challenged by the licensee.

During their presentation, the licensee stated that items relied on for safety (IROFS) associated with the ventilation and scrubber system provided additional safety controls to mitigate potential criticality events and pointed out that the actual and potential risk of a criticality remained low. The licensee summarized that these controls were in place to ensure the solution concentration remained below the single-parameter limit.

The licensee also asked the NRC to consider that the licensee identified and reported the failed and degraded IROFS following the January 19, 2023, spill of organic solution, they conducted an extensive investigation and implemented corrective actions, and determined the actual and potential safety significance was low.

### **Summary of NRC Evaluation**

The NRC reviewed the following information:

- 1) The licensee's pre-decisional enforcement conference presentation (ML23177A005).
- 2) NCS-2023-016, "Revised NCS Safety Concern for Organic Solution Flowing from the Organic Waste Tank into Ventilation Ducting per CA202300083," dated February 9, 2023.
- 3) Safety Analysis Report (SAR) 15.12, "Liquid and Solid Waste Handling Processes in Uranium Recovery," Rev. 86.
- 4) OP-0061137, "Operating Procedure for General Purpose Area A/B," Rev. 50.
- 5) The licensee's letter, "10 CFR 70 App A (b), 60 Day Report for EN 56336," dated April 4, 2023 (ADAMS Accession Number ML23212A918).
- 6) The licensee's Root Cause Evaluation CA202300083.
- 7) NRC requirements found in 10 CFR Part 70 and applicable guidance, including Inspection Manual Chapter (IMC) 2606, "Assessment of the Risk Resulting from a Potential Safety Noncompliance at a Fuel Cycle Facility," dated April 1, 2016.

No additional information on the initiating event probability was provided within the presentation or at the PEC. The assessment of the initiating event as -1, as assessed by the licensee when they reported the event, and as discussed in NRC inspection report 07000027/2023-006 dated May 5, 2023 (ADAMS Accession Number ML23115A020), appears reasonable and representative of the observed failure frequency.

The licensee stated that the concentration control IROFS would prevent a criticality event and that the safety significance is low. However, BWXT did not provide justification for why additional credit beyond that normally applied to administrative IROFS was appropriate.

Therefore, the NRC assessed this IROFS in accordance with the licensee's normal ISA methodology for administrative IROFS (scored as a 2).

Accident Sequence 12-14 of SAR Appendix 15.12 identified the air gap and overflow drain IROFS, as well as upstream concentration control IROFS, as applying to prevent an accidental criticality due to organic solution overflowing into the ventilation system. The failure of the air gap IROFS was considered part of the initiating event for Accident Sequence 12-14, and scored at -2 (e.g., a roughly  $10^{-2}$  per year likelihood of organic solution flowing into the ventilation system). Due to the air gap being degraded, the licensee re-assessed its credit at -1. No credit was given to the overflow drain due to it being failed. The upstream concentration control IROFS are administrative (e.g., rely on operators to take samples and verify safe concentration before transfers) so they are scored at 2 for this upset case. The resulting score for the upset case is therefore -3 ( $-1 - 2 = -3$ ), which is considered unlikely based on the licensee's NRC-approved ISA methodology (See Table 3.2.4-4: Risk Assessment Table from the license application).

The licensee also listed other IROFS that are applied to the ventilation and scrubber systems upstream of the system covered by Accident Sequence 12-14. The NRC considers these other IROFS as either inapplicable or unable to prevent this accident sequence (e.g., the T-duct collection column will increase the volume of organic solution and mass of uranium required for a criticality but will not prevent such a criticality). Therefore, no credit will be given for these other IROFS as they do not apply to Accident Sequence 12-14 of SAR Appendix 15.12.

These factors were assessed for their impact on the significance of the violations with the result that these violations align with Enforcement Policy example 6.2.c.1, for Severity Level III violations, which states: "Under 10 CFR Part 70, Subpart H, a high-consequence event is "unlikely" based on a licensee's ISA."