



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**

REGION II  
SAM NUNN ATLANTA FEDERAL CENTER  
61 FORSYTH STREET, SW, SUITE 23T85  
ATLANTA, GEORGIA 30303-8931

January 24, 2008

EA-07-240

Mr. R. P. Cochrane, General Manager  
BWX Technologies, Inc.  
Nuclear Products Division  
P. O. Box 785  
Lynchburg, VA 24505-0785

SUBJECT: NOTICE OF VIOLATION AND PROPOSED IMPOSITION OF CIVIL PENALTY -  
\$32,500 (NRC INSPECTION REPORT NO. 70-27/2007-006)

Dear Mr. Cochrane:

This refers to the inspection conducted from August 12 through September 22, 2007, at the Nuclear Products Division facility. The purpose of the inspection was to determine whether activities authorized by the license were conducted safely and in accordance with NRC requirements. The results of our review of this matter, including the identification of an apparent violation involving the failure to analyze a nuclear criticality safety (NCS) event associated with the transfer of Raschig ring vacuum cleaners (RRVC) at your facility, were discussed and transmitted to BWX Technologies, Inc. (BWXT) on September 27, 2007.

In the letter transmitting the inspection report, we provided you the opportunity to address the apparent violation identified in the report by either attending a predecisional enforcement conference or by providing a written response before we made our final enforcement decision. In a letter dated November 16, 2007, BWXT provided a written response to the apparent violation.

Based on the information developed during the inspection and the information that you provided in your response to the inspection report dated November 16, 2007, the NRC has determined that a violation of NRC requirements occurred. The violation is cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding it are described in detail in the subject inspection report. The violation involved the failure to analyze the nuclear criticality safety consequences associated with the transfer of RRVCs at your facility. This condition was identified on July 26, 2007, when a RRVC spilled its contents, which consisted of a solution bearing special nuclear material (SNM), during transfer into an attached plastic bag being used for contamination control. The failure to analyze the transfer activity resulted in SNM-bearing solution being in a condition without any NCS controls, and is a violation of Safety Condition S-1 of the license and License Application, Section 5.1.1 (f), "Protection Against Criticality" which

requires BWXT to conduct NCS evaluations to assure that under normal and abnormal credible conditions, all nuclear processes will remain subcritical.

In this case, the actual consequences of the RRVC spill were minimal because of the small amount and low concentration of SNM that was present. However, the potential consequences of the event were significant. Under different circumstances where a sufficient concentration of high enriched uranium (HEU) bearing solution was available, a criticality accident would have been possible. In this case, BWXT had insufficient controls to ensure that HEU would be maintained below acceptable quantities and concentrations. Therefore, this violation has been categorized in accordance with the NRC Enforcement Policy at Severity Level III.

In its written response, BWXT provided a detailed event tree analysis which evaluated the likelihood of a criticality accident from a RRVC spill. In summary, BWXT's evaluation concluded that the series of events required to permit a criticality accident were not credible, and therefore the potential safety significance of the event scenario is low. Based on our review, the NRC disagrees with BWXT's conclusion.

In summary, the low failure probabilities in BWXT's analysis are based on judgments about past operational practices for which little data is available. In addition, they are not based on managed safety controls for which their reliability can be established with a sufficient degree of certainty. As a result, the NRC lacks confidence in the various estimated failure probabilities. Moreover, the NRC notes that the series of events that would be necessary to cause a criticality accident in BWXT's event tree did, in fact, occur with the exception of the accumulation of a sufficient concentration of HEU. As stated above, BWXT had insufficient controls to ensure that HEU would be maintained below acceptable quantities and concentrations. Based on this, the NRC disagrees with BWXT's conclusion that the series of events required to permit a criticality accident were not credible.

In accordance with the Enforcement Policy, a base civil penalty in the amount of \$32,500 is considered for a Severity Level III violation. 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 VI.C.2 of the Enforcement Policy.

In this case, BWXT became aware of the spill of SNM and the unanalyzed condition as a result of the July 26, 2007 event. This matter was not discovered through any particular self-monitoring efforts, nor were any licensee initiatives underway at the time. In addition, multiple prior opportunities existed for facility NCS engineers and management to identify this significant deficiency in the handling of SNM. Based on the above, the NRC concluded that credit was not warranted for the factor of *Identification*.

Corrective actions in response to the July 26, 2007 event were detailed in BWXT's written response of November 16, 2007. In summary, corrective actions included: (1) the immediate suspension of all transfers of portable RRVCs until the proper criticality analysis and controls were implemented; (2) initiation of a Human Performance Analysis to review the event and develop corrective actions; (3) revision of the operational procedure for SNM transfers to include RRVCs; and (4) plans to install lifting devices on RRVCs. Based on these and other corrective actions identified in its written response, credit was warranted for the factor of *Corrective Action*.

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<sup>1</sup> A Severity Level III Problem and \$32,500 Civil Penalty was issued on February 27, 2007.

Therefore, to emphasize the importance of ensuring all SNM processes at your facility are analyzed in order to control SNM, and in recognition of your previous escalated enforcement action, 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 (Notice) in the base amount of \$32,500 for the Severity Level III violation. In addition, issuance of this Notice constitutes escalated enforcement action that may subject you to increased inspection effort.

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 the docket in Inspection Report 70-027/2007-006 and your written response dated November 16, 2007. 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," a copy of this letter and its enclosures will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at [www.nrc.gov/reading-rm/pdr.html](http://www.nrc.gov/reading-rm/pdr.html) [www.nrc.gov/reading-rm/adams.html](http://www.nrc.gov/reading-rm/adams.html). The NRC also includes significant enforcement actions on its Web site at [www.nrc.gov/reading-rm/doc-collections/enforcement/actions/](http://www.nrc.gov/reading-rm/doc-collections/enforcement/actions/).

Sincerely,

/RA/

Victor M. McCree  
Acting Regional Administrator

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

Enclosures:

1. Notice of Violation and Proposed Imposition of Civil Penalty
2. NUREG/BR-0254 Payment Methods (Licensee only)

cc w/encls:

Barry L. Cole

Manager, Licensing and Safety Analysis

BWX Technologies

P. O. Box 785

Lynchburg, VA 24505-0785

Leslie P. Foldesi, Director

Bureau of Radiological Health

Division of Health Hazards Control

Department of Health

1500 East Main Street, Room 240

Richmond, VA 23219

Distribution w/encls:

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E-MAIL COPY?	YES    NO	YES    NO	YES    NO	YES    NO	YES    NO	YES    NO

NOTICE OF VIOLATION  
AND  
PROPOSED IMPOSITION OF CIVIL PENALTY

BWX Technologies, Inc.  
Lynchburg, Virginia

Docket No. 70-27  
License No. SNM-42  
EA-07-240

During NRC inspection activities conducted between August 12 and September 22, 2007, a violation of NRC requirements was 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 particular violation and associated civil penalty is set forth below:

Safety Condition S-1 of NRC license SNM-42 authorizes the use of nuclear materials in accordance with Chapters 1-11 of the License Application submitted on March 24, 2006, and supplements thereto.

License Application, Section 5.1.1 (f), "Protection Against Criticality," requires the licensee to conduct Nuclear Criticality Safety (NCS) evaluations to assure that under normal and abnormal credible conditions, all nuclear processes will remain subcritical.

Contrary to the above, on July 26, 2007, workers inadvertently overturned a Raschig ring vacuum cleaner (RRVC) and spilled its liquid contents of special nuclear material-bearing solution into a plastic bag that was used for contamination control and was attached to the top of the vessel. The event resulted in licensed, special nuclear material being in a potentially unfavorable geometry container (plastic bag) without any controls present to prevent a nuclear criticality. The licensee failed to conduct a NCS evaluation of the RRVC transfer process to ensure that the configuration would not result in a criticality accident.

This is a Severity Level III violation (Supplement VI).  
Civil Penalty - \$ 32,500. (EA-07-240)

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 the docket in Inspection Report 70-027/2007-006 and in your written response dated November 16, 2007. 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 under 10 CFR 2.201. 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, MD 20852-2738, with a copy to the Regional Administrator, U.S., Nuclear Regulatory Commission, Region II, and a copy to the NRC Resident Inspector at your facility that is the subject of this NOV.

The Licensee may pay the civil penalty proposed above or the cumulative amount of the civil penalties if more than one civil penalty is proposed, in accordance with NUREG/BR-0254 and by submitting to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, a

statement indicating when and by what method payment was made, or may protest 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. 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 addressed in Section VI.C.2, "Civil Penalty Assessment," 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 (should you choose to provide one), 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 the Licensee 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.

If you choose to respond, your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS). To the extent possible, it should not include any personal privacy, proprietary, classified or safeguards information so that it can be made available to the public without redaction. ADAMS is accessible from the NRC Web site at [www.nrc.gov/reading-rm/pdr.html](http://www.nrc.gov/reading-rm/pdr.html) [www.nrc.gov/reading-rm/adams.html](http://www.nrc.gov/reading-rm/adams.html). 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.

Dated this 24th day of January 2008