



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-8931

April 21, 2008

EN 44035

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

SUBJECT: NRC INSPECTION REPORT NO. 70-27/2008-001 AND NOTICE OF VIOLATION

Dear Mr. Cochrane:

This letter refers to the inspection conducted from January 1 through March 22, 2008, at the BWXT facility in Lynchburg, VA. The purpose of the inspection was to determine whether activities authorized under the license were conducted safely and in accordance with NRC requirements. At the conclusion of the inspection, the findings were discussed with those members of your staff identified in the enclosed report.

Areas examined during the inspection included: Plant Operations, Management Organization and Controls, Radiation Protection, Maintenance and Surveillance, and Transportation. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observation of activities in progress.

Based on the results of this inspection, the NRC has determined a violation of NRC requirements occurred. The violation was evaluated in accordance with the NRC Enforcement Policy included on the NRC's Web site at <http://www.nrc.gov>. 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. If you contest this violation or its significance, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, Region II, and the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001, and the NRC Senior Resident Inspector at your facility.

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 is already adequately addressed on the docket in the enclosed inspection report. 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.

By letter dated March 25, 2008, we received your reply to our Request for Additional Information which was issued on February 26, 2008. We have reviewed your response and concluded that the additional information provided adequate justification for your request, by letter dated January 23, 2008, to modify the commitment, regarding installation of lifting devices on Raschig-ring-filled Vacuum Cleaners, made in your November 16, 2007 Response to Apparent Violation 70-27/2007-06-01. The reply met the requirements of 10 CFR 2.201 and your corrective actions will be reviewed in an upcoming inspection.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," 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 or from the NRC's document system (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/readingrm/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.

Should you have any questions concerning this inspection, please contact us.

Sincerely,

/RA/ M. Crespo acting for

D. Charles Payne, Chief
Fuel Facility Inspection Branch 1
Division of Fuel Facility Inspection

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

Enclosures: 1. Notice of Violation.
2. NRC Inspection Report No. 70-27/2008-001

cc w/encls:
Barry L. Cole, Manager
Licensing and Safety Analysis
BWX Technologies, Inc.
P.O. Box 785
Lynchburg, VA 24505-0785

cc w/encls (Cont'd on page 3)

(cc w/encls : cont'd)
 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:

- M. Tschlitz, NMSS
- M. Baker, NMSS
- P. Habighorst, NMSS
- A. Gooden, RII
- C. Payne, RII
- A. Snyder, NMSS
- D. Jackson, NMSS

PUBLICLY AVAILABLE NON-PUBLICLY AVAILABLE SENSITIVE NON-SENSITIVE
 ADAMS: X Yes ACCESSION NUMBER:

OFFICE	RII:DFFI	RII:DFFI	RII:DFFI	RII:DFFI		
SIGNATURE	Ss 4/21/08	AG 4/21/08	DMC 4/21/08			
NAME	S Subosits	AGooden	Classifier			
DATE	4/ /2008	4/ /2008	4/ /2008	4/ /2008	4/ /2008	4/ /2008
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

NOTICE OF VIOLATION

BWX Technologies, Inc.
Lynchburg, Virginia

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

During NRC inspection activities conducted between January 1 and March 22, 2008, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed 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 October 24, 2006, and supplements thereto.

License Application, Section 11.4, "Procedures" requires activities involving licensed material to be conducted in accordance with written and approved procedures.

Operating Procedure (OP) 1014952, Revision 8, Section G, requires in part that an operator add nitric acid to the feed system to adjust the pH of the feed.

Contrary to the above, on January 24, a Uranium Recovery operator opened the outlet valve on the chemical addition vessel to add nitric acid to the feed system without closing one of the isolation valves to one of the feed vessels in the common piping header. This action caused Special Nuclear Material (SNM) solution at a substantially higher head pressure in the feed vessel to overflow at a siphon break on the chemical addition vessel resulting in a spill of SNM-bearing solution and contamination of the operator. OP 1014952 contained inadequate written instructions for valve manipulations to prevent an occurrence of this type during chemical additions to the contactor feed system.

This is a Severity Level IV violation (Supplement IV).

The NRC has concluded that information regarding the reasons 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 the enclosed inspection report. 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," and send it to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555 with a copy to the Regional Administrator, Region II, within 30 days of the date of the letter transmitting this Notice of Violation (Notice).

If you contest this violation or its significance, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, Region II, and the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-001, and the NRC Senior Resident Inspector at your facility.

Enclosure 1

Because your response 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 <http://www.nrc.gov/reading-rm/adams.html> 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. 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 withholding of such material, 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). 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 21st day of April 2008

U. S. NUCLEAR REGULATORY COMMISSION
REGION II

Docket No.: 70-27

License No.: SNM-42

Report No.: 70-27/2008-001

Licensee: BWX Technologies, Inc.

Facility: Nuclear Products Division

Location: Lynchburg, Virginia

Dates: January 1 through March 22, 2008

Inspectors: S. Subosits, Acting Senior Resident Inspector
M. Thomas, Senior Fuel Facilities Inspector
J. Jimenez, Fuel Facilities Inspector

Approved by: D. Charles Payne, Chief
Fuel Facility Inspection Branch 1
Division of Fuel Facility Inspection

Enclosure 2

EXECUTIVE SUMMARY

BWX Technologies, Inc., Nuclear Products Division
NRC INSPECTION REPORT 70-27/2008-001

This inspection included periodic observations conducted by the Acting Senior Resident Inspector during normal and off-normal shifts in the areas of Plant Operations, Management Organization and Controls, Maintenance and Surveillance, and Radiation Protection. Specialized inspections and reviews of documentation were conducted by regional inspectors in the areas of Transportation, Management Organization and Controls (February 25 - 29), and Maintenance and Surveillance (March 10 - 13).

Plant Operations

- A violation was identified for failure to provide written valving instructions for chemical additions to the contactor feed system. The lack of adequate written instructions resulted in an overflow of SNM-bearing solution onto an operator and the floor in Uranium Recovery. The facility was operated safely in accordance with procedures and NCS postings during the remainder of the inspection period. (Paragraph 2.a.)
- The licensee appropriately evaluated and categorized the inadequate Raschig ring level conditions found for the Raschig-ring-filled Vacuum Cleaners (RRVCs) and made the initial and supplemental notifications within the required timeframes. The immediate corrective actions following the discovery of inadequate levels of Raschig rings in RRVCs were adequate. (Paragraph 2.b.)

Management Organization and Controls

- The recent personnel changes in the licensee's management organization met license requirements, internal safety audits were adequate in identifying potential safety concerns and procedure changes were properly reviewed and approved. (Paragraph 3.a.)

Maintenance and Surveillance

- In response to procedural and configuration discrepancies with a diesel generator noted by the inspectors during the performance of a weekly no-load test, a licensee representative stated that they would update preventive maintenance procedures and vendor documentation for the equipment. (Paragraph 4.a.)

Radiation Protection

- Radiation Protection personnel demonstrated adequate performance of contamination survey techniques and contamination control principles. (Paragraph 5.a.)

Transportation

- Shipments of radioactive materials were prepared and shipped in accordance with applicable regulations and plant procedures. Certificates of compliance were maintained current. Shipping paper records were properly completed and maintained in accordance with applicable regulations. (Paragraph 6.a.)

Attachment:

Partial Listing of Persons Contacted
List of Items Opened, Closed and Discussed
Inspection Procedures Used

REPORT DETAILS

1. Summary of Plant Status

Routine fuel manufacturing operations and maintenance activities were conducted in the fuel process areas and in the Research Test Reactors and Targets (RTRT) facility. Uranium recovery was conducted in the Uranium Recovery (UR) facility.

2. Plant Operations (Inspection Procedure (IP) 88135)

a. Uranium Recovery Activities

(1) Inspection Scope and Observations

On January 24, an operator in training on a system in UR was splashed on the forehead and legs with SNM-bearing/nitric acid solution while performing valve manipulations to add nitric acid to the feed system. The operator who was performing the valving under the supervision of a qualified UR operator did not close or verify closed all of the outlet valves necessary to isolate the contactor feed vessels which are interconnected by a common piping header to the chemical addition vessel. As a result, when the operator opened the outlet valve on the chemical addition vessel, SNM-bearing/nitric acid solution at a higher hydrostatic pressure from one of the feed vessels overflowed the chemical addition vessel at a siphon break onto the operator and the floor. The operator received adequate first aid treatment following the incident and lost some of his personal effects due to radioactive contamination.

The inspectors reviewed OP 1014952 and determined that the procedure contained inadequate written steps for valve lineups during chemical additions to prevent an overflow and spill of SNM-bearing solution from the chemical addition vessel. The failure to provide written instructions in OP 1014952 to prevent a spill of SNM-bearing solution is a violation of License Application (LA) Section 11.4, "Procedures" which requires activities involving licensed material to be conducted in accordance with written and approved procedures (VIO 70-27/2008-01-01: Failure to Provide Written Valving Instructions to Prevent a Spill of SNM-Bearing Solution).

The inspectors reviewed the corrective actions, documented in BWX 2024368, which included providing detailed instructions in OP 1014952 for valve lineups during chemical additions and piping modifications to reduce the likelihood and risk of spills of acidic or SNM-bearing solution. The inspectors concluded the corrective actions were adequate to prevent recurrence.

The inspectors observed special nuclear material (SNM) operations throughout the remainder of the inspection period and determined that the facility was operated safely and in accordance with operating procedures and Nuclear Criticality Safety (NCS) postings. The inspectors observed the biannual maintenance and clean-out on the

ventilation ductwork in UR and determined it was completed in accordance with the applicable operation procedure. Routine fire safety tours verified that fire protection systems were maintained and housekeeping was sufficient to minimize fire risk.

(2) Conclusions

A violation was identified for failure to provide written valving instructions for chemical additions to a feed system. The facility was operated safely in accordance with procedures and NCS postings during the remainder of the inspection period.

b. Event Notification 44035 – Inadequate Levels of Raschig Rings In Raschig-Ring-Filled Vacuum Cleaners

(1). Inspection Scope and Observations

On March 5, a production foreman recently assigned to the Research and Test Reactors and Targets (RTRT) production area became aware that the area had a Raschig-ring-filled Vacuum Cleaner (RRVC). The foreman also discovered that the inspection of the rings level in the RRVC had not been completed since January 28, 2008, when the inspection record indicated the level as 'good'. Upon checking the level of rings in the RRVC it was determined that the level of rings was inadequate as they were approximately 5 inches below the level of the hose intake. The licensee considered the discovery of an inadequate level of rings as a degraded Item Relied On For Safety (IROFS) and the failure to perform inspections of the Raschig Ring level in the RRVC as a failure of an IROFS. One administrative control IROFS for NCS remained available which was based on the RTRT operator controlling the solution collected with the RRVC. The licensee noted that fissile solutions are not generated in RTRT; only floor scrubbing solutions are collected with RRVCs in RTRT. The event was reported to the NRC within 24 hours of discovery in Event Notification (EN) 44035 in accordance with 10 CFR 70 Appendix A (b) (2) - Loss or degradation of IROFS that results in a failure to meet the performance requirements of 10 CFR 70.61.

On March 6, following an extent of condition review of RRVCs at the site, the licensee discovered two other RRVCs with inadequate levels of rings. An RRVC that was located in the Chemistry Laboratory had a ring level approximately 3 inches below the hose intake. The RRVC used in the Chemistry Laboratory had a NCS posting allowing concentrated uranium-bearing solutions such as those processed in the UR process. Although the licensee determined it is unlikely that the RRVC would be transferred from the Chemistry Lab to UR, there were no controls in place to prevent its movement out of the laboratory area to the UR area. In addition, there were no controls to check the Raschig ring level in this RRVC. The discovery of an inadequate level of rings is considered a degraded IROFS and the failure to perform inspections of the Raschig ring level is a failure of an IROFS. This condition was reported to the NRC within 1 hour of discovery as an update to EN 44035 in accordance with 10 CFR 70 Appendix A (a)(4)(ii) - An event or condition such that no IROFS, as documented in the Integrated Safety

Analysis summary, remain available and reliable in an accident sequence evaluated in the Integrated Safety Analysis summary, to perform their function: prevent a nuclear criticality accident.

Based on NCS concerns expressed by both NRC Region II and the licensee, regarding the ability to collect fissile solutions above the level of the Raschig rings in the RRVC, the licensee conducted a test using a vacuum cleaner similar to a RRVC with non-fissile solutions. On March 7, the licensee determined that an unanalyzed condition existed based on their testing of a vacuum cleaner not filled with Raschig rings. The licensee concluded that based on the test results, it was possible to fill the RRVCs with solution above the level of the rings. The ANSI/ANS 8.5 standard requires that the level of solution shall not exceed the level of uniformly packed rings. Though unlikely, because the possibility to collect concentrated fissile solutions above the level of the Raschig Rings existed, the licensee reported this unanalyzed condition within 24 hours of discovery as an update to EN 44035 in accordance with 10 CFR 70, Appendix A, (b)(1) – Any event or condition that results in the facility being in a state that was not analyzed, was improperly analyzed or is different from that analyzed in the Integrated Safety Analysis, and which results in failure to meet the performance requirements of 10 CFR 70.61. The inspectors reviewed the information provided regarding the inadequate Raschig ring level conditions found in the RRVCs. The inspectors also reviewed the unanalyzed condition where solution could be collected above the level of Raschig rings in a RRVC reported in EN 44035 and concluded that the conditions were appropriately categorized, and the event notifications were completed within the required timeframes.

As an immediate corrective action, the licensee suspended use of all RRVCs and inspected the level of Raschig rings in all the RRVCs on site. In addition, after completion of the inspection, a limited number of RRVCs with acceptable levels of Raschig Rings were returned to service with a Radiation Work Permit requiring sampling of spills before collection with the RRVCs, and a temporary NCS posting limiting the concentration of solutions being collected to a maximum of 5 grams U-235/liter as compensatory measures. The inspectors concluded the immediate corrective actions to the discovery of inadequate levels of Raschig Rings in RRVCs were adequate.

The conditions reported in EN 44035 were reviewed in detail by NRC Headquarters NCS inspectors during a routine inspection the week of March 10-13, 2008, and the results of that inspection were documented in inspection report 70-27/2008-202.

(2) Conclusions

The licensee appropriately evaluated and categorized the inadequate Raschig ring level conditions found for the RRVCs and made the initial and supplemental notifications within the required timeframes. The immediate corrective actions following the discovery of inadequate levels of Raschig Rings in RRVCs were adequate.

3. **Management Organization and Controls (IP 88005)**

a. **Inspection Scope and Observations**

The inspectors reviewed personnel changes involving management positions called out in the license during the past year and determined that the individuals met the qualification requirements specified in the license. The inspectors verified that managers for the different safety disciplines specified in the license understood their roles and responsibilities.

The inspectors reviewed a number of internal safety audits and concluded that the internal audits reviewed a wide range of safety disciplines and were adequate for identifying potential safety concerns. The licensee's Safety Committee meeting minutes and memorandums were reviewed for the past year. The licensee had adequately assessed the issues presented at the meetings. The inspectors reviewed actions described in the meeting minutes to ensure implementation of corrective action was performed accordingly.

The licensee's system to review and issue procedures adequately ensured that procedures were properly controlled and approved. Operators and first line managers demonstrated an adequate knowledge of management measures for procedures and training specified in their license and plant implementing procedures. The inspectors' review of applicable documents and interviews with program managers and plant personnel confirmed that the licensee was meeting the intent of the criticality, radiological, industrial and operational safety programs.

b. **Conclusions**

Recent personnel changes in the licensee's management organization met license requirements, internal safety audits were adequate in identifying potential safety concerns and procedure changes were properly reviewed and approved.

4. **Maintenance and Surveillance (IP 88025)**

a. **Inspection Scope and Observations**

During the observation of a weekly no-load test on a diesel generator, which does not supply backup power to any IROFS, the inspectors noted discrepancies between the maintenance procedure, test log sheet, and the vendor documentation of the equipment being tested. Newer generator controls, a new uninterruptible power supply, and sealed batteries had been installed by a vendor in the recent past. A licensee representative stated that they would update the preventive maintenance work documents and obtain an updated copy of the vendor manuals and drawings for the diesel generator. The actual performance of the no-load test by maintenance personnel was satisfactory.

The inspectors reviewed procedures related to testing of the criticality monitoring system and determined that the procedures were written with sufficient detail to ensure adequate testing of the system.

b. Conclusions

In response to the procedural and configuration discrepancies with a diesel generator noted by the inspectors during the performance of a weekly no-load test, the licensee committed to update preventive maintenance procedures and vendor documentation for the equipment.

5. **Radiation Protection (IP 88135)**

a. Inspection Scope and Observations

The inspectors observed Radiation Protection (RP) personnel during the performance of daily contamination surveys and change-outs of filter papers on the stationary air samplers in UR. The inspectors noted that RP technicians demonstrated adequate survey techniques and contamination control principles.

b. Conclusions

RP personnel demonstrated adequate performance of contamination survey techniques and contamination control principles.

6. **Transportation (86740)**

a. Inspection Scope and Observations

The inspectors reviewed a number of shipping records involving the shipment and receipt of special nuclear material (SNM) products and waste disposal. The licensee ensured that the appropriate documentation accompanied all the packages being shipped. The licensee recorded the required information on the packaging and shipping orders including the transportation index, package activity, labeling, and placards. The inspectors concluded that the transportation activities reviewed were conducted in accordance with requirements

The licensee's certificates of compliance for packages used for transportation of radioactive material were current, including the necessary design information and packaging criteria. The licensee conducted shipment and receipt inspections and surveys of SNM containers, empty packages and waste disposal consignments in accordance with procedural requirements. The inspectors interviewed personnel responsible for the shipment and receipt of material and verified they were knowledgeable of NRC and DOT requirements in addition to plant procedures for the transport of radioactive materials.

b. Conclusions

Shipments of radioactive materials were prepared and shipped in accordance with applicable regulations and plant procedures. Certificates of compliance were maintained current. Shipping paper records were properly completed and maintained in accordance with applicable regulations.

7. **Followup of Previously Identified Issues (IP 88135)**

a. Violation (VIO) 70-27/2006-08-01: Failure to Maintain Fire Safety Controls

The inspectors reviewed the completed corrective actions which included: 1) revising Safety Analysis Report (SAR) 15.35 to replace the shutoff of the ventilation system by smoke detectors with a non-IROFS fire safety control on hydraulic fluid requiring the use of a liquid with a flash point greater than 300°F; 2) completing a technical evaluation which determined a fire in the area would not result in the exposures in the area exceeding the occupational exposure limits in 10 CFR 20; and 3) revising licensing and safety analysis procedure, A62-01 to include steps requiring reviews for impacts to safety controls described in the applicable SARs prior to operational release of the area. The inspectors concluded that the corrective actions were adequate and the item was closed.

7. **Exit Meeting**

The inspection scope and results were summarized on February 29, March 14, and March 27, 2008, with R. Cochrane, General Manager, and other members of the licensee's staff. Although proprietary information and processes were reviewed during this inspection, proprietary information was not included in this report. No dissenting comments were received from the licensee.

ATTACHMENT

1. **LIST OF PERSONS CONTACTED**

J. Burch, Manager, Operations
R. Cochrane, General Manager
J. Creasey, Manager, Uranium Processing
D. Faidley, Manager, Nuclear Criticality Safety
B. Cole, Manager, Licensing & Safety Analysis
T. Nicks, Manager, Security
C. Yates, Manager, Safety and Licensing
D. Spangler, Manager, Radiation Protection
M. Suwala, Manager, Nuclear Materials Control
D. Ward, Manager, Environment, Safety, Health and Safeguards

Other licensee employees contacted included engineers, technicians, production staff, security, and office personnel.

2. **LIST OF ITEMS OPENED AND CLOSED**

<u>Item Number</u>	<u>Status</u>	<u>Description</u>
70-27/2008-01-01	Open/Closed	VIO – Failure to Provide Written Valving Instructions to Prevent a Spill of SNM-Bearing Solution (Paragraph 2.a).
70-27/2006-08-01	Closed	VIO - Failure to Maintain Fire Safety Controls (Paragraph 7.a).

3. **INSPECTION PROCEDURES USED**

IP 88135	Resident Inspection Program for Category I Fuel Cycle Facilities
IP 88005	Management Organization and Controls
IP 88025	Maintenance and Surveillance of Safety Controls
IP 86740	Transportation of Radioactive Materials