



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

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

[REDACTED]

May 28, 2004

BWX Technologies, Inc.  
ATTN: Mr. W. D. Nash, Vice President  
and General Manager  
Nuclear Products Division  
P. O. Box 785  
Lynchburg, VA 24505-0785

SUBJECT: NRC INSPECTION REPORT NO. 70-27/2004-003 AND NOTICE OF VIOLATION

Dear Mr. Nash:

This refers to the inspection conducted from March 21 through May 1, 2004, 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. 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 are identified in the report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observation of activities in progress.

Within the scope of the inspection, certain of your activities appeared to be in violation of NRC requirements, as specified in the enclosed Notice of Violation (Notice). 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 violation 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 Enclosures 1 and 2 will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room). [REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

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

Sincerely,

**/RA BY WILLIAM B. GLOERSEN  
ACTING FOR/**

David A. Ayres, 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 (Part 1)  
3. Notice of Violation [REDACTED]  
4. NRC Inspection Report (Part 2) [REDACTED]

cc w/encls:  
Leah R. Morrell  
Manager, Licensing and Safety Analysis  
BWX Technologies  
P. O. Box 785  
Lynchburg, VA 24505-0785

cc w/encls 1 and 2 only:  
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: (See Page 3)

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Distribution w/encls:

- D. Ayres, RII
- A. Gooden, RII
- B. Gleaves, NMSS
- W. Gloersen, RII
- G. Wertz, RII
- A. Boland, RII
- C. Gibson, NMSS
- B. Westreich, NSIR

PUBLIC DOCUMENT (circle one): YES NO

OFFICE	RII:DFFI	RII:DFFI	CLASSIFIER			
SIGNATURE	/RA by email/	/not in office/	/RA/			
NAME	GWertz	AGooden	WBGloersen			
DATE	05/26/2004	05/27/2004	05/28/2004			
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

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NOTICE OF VIOLATION

BWX Technologies, Inc.  
Lynchburg, Virginia

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

During an NRC inspection conducted on March 21 through May 1, 2004, a violation of NRC requirements was identified. In accordance with the "General Statement of Policy and Procedures for NRC Enforcement Actions," NUREG-1600, the violation is listed below:

Safety Condition S-1 of NRC license SNM-42 authorizes the use of nuclear materials in accordance with Chapter 1-8 of the License Application submitted on July 14, 1995, and supplements thereto. Section 4.1.2 of the License Application states that activities at the site involving special nuclear materials are conducted according to limits and controls specified on nuclear criticality safety postings.

Contrary to the above, on March 31, special nuclear material was observed in a storage location not in accordance with the nuclear criticality safety posting requirement. The material had been wrapped in moderating material (paper) not allowed by the posting. Upon notification, the licensee took prompt and effective corrective action.

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

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 enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

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, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is

Enclosure 1

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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 28<sup>th</sup> day of May, 2004

[REDACTED]

[REDACTED]

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 70-27

License No.: SNM-42

Report No.: 70-27/2004-003

Licensee: BWX Technologies, Inc.

Facility: Nuclear Products Division

Location: Lynchburg, Virginia

Dates: March 21 through May 1, 2004

Inspector: G. Wertz, Senior Resident Inspector

Approved by: David A. Ayres, Chief  
Fuel Facilities Inspection Branch 1  
Division of Fuel Facility Inspection

Enclosure 2

[REDACTED]

[REDACTED]

**NRC INSPECTION REPORT 70-27/2004-03 (PART 1)**

**EXECUTIVE SUMMARY**

BWX Technologies, Inc., Nuclear Products Division

This inspection included periodic observations conducted by the senior resident inspector during normal and off-normal shifts in the area of facility operations. The results of this inspection are included in Part 1 of this report.

**Plant Operations**

- The facility was operated safely and in accordance with regulatory and license requirements. The Emergency Operations Center and associated equipment were maintained in a state of readiness. Maintenance work was performed in accordance with radiation work permit requirements. Housekeeping was adequate to ensure routes of egress were clear in case of an emergency (Paragraph 2.a).
- A violation of NRC requirements was identified when special nuclear material was not handled in accordance with the nuclear criticality safety posting requirement. When notified, the nuclear criticality safety engineer took prompt and effective corrective action. Otherwise, nuclear criticality safety control devices and measures observed were properly implemented (Paragraph 2.b).

**Management Controls**

- Three discrepant nuclear criticality safety conditions were properly identified and captured in the licensee's corrective action program. In all three conditions, a contributing cause appeared to be inadequate attention to the applicable nuclear criticality safety posting requirements by operators (Paragraph 3.b).

**Radiation Protection**

- Radiation work permit requirements properly assessed radiological hazards and provided the appropriate protection requirements. Work areas were controlled and posted in accordance with the requirements. Observations of active and completed work activities indicated that the requirements had been effectively implemented (Paragraph 4.a).
  - A safety review of zero power fuel processing appropriately identified the potential radiological hazards. Radiological protection and license application requirements were satisfied prior to the commencement of material processing. Radiation surveys, performed during initial operations, were effective to ensure proper radiological protection of the processing operators (Paragraph 4.b).
- [REDACTED]

Maintenance

- Calibration of an alpha/beta radioactive sample counting system was performed in accordance with the approved procedure. A review of the calibration data and methodology identified no discrepancies (Paragraph 5.a).
- A 15 kilovolt electrical cable fault caused a momentary loss of site-wide electrical power. [REDACTED] and special nuclear material operations affected by the power loss were safely halted. Management oversight was effective in the repair and testing to ensure prompt restoration of power and safety of operations. The corrective action included a recommendation to test the facility's remaining 15 kilovolt electrical cables (Paragraph 5.b).

Attachment:

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

[REDACTED]

[REDACTED]

## REPORT DETAILS

1. **Summary of Plant Status**

Routine fuel manufacturing operations and maintenance activities were conducted in the [REDACTED] and other routine operations and maintenance activities were conducted in the [REDACTED] facility.

2. **Plant Operations (Temporary Instruction (TI) 2600/006)**

a. **Conduct of Operations - Routine Observations**

(1) **Inspection Scope**

The inspector toured the licensee's facilities to observe various operational and work activities. The observed activities were assessed to determine if the facility was operated safely and in accordance with license and regulatory requirements. The inspector also examined the Emergency Operations Center (EOC) and associated equipment to determine if the facility was maintained in a state of readiness.

Housekeeping associated with the storage of equipment and materials throughout the facility was reviewed for any significant potential hazards. The inspector performed a routine fire safety tour to verify that fire hazards were minimized especially in locations containing hazardous chemicals or [REDACTED] nuclear materials.

The inspector reviewed various operational procedures and records, radiation work permits (RWP), and nuclear criticality safety (NCS) postings, to determine if operations were performed safely and in accordance with approved plant procedures and postings.

(2) **Observations and Findings**

The inspector observed that specific operations were performed safely and in accordance with approved plant procedures and postings. Discussions with operations personnel confirmed an understanding of the procedural and posting requirements. The inspector verified that the EOC and associated equipment were maintained in a state of readiness.

Outside areas were toured and inspected. No conditions that could create an undesirable situation or hazard in the event of adverse weather (high winds, cold weather, or flooding), or blocked evacuation pathways were observed. During tours of the facility, the inspector noted radiological signs, postings, and procedures were properly posted or readily available. The inspector observed conditions and determined that equipment and devices used to confine and contain radioactive contamination and

[REDACTED]

airborne radioactivity in fuel processing, UR, and other material access areas (MAA) were in proper working condition, and that proper personal protective clothing and dosimetry were issued and properly worn. During process area tours, the inspector noted that emergency egress routes were passable.

(3) Conclusions

The facility was operated safely and in accordance with regulatory and license requirements. The EOC and associated equipment were maintained in a state of readiness. Maintenance work was done in accordance with radiation work permit requirements. Housekeeping was adequate to ensure routes of egress were clear in case of an emergency.

b. Implementation of Process Safety Controls

(1) Inspection Scope

The inspector reviewed nuclear criticality control devices and measures in effect during this inspection period in order to assess the effectiveness of the licensee's program for prevention of an inadvertent criticality.

(2) Observations and Findings

The inspector toured fuel processing, storage, and recovery areas, and in one case, observed that special nuclear material (SNM) was not stored in accordance with the applicable NCS posting requirement which prohibited moderating materials on the UR storage rack. On March 31, the inspector notified the cognizant NCS engineer that SNM wrapped in paper appeared in violation of the NCS posting. The NCS engineer agreed and immediately corrected the condition by moving the SNM to another storage location authorized to contain moderating material.

The inspector reviewed NCS analyses: NCS-2004-087, 2004-096, 2003-010, and Safety Analysis Report 15.5, and determined that double contingency (mass, spacing, and geometry) controls had remained effective to ensure that an accidental criticality remained highly unlikely. NCS engineering reviewed the safety basis and revised the NCS posting to allow moderating materials. In addition to the immediate corrective action to remove the material, UR management reviewed the issue with the operators to enhance their attention to detail to NCS postings. Also, NCS engineering reviewed other UR storage areas for similar NCS posting issues and planned to revise NCS postings, as appropriate, to enhance human factors. The inspector concluded that the licensee's evaluations and corrective actions were appropriate. The licensee captured the issue as corrective action (CA) 2004-186.

Although the potential for an inadvertent criticality remained low, the inspector determined that the discrepancy had more than minor safety significance because NCS posting compliance represents an important administrative safety control for handling SNM. Furthermore, SNM-42, License Application, Section 4.1.2 requires activities involving SNM to be conducted according to the limits and controls specified on the NCS postings. Failure to handle SNM in accordance with the NCS posting represented a violation (VIO) of NRC requirements and was cited as VIO 70-27/2004-03-01, Failure to Handle SNM in accordance with NCS Posting Requirements.

Otherwise, the inspector observed that personnel complied with approved, written NCS limits and controls, especially in areas where the licensee was using administrative controls rather than passive or active engineering controls. The inspector verified NCS limits were posted and available to the operators. During tours of [REDACTED] areas of the facility, the inspector observed proper spacing practices and controls, use of storage locations, and identification of SNM.

(3) Conclusions

A violation of NRC requirements was identified when SNM was not handled in accordance with the NCS posting requirement. When notified, the NCS engineer took prompt and effective corrective action. Otherwise, NCS control devices and measures observed were properly implemented.

3. Management Organization and Controls (TI 2600/006)

a. Problem Identification System Review

Three items from the corrective action system were reviewed in order to assess the licensee's root cause analysis and corrective action effectiveness.

b. Observations and Findings

CA 2004-135, CA 2004-147 and CA 2004-152 documented NCS posting discrepancies. In all three cases, license application Limiting Condition of Operation and double contingency NCS were adequately maintained. However, the inspector reviewed the issues with the responsible supervisors and operators and concluded that inadequate attention to NCS posting requirements contributed to the cause of the discrepant conditions. The corrective actions included prompt notification and review by NCS engineering, immediate restoration of NCS compliance, and operator review and retraining. The inspector concluded that the corrective actions appeared sufficient to address the issues.

c. Conclusions

Three discrepant NCS conditions were properly identified and captured in the licensee's corrective action program. In all three conditions, a contributing cause appeared to be inadequate attention to the applicable NCS posting requirements by SNM operators.

4. **Radiation Protection (TI2600/006)**

a. Radiation Work Permit Requirements

(1) Inspection Scope

The inspector reviewed and observed work done in accordance with RWP requirements in order to assess the effectiveness of the licensee's RWP program. The inspector also reviewed RWP requirements with area radiation control technicians.

(2) Observations and Findings

RWP 04-002 and 04-031 provided radiological safety requirements for work in the fuel manufacturing and UR areas, respectively. Both RWP's properly assessed potential radiological hazards and provided appropriate protection requirements. The inspector observed contamination control practices in both work areas noting that the work was performed as described in the RWP. Radiological postings were consistent with the RWP requirements. Workers were observed working in accordance with the requirements of RWP 04-002 and completed work appeared consistent with the requirements of RWP 04-031.

(3) Conclusions

RWP requirements properly assessed radiological hazards and provided the appropriate protection requirements. Work areas were controlled and posted in accordance with the RWP requirements. Observations of active and completed work activities indicated that the RWP requirements had been effectively implemented.

b. Safety Review of Zero Power Fuel Processing

(1) Inspection Scope

UR processed zero power (slightly irradiated) fuel in the fourth quarter of 2003. The inspector reviewed the licensee's safety review in order to evaluate the effectiveness of the radiological protection provided to the workers and the environment.

(2) Observations and Findings

The inspector discussed the safety review with the responsible process engineer and reviewed the documentation in Change Request (CR) 1012547. The CR was performed as described by Quality Work Instruction 5.1.12, "Change Management." The CR review was performed by the required safety disciplines (NCS, Radiation Protection, etc.) and appeared complete and comprehensive. Recommended actions were incorporated into the material process operation and design.

Radiation Protection (RP) Technical Work Record (TWR) 04-005 evaluated the potential fission product release for the zero power fuel recovery operation. The inspector discussed the TWR with the responsible health physicist. An isotopic analysis of the zero power fuel was performed which determined that (License Application, Section 5.1.5) pre-treatment of the uranium recovery process liquid discharge was not required. In addition, plutonium and fission product concentration limits (as specified in SNM-42, Possession Limit L) were satisfied based on the isotopic analysis. The TWR documented the RP review results, and the radiological dose and contamination survey requirements. The inspector noted that the additional radiation surveys of the processing area, performed during initial operations, appeared effective to ensure proper radiological protection of the processing operators.

(3) Conclusions

A safety review of zero power fuel processing appropriately identified the potential radiological hazards. Radiological protection and license application requirements were satisfied prior to the commencement of material processing. Radiation surveys, performed during initial operations, were effective to ensure proper radiological protection of the processing operators.

5. Maintenance and Surveillance (TI2600/006)

a. Calibration of the Alpha/Beta Radioactive Sample Counting System

(1) Inspection Scope

Calibration of the alpha/beta radioactive sample counting system by a radiation control (RC) technician was observed by the inspector in order to assess the effectiveness of the licensee's maintenance process.

(2) Observations and Findings

The alpha/beta radioactive sample counting system was calibrated in accordance with procedure RP 07-17, "Tennelec Series S5E Calibration and Operation." National Institute of Standards and Technology traceable alpha and beta radiation sources were

[REDACTED]

used appropriately. The calibration data was properly obtained, calculated and reviewed by the RC technician. The inspector discussed the calibration methodology with the responsible RP specialist. Radioactive sources were handled safely and properly controlled. The inspector observed no discrepancies and concluded that the calibrations were done effectively.

(3) Conclusions

Calibration of an alpha/beta radioactive sample counting system was performed in accordance with the approved procedure. A review of the calibration data and methodology identified no discrepancies.

b. Review of High Voltage Cable Failure

(1) Inspection Scope

On January 27, an electrical fault in a 15 kilovolt (kV) cable caused a momentary loss of site electrical power. The load center supplied by the 15 kV cable was without power for approximately eighteen hours. The inspector observed the damaged cable and repair activities by maintenance, and reviewed the potential safety consequences of the unexpected loss of facility electrical power. The cause and corrective actions were also reviewed.

(2) Observations and Findings

The [REDACTED] following the loss of site power. Systems in the area affected by the failed cable (compressed air, ventilation, and acid treatment) ceased operation as designed. The inspector reviewed the plant's safety status with a safety manager and discussed SNM operations with the operators in the affected areas. No safety concerns were identified. The operators responded to the event in a safe manner.

Repairs to the 15 kV cable were performed promptly and involved replacement of the damaged cable. Cable testing was successfully performed before the load center was re-energized. The inspector noted effective maintenance and safety management oversight during the event. Additionally, prior to re-energizing the load center, the safety manager implemented "storm watch" measures in order to prevent a potential unnecessary actuation of the site-wide evacuation alarm.

The inspector reviewed the completed incident investigation described in CA 2004-61 and discussed the results with the cognizant electrical engineer. The cause of the 15 kV cable fault was due to insulation failure. The engineer noted that the cable insulation appeared to be nearing the vendor-specified service life of 40 years, and recommended that management consider implementation of a testing/replacement plan for the facility's

[REDACTED]

remaining 15 kV cables in order to preclude additional failures. Maintenance management accepted this recommendation and entered it in their tracking system as Project 40-047.

(3) Conclusions

A 15 kilovolt electrical cable fault caused a momentary loss of site-wide electrical power. The [REDACTED] and special nuclear material operations affected by the power loss were safely halted. Management oversight was effective in the repair and testing to ensure prompt restoration of power and safety of operations. The corrective action included a recommendation to test the facility's remaining 15 kilovolt electrical cables.

6. Exit Meeting

The inspection scope and results were summarized on May 7, 2004, with W. Nash, Vice President and General Manager, and other members of the licensee's staff. Although proprietary documents and processes were occasionally reviewed during this inspection, the proprietary nature of these documents or processes was deleted from Part 1 of this report. No dissenting comments were received from the licensee.

[REDACTED]

ATTACHMENT

1. **LIST OF PERSONS CONTACTED**

Licensee

C. Abernathy, Supervisor, Nuclear Material Control  
W. Bakèr, Supervisor, Nuclear Material Control  
T. Brown, Manager, Operations  
J. Calvert, Manager, Industrial Health and Safety  
C. Carr, Manager, Administration and Security  
J. Creasey, Manager, Uranium Processing Services  
R. Coats, Manager, Environmental Protection  
L. Duncan, Manager, Nuclear Criticality Safety  
L. Morrell, Manager, Licensing and Safety Analysis  
W. Nash, Vice President and General Manager  
S. Niedzialek, Manager, CRF Operations and Maintenance  
C. Reed, Manager, Uranium Process Services  
S. Schilthelm, Manager, Safety and Licensing  
D. Spangler, Manager, Radiation Protection  
M. Suwala, Manager, Nuclear Materials Control  
D. Ward, Manager, Environment, Safety, Health and Safeguards  
D. Wilson, Supervisor, Radiation Control

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>
70-27/2004-03-01	Open/Closed	VIO - Failure to Handle SNM in accordance with NCS Posting Requirements (Paragraph 2.b).

3. **INSPECTION PROCEDURES USED**

TI 2600/006 Resident Inspection Program for Category I Fuel Cycle Facilities

[REDACTED]

4. **LIST OF ACRONYMS USED**

CA	Corrective Action
CR	Change Request
EOC	Emergency Operations Center
kV	kilovolt
MAA	Materials Access Area
NCS	Nuclear Criticality Safety
RC	Radiation Control
RP	Radiation Protection
RTRT	Research Test Reactor and Targets
RWP	Radiation Work Permit
SNM	Special Nuclear Material
TI	Temporary Instruction
TWR	Technical Work Record
UR	Uranium Recovery
VIO	Violation