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

[redacted]

July 24, 2006

EA-06-020
NRC Event No. 42629

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

SUBJECT: NRC INSPECTION REPORT NO. 70-27/2006-005

Dear Mr. Nash:

This refers to the inspection conducted from May 28 through July 8, 2006, 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 included: Plant Operations, Operator Training, Emergency Preparedness, Radiation Protection, Radioactive Waste Management, Low-Level Radioactive Waste Storage, Environmental Protection, Radioactive Waste Generator Requirements and Physical Protection. 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, violations or deviations were not identified.

[redacted]

[redacted]

[redacted]

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

Sincerely,

/RA/

David A. Ayres, Chief
Fuel Facility Inspection Branch 1
Division of Fuel Facility Inspection

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

Enclosure: NRC Inspection Report

cc w/encl:
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ADAMS: ☐ Yes ACCESSION NUMBER:_____

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.:	70-27
License No.:	SNM-42
Report No.:	70-27/2006-005
Licensee:	BWX Technologies, Inc.
Facility:	Nuclear Products Division
Location:	Lynchburg, Virginia
Dates:	May 28 through July 8, 2006
Inspectors:	G. Wertz, Senior Resident Inspector R. Gibson, Fuel Facility Inspector N. Rivera, Fuel Facility Inspector S. Subosits, Fuel Facility Inspector C. Taylor, Fuel Facility Inspector
Approved by:	David A. Ayres, Chief Fuel Facilities Inspection Branch 1 Division of Fuel Facility Inspection

Enclosure

[redacted]

NRC INSPECTION REPORT 70-27/2006-005

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 Plant Operations, Emergency Preparedness and Physical Protection. A specialized inspection and review of documentation were conducted by regional inspectors in the areas of Radioactive Waste Management, Low-Level Radioactive Waste Storage, Environmental Protection, Radioactive Waste Generator Requirements (May 30 through June 2), Plant Operations, Operator Training (June 12 through 16), and Radiation Protection (June 19 through 23).

Plant Operations

- A spill of non-radioactive hazardous solution on June 8, 2006, was properly contained and reported (Paragraph 2.a).
- Lynchburg Technology Center operators performed a dry-run of planned spent nuclear [redacted]. An independent readiness review team evaluated the activities (Paragraph 2.b).
- Items Relied on For Safety in Uranium Recovery were adequately implemented and maintained. Nuclear criticality safety audits were thorough (Paragraph 2.c).

Operator Training

- Operators possessed sufficient knowledge to safely operate Uranium Recovery processes. Training for criticality safety, radiation worker and employee safety was adequate (Paragraph 3).

Emergency Preparedness

- A lightning strike on July 4 resulted in actuation of the Criticality Monitoring System and plant evacuation. The emergency team and management organization responded effectively to ensure worker safety and determine and correct the cause of the alarm (Paragraph 4.a).
- The [redacted] emergency preparedness drill sufficiently exercised the emergency team and Emergency Operations Center staff (Paragraph 4.b).

[redacted]

Radiation Protection

- The external and internal exposure monitoring program was implemented to facilitate ALARA goals. Exposures were less than the limits in 10 CFR 20.1201(Paragraph 5.a).

- Radiation protection program self-assessments and procedure changes were implemented in accordance with the license requirements (Paragraph 5.b).

- The respiratory protection equipment program, radiological postings, radiation work permits, radiation contamination survey and ALARA programs were adequately implemented to protect workers (Paragraph 5.c).

Radioactive Waste Management

- The liquid and airborne effluent program effectively maintained effluent concentrations and offsite dose below the limits specified in 10 CFR Part 20 (Paragraph 6.a).

- The collection and disposal of solid waste and storage of greater than Class C waste was in accordance with license requirements (Paragraph 6.b).

Low-Level Radioactive Waste Storage

- Low-level radioactive waste was stored in accordance with regulatory requirements (Paragraph 7).

Environmental Protection

- The environmental monitoring program was effectively implemented (Paragraph 8.a).

- The [redacted] monitoring was performed in accordance with license requirements (Paragraph 8.b).

Radioactive Waste Generator Requirements

- Radioactive waste generator requirements were maintained (Paragraph 9).

Physical Protection

- [redacted]

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

[redacted]

REPORT DETAILS

1. **Summary of Plant Status**

Routine fuel manufacturing operations and maintenance activities were conducted in the [redacted] process areas, [redacted]. Uranium recovery and other routine operations and maintenance activities were conducted in the [redacted] facility. [redacted] was conducted at the Lynchburg Technology Center (LTC).

The [redacted] high enriched uranium (HEU) downblending project completed downblending operations in June. Although a few workers remained in Downblending to maintain the equipment and perform surveillance tests, most were reassigned to other areas of the facility. Additional HEU downblending material is not expected before [redacted] International Atomic Energy Agency inspection activities also completed.

[redacted] No major facility modifications were performed.

Major Management Changes

On July 7, John Fees, BWXT President, announced that the NPD and Nuclear Equipment Divisions would be consolidated into the Nuclear Operations Division under Winfred Nash, currently the NPD Vice President and General Manager. Bob Cochran was named President of BWXT Services reporting to John Fees.

Effective July 1, 2006, RTRT operations were reassigned to report to Jim Creasey, Uranium Processing Manager.

Effective June 24, 2006, Robert Hogg was assigned as the acting Manager of Criticality Safety.

2. **Plant Operations (Temporary Instruction (TI) 2600/006 and Inspection Procedure (IP) 88020)**

a. Event Notification 42629 Review

(1) Inspection Scope and Observations

The inspectors reviewed Event Notification (EN) 42629 involving an acid spill on June 8. The solution was non-radioactive and contained on-site. The event was evaluated in accordance with the performance requirements of 10 CFR 70.61 and an Integrated Safety Analysis (ISA) scenario was not required.

[redacted]

[redacted]

(2) Conclusions

A spill of non-radioactive hazardous solution on June 8, was properly contained and reported.

b. Lynchburg Technology Center [redacted]

(1) Inspection Scope and Observations

The inspectors observed dry-run activities in preparation [redacted] The licensee chartered an independent readiness review team which observed the dry-run and provided a safety assessment. No safety concerns were identified.

(2) Conclusions

LTC operators performed a dry-run of planned [redacted]. An independent readiness review team observed the activities.

c. Safety Function (O3.02), Plant Activities (O3.03), Configuration Control (O3.04), Operating Procedures (O3.06), Maintenance of Nuclear Criticality Safety Systems (O3.07), Nuclear Criticality Safety Training (O3.08), and Nuclear Criticality Safety Inspections, Audits and Investigation (O3.09)

(1) Scope and Observations

The inspectors reviewed the ISA and Items Relied on For Safety (IROFS), toured the facility, and discussed IROFS and criticality safety controls with operators in UR. Surveillance tests of IROFS were performed in accordance with the operating procedure (OP). UR OPs adequately described system startup, routine and abnormal operations. The inspectors questioned operators in UR who were knowledgeable of the [redacted] processes and OPs. Nuclear criticality safety (NCS) audits were thorough and probing. The inspectors observed [redacted] at the LTC and noted that the radiological controls were used to minimize personnel exposure.

(2) Conclusions

Selected IROFS in UR were adequately implemented and maintained. NCS audits were thorough.

3. **Operator Training (IP 88010)**

a. 10CFR 19.12 Training(F2.01), General Nuclear Criticality Safety Training (F2.02), General Radiological Safety Training (F2.03), General Emergency Training (F2.04), Operating Procedure Training (F2.05), and On-the-Job Training (F2.06)

(1) Scope and Observations

The inspectors reviewed training materials, training records, and discussed general, process-specific, and on-the-job training requirements with operators in UR. The operators possessed sufficient knowledge to safely operate [redacted]. NCS, radiation worker and general employee safety training were adequate in scope and detail.

(2) Conclusions

Plant operators possessed sufficient knowledge to safely operate UR processes. Training for NCS, radiation worker and employee safety was satisfactory.

4. **Emergency Preparedness (TI 2600/006)**

a. Criticality Monitoring System Activation

(1) Inspection Scope and Observations

On July 4, at 4:50 p.m., the criticality monitoring system (CMS) actuated the evacuation alarm. On-site employees evacuated to the cafeteria (storm watch) where personnel accountability was performed. The Emergency Operations Center (EOC) was staffed. The emergency team surveyed the facility and no elevated radiation levels were identified. The EOC determined that the CMS activation was due to a lightning strike which affected CMS detectors in an outlying building. The detectors were replaced and the CMS returned to normal status. The inspectors reviewed the event and the emergency assessment flow chart and determined that emergency response was effective to ensure worker safety. Event classification and notifications were done correctly.

(2) Conclusions

A lightning strike on July 4 resulted in actuation of the CMS audible alarm and a plant evacuation. The emergency team and management organization responded effectively to ensure worker safety and determine and correct the cause of the alarm.

b. Emergency Preparedness Drill

(1) Inspection Scope and Observations

The inspectors observed [redacted] Emergency Preparedness drill [redacted] The drill sufficiently exercised the emergency team in a simulated event involving contaminated injured employees in a hazardous environment. The EOC staff determined the proper event classifications and notifications.

(2) Conclusions

The [redacted] emergency preparedness drill sufficiently exercised the emergency team and EOC staff.

5. **Radiation Protection (TI 2600/006 and Inspection Procedure (IP) 83822)**

a. Exposure Control Program (R1.04 and R1.05)

(1) Scope and Observations

The inspectors reviewed personnel exposure data to ensure compliance with 10 CFR 20.1201 limits and the controls used to maintain exposure as low as reasonably achievable (ALARA). Table 1 displays the maximum assigned exposure data for calendar years (CY) 2004 and 2005. CY 2005 external and internal exposures were slightly higher than CY 2004 due to the changes in production levels. The inspectors reviewed the program for monitoring exposures and determined that the program was adequate.

Table 1. Maximum Annual Dose Data

Year/ Facility Location		Deep Dose Equivalent (DDE) - rem	Shallow Dose Extremity (SDE) - rem	Total Effective Dose Equivalent (TEDE) - rem	Collective TEDE (person-rem)	Committed Effective Dose Equivalent (CEDE) - rem
2004	NPD	0.099	0.000	0.513	24.6	0.513
	LTC	0.775	2.155	0.775	5.299	0.000
2005	NPD	0.093	0.123	0.543	26.5	0.374
	LTC	1.164	5.696	1.164	7.316	0.016

[redacted]

(2) Conclusions

The external and internal exposure monitoring program was implemented to facilitate ALARA goals. Exposures were less than the limits in 10 CFR 20.1201.

b. Radiation Protection Program Implementation (R1.01), Radiation Protection Program Procedures (R1.02)

(1) Scope and Observations

The inspectors reviewed Radiation Protection (RP) program self-assessments. Findings were captured and tracked in Radiation Safety Incident Notices (RSINs). Quarterly observations and management audits were provided to the ALARA Committee. The inspectors reviewed the OP change program and several OPs and noted the changes were included in the employee training.

(2) Conclusions

RP program self-assessments and procedure changes were implemented in accordance with the license requirements.

c. Respiratory Protection (R1.06), Postings, Labeling, Control (R1.07), Surveys (R1.08), and Implementation of ALARA Program (R1.10)

(1) Scope and Observations

Respiratory protection equipment issuance and training were examined and determined adequate to ensure respiratory protection equipment was only obtained by certified users. The radiological posting program was reviewed and radiation work was observed in accordance with radiation work permit (RWP) 06-0053 and OP-1015720. The inspectors observed an RP technician perform contamination surveys at the LTC in accordance with procedure RP-04-08. The ALARA program was reviewed and implemented in accordance with the license. The 2005 ALARA annual report was reviewed by management, and included detailed ALARA goals and exposure summaries to identify undesirable exposure trends.

(2) Conclusions

The respiratory protection equipment program, radiological postings, radiation work permits, radiation contamination survey and ALARA programs were adequately implemented to protect workers.

[redacted]

[redacted]

6. **Radioactive Waste Management (IP 88035)**

a. Radioactive Liquid/Airborne Effluents (R3.01/3.02), Records and Reports (3.03), and Effluent Monitoring Instruments (R3.04) and Procedures (3.05)

(1) Scope and Observations

The inspectors reviewed the liquid and airborne effluent monitoring data submitted in the semi-annual reports dated August 30, 2005, and March 20, 2006, for the period January 1, 2005, through January 1, 2006. The total exposure from airborne and liquid effluents for CY 2005 was 0.05 mRem and 0.1 mRem well below 10 CFR Part 20 limits. The measured airborne and liquid concentrations were also well below 10 CFR Part 20, Appendix B limits. The sanitary sewer effluent is processed through the waste treatment facility. Solid waste was shipped offsite to a licensed waste disposal facility. Sample results taken at the outfall before discharge into the James River were reviewed by the inspectors and determined to be below the license limits and those limits set forth in 10 CFR Part 20, Appendix B. The inspectors examined in-line monitoring systems and outfall sampling stations, reviewed calibration records for the in-line monitors, and verified no significant program changes occurred since the last Waste Management inspection.

(2) Conclusions

The liquid and airborne effluent program effectively maintained effluent concentrations and offsite dose below the limits specified in 10 CFR Part 20.

b. Solid Waste (R3.06), Waste Burial (R3.07), and Storage of High-Level Waste (R3.08)

(1) Scope and Observation

The inspectors toured solid waste collection areas, and reviewed the classification, documentation and handling of low-level radioactive waste (LLRW). Past shipment manifests and waste shipment status logs were accurate. The inspectors toured the greater than Class C waste storage area and determined that labeling, posting and access controls were adequate. Inventory and area surveys were current. There are no active burial sites at the facility.

(2) Conclusions

The collection and disposal of solid waste and storage of greater than Class C waste was in accordance with license requirements.

[redacted]

[redacted]

7. **Low-Level Radioactive Waste Storage (IP 84900) (R5)**

a. Scope and Observation

The LLRW storage program was reviewed for adequacy of proper storage area, waste container integrity, and the safe shipment, processing and disposal. The inspectors toured the LLRW storage areas and observed the storage of non-recoverable solid and liquid LLRW in 55-gallon drums [redacted], shipment and offsite disposal. Waste containers were properly labeled, in good physical condition, and adequately secured.

b. Conclusions

LLRW was stored in accordance with regulatory requirements.

8. **Environmental Protection (IP 88045)**

a. Program/Procedure Changes (R2.01), Internal Audits and Inspections (R2.02), Quality Control of Analytical Measurements (R2.03), Quality Control Records (R2.04), Monitoring Stations (R2.05) and Monitoring Program Reports (R2.06)

(1) Scope and Observations

The inspectors interviewed personnel to confirm that no significant environmental program or procedure changes occurred since the last inspection. Internal audits were adequate. Air monitoring station samples, and soil, surface water, river sediment, and vegetation samples were properly analyzed. Environmental sample raw data did not exceed regulatory limits. Measurement procedures and sample chain-of-custody requirements were adequate. Procedures for the collection of air, soil, surface water, river sediment, vegetation, and fallout samples were sufficiently detailed.

(2) Conclusions

The environmental monitoring program was effectively implemented.

b. LTC [redacted] Monitoring Requirements

(1) Scope and Observations

The inspectors reviewed that the LTC [redacted] monitoring and structural inspection requirements had been performed and maintained.

(2) Conclusions

The [redacted] monitoring was performed in accordance with the License Application requirements.

[redacted]

[redacted]

9. **Radioactive Waste Generator Requirements (IP 84850)**

a. Management Controls (R6.01), Quality Assurance (R6.02), Waste Manifests (R6.03), Waste Classification (R6.04), Waste Form and Characterization (R6.05), Tracking of Waste Shipments (R6.07), and Disposal Site License Conditions (R6.08)

The inspectors reviewed the program for preparing radioactive waste shipping manifests and tracking waste shipments. Adequate management controls, including training, procedures, and audits were maintained to ensure compliance with the requirements of 10 CFR Part 20, Appendix G, 10 CFR 61.55 and 10 CFR 61.56.

Shipment records for solid waste disposals to licensed waste burial facilities were acceptable to determine radioactive nuclide quantities. Shipping manifests were complete and met the requirements of 10 CFR Parts 20 and 61. Procedures were adequate to track waste shipments. Plant staff was cognizant of disposal site license conditions. The waste shipment tracking log was current and included waste shipment receipts.

b. Conclusions

Radioactive waste generator requirements were maintained.

10. **Physical Protection (TI 2600/006)**

[redacted]

[redacted]

[redacted]

11. **Followup of Previously Identified Issues**

[redacted]

[redacted]

[redacted]

12. **Exit Meeting**

The inspection scope and results were summarized on June 2, June 16, June 23, and July 13, 2006, with W. Nash, Vice President and General Manager, and other members of the licensee's staff. Proprietary documents and processes were reviewed during this inspection and this report has been appropriately marked as such. No dissenting comments were received from the licensee.

[redacted]

[redacted]

ATTACHMENT

1. LIST OF PERSONS CONTACTED

R. Cochrane, Manager, Operations
J. Creasey, Manager, Uranium Processing
L. Duncan, Manager, Nuclear Criticality Safety
L. Morrell, Manager, Licensing & Safety Analysis
W. Nash, Vice President and General Manager
T. Nicks, Manager, Security
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

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

2. INSPECTION PROCEDURES USED

TI 2600/006	Resident Inspection Program for Category I Fuel Cycle Facilities
IP 83822	Radiation Protection
IP 88035	Radioactive Waste Management
IP 84900	Low Level Radioactive Waste Storage
IP 88045	Environmental Protection
IP 84850	Waste Generator Requirements
TI 2600/013	Safety of Uranium Hexafluoride Cylinders at Fuel Cycle Facilities

3. LIST OF ITEMS OPENED AND CLOSED

Item Number	Status	Description
70-27/2006-05-01	Opened	URI - [redacted]
70-27/2006-02-01	Closed	VIO - [redacted]

[redacted]