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

[redacted]

January 9, 2005

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

SUBJECT: NRC INSPECTION REPORT NO. 70-27/2005-009

Dear Mr. Nash:

This refers to the inspection conducted from October 30 through December 10, 2005, 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: Operations, Management Organization and Controls, Radiation Protection, Maintenance and Surveillance, Chemical Operations, Transportation, Material Control and Accounting, 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]

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

Distribution w/encl: (See page 3)

[redacted]

Distribution w/encl:
D. Ayres, RII
B. Bonser, RII
S. Caudill, RII
G. Wertz, RII
J. Olivier, NMSS
B. Gleaves, NMSS
N. Baker, NMSS
B. Westreich, NSIR

*see previous concurrence

[redacted]

ADAMS: ☐ Yes ACCESSION NUMBER:_____

OFFICE	RII:DFFI	RII:DFFI	RII:DFFI	RII:DFFI	RII:DFFI		
SIGNATURE		WBG for	/NSR/	/JGJ /	WBG		
NAME	GWertz	SCaudill*	NRivera*	JJimenez*	Classifer*		
DATE	5/ /2008	01/05/2006	01/05/2006	5/ /2008	5/ /2008	5/ /2008	5/ /2008
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY DOCUMENT NAME: E:\Filenet\ML060090399.wpd

[redacted]

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.:	70-27
License No.:	SNM-42
Report No.:	70-27/2005-009
Licensee:	BWX Technologies, Inc.
Facility:	Nuclear Products Division
Location:	Lynchburg, Virginia
Dates:	October 30 through December 10, 2005
Inspectors:	G. Wertz, Senior Resident Inspector N. Rivera, Fuel Facility Inspector J. Jimenez, Fuel Facility Inspector
Approved by:	David A. Ayres, Chief Fuel Facilities Inspection Branch 1 Division of Fuel Facility Inspection

Enclosure

NRC INSPECTION REPORT 70-27/2005-009

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, Management Organization and Controls, Radiation Protection, Emergency Preparedness, Material Control and Accounting, and Physical Protection. A specialized inspection and review of documentation were conducted by regional inspectors in the areas of Chemical Operations (October 31 through November 3); and Management Organization and Controls, Maintenance and Surveillance, and Transportation (November 28 through December 2).

Plant Operations

- The facility was operated safely in accordance with procedures and nuclear criticality safety postings (Paragraph 2.a).

- Drain systems required to ensure that a criticality event due to an inadvertent leak of uranyl nitrate solution remained highly unlikely were properly evaluated and maintained in Uranium Recovery enclosures. Calculational assumptions involving drain system size and enclosure pressures matched the as-built configuration and operational settings (Paragraph 2.b).

Management Organization and Controls

- Nuclear criticality safety controls and control maintenance associated with Items Relied on For Safety were implemented and maintained as described in the Safety Analysis Report (Paragraph 3.a).

- The transition of the fire detection system and other safety monitoring alarms to a new communications systems was properly designed and implemented. The new system enhanced facility safety monitoring with redundant communications pathways and improved alarm descriptions. Effective teamwork between operators, engineers and technicians reduced the installation time and enhanced operability of the completed system (Paragraph 3.b).

- The Plant Incident Review Team performed a thorough review of the July 13 Lightning Event and provided comprehensive recommendations for management review (Paragraph 3.c).

- The licensee's management organization met license requirements, audits were performed as required, and facility changes were properly evaluated (Paragraph 3.d).

- Information Notices 86-077, 87-033, and 89-003 were appropriately implemented (Paragraph 3.e).

[redacted]

Radiation Protection

- Air flow testing of special nuclear material handling enclosures was performed in accordance with the procedure by radiation control technicians. An enclosure that failed to meet the acceptance criteria invoked proper compensatory measures and planned corrective maintenance (Paragraph 4).

Maintenance and Surveillance

- Preventive maintenance work observed was properly tracked and performed according to the procedure. An inspector followup item was opened for review of setpoint actuation of three in-line monitor items relied on for safety (Paragraph 5).

Chemical Operations

- The process areas inspected were operated in accordance with the chemical safety requirements (Paragraph 6.a).
- Workers were properly trained to handle chemicals safely. Safety training and procedures provided to the workers were adequate (Paragraph 6.b).
- Inspection, testing and maintenance of key chemical safety protection components were adequately implemented (Paragraph 6.c).
- The conditions identified in Information Notice 90-070 were not applicable to the licensee (Paragraph 6.d).

Transportation

- Radioactive shipments were prepared according to procedures. Shipment records were properly completed and maintained. Workers were adequately trained. Container use requirements were properly performed (Paragraph 7).

Emergency Preparedness

- The [redacted] Emergency Preparedness drill adequately demonstrated that the licensee could execute their emergency response requirements and safely protect their workers (Paragraph 8).

Material Control and Accounting

- [redacted]

[redacted]

[redacted]

Physical Protection

- [redacted]

- [redacted]

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

[redacted]

[redacted]

REPORT DETAILS

1. **Summary of Plant Status**

Routine fuel manufacturing operations were conducted in the Nuclear Products Division (NPD) [redacted] area. Uranium recovery, downblending [redacted] work was done in the [redacted] area.

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

a. Routine Observations

(1) Scope and Observations

The inspector observed special nuclear material (SNM) operations to determine if the facility was operated safely and in accordance with license and regulatory requirements. The inspectors reviewed radiation work permits (RWP) and nuclear criticality safety (NCS) postings and observed work was performed safely and in accordance with operating procedures (OP) and NCS postings. Outside areas were toured and no egress hazards nor blocked evacuation pathways were observed. The inspector observed that controls used to contain dispersable radioactive material in material access areas (MAA) were in proper working condition and that personal protective clothing and dosimetry were properly worn. A routine fire safety tour verified that fire safety systems were maintained and housekeeping was sufficient to minimize fire risk.

(2) Conclusions

The facility was operated safely in accordance with procedures and NCS postings.

b. Enclosure Drain Systems Review

(1) Scope and Observations

The inspector performed a review of the enclosure drain systems for liquid processing operations in UR, Downblending [redacted] areas. The review focused on verification that the enclosure drain capacities were sufficient to limit an unplanned leak of uranyl nitrate (UN) solution to less than the NCS k-effective limit of [redacted]. The inspector toured the area with the cognizant NCS engineer and reviewed the corresponding drain system calculations. The inspectors noted that calculational assumptions matched the as-built drain configurations and enclosure exhaust system pressure settings. The inspectors observed [redacted] operations noting that an Item Relied on For Safety (IROFS) [redacted] was properly installed and controlled by the operator.

[redacted]

(2) Conclusions

Drain systems used to ensure that a criticality event due to inadvertent leak uranyl nitrate solution remained highly unlikely were properly evaluated and maintained in UR enclosures. Calculational assumptions involving drain system size and enclosure pressures matched the as-built configuration and operational settings.

3. **Management Organization and Controls (TI 2600/006, TI 2600/012, Inspection Procedures (IP) 88005, and IP 88066)**

a. Review of Safety Analysis Report Nuclear Criticality Safety Controls

(1) Scope and Observations

The inspector reviewed the NCS controls and control maintenance for the processing area listed in the Safety Analysis Report (SAR) 15.34. The inspector toured the area with an NCS engineer and verified the NCS controls and control maintenance were implemented and maintained as described in the SAR. Specific maintenance requirements for NCS controls involving unfavorable geometry containers and ventilation condensation were discussed with cognizant area foreman. Checklists used to perform the maintenance were current. The NCS controls were evaluated and were consistent with double contingency safety methodology. The inspector observed that an IROFS listed only one control in the SAR. The NCS engineer demonstrated that other controls were used and planned to include them in the next revision to the SAR IROFS table.

(2) Conclusions

The NCS controls and control maintenance associated with IROFS were implemented and maintained as described in the SAR.

b. Transition of the Fire Detection and Safety Monitoring Systems

(1) Scope and Observations

The inspector reviewed facility modification documentation described in Safety Evaluation Report (SER) 04-002 used to control the transition of the fire detection system and other safety monitoring alarms to a new communications system.

Note: Installation of a new communication system was committed to the NRC in response to Event Notices 41822 and 41843, dated August 2 and 11, 2005, respectively. Also, the Facility Alarm System was not transitioned and remained on the existing communications platform pending additional engineering review.

[redacted]

The transition involved installation of a new communications system [redacted] The inspector observed alarm station personnel verify [redacted] necessary to ensure that the system's communication integrity was maintained during the transition process. [redacted]. The inspector also noted effective teamwork between alarm station operators, engineers, and field technicians which resulted in reduced installation time and enhanced operability of the completed system.

(2) Conclusions

The transition of the fire detection system and other safety monitoring alarms to a new communications systems was properly designed and implemented. The new system enhanced facility safety monitoring with redundant communications pathways and improved alarm descriptions. Effective teamwork between operators, engineers and technicians reduced the installation time and enhanced operability of the completed system.

c. Post Incident Review Team Report

(1) Scope and Observations

The inspector reviewed the Plant Incident Review Team (PIRT) report 05-001 of the July 13, 2005, Lightning Event. The PIRT performed a thorough review of the event and provided corrective actions (CA) in CA 2005-00596 for management review and approval. The inspector reviewed the completed corrective actions noting they appeared comprehensive and effective.

(2) Conclusions

The PIRT performed a thorough review of the July 13 lightning event and provided comprehensive recommendations for management review.

d. Organizational Structure, Procedure Controls, Internal Reviews and Audits, Safety Committees, Quality Assurance Programs; and Audit and Inspection (IP 88066)

(1) Scope and Observations

The inspector reviewed changes in personnel responsibilities and functions that occurred in the past year and verified that license application requirements for personnel qualifications were met. The inspector reviewed several transportation and fuel

[redacted]

processing procedures and noted that they were properly reviewed and updated at the required biennial frequency.

The inspector determined that safety audits conducted in 2005 were properly performed and audit findings were properly tracked. The inspectors concluded that the safety review committee was functioning in accordance with license conditions. The inspector reviewed several facility change requests and verified that safety evaluation reports, OP revisions and operator training were properly performed.

(2) Conclusions

The licensee's management organization met license requirements, audits were performed as required, and facility changes were properly evaluated.

e. Information Notice Review (TI 2660/012)

(1) Scope and Observations

Information Notice (IN) 86-077, "Computer Program Error Report Handling," IN-87-033, "Applicability of 10 CFR Part 21 to Non-licensees," and IN-89-003, "Potential Electrical Equipment Problems," were reviewed. With regard to IN's 86-077 and 87-033, the licensee had a process to identify and track computer program errors, and 10 CFR Part 21 requirements. With regard to IN-99-003, the inspector verified that the in-line monitors in UR failed in a safe mode.

(2) Conclusions

IN-86-077, IN-87-033, and IN-89-003 were appropriately implemented.

4. **Radiation Protection (TI 2600/006)**

a. Scope and Observations

The inspector observed radiation control technicians perform air flow measurements for controlled area enclosure in accordance with radiation protection (RP) procedure RP-02-07 and SNM-42 license condition 3.3.1.1.3. All enclosures met the license condition requirement [redacted]. Past test data indicated proper operation. However, operating restrictions were implemented such that the requirement was maintained and a maintenance work order was initiated for corrective action.

[redacted]

b. Conclusions

Air flow testing of SNM handling enclosures was performed in accordance with the procedure by radiation control technicians. An enclosure that failed to meet the acceptance criteria invoked proper compensatory measures and planned corrective maintenance.

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

Conduct of Maintenance, Work Control Procedures, Work Control Authorizations, Qualifications of Maintenance Personnel, Management Audit of Maintenance, Surveillance Testing, and Calibrations of Equipment

a. Scope and Observations

The inspector observed and reviewed preventive maintenance (PM) testing for selected safety equipment and controls in UR, [redacted] and reviewed the licensee's "MP2" computerized maintenance tracking system.

The inspector observed maintenance and surveillance activities associated with the weekly interlock testing of the three in-line monitor IROFS located in the UR area. The weekly test verified that the calibration curve remained constant and that system actuation isolated flow. However, the inspector noted that there was no verification that the system actuated at the desired set point. The inspector reviewed the annual calibration noting that multi-point calibrations of the in-line monitors were performed using calibrated solutions, but there was no verification that the monitors actuated at the designated setpoint. The inspector decided to continue the review and inspector follow-up item (IFI) 2005-09-01, UR In-Line Monitor IROFS Setpoint Actuation not Verified, was opened.

b. Conclusions

Preventive maintenance work observed was properly tracked and performed according to the procedure. An IFI was opened for review of setpoint actuation of three in-line monitors designated as IROFS.

[redacted]

6. **Chemical Operations (IPs 88056 through 88066 and TI 2600/012)**

a. Process Safety Information, and Hazard Identification and Assessment (IPs 88056, 88057)

(1) Scope and Observations

The inspector reviewed chemical safety operations noting that chemical hazards were identified, material safety data sheet information posted, and accident prevention planning provided to the workers to prevent and mitigate safety events.

(2) Conclusions

The process areas inspected were operated in accordance with the chemical safety requirements.

b. Standard Operating Procedures, Site-Wide Safety Procedures, Chemical Safety Training, and Emergency Response Procedures (IPs 88058-59, 88061, 88064)

(1) Scope and Observations

The inspector reviewed the licensee's chemical safety training and procedures and verified that chemical hazards were evaluated and that workers understood safe handling requirements. Operators questioned demonstrated adequate knowledge of the chemical hazards in their area. The inspector reviewed the chemical safety training program and noted the program was current. The inspector also verified that the training plans addressed process and facility safety controls, normal operations, and upset conditions.

(2) Conclusions

Workers were properly trained to handle chemicals safely. Safety training and procedures provided to the workers were adequate.

c. Detection and Monitoring, Maintenance and Inspection, Maintenance of Change, and Incident Investigation (IPs 88060, 88062-63, 88065)

(1) Scope and Observations

The inspector reviewed the licensee's incident investigation process and verified that investigations enhanced safety. The inspector interviewed maintenance personnel who indicated adequate knowledge of RWP requirements. The inspector verified that safety was a primary consideration of maintenance planning. The inspector reviewed the licensee's chemical detection and monitoring program for the selected areas and noted that IROFS were operational and adequately maintained.

[redacted]

(2) Conclusions

Inspection, testing and maintenance of key chemical safety protection components were adequately implemented.

d. Information Notice Review (TI 2600/012)

(1) Scope and Observations

The inspector reviewed the applicability of IN 90-070, "Pump explosions Involving Ammonium Nitrate" noting that the conditions for an explosion were not possible.

(2) Conclusions

The conditions identified in IN 90-070 were not applicable to the licensee.

7. **Transportation (IP 86740)**

Preparation, Delivery Packages for Shipment, Delivery of Completed Packages to Carriers, Receipt of Packages, Certificates of Compliance, Management Controls, Records and Reports

a. Scope and Observations

The inspector observed an SNM receipt and the preparation of shipment packages for delivery noting they were performed in accordance with the OPs. Training records for the workers were current and employees interviewed were familiar with the inspection and packaging requirements. Shipment and container maintenance records were current and pre-shipment inspections were properly documented in the Container Specification and Inspection Report. Radiological surveys of shipments were performed properly.

b. Conclusions

Radioactive shipments were prepared according to procedures. Shipment records were properly completed and maintained. Workers were adequately trained. Container use requirements were properly performed.

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

a. Scope and Observations

The inspector reviewed the [redacted] Emergency Preparedness Drill Scenario and observed the [redacted] drill exercises. The scenario adequately tested the licensee's emergency response requirements including transportation of a

[redacted]

[redacted]

radiologically contaminated worker for offsite medical treatment. Emergency classification and NRC notification determinations were performed properly.

b. Conclusions

The [redacted] Emergency Preparedness drill adequately demonstrated that the licensee could execute their emergency response requirements and safely protect their workers.

9. **Material Control and Accounting (TI 2600/006)**

[redacted]

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

[redacted]

[redacted]

[redacted]

[redacted] [redacted]

[redacted]

[redacted] [redacted]

[redacted] [redacted]

[redacted]

[redacted] [redacted]

[redacted]

11. **Exit Meeting**

The inspection scope and results were summarized on November 3, December 2, and December 19, 2005, 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]

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
J. Noel, Manager, NRC Security
D. Spangler, Manager, Radiation Protection
M. Suwala, Manager, Nuclear Materials Control
D. Ward, Manager, Environment, Safety, Health and Safeguards

2. LIST OF ITEMS OPENED AND CLOSED

Item Number	Status	Description
70-27/2005-09-01	Open	IFI - UR In-Line Monitor IROFS Setpoint Actuation not Verified (Paragraph 5).
70-27/2005-09-02	Open	URI - [redacted]

3. INSPECTION PROCEDURES USED

TI 2600/006	Resident Inspection Program for Category I Fuel Cycle Facilities
IP 86740	Transportation of Radioactive Materials
IP 88005	Management Organization and Controls
IP 88025	Maintenance and Surveillance
IP 88056	Process Safety Information
IP 88057	Hazard Identification and Assessment
IP 88058	Standard Operating Procedures
IP 88059	Safety-wide Safety Procedures
IP 88060	Detection and Monitoring
IP 88061	Chemical Safety Training
IP 88062	Maintenance and Inspection
IP 88063	Management of Change
IP 88064	Emergency Procedures
IP 88065	Incident Investigation
IP 88066	Audit and Inspection
TI 2600/012	Institutionalizing Concern Regarding Safety Issues Identified in selected Past Generic Communications

[redacted]