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

[redacted]

May 11, 2006

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. 70-27/2006-003

Dear Mr. Nash:

This refers to the inspection conducted from March 5 through April 15, 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, Management Organization and Controls, Radiation Protection, and Emergency Preparedness. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observation of activities in progress.

In addition, enclosed for your information is the synopsis of the Nuclear Regulatory Commission's (NRC) Office of Investigation's (OI) completed report regarding whether a machine operator willfully failed to provide complete and accurate information during a shearing procedure. OI determined that there was insufficient evidence to substantiate the allegation. We plan no further action with regard to this matter

[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

Enclosures: 1. NRC Inspection Report
2. [redacted]

cc w/encls:
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[redacted]

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.:	70-27
License No.:	SNM-42
Report No.:	70-27/2006-003
Licensee:	BWX Technologies, Inc.
Facility:	Nuclear Products Division
Location:	Lynchburg, Virginia
Dates:	March 5, through April 15, 2006
Inspectors:	G. Wertz, Senior Resident Inspector O. Lopez, 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 1

[redacted]

NRC INSPECTION REPORT 70-27/2006-003

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, and Radiation Protection. A specialized inspection and review of documentation were conducted by regional inspectors in the areas of Plant Operations (March 6 through 9) and Emergency Preparedness (April 3 through 6).

Plant Operations

- Safety problems were identified and resolved in a prompt manner. Items Relied on For Safety were adequately implemented and maintained. Plant activities observed were performed safely and in accordance with license requirements. Source checks of the criticality detectors were performed in accordance with approved procedures (Paragraph 2.a).

- [redacted] at the Lynchburg Technology Center. The work was performed in accordance with the radiation work permit and the workers' radiation doses were maintained as low as reasonably achievable (Paragraph 2.b).

- [redacted] operations were suspended on April 11 after [redacted] fell into its storage location when the nylon support rope failed. The licensee responded appropriately and corrective actions are planned to preclude recurrence (Paragraph 2.b).

- Information Notices 99-05 and 99-30 were properly addressed (Paragraph 2.c).

Management Organization and Controls

- The immediate corrective actions were adequate for an event involving a special nuclear material [redacted] which fell from an overhead crane due to an inadequately designed lifting device. An independent assessment of the facility's lifting procedures and design requirements was planned. However, an inspector followup item was opened to review the adequacy of the licensee's determination of the chemical safety consequence for this event (Paragraph 3).

[redacted]

[redacted]

Radiation Protection

- Results from the Semi-Annual Effluent Monitoring report indicated the offsite dose remained very low at less than 0.1 milli-Roentgen Equivalent Man (Paragraph 4.a).

- [redacted] ventilation ductwork was surveyed and minimal special nuclear material had accumulated downstream of the enclosure filters. However, appreciable material was found in the enclosure filters and a nuclear criticality safety analysis had not been performed to evaluate this condition. As such, an unresolved item was opened for additional NRC review of the nuclear criticality safety analysis requirements of enclosure filters (Paragraph 4.b).

Emergency Preparedness

- The Emergency Preparedness program continued to support effective emergency response. Emergency plan changes had been done properly and the audit was comprehensive. Emergency procedures had been properly revised to support the plan. Emergency Management Organization training requirements were current. Plant workers understood the emergency evacuation requirements and process. Offsite emergency support agencies continued to participate in drills and site familiarization tours. Emergency drill critiques were conducted effectively and corrective action taken. Emergency equipment was maintained in working condition (Paragraph 5.a).

- Information Notices 89-47 and 86-24 were properly addressed (Paragraph 5.b).

[redacted]

[redacted]

REPORT DETAILS

1. **Summary of Plant Status**

Routine fuel manufacturing operations and maintenance activities were conducted in the process areas, and the [redacted] facility. Uranium recovery, downblending and other routine operations and maintenance activities were conducted in the [redacted] facility.

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

a. Management and Administrative Practices (O3.01), Safety Function (O3.02), Maintenance of Nuclear Criticality Safety Systems (O3.07), Plant Activities (O3.03), Configuration Control (O3.04), Nuclear Criticality Safety Change Control (O3.05), Operating Procedures (O3.06), and Criticality Alarm System (03.10)

(1) Scope and Observations

The inspectors reviewed selected unusual incident reports (UIRs), Safety Analysis Reports (SARs) and Items Relied on For Safety (IROFS), toured the facility, and discussed operational requirements with operators and engineers. Safety problems were identified, reported, and communicated to management in a timely manner. Functional tests of IROFS in UR were performed properly. Source checks of criticality detectors were performed in accordance with approved procedures at the specified frequency. Nuclear criticality safety (NCS) postings, radiological signs, and procedures were properly posted or available to the operators. Operators were knowledgeable of the operating procedures (OPs) which adequately described system startup, routine and emergency operations. Plant personnel working in radiological control areas were observed wearing dosimetry and proper personal protective equipment. Recent facility modifications were reviewed, approved, and documented according to licensee procedures.

(2) Conclusions

Safety problems were identified and resolved in a prompt manner. Selected IROFS in UR and fuel fabrication facilities were adequately implemented and maintained. Plant activities observed were performed safely and in accordance with license requirements. Source checks of the criticality detectors were performed at the specified frequencies and in accordance with approved procedures.

[redacted]

b. [redacted]

(1) Inspection Scope and Observations

The inspectors observed [redacted] activities at the Lynchburg Technology Center (LTC). The work was performed in accordance with radiation work permit (RWP) LC-06-16 and technical procedure (TP) 876. The inspectors observed proper radiation protection (RP), contamination control, and surveys. Radiation exposures were consistent with the RWP. The highest individual radiation dose received was 6 milli-Roentgen Equivalent Man (mrem) and the total for the [redacted] was 29 mrem.

Dropped Canister Event Review

On April 11, a [redacted] fell approximately five feet while being lowered into its storage location when the attached nylon rope failed. Transfer operations were immediately halted. RP personnel surveyed the area and found no elevated radiation levels. The project manager, after discussions with a design engineer, concluded that the integrity [redacted] had not been breached and planned to leave it in the storage location. The inspectors reviewed the Integrated Safety Analysis (ISA) and determined that the radiation protection measures used (surveys and automatic alarms) would ensure no high or intermediate consequence event, as listed in 10 CFR 70.61, would result. A Radiation Safety Incident Notice (RSIN) LTC 06-03 was initiated and corrective actions were under review at the conclusion of the inspection period.

(2) Conclusions

[redacted] at the LTC. The work was performed in accordance with the RWP and the workers' radiation doses were maintained as low as reasonably achievable.

LTC [redacted] operations were suspended on April 11 after [redacted] fell into its storage location when the nylon support rope failed. The licensee responded appropriately and corrective actions were planned to preclude recurrence.

c. Information Notice Review (TI 2600/012)

TI 2600/012 "Institutionalizing Concerns Regarding Safety Issues Identified In Selected Past Generic Communications"

The inspector reviewed Information Notices (INs) 99-05, "Inadvertent Discharge of Carbon Dioxide Fire Protection System and Gas Migration" and 99-30, "Failure of Double Contingency Based on Administrative Controls Involving Laboratory Sampling and Spectroscopic Analysis of Wet Uranium Waste." For IN 99-05, the licensee does

not have a carbon dioxide fire suppression system and for IN 99-30 the licensee has in-line monitoring and procedures implemented for wet uranium sampling analysis.

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

a. Inspection Scope and Observations

The inspectors reviewed the root cause and corrective actions for a SNM [redacted] which dropped during manufacturing while suspended from an overhead crane. The event occurred on February 20 and additional details were reported in NRC Event Notice 42352. The root cause investigation was comprehensive and detailed the failure which was attributed to an inadequate re-design of a lifting attachment. The designer failed to account for a lateral bending stress applied during movement, and, as a result, a small crack developed and grew until failure following a few months of operation. Immediate action included halting operations involving this and a similar crane until the design deficiencies were corrected. In addition, an independent team was chartered to review lifting procedures and design requirements. The inspector reviewed the new lifting attachment and observed its use with the responsible supervisor.

ISA Review

The potential NCS and radiation protection consequences were reviewed against the performance requirements listed in 10 CFR 70.61 and were bounded by scenarios documented in SAR 15.37. Chemical safety required an additional review which was documented in Process Hazards Analysis 06-00001 and Technical Work Record HS-2006-084. This review concluded that the **unmitigated** consequences of an acid splash event, as previously evaluated in SAR 15.37, Appendix A, Node 7-67, remained below "intermediate" meaning no serious, or irreversible long-lasting health effects could result. No credit was given for personnel protective equipment (PPE). The basis for this determination was that the safety organization concluded that the dropped load would not cause acid to splash high enough to reach an operator's face. The inspectors disagreed with this conclusion since the operators worked in close proximity to the acid tank. Inspector Followup Item (IFI), 70-27/2006-03-01, Chemical Safety Consequence Determination of Acid Splash Event, was opened to track additional NRC review to determine if this accident scenario would warrant the designation of an IROFS. The inspectors observed that the OP required safety controls including PPE, limited area access, and emergency response, and therefore, safety concerns were being controlled with non-IROFS.

b. Conclusions

The immediate corrective actions were adequate for an event involving a special nuclear material bearing component which fell from an overhead crane due to an inadequately designed lifting device. An independent assessment of the facility's lifting procedures

and design requirements was planned. However, an inspector followup item was opened to review the adequacy of the licensee's ISA determination of the chemical safety consequence for this event.

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

a. Semi-Annual Effluent Monitoring Report Review

(1) Inspection Scope and Observations

The inspector reviewed the results of the Semi-Annual Effluent Monitoring report for the period covering July 4, 2005, through January 4, 2006. The total offsite dose remained low at less than 0.1 mrem. Due to an administrative oversight, the report was not submitted within the 60-day period as required by 10 CFR 70.59. This failure was determined to be a violation of minor significance and not subject to formal enforcement action. The issue was entered into the licensee's corrective action program as BWX 2002720.

(2) Conclusions

Results from the Semi-Annual Effluent Monitoring report indicated the offsite dose remained low at less than 0.1 mrem.

b. Radiation Survey of [redacted] Ductwork

(1) Inspection Scope and Observations

The inspectors reviewed radiation survey results which indicated minimal SNM accumulation in the ductwork downstream [redacted]. The surveys were performed in accordance with RWP 06-028 and the results were documented in NCS-031006A. However, the inspectors noted more substantial SNM was recovered from the High Efficiency Particulate Air filters (HEPA) located within the enclosures and questioned NCS engineers concerning SNM mass limit requirements. The NCS engineers indicated that the filters would restrict exhaust air flow below enclosure operating requirements and thus require replacement before exceeding an SNM mass limit. However, no NCS analysis existed to demonstrate this condition. As such, Unresolved Item (URI) 70-27/2006-03-02, NCS Evaluation of SNM Loading of HEPA Filters, was opened for additional NRC review of the NCS analysis requirements for enclosure filters.

(2) Conclusions

[redacted] ventilation ductwork was surveyed and minimal SNM had accumulated downstream of the enclosure filters. However, appreciable material was found in the enclosure filters and an NCS analysis had not

been performed to evaluate this condition. As such, an URI was opened for additional NRC review of the NCS analysis requirements for enclosure filters.

5. **Emergency Preparedness (IP 88050)**

a. Review of Program Changes (F3.01), Implementing Procedures (F3.02), Training and Staffing of Emergency Organization (F3.03), Offsite Support (F3.04), Drills and Exercises (F3.05), and Emergency Equipment and Facilities (F3.06)

(1) Inspection Scope and Observations

The inspectors reviewed the Emergency Plan (EP), changes and audits, and Emergency Preparedness Manual (EPM) changes, the Emergency Management Organization (EMO) training, offsite emergency support, drill and exercise results, and emergency equipment operability. The most recent EP changes, dated May 24, 2005, had been submitted for review in accordance with 10 CFR 70.32 as Revision 17, and were approved by NRC letter dated August 2, 2005. The EP audit was completed in April 2006, and was comprehensive. EPM changes had been performed in accordance with the change request process listed in the EP, Section 4. EMO training was current and emergency team members questioned understood their emergency response actions. Plant workers questioned understood the emergency evacuation process, egress and assembly locations.

Agreements with offsite support groups were maintained in accordance with the EP, Section 7.7, including [redacted] offsite support training. A site familiarization tour was provided to offsite fire support and rescue personnel [redacted] Offsite agencies participated in the biennial exercise conducted [redacted] The inspectors toured the alternate onsite and offsite Emergency Operations Centers and found both in a state of readiness. The last biennial exercise, [redacted], included participation by State and local agencies. Critique items from drills were reviewed by the Emergency Preparedness Committee and actions tracked to completion. Emergency response survey and respiratory protection equipment were inspected and found operational.

(2) Conclusions

The EP continued to support effective emergency response. EP changes had been done properly and an independent EP audit was comprehensive. The EPM had been revised to support the EP. EMO staff had maintained their training requirements current. Plant workers understood the emergency evacuation requirements and process. Offsite emergency support agencies continued to participate in EP drills and site familiarization tours. EP drill critiques were conducted effectively and corrective action taken. Emergency equipment was maintained in working condition.

[redacted]

b. IN Review (TI 2600/012)

TI 2600/012 "Institutionalizing Concerns Regarding Safety Issues Identified In Selected Past Generic Communications"

The inspector reviewed procedures and procedure implementation concerning INs 89-47, "Potential Problems With Worn Or Distorted Hose Clamps On Self-Contained Breathing Apparatus' and IN 86-24, "Increased Inspection Frequency For Certain Self-Contained Breathing Apparatus Air Cylinders." For IN 89-47, the licensee did not possess those SCBAs identified in the notice. For IN 86-24, the inspector determined that the licensee was aware of the notice and had implemented a preventative maintenance program for the respirators.

6. Followup of Previously Identified Issues (O3.12)

a. IFI on UR In-line Monitor Setpoint Verification

The inspectors reviewed IROFS alarm setpoint testing with the cognizant engineer and verified that the alarm was properly tested and actuated at the designated setpoint. IFI 70-27/2005-09-01, "UR In-Line Monitor IROFS Setpoint Actuation not Verified" was closed.

b. [redacted] Potential Procedure Falsification Event

The NRC Office of Investigations completed an investigation (Case No. 3-2005-021) and concluded that a [redacted] machine operator did not willfully fail to provide complete and accurate information to a procedure used to verify SNM [redacted] The inspectors were concerned about the potential radiological consequences should [redacted] spread SNM contamination in the uncontrolled area. After review, the inspectors concluded that the consequences would be very low since the SNM [redacted] was in an insoluble form, the [redacted] were stored [redacted] between manufacturing operations, and routine area radiation surveys were performed. As such, the failure to identify and record the damaged [redacted] condition in accordance with OP-0000163, was a violation of minor significance and not subject to formal enforcement action.

7. Exit Meeting

The inspection scope and results were summarized on March 9, April 6, and 25, 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. **LIST OF ITEMS OPENED AND CLOSED**

Item Number	Status	Description
70-27/2005-09-01	Closed	IFI - UR In-Line Monitor IROFS Setpoint Verification not Verified (Paragraph 2.a)
70-27/2006-03-01	Opened	IFI - Chemical Safety Consequence Determination of Potential Acid Splash Event (Paragraph 3).
70-27/2006-03-02	Opened	URI - NCS Evaluation of SNM Loading of HEPA Filters (Paragraph 4.b)

3. **INSPECTION PROCEDURES USED**

TI 2600/006	Resident Inspection Program for Category I Fuel Cycle Facilities
TI 2600/012	Institutionalizing Concern Regarding Safety Issues Identified in selected Past Generic Communications
IP 88020	Regional Nuclear Criticality Safety Inspection Program

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]