[redacted]

June 17, 2004

Mr. W. D. Nash, General Manager
BWX Technologies, Inc.
P.O. Box 785
Lynchburg, VA 24505-0785

SUBJECT: INSPECTION REPORT 70-27/2004-204

Dear Mr. Nash:

The U.S. Nuclear Regulatory Commission (NRC) conducted a routine announced criticality safety inspection at your facility in Lynchburg, Virginia, from May 17 through 21, 2004. The purpose of the inspection was to determine whether activities involving special nuclear material (SNM) were conducted safely and in accordance with NRC regulatory requirements. An exit meeting was held at the conclusion of the inspection on May 21, 2004. The inspection observations and findings were discussed with you and members of your staff.

The inspection, which is described in the enclosure, focused on: 1) the most hazardous activities and plant conditions; 2) the most important controls relied on for safety; and 3) the principal management measures for ensuring controls are capable, available, and reliable to perform their functions relied on for safety. The inspection consisted of facility walkdowns, selective examinations of relevant procedures and records, examinations of safety-related equipment, interviews with plant personnel, and observations of plant conditions and activities in progress. Throughout this inspection, observations were discussed with your managers and staff. Based on the inspection, your activities involving nuclear criticality hazards were found to be conducted safely and in accordance with regulatory requirements.

[redacted]

[redacted]

[redacted]

[redacted]

If you have any questions concerning this report, please contact Lawrence Berg, of my staff, at (301) 415-6215.

Sincerely,

/RA/

Melanie A. Galloway, Chief
Technical Support Group
Division of Fuel Cycle Safety
and Safeguards, NMSS

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

Enclosure: Inspection Report 70-27/2004-204

[redacted]

[redacted]

[redacted]

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U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS

Docket No:	70-27
License No:	SNM-42
Report No:	70-27/2004-204
Licensee:	BWX Technologies, Inc.
Location:	Lynchburg, VA
Inspection Dates:	May 17 - 21, 2004
Inspectors:	Lawrence Berg, Criticality Safety Inspector, NRC Headquarters Dennis Morey, Senior Criticality Safety Inspector, NRC Headquarters
Approved by:	Melanie A. Galloway, Chief Technical Support Group Division of Fuel Cycle Safety and Safeguards, NMSS

[redacted]

Enclosure

[redacted]

EXECUTIVE SUMMARY

BWX Technologies, Inc.
NRC Inspection Report 70-0027/2004-204

Introduction

Staff of the U.S. Nuclear Regulatory Commission (NRC) performed a routine and announced nuclear criticality safety (NCS) inspection of the BWX Technologies, Lynchburg, Virginia, facility from May 17 through 21, 2004. The inspection included an on-site review of the license programs dealing with plant operations, criticality accident alarm systems, and the NCS function. The license programs were acceptably directed toward the protection of public health and safety, and in compliance with NRC requirements. The inspection focused on risk-significant fissile material processing activities including fuel fabrication and machining, pickling and etching, Research Test Reactor and Target (RTRT) fabrication areas, uranium recovery, the retention tanks, downblending and the X-ray booths.

Results

- Plant operations involving fissile materials were conducted safely and in accordance with written procedures.
- The NCS function was adequate for maintaining acceptable levels of safety.
- The licensee's placement of criticality monitoring system detectors provides acceptable coverage of risk-significant operations.
- NCS quarterly audits were adequate for maintaining acceptable levels of safety.

[redacted]

REPORT DETAILS

1.0 Plant Operations (88015)

a. Scope of Inspection

The inspectors performed plant walkdowns to review activities in progress and to determine whether risk-significant fissile material operations were being conducted safely and in accordance with regulatory requirements. The inspectors verified the adequacy of management measures for assuring the continued availability, reliability and capability of safety-significant controls relied upon by the licensee for controlling criticality risks to acceptable levels. [redacted]

The inspectors reviewed selected aspects of the following documents prior to performing the walkdowns:

- NCS-1998-081, "NCS Evaluation Supporting SER98-029," dated May 20, 1998
- NCS-2000-319, "NCS Analysis Supporting SER00-032," dated September 26, 2000
- NCS-2000-389, "NCS Analysis Supporting SER00-083," dated December 13, 2000
- NCS-2004-062, "NCS Analysis Supporting Phases 4B and 5 of SER03-033," dated March 15, 2004
- NCS-2004-068, "Nuclear Safety Release Supporting Phase 4B of SE03-033," dated March 25, 2004
- SAR15.12, Rev. 27, dated October 2, 2003
- SAR15.21, Rev. 27, dated January 12, 2004
- SAR15.25, Rev. 10, dated December 9, 2002
- SAR15.26, Rev. 32, dated January 27, 2004

[redacted]

b. Observations and Findings

The inspectors verified that the controls identified in the NCS analyses were installed or implemented and were adequate to assure safety. The cognizant NCS engineers were knowledgeable and had good interfaces with operators on the process floors.

While performing a walkdown in the [redacted], the inspectors noted that NCS posting #110, dated April 29, 2002, required greater than [redacted] internal volume containers entering the [redacted] to comply with [redacted] container requirements at the same time. Through interviews with operators and supervisors, the inspectors determined that the intended meaning of the posting was to ensure that containers having [redacted]. The inspectors did not observe any containers with volumes greater than [redacted] that were not [redacted]. The licensee's failure to comply with NCS posting #110 is a violation of minor significance and is not subject to formal enforcement action. During the inspection, the licensee committed to revising the posting to clarify the requirements for [redacted] No other safety concerns were identified in the [redacted].

During tours of [redacted], the inspectors noted that NCS posting NRRack-006, dated November 22, 2002, limited the amount of moderating materials permitted on fuel storage racks to that which was necessary for normal operation. The inspectors also noted that NCS posting NRCart-20, dated November 22, 2002, precluded storage of moderating materials other than paper or plastic dust covers on carts. The inspectors observed that moderating material such as slings and gloves was being stored atop fuel components in storage racks when not actually needed for the normal storage operation. The inspectors also observed that moderating material such as stacks of notebooks were being stored atop loaded fuel carts. The inspectors determined that the storage of the as-found moderating materials was adequately bounded by the normal case moderation conditions and was not a safety concern. The licensee's failure to comply with NCS Postings NRRack-006 and NRCart-20 are violations of minor significance, and are not subject to formal enforcement actions. During the inspection, the licensee committed to revising the postings to clarify the moderation control requirements. The clarification of the greater than [redacted] container requirements on NCS posting #110, and the moderation control requirements on postings NRRack-006 and NRCart-20 will be tracked as **Inspection Follow-up Item (IFI) 70-27/2004-204-01.**

c. Conclusions

Plant operations involving fissile materials were conducted safely and in accordance with written procedures.

2.0 NCS Function (88015)

a. Scope of Inspection

The inspectors reviewed NCS analyses to determine that criticality safety of risk-significant operations was assured through engineered and human performance (controls) with adequate safety margin/certainty, preparation and review by capable staff. The inspectors reviewed selected aspects of the following documents:

- NCS-1996-165, "[redacted]Wet Exhaust Ductwork and Scrubber Re-evaluation," dated July 28, 1995
- NCS-1985-007, "[redacted]," dated February 21, 1985
- NCS-1998-081, "NCS Evaluation Supporting SER98-029," dated May 20, 1998
- NCS-2000-319, "NCS Analysis Supporting SER00-032," dated September 26, 2000
- NCS-2000-389, "NCS Analysis Supporting SER00-083," dated December 13, 2000
- NCS-2004-062, "NCS Analysis Supporting Phases 4B and 5 of SER03-033," dated March 15, 2004
- NCS-2004-068, "Nuclear Safety Release Supporting Phase 4B of SE03-033," dated March 25, 2004

b. Observations and Findings

The inspectors determined that analyses were performed by capable NCS engineers, independent reviews were completed for the evaluations by other qualified NCS engineers, subcriticality of the operations was assured through appropriate limits on controlled parameters, and double contingency was assured for each credible accident sequence leading to inadvertent criticality. The inspectors determined that NCS controls for equipment and processes assured the safety of the operations.

The inspectors reviewed a less than optimal bounding assumption for an off-gas system. The licensee's NCS evaluation of the [redacted] assumed that uranium deposition in [redacted] and the licensee accordingly developed limiting masses for the system [redacted]. The inspectors did not identify any credible mechanism for deposition resulting in a more reactive configuration in the [redacted]. The inspectors did not identify any safety concerns with the mass limits derived from the [redacted]. NCS controls implemented for the ductwork included mass limits and periodic visual inspection. The inspectors determined that the [redacted] wet exhaust NCS controls provided adequate protection against inadvertent criticality.

c. Conclusions

The NCS function was adequate for maintaining acceptable levels of safety.

3.0 Criticality Alarm System (88015)

a. Scope of Inspection

The inspectors reviewed criticality monitoring system (CMS) detector placement analyses to determine the adequacy of models, assumptions, variance reduction, and calculation results used to support the licensee's efforts to reduce the number of installed detectors. The inspectors visually inspected detector placement configurations to verify that dual detector coverage of risk-significant operations was being maintained. The inspectors reviewed selected aspects of the following documents:

- NCS-2004-017, "NCS Analysis Addressing Criticality Accident Monitor Coverage at [redacted]," dated February 19, 2004
- NCS-2004-073, "NCS Analysis Addressing the Addition of up to [redacted] of [redacted]," dated March 26, 2004

b. Observations and Findings

The inspectors observed that the licensee had reevaluated placement of [redacted] at the [redacted] using Monte Carlo N-Particle (MCNP) calculations. The calculations were required to evaluate the effect of configuration changes in those areas on CMS coverage. The inspectors noted that the more accurate calculations showed that the areas were completely covered by each individual detector resulting in the conclusion that all but two detectors could be removed, in this case, one at each location. The inspectors determined that detector coverage of risk-significant operations was adequate.

inspectors determined that detector coverage of risk-significant operations was adequate.

c. Conclusions

The licensee's placement of criticality monitoring system detectors provides acceptable coverage of risk-significant operations.

4.0 Inspections, Audits and Investigations (88015)

a. Scope of Inspection

The inspectors reviewed results of the most recent NCS quarterly audit to assure that appropriate issues were identified and resolved. The inspectors reviewed selected aspects of the following documents:

- NCS-2004-095, "1st Quarter 2004 NCS Findings and Observation Summary," dated May 17, 2004

b. Observations and Findings

The inspectors observed that the licensee NCS audits were conducted in accordance with written procedures. The inspectors noted that the audits were performed by NCS engineers who: (1) reviewed open NCS issues from previous audits; (2) reviewed the adequacy of control implementation; (3) reviewed plant operations for compliance with license requirements, procedures, and postings; and (4) examined equipment and operations to determine that past evaluations remain adequate.

The inspectors noted that five of the ten findings for the first quarter involved failure to follow NCS postings, and that two of the findings were NRC-identified. The inspectors observed that the total number of findings for the first quarter was more than half the total number of findings for calendar year 2003. The inspectors discussed this trend with the licensee and determined that the trend was not risk-significant. As mentioned in Section 1.0 of this report, the licensee committed to clarifying the requirements associated with three NCS postings that the inspectors determined required greater management attention to ensure compliance. The inspectors determined that the licensee's efforts to clarify postings were adequate for reducing the likelihood of posting non-compliance.

c. Conclusions

NCS quarterly audits were adequate for maintaining acceptable levels of safety.

5.0 Open Item Review

Violation (VIO) 70-27/2004-201-01

This item concerned licensee failure to control introduction of a greater [redacted]. The inspectors noted that the licensee's response to the violation included three corrective actions to restore control of introduction of greater than [redacted] containers into the uranium recovery facility: (1) development of a standard for container modification; (2) creation of a step-by-step checklist; and (3) the use of routine containers on an approved container list. The inspectors determined that all corrective actions are complete with the exception of the approved container list which is an on-going effort to assure that the list will be maintained up-to-date. This item is closed.

6.0 Management Meetings

The inspectors presented the inspection scope and results to members of the licensee's management and staff during an exit meeting on May 21, 2004. The licensee acknowledged and understood the findings as presented.

List of Items Opened, Closed, and Discussed

Opened

IFI 70-27/2004-204-01 Tracks the clarification of the [redacted] on NCS posting #110, and the moderation control requirements on postings [redacted]

Closed

VIO 70-27/2004-201-01 Failure to control introduction of a greater than [redacted] into the [redacted] facility.

Discussed

None

Inspection Procedures Used

IP 88015 Headquarters Nuclear Criticality Safety Program

Partial List of Persons Contacted

BWXT

* T. Brown	Manager, Operations
* J. Creasy	Manager, Uranium Recovery Process Systems
* L. Duncan	Manager, Nuclear Criticality Safety
* W. Nash	General Manager, Nuclear Products Division
* C. Reed	Manager, Uranium Recovery Process Systems
* S. Schilthelm	Manager, Safety and Licensing
* D. Ward	Manager, Environment, Safety, Health and Safeguards
* L. Morrell	Manager, Licensing and Safety Analysis
M. Mitchell	NCS Engineer
L. Wetzel	NCS Engineer
B. Kidd	NCS Engineer
A. Koudelka	NCS Engineer

* All attended the exit meeting on May 21, 2004.