babcock & wilcox nuclear operations group
p o. box 785 lynchburg, va 24505-0785 usa phone 434 522 6000
www.babcock.com

February 9, 2010
10-012

Roy Zimmerman
Director, Office of Enforcement
U.S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

References:
1. License SNM-42, Docket 70-27
2. Letter dated October 14, 2009, Joseph W. Shea (NRC, signed by Eugene W. Cobey for) to R. P. Cochrane (B&W NOG), NRC Special Inspection Team Report No. 70-27/2009-006, EA-09-263
3. Letter dated January 11, 2010, Luis A. Reyes (NRC, signed by Victor N. McCree for) to R. P. Cochrane (B&W NOG), Notice of Violation and Proposed Imposition of Civil Penalty – $35,000 (Special Inspection Team Report No. 70-27/2009-006), EA-09-263

Subject: Reply to a Notice of Violation; (EA-09-263)

Dear Sir:

Pursuant to the provisions of 10 CFR 2.201, Babcock & Wilcox Nuclear Operations Group, Inc. (B&W NOG), Lynchburg facility, is providing this written statement of explanation to the U.S. Nuclear Regulatory Commission (NRC) in reply to the Notice of Violation that was received by letter dated January 11, 2010 (Reference 3). B&W NOG's reply is provided as **Enclosure 1**.

B&W NOG is also providing confirmation of payment of the imposed Civil Penalty. A check in the amount of $35,000 was mailed to the NRC's License Fee and Accounts Receivable Branch on February 2, 2010. A copy of the check is provided as **Enclosure 2**.

Enclosure 3 contains a copy of B&W NOG's post critique which immediately followed after B&W NOG exited the Alert status at 12:35 a.m. on July 16, 2009. This critique is provided in order to demonstrate that B&W NOG self-identified on July 16, 2009, its failure to follow Appendix G of its Emergency Plan at 5:30 p.m. on July 15, 2009, when staff members were cognizant of the issues surrounding the band saw reservoir.

If there are any questions in this regard, please contact Barry Cole at (434) 522-5665.

Sincerely,

Roger P Cochrane

Roger Cochrane
General Manager
B&W NOG, Inc., Lynchburg

Enclosures

cc: NRC, Regional Administrator, Region II
NRC, Resident Inspector
NRC, M. Baker

ENCLOSURE 1

VIOLATION ASSESSED A CIVIL PENALTY

Violation 70-27/2009-006-01 – the licensee failed to declare an Alert once the conditions of Appendix G had been met:

Safety Condition S-2 of Special Nuclear Material License 42 dated April 10, 2009, requires that the licensee shall maintain and execute the response measures in the Emergency Plan, Revision 19, dated April 15, 2007, or as further revised in accordance with 10 CFR 70.32(i).

Appendix G to the Emergency Plan states, in part, that an Alert is declared when the loss of control of all parameters preventing criticality for which control cannot be immediately reestablished occurs.

Contrary to the above, at 5:30 p.m. on July 15, 2009, the licensee failed to declare an Alert once the conditions of Appendix G had been met. Specifically, staff members were cognizant of the issues surrounding the band saw reservoir (i.e., that all parameters preventing criticality from occurring were lost and controls could not be immediately reestablished) yet concluded that the situation should be described as an unanalyzed condition and reported to NRC within twenty-four hours as required by Appendix A to 10 CFR Part 70, but failed to recognize in a timely manner that the situation required an Alert emergency declaration until 8:01 p.m. that same day.

Admission of the Violation:

B&W NOG admits that it failed to follow Appendix G of its Emergency Plan at 5:30 p.m. on July 15, 2009, when staff members were cognizant of the issues surrounding the band saw reservoir (i.e., that all parameters preventing criticality from occurring were lost and controls could not be immediately reestablished).

B&W NOG fully agrees with the NRC's opinion that "the timely declaration of incidents in accordance with Emergency Plans to be a crucial component of successful implementation of emergency response measures." Recognizing this importance, B&W NOG staff documented "*need to think about timing/reportability, focus on reporting initially*" in the post critique immediately after B&W NOG exited the Alert status at 12:35 a.m. on July 16, 2009, as shown in **Enclosure 3**. This critique then became part of B&W NOG's internal investigation and thus was addressed in that investigation's recommendations for preventative/corrective actions as noted in the NRC's October 14, 2009, letter (Reference 2). Also shown in **Enclosure 3** is that the internal investigation team (Post Incident Review Team) was established at 12:14 a.m. on July 16, 2009, which is before B&W NOG exited the Alert status. The team began its investigation on July 16, 2009. The preventative measure to address this particular issue was not entered immediately into the formal preventative/corrective action system following the July 15, 2009, event because B&W NOG followed its normal procedures for investigation and evaluation before determining actions to prevent recurrence. This normal course of action does not preclude B&W NOG's recognition of the significance of this issue, but rather demonstrates that B&W NOG considered the serious nature of this issue and desired to make sure that appropriate preventative/corrective actions were taken.

Based on this clarification, B&W NOG respectfully requests that the NRC reconsider its conclusion that credit is not warranted for the factor of *Identification* for this violation.

Reason For The Violation:

After a B&W NOG operator discovered the cutting fluid leak and notified management, the manager for the band saw stopped operation of the saw and notified Nuclear Criticality Safety (NCS) of the situation. After an initial assessment, the band saw was locked out and tagged out and the sectioning area was isolated, establishing a perimeter of approximately 75 feet from the band saw. The NCS staff determined that the situation was stable and did not consider it to be an active event, and therefore did not consult the Emergency Plan. With the immediate safety concern addressed and determined to be stable, NCS and Licensing staff met to determine under which 10 CFR 70 Appendix A requirements to report the situation. The issue of immediate safety was addressed again in the meeting, and it was determined that the situation was still stable and not an active event. The procedure used to determine reportability requirements did not address consideration of the Emergency Plan. The NCS and Licensing staff reviewed the reportability procedure and 10 CFR 70 Appendix A, but did not consider the Emergency Plan because the situation was considered stable.

Corrective Actions:

1. The procedure used to determine reportability requirements was revised to include direction to consider activation of the Emergency Operations Center (EOC) in accordance with the Emergency Plan as part of the reportability evaluation. This change has resulted in safety evaluators considering EOC activation whenever evaluating an unusual incident.

   Completion Date: 9/8/2009

2. The Initial Emergency Assessment Flow Chart, a tool used in the EOC, was revised to clarify classification of events. The result is a EOC tool with clear event classification decision paths.

   Completion Date: 9/17/2009

3. Emergency Directors were trained on the revised Emergency Assessment Flow Chart and lessons learned. The result is that the Emergency Directors have a better understanding of the event classification decision paths and importance of EOC activation.

   Completion Date: 9/15/2009

4. Lessons learned from B&W NOG's 2009 biennial drill were incorporated into the annual Emergency Management Organization training. The result is that event classification reviews will be conducted during an event to ensure that event progression is properly understood and that the proper event classification is used per the Emergency Plan guidance.

   Completion Dates: 6/30/2009

Date When Full Compliance Will Be Achieved:

Full compliance was achieved 9/17/2009.

VIOLATIONS NOT ASSESSED A CIVIL PENALTY

Violation 70-27/2009-006-02 — the licensee failed to complete or verify the requirements of SER-03-087. Specifically, the licensee failed to ensure that the band saw's built-in coolant reservoir was disabled and not usable prior to operation of the band saw:

Safety Condition S-1 of Special Nuclear Material License 42 authorizes the use of nuclear material in accordance with chapters 1 through 11 of the license application submitted on October 24, 2006, and supplements thereto.

Section 11.4, "Procedures," of the license application states, in part, that activities at the NOG [Nuclear Operations Group] Site involving licensed material shall be conducted in accordance with written and approved procedures.

Quality Work Instruction 5.1.7, "Safety Evaluation Requests," Appendix B states, in part, that a Safety Evaluation Report (SER) Originator completes the requirements of the SER, and the evaluator verifies the requirements of the SER are met.

Safety Evaluation Request 03-087 states, in part, that if each machine has a built-in coolant reservoir, it shall be disabled such that it is not usable.

Contrary to the above, on or before July 15, 2009, the licensee failed to complete or verify the requirements of SER-03-087. Specifically, the licensee failed to ensure that the band saw's built-in coolant reservoir was disabled and not usable prior to operation of the band saw.

Admission of the Violation:

B&W NOG admits that it failed to ensure that the band saw's built-in coolant reservoir was disabled and not usable prior to operation of the band saw.

Reason For The Violation:

B&W NOG's internal investigation team reviewed the NCS release document for SER 03-087, and found the former NCS engineer's verification of the requirement to disable the built-in coolant reservoir to be inadequately completed. The former NCS engineer's verification was to ensure the saw was connected to a new coolant system. When contacted by telephone, the former NCS engineer did not provide any more useful information in regards to the event or evaluation.

Upon examining the procedure utilized for NCS safety releases, the investigation team recognized a potential improvement in the language utilized for the verification. The procedure stated that a NCS engineer must verify equipment installation when required by the analysis. It did not address equipment modifications such as in the case for disabling the coolant reservoir.

Utilizing the *TWIN's Analysis (Task Demands, Work Environment, Individual Capabilities, and Natural Tendencies or Human Nature), the table below lists error precursors identified during the investigation for each causal factor analyzed in the four broad categories specified by the Institute of Nuclear Power Operations Human Performance Fundamentals Course Reference.

Error Precursors (TWIN's Analysis)		
Causal Factor – NCS Requirement not adequately verified		
Task Demands	**Definition**	**Application to Event**
Interpretation requirements	Situations requiring "in-field" diagnosis, potentially leading to misunderstanding or application of wrong rule or procedure	Interpretation of meeting the requirement was the new coolant system was installed.
Work Environment	**Definition**	**Application to Event**
Unexpected equipment conditions	System or equipment status not normally encountered creating an unfamiliar situation for the individual	Coolant leaking past the diverter tray into the sump was not expected or considered.
Natural Tendencies/Human Nature	**Definition**	**Application to Event**
Tunnel vision (lack of big picture)	Narrowness of viewpoint resulting in concentration on only one aspect of a subject or situation	Coolant system modification was made to increase safety margin. Mass was still considered the primary control.

*Human Performance Fundamentals Course Reference, December 2002, Institute of Nuclear Power Operations.

Corrective Actions:

1. Extent-of-condition walk-downs of the radiological areas where high-enriched uranium is processed were conducted to determine if similar conditions exist in equipment with geometry control. No other similar conditions were found to exist in the facility.

   Completion Date: 7/17/2009

2. NCS staff reviewed the past 10-years of NCS Safety Releases for Safety Evaluation Requests (SERs) related to facility modifications to determine effectiveness of the releases. This action resulted in a review of 770 releases with no significant issues being found.

   Completion Date: 11/5/2009

3. Safety release procedures were reviewed and revised as needed to include specific instructions for verification of requirements. The revisions provide better instructions for verification of requirements.

   Completion Date: 10/30/2009

4. The system for peer checking of safety releases was revised to include independent verification for changes to engineered and administrative Class A and Class B (both Items Relied On For Safety and non-IROFS) safety controls. The result was to provide another check for safety releases in order to ensure that requirements have been met.

   Completion Date: 10/30/2009

Date When Full Compliance Will Be Achieved:

Full compliance was achieved 11/5/2009.

Violation 70-27/2009-006-03 — the licensee failed to ensure that double contingency was established or maintained for the band saw cutting fluid reservoir. Specifically, the licensee failed to establish any controls on the band saw cutting fluid reservoir to prevent process changes which would make a criticality accident possible such as accumulation of cutting fluid or fissile material in the reservoir:

Safety Condition S-1 of Special Nuclear Material License 42 authorizes the use of nuclear material in accordance with chapters 1 through 11 of the license application submitted on October 24, 2006, and supplements thereto.

Section 5.1, "Nuclear Criticality Safety Specifications," of the license application states, in part, that NOG [Nuclear Operations Group] is committed to the following double contingency policy: "Process designs shall incorporate sufficient factors of safety to require at least two unlikely, independent, and concurrent changes in process conditions before a criticality accident is possible."

Contrary to the above, on and before July 15, 2009, the licensee failed to ensure that double contingency was established or maintained for the band saw cutting fluid reservoir. Specifically, the licensee failed to establish any controls on the band saw cutting fluid reservoir to prevent process changes which would make a criticality accident possible such as accumulation of cutting fluid or fissile material in the reservoir.

Admission of the Violation:

B&W NOG admits that it failed to establish any controls on the band saw cutting fluid reservoir to prevent process changes which would make a criticality accident possible such as accumulation of cutting fluid or fissile material in the reservoir.

Reason For The Violation:

The cause for this violation resulted from the causes for violations 70-27/2009-006-02 and 70-27/2009-006-04. Refer to the **Reason For The Violation** for each of those violations for more details.

Corrective Actions:

The corrective actions for violations 70-27/2009-006-02 and 70-27/2009-006-04 are also applicable to this violation. Refer to the **Corrective Actions** for each of those violations for more details.

Violation 70-27/2009-006-04 — the licensee failed to limit the risk of a nuclear criticality accident in the sectioning band saw. Specifically, the licensee failed to evaluate an accident scenario or establish appropriate controls preventing the accumulation of high enriched uranium and moderator in the band saw cutting fluid reservoir, an unfavorable geometry vessel:

10 CFR 70.61(a) states, in part, that each licensee shall evaluate in the integrated safety analysis performed in accordance with 10 CFR 70.62 its compliance with the performance requirements in paragraphs (b), (c), and (d) of this section.

10 CFR 70.61(d) states, in part, that the risk of nuclear criticality accidents must be limited by assuring that under normal and credible abnormal conditions, all nuclear processes are subcritical, including use of an approved margin of subcriticality for safety.

Contrary to the above, on and before July 15, 2009, the licensee failed to limit the risk of a nuclear criticality accident in the sectioning band saw. Specifically, the licensee failed to evaluate an accident scenario or establish appropriate controls preventing the accumulation of high enriched uranium and moderator in the band saw cutting fluid reservoir, an unfavorable geometry vessel.

Admission of the Violation:

B&W NOG admits that it failed to evaluate an accident scenario or establish appropriate controls preventing the accumulation of high enriched uranium and moderator in the band saw cutting fluid reservoir.

Reason For The Violation:

B&W NOG's internal investigation team discovered that although the tooling request for the diverter tray was submitted to meet NCS requirements for SER 03-087, the design of this tray was not evaluated by the NCS engineer. Until recently, tooling requests were not required to be reviewed under the change management program. A recent corrective action unrelated to the saw event revised the tooling control procedure requiring a change request for all changes to tooling that comes in contact with, or is associated with, the processing of uranium bearing material or components. The investigation team felt that this action adequately addressed the "management of change" deficiency for this event.

The "who" and "why" for the lack of a design review was unknown, therefore a Human Performance evaluation was not possible. Corrective actions however were determined from evaluation of the deficiencies using the TapRoot® cause analysis technique as shown in the table below:

TapRoot® Cause Tree (potential root causes)		
Causal Factor – Diverter Tray Design Not Evaluated		
Equipment Difficulty	**Deficiency**	**Application to Event**
Design Specs/Problem Not Anticipated	Equipment environment not considered	The design of the tray not being reviewed as part of the SER precluded possible scenarios of coolant bypassing the tray from being considered.
Design Review / Independent Review needs improvement	Management of change needs improvement	Tooling requests of this nature were not required to go through the formal change management system.

Corrective Actions:

1. Develop and implement modifications to the saw under the present change management system to ensure compliance with the safety controls as documented in the Integrated Safety Analysis.

   Scheduled Completion Date: 6/1/2010

2. An integrated safety review of the Sectioning Facility as a whole was conducted which included review of all equipment, conditions, and requirements. This review resulted in three recommendations: 1) add one new scenario to address failure in the geometry control for the modified reservoir, 2) revise the other scenarios to distinguish between the modified saw reservoir and the favorable geometry columns, and 3) designate a different location for normal staging of a 55-gallon drum in the Sectioning Facility.

   Completion Date: 12/22/2009

3. The failure mode of the favorable geometry coolant system was analyzed. This analysis resulted in the discovery of the path by which coolant was able to by-pass the diverter tray and enter the unfavorable geometry reservoir.

   Completion Date: 11/3/2009

Date When Full Compliance Will Be Achieved:

Full compliance will be achieved 6/1/2010.

ENCLOSURE 2

Babcock & Wilcox Nuclear Operations Group, Inc

2016 Mt Athos Rd
Lynchburg, VA 24504

CODE	INVOICE NO	DATE	GROSS AMOUNT	DISCOUNT AMOUNT	NET AMOUNT
	EA-09-263	01/28/2010	35,000.00	0.00	35,000.00

Description: DOCKET#70-27/LICENSE#SNM-43-CIVIL PENALTY

BANK: 041203824
ACCOUNT NO: 9600065662
CHECK NO: 3280011387
CHECK DATE: 01/28/2010
VENDOR: 10003142
DOCUMENT: 2000044606

	TOTAL	35,000.00

REMOVE DOCUMENT ALONG THIS PERFORATION

Wells Fargo Bank, N.A.
115 Hospital Drive
Van Wert, OH 45891
9600065662

Babcock & Wilcox Nuclear Operations Group, Inc

56-382/412

2016 Mt Athos Rd
Lynchburg, VA 24504

Check No 3280011387
Check Date 01/28/2010

CHECK AMOUNT
$********35,000.00

PAY *** *THIRTY-FIVE THOUSAND DOLLARS*

TO THE ORDER OF
US NUCLEAR REGULATORY COMMISSION
ACCOUNTS RECEIVABLE TEAM
PO Box 979051
ST LOUIS MO 63197-9000

Authorized Signature

⑈3280011387⑈ ⑆041203824⑆ 9600065662⑈

ENCLOSURE 3

Emergency Preparedness Manual	B&W NOG-L	EMERGENCY TERMINATION	EPR-04-01-01 Rev.01 Page 1 of 1 Effective Date: 8/29/08

Date of Incident 7/15/09 Start Time 19:45

Classification: ☐ Unclassified ☒ Alert ☐ Site Area

Description: Do All Saw Sechrary Facility Coolant UCS Concern

Has applicable notifications been made or considered by applicable disciplines?
(i.e. 91-01, 70.50, etc.) ☒ Yes ☐ No

EOC Recommendations to Terminate EOC Activities:

W.L. Moore
Plant Operations Director

Robert J. Jones
Human Resources Director

Safety & Safeguards Director

Industrial Engineering Coordinator

D Ward for Mike Edstrom
(OK from On-Scene Director)

Environmental Protection Coordinator

David E. McKee
Public Information Coordinator

Security Coordinator

Terry W. Hall
NMC Coordinator

Reg. Communication Coordinator

NCS Coordinator

NA DWard
Industrial Safety Coordinator

Rad. Protection Coordinator

PIRT established ✓ (check)

EPC Chairman notified within 24 hours?
☒ YES ☐ NO

Is restart authorization required from the Emergency Preparedness Committee?
☒ YES ☐ NO

EOC TERMINATION: Date 7/16/09 Time: 00:35

Approved By: Ron P Cochran
VRM Emergency Director

Emergency Preparedness Manual	BWX Technologies	PRELIMINARY INCIDENT REVIEW	EP-05-01-01 Rev.00 Page 1 of 1 Effective Date: 3/1/06

Date 7/15/09 Time Incident Terminated 19 :45

Incident Description:
Do All Saw Sectioning Facility Coolant NCS Concern

PIRT Required? ☒ Yes ☐ No David C Ward 7/16/09 00 :14
Signature Date Time

10 day NRC Report Required ☒ Yes ☐ No David C Ward 7/16/09
Signature Date

Emergency Director RMM Roger P Cochrane 7/16/09
JKM Signature Date

PIRT Leader Assigned

Kevin Butt — Name
Manager S6HX/Tooling — Title

PIRT Members

NAME	TITLE
Brian Kidd	HPT Coordinator
James Calvert	Manager IH&S
Cheryl Goff	Licensing Engineer
Gary Baker	IE Maintenance Supervisor
JEFF JAMERSON	UPRR Maintenance Supervisor

PIRT Report Number Assigned _____

Critique

not all
phones not working behind window

need headset for phone - staying on line.

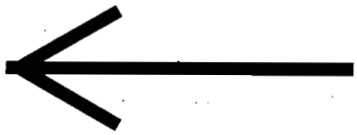
pager issues - some didn't receive, some scrambled

internet not working in EOC

fax machine not working - due to phone lines down

Need to think about timing / reportability

focus on reporting initially



Concern w/ flow chart -

IROFS Lost / Crit Chart discrepancies

Imminent - yes → Straight to site area

the other doesn't ask if imminent

Could have done a better job giving scribe

notes

Camera for security to maintain so we don't

have to hunt one.

Shoe covers in EOC