February 7, 2014

EN 49259

Mr. B. Joel Burch, General Manager
Babcock and Wilcox
Nuclear Operations Group, Inc.
P.O. Box 785
Lynchburg, VA 24505-0785

SUBJECT: BABCOCK AND WILCOX NUCLEAR OPERATIONS GROUP, INC. – U.S. NUCLEAR REGULATORY COMMISSION INSPECTION REPORT NUMBER 70-027/2014-201

Dear Mr. Burch:

The U.S. Nuclear Regulatory Commission (NRC) conducted a routine, announced nuclear criticality safety (NCS) inspection at your facility in Lynchburg, Virginia, from January 7-10, 2014. The purpose of the inspection was to determine whether activities involving special nuclear material were conducted safely and in accordance with your license and regulatory requirements. Throughout the inspection, observations were discussed with your staff. An exit meeting was held on January 10, 2014, during which inspection observations and findings were discussed with your management and staff.

The inspection, which is described in the enclosure, focused on the most hazardous activities and plant conditions, the most important controls relied on for safety and their analytical basis, and the principal management measures for ensuring controls are available and reliable to perform their functions relied on for safety. The inspection consisted of analytical basis review, selective review of related procedures and records, examinations of relevant NCS-related equipment, interviews with NCS engineers and plant personnel, a review of the new criticality accident alarm system, and facility walkdowns to observe plant conditions and activities related to safety basis assumptions and related NCS controls. Based on the inspection, your activities involving nuclear criticality hazards were found to be conducted safely and in accordance with regulatory requirements.

In accordance with Title 10 of the *Code of Federal Regulations* 2.390 of NRC's "Rules of Practice," a copy of this letter and the enclosure will be made publicly available in the public electronic reading room of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html.

If you have any questions concerning this report, please contact Jeremy Munson of my staff at 301-287-9148, or via email to Jeremy.Munson@nrc.gov.

Sincerely,

/RA/

Michael X. Franovich, Chief
Programmatic Oversight and
Regional Support Branch
Division of Fuel Cycle Safety
and Safeguards
Office of Nuclear Material Safety
and Safeguards

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

Enclosure:
Inspection Report 70-027/2014-201

cc w/encl:
C. A. England, Manager
Licensing and Safety Analysis
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Lynchburg, VA 24505-0785

Steve Harrison, Director
Division of Radiological Health
Department of Health
109 Governor Street, Room 730
Richmond, VA 23219

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Enclosure:
NRC Inspection Report 70-027/2014-201
w/Attachment: Supplementary Information

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NAME	JMunson	PGlenn	CTripp	Program Assistant	MFranovich
DATE	1/6/2014	2/6/2014	1/28/2014	1/30/2014	2/7/2014

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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.:	70-027/2014-201
Licensee:	Babcock and Wilcox Nuclear Operations Group, Inc.
Location:	Lynchburg, VA
Inspection Dates:	January 7-10, 2014
Inspectors:	Jeremy Munson, Criticality Safety Inspector (Trainee) Christopher Tripp, Criticality Safety Inspector Patricia Glenn, Fuel Facility Inspector
Approved by:	Michael X. Franovich, Chief Programmatic Oversight and Regional Support Branch Division of Fuel Cycle Safety and Safeguards Office of Nuclear Material Safety and Safeguards

Enclosure

EXECUTIVE SUMMARY

Babcock and Wilcox Nuclear Operations Group, Inc.
NRC Inspection Report 70-027/2014-201

Introduction

Staff of the U.S. Nuclear Regulatory Commission (NRC) performed a routine, announced nuclear criticality safety (NCS) inspection of the Babcock and Wilcox (B&W) Nuclear Operations Group (NOG), Inc., facility in Lynchburg, Virginia from January 7-10, 2014. The inspection included an onsite review of the licensee's NCS program, NCS training, NCS evaluations, NCS audits, internal NCS event review and follow-up, the newly installed criticality accident alarm system (CAAS), plant operations, and open item review. The inspection focused on risk-significant fissile material processing activities and areas including fuel fabrication and machining, the Uranium recovery area, the Research Test Reactor and Target area, the Specialty Fuels Facility, and the Lynchburg Technology Center (LTC).

Results

- No safety concerns were identified regarding the licensee's NCS program.
- No safety concerns were identified during review of the NCS event review and follow-up.
- No safety concerns were identified regarding NCS training
- No safety concerns were identified regarding NCS audits.
- No safety concerns were identified during a review of the licensee's newly installed CAAS.
- No safety concerns were identified during walkdowns of plant operations.
- Unresolved Item (URI) 70-27/2013-202-01 was closed to a minor violation regarding conformance with the requirement in Title 10 of the *Code of Federal Regulations* (10 CFR) 70.72(f) that the licensee document a written evaluation providing the basis for the determination that facility changes do not require prior NRC approval.

REPORT DETAILS

1.0 Summary of Plant Status

B&W NOG manufactures high-enriched Uranium fuel, reactor core components, and reactor cores at its facility near Lynchburg, VA. During the inspection, the licensee conducted routine fuel manufacturing operations and maintenance activities in the fuel fabrication and uranium recovery areas.

2.0 Nuclear Criticality Safety Program (IP 88015 & 88016)

a. Inspection Scope

The inspectors reviewed the licensee's NCS program and analyses to ensure the safety of fissile material operations. The inspectors reviewed selected nuclear criticality safety evaluations (NCSEs) to determine if criticality safety of risk-significant operations was assured through engineered and administrative controls with adequate safety margin as well as prepared and reviewed by qualified staff. The inspectors interviewed licensee managers and engineers in the safety and production departments and selected operators. The inspectors accompanied NCS and other technical staff on walkdowns of NCS controls in selected plant areas. The inspectors reviewed selected portions of the documents listed in Section 2.2 of the Attachment.

b. Observations and Findings

The inspectors observed that the licensee had an NCS program which was independent from production and was implemented through written procedures. The inspectors also observed that the licensee's NCS program reviewed process changes affecting criticality safety. The inspectors reviewed selected NCSEs and supporting calculations for new, changed, and other selected operations. For the analyses reviewed, the inspectors determined that the analyses were performed by qualified NCS engineers and that the analyses provided for subcriticality of the systems and operations through appropriate limits on controlled parameters. NCS analyses and supporting calculations demonstrated adequate identification and control of NCS hazards to assure operations within subcritical limits.

c. Conclusions

No safety concerns were identified regarding development, review, or approval of NCS analysis or calculations or resulting NCS controls.

3.0 Nuclear Criticality Safety Inspections, Audits, and Investigations (IP 88015)

a. Inspection Scope

The inspectors reviewed the results of the most recent NCS quarterly audit to ensure that appropriate issues were identified and resolved. The inspectors accompanied a

licensee NCS engineer on a routine internal audit of the LTC. The inspectors reviewed selected portions of the documents listed in Section 2.3 of the Attachment.

b. Observations and Findings

The inspectors observed that the licensee's NCS audit of the LTC was conducted in accordance with written procedures and that non-compliances identified during audits were appropriately captured in the licensee's corrective action program along with any recommendations from the auditor. The inspectors verified that audit findings and recommendations were reviewed and acknowledged by plant management for use as potential improvements in operations. Additionally, the inspectors verified that audits were performed on a periodic basis in accordance with procedures.

c. Conclusions

No safety concerns were identified regarding NCS audits.

4.0 Nuclear Criticality Safety Training and Qualification (IP 88015)

a. Inspection Scope

The inspectors reviewed the content of initial and annual fissile material handler training to determine if the training met specified qualification requirements. Additionally, the inspectors reviewed qualification records of selected NCS engineers to determine whether the specified qualification requirements were met in accordance with procedures. The inspectors evaluated the effectiveness of the licensee NCS training through interviews of NCS staff and operators. The inspectors reviewed selected portions of the documents listed in Section 2.4 of the Attachment.

b. Observations and Findings

NCS engineers, NCS auditors, and senior NCS engineers were observed to have a series of requirements and tasks that must be completed prior to being considered qualified, and all qualified licensee staff that was selected for review was determined to meet these requirements. The inspectors determined that the licensee NCS training program adequately addressed NCS aspects of facility hazards affecting fissile material operations. The inspectors also determined that only qualified NCS staff performs safety functions for the establishment of new safety analyses and reviews of new operating procedures. Documents prepared by unqualified staff were observed to have sufficient oversight and verification from qualified NCS staff.

The inspectors discussed NCS controls with operations personnel to assess their understanding of controls for NCS. The inspectors reviewed the training records and content of training for general workers and fissile material handlers. Each operator receives general training as well as task-specific training for familiarization with the NCS hazards related to their specific task. The inspectors observed that operators complete a general NCS training course with an annual refresher. Only operators that have completed their training requirements handle fissile material or perform safety significant activities.

c. Conclusions

No safety concerns were identified regarding the licensee's NCS training and qualification program.

5.0 Nuclear Criticality Safety Event Review and Follow-up (IP 88015 & 88016)

a. Inspection Scope

The inspectors reviewed the licensee's response to a selection of recent internally-reported events as well as the recent NCS-related event that the licensee reported to the NRC. The inspectors reviewed the progress of investigations and interviewed licensee staff regarding immediate and long-term corrective actions. The inspectors reviewed selected portions of the documents listed in Section 2.5 of the Attachment.

b. Observations and Findings

The inspectors evaluated the recent event reported to the NRC and selected licensee internally reported events that occurred since the last NCS inspection. The inspectors determined that the licensee adequately evaluated whether or not these events were reportable to the NRC. The inspectors observed that internal events were investigated in accordance with written procedures and appropriate corrective actions were assigned and tracked.

Event Report 49259

This event involves an unanalyzed condition of various fissile material storage racks. On August 9, 2013, the licensee notified the NRC of an unanalyzed condition involving poisoned 2.5-liter storage racks fitted with a horizontal poison plate. The original analysis for the storage racks was based on an evaluation of a similar poisoned transport cart; however, this analysis was not properly applied to the storage racks. Analysis revealed that the upper safety limit of 0.95 as per NRC License SNM-42 would be exceeded under the condition of optimal moderation. The licensee submitted a 24-hour report in accordance with 10 CFR 70, Appendix A, (b)(1) to the NRC.

The licensee determined that there was no immediate risk of a criticality or threat to the safety of workers or the public as a result of this event. As found, the storage racks were not in an upset condition. Immediate corrective actions involved removing the top row of the storage racks from service. An investigation was launched to determine the root cause of this event and if other storage racks within the facility were affected.

The inspectors reviewed the event notice, EN 49259, to determine whether appropriate immediate corrective measures were taken. An analysis of the affected storage racks was later reviewed to ensure that the corrective action of removing the top row from service would be adequate to ensure that the upper safety limit of 0.95 was not exceeded under optimal moderation conditions. Additionally, the inspectors field-verified that each affected storage rack was modified to discourage use of the top row. The inspectors reviewed the root cause investigation and corrective actions associated with the event. The inspectors determined that the licensee staff correctly determined the

root cause of the event and took adequate corrective actions to prevent reoccurrence of the event. This item is **closed**.

c. Conclusions

No safety concerns were identified during a review of recent licensee investigation of internal and NRC reported events. Corrective actions were adequately tracked by the licensee.

6.0 Criticality Alarm Systems (IP 88017)

a. Inspection Scope

The inspectors reviewed documentation of the newly installed CAAS. The inspectors reviewed documentation of criticality accident alarm detector coverage and audibility tests and performed facility walkdowns to determine the adequacy of the licensee criticality alarm system. The inspectors reviewed selected portions of the documents listed in Section 2.6 of the Attachment.

Observations and Findings

The licensee recently completed installation of a new CAAS. This new criticality incident detection and alarm system (CIDAS) operates with detectors connected in three separate circuits configured such that two detector trips on any two separate circuits are required to initiate an alarm, providing more reliable detection with a low spurious alarm probability. The CIDAS is designed so that no single equipment failure will result in a lapse in CAAS coverage. The system uses a gamma check source to ensure that each detector is functioning properly; if a detector no longer senses the presence of the gamma source, then a signal notifies personnel of a fault.

The inspectors reviewed documentation describing the methodology for determining detector placement to ensure adequate coverage of fissile material handling areas. The licensee utilized the MAVRIC (Monaco with automated variance reduction using importance calculations) sequence to determine proper detector locations to ensure detection of a criticality event. The inspectors reviewed detailed models and output data from the MAVRIC sequence and verified that the detector placement covered all applicable areas of the facility. Additionally, the inspectors verified detector placement during walkdowns of the facility.

The licensee evaluated detector coverage with the MAVRIC sequence by ensuring that a defined minimum dose was detected for numerous source term placements and Hydrogen-to-fissile material (H/X) ratios. The defined minimum dose used for the evaluations was significantly higher than the trip threshold of the detectors, providing additional safety margin to account for analytical uncertainties. Different H/X ratios were used for each area of the facility based on the most conservative credible amount of water that could be present. Areas in which dry operations are performed were assigned low H/X ratios; areas in which wet operations are performed were assigned high H/X ratios. Furthermore, most areas of the facility were evaluated with both a high and a low H/X ratio for conservatism.

Subsequent fissions in surrounding material were not allowed in the analysis, which is conservative in that subsequent fissions did not contribute to the defined minimum dose; however, secondary gammas produced from surrounding materials were allowed. Due to the complexity of each model used in the analysis and the fact that the defined minimum dose is somewhat dependent on the secondary gammas produced from surrounding materials, there is a possibility that each model will require a reevaluation for future changes that may affect or alter area shielding. The analysis was performed such that sensitivity to any actual transient shielding is minimized, but major facility changes could affect CAAS coverage. The inspectors observed that the licensee evaluates whether facility changes may affect CAAS coverage and that doing so is required by NCSE-02, "Nuclear Criticality Safety Analysis and Quality Assurance Review;" however, the licensee does not currently have specific criteria for determining if an evaluation is required or how it is to be performed. Additionally, several NCS staff members are being trained to use the MAVRIC sequence; however, there is currently only one NCS staff member that is trained.

The inspectors reviewed records of audibility tests to ensure that annunciators were capable of notifying personnel in the case of a criticality alarm. Sound levels above ambient were verified to be consistent with current industry standards.

The new CAAS is currently operating in parallel with the previous CAAS; a complete transition to the new CAAS has not yet been implemented. All areas of the facility under CAAS coverage have been upgraded to the new CIDAS with the exception of the LTC, which will maintain the previous CAAS.

No changes were observed for the site emergency plan.

b. Conclusions

No safety concerns were identified during a review of the licensee's newly installed CAAS.

7.0 Plant Activities (IP 88015, IP 88016)

a. Inspection Scope

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 interviewed Operations staff and NCS engineers during walkdowns.

b. Observations and Findings

The inspectors verified that controls identified in NCS analyses were installed or implemented and were adequate to ensure safety. The inspectors also verified that safety was maintained for observed facility operations. The cognizant NCS engineers were knowledgeable and interacted regularly with operators on the process floors. 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.

c. Conclusions

No safety concerns were identified during a review of the licensee's plant activities.

8.0 Open Item Review

URI 70-27/2013-204-01

This item tracks an unanalyzed upset condition of "stacking" and potentially inadequate controls to prevent criticality in the Target Storage Cabinets. During a previous inspection, the inspectors observed that analysis of the Target Storage Cabinets did not evaluate the possible "stacking" of targets. The analysis evaluated other spacing upsets, but it did not address stacking targets within a drawer or impose any controls to prevent stacking specifically. Based on the results of the other spacing upset analyses and knowledge of neutron physics, the inspector concluded that this upset would increase reactivity and should be analyzed; however, it is difficult to determine the magnitude of the effect on the system's ability to sustain a neutron chain reaction or the adequacy of the existing controls without an actual analysis. The existing controls require that the targets be placed in a specific configuration, discouraging the upset of stacking. The licensee's immediate corrective action was to verify that the cabinets were not in an unsafe configuration. Additionally, the licensee confirmed that no stacking events had previously occurred. The licensee is currently performing analysis for this condition, but has not yet completed all necessary steps. Therefore, this item remains **open** pending the review of a finalized analysis.

URI 70-27/2013-202-01

This item involves the licensee's lack of a detailed written justification for why facility changes do not require a license amendment. Paragraph 70.72(f) of 10 CFR requires "a written evaluation that provides the bases for the determination that the changes do not require prior Commission approval," and that this evaluation be maintained until termination of the license. During a previous inspection, the inspectors identified that the licensee's change package contained a checklist requiring a "yes" or "no" answer to each of the 10 CFR 70.72(c) criteria, as Section 1 of Form N-517. Inspectors' concerns about the basis for deciding when a change warrants a full Safety Evaluation Request (SER) had been previously resolved.

In the current inspection, the inspectors confirmed that documentation of whether prior NRC approval is needed still consists of the checklist on Form N-517, without additional explanation. The inspectors reviewed several additional facility changes since the previous NCS inspection and determined that none of the changes required prior NRC approval in accordance with the 10 CFR 70.72(c) criteria. For each such change, the inspectors were able to construct a basis for why the change did not need prior approval, but there was no way to be assured that the basis was the same as the initial reviewer's basis. The licensee stated that it considers the entire change package the justification for the change, but the inspectors determined that only Form N-517 addresses the need for prior approval. As stated above, Section 1 of Form N-517 contains the checklist of

the 10 CFR 70.72(c) criteria, as well as the determination of whether an SER is required. Section 2 of Form N-517 is required to be completed if items relied on for safety (IROFS) are removed or replaced, and has several additional possible justifications that can be selected. For example, the reviewer can check that the accident sequence no longer exists due to the removal of a process, or that the performance requirements can be met without crediting the removed IROFS. The inspectors determined that Section 2 of the form provides some additional detail concerning some of the 10 CFR 70.72(c) criteria, specifically those involving the removal of an IROFS without an equivalent replacement, but not for other criteria such as creation of a new type of accident sequence. The licensee pointed out that Section 11.1.3.1 of the License Application contains more detailed guidance on the criteria, but there is no documentation of how this is applied other than the contents of Form N-517 as described above. The inspectors determined that the licensee's documentation does not constitute "a written evaluation that provides the bases for the determination that the changes do not require prior Commission approval," as required by 10 CFR 70.72(f). This failure is a minor violation because the NRC has thus far not found any examples of this failure contributing to an incorrect determination of whether a change needs prior approval. Although this issue should be corrected, it constitutes a violation of minor significance that is not subject to enforcement action in accordance with Section IV of the NRC Enforcement Policy. This item is **closed**.

In the course of reviewing this open item, the inspectors noted that one of the criteria in the checklist in Section 1 of Form N-517 is stated thus: "Does the proposed change remove, without at least an equivalent replacement of the safety function, an item relied on for safety (IROFS) that is listed in the ISA Summary?" This language has not been updated to reflect the current rule language, which adds the words "and is necessary for compliance with the performance requirements of § 70.61" (as amended September 27, 2006 in 71 FR 56344). While the checklist is not consistent with the current rule, this is conservative in that it is more restrictive than the current rule language. The inspectors also noted that administrative procedure NCSE-02, "Nuclear Criticality Safety Analysis & Quality Assurance Reviews," contains outdated language regarding definitions of safety limits and limiting conditions for operations in Section 5.2.3 of the License Application. Specifically, the procedure has not been updated to include the higher limits associated with fuel designs approved in license amendment 10, dated March 16, 2011, and license amendment 19, dated November 19, 2013. As with the wording of Form N-517, the inconsistency is conservative in that it is more restrictive than the current rule. In response the licensee issued COM-46274, dated January 10, 2013, to track alignment of its internal procedures with current regulatory requirements.

9.0 Exit Meeting

The inspectors presented the inspection scope and results to members of the licensee's management and staff, including Joel Burch, during an exit meeting on January 10, 2014. The licensee stated that it understood the findings as presented.

SUPPLEMENTARY INFORMATION

1.0 List of Items Opened, Closed, and Discussed

Item Number	Status	Description
URI 70-27/2013-204-01	Discussed	Unanalyzed upset condition of "stacking" and potentially inadequate controls to prevent criticality in the Target Storage Cabinets.
URI 70-27/2013-202-01	Closed	Lack of a detailed justification for why changes do not require a safety evaluation or a license amendment.
LER 70-27/2013-004-0	Closed	Event Notification 49259 – Storage racks determined to be in an unanalyzed condition.

2.0 Key Documents Reviewed:

Inspectors reviewed selected aspects of the following documents. Documents that apply to multiple sections are listed in the section that is most applicable.

2.1 Plant Status

Not Applicable

2.2 Nuclear Criticality Safety Program (IP 88015 & 88016)

- NCS-2008-030, "NCS Analysis for the Removal of Station 15 per SER-08-010 Phase 1 (U)," March 25, 2008.
- NCS-2013-091, NCS Safety Analysis, October 7, 2013.
- NCS-2013-094, NCS Safety Analysis, November 15, 2013.
- NCS-2013-101, NCS Safety Analysis, September 26, 2013.
- NCS-2013-106, "NCS Safety Analysis Supporting SER 11-025 Phase 01 Higher Tier Fixtures (VFF Cluster Production) (Revised Requirement) (U)," September 19, 2013.
- NCS-2013-121, NCS Justification Analysis, August 9, 2013.
- NCS-2013-122, NCS Safety Release, September 4, 2013.
- NCS-2013-126, "NCS Analysis of the Increased Storage Limit in Vault 7: SER 13-031 Phase 1 (U)," November 6, 2013.
- NCS-2013-130, "NCS Safety Analysis to Revise SAR 15.12 and Appendix to Address COM-39901 per CR-1041281 (U)," October 9, 2013.
- NCS-2013-131, "NCS Safety Evaluation Revising Appendix to SAR 15.37 per CR-1041287 in Response to CA-201203050 (U)," September 25, 2013.
- NCS-2013-132, Safety Concern Analysis (CA-201301799), September 11, 2013.
- NCS-2013-134, Nuclear Safety Release (CR-1041113), September 20, 2013.
- NCS-2013-136, NCS Safety Release, September 23, 2013.

- NCS-2013-140, Safety Concern Analysis (CA-201301916 & CA-201301923), September 26, 2013.
- NCS-2013-154, NCS Safety Analysis, November 25, 2013.
- NCS-2013-156, NCS Safety Release, December 23, 2013.
- NCS-2013-159, "NCS Safety Analysis Revising Safety Basis for 11-Liter Bottle Cart in Response to CA-200902252 per CR-1041562 (U)," November 7, 2013.
- NCS-2013-165, NCS Justification Analysis, November 20, 2013.
- NCS-2013-168, NCS Justification Analysis, November 25, 2013.
- NCS-2013-169, NCS Safety Release, December 3, 2013.
- NCS-2013-170, NCS Safety Analysis, November 26, 2013.
- NCS-2013-177, NCS Justification Analysis, December 4, 2013.
- NCSE-02, "Nuclear Criticality Safety Analysis & Quality Assurance Reviews," Rev. 41, January 23, 2013.
- COM-47274, January 10, 2014.

2.3 Nuclear Criticality Safety Inspections, Audits, and Investigations (IP 88015)

- NCS-2013-148, "NCS Violation and Observation Summary – 3rd Quarter 2013," October 17, 2013.

2.4 Nuclear Criticality Safety Training and Qualification (IP 88015)

- NCS Training, 6/22/2011.
- NCS Training Annual Refresher, July 18, 2013.
- NCSE-07 Rev. 4, "Qualification and Training Requirements for a NCS Engineer," January 23, 2013.
- NCS-2013-013, "NCS Qualification," January 23, 2013.
- NCS-2013-028, "NCS Qualification," February 25, 2013.
- NCS-2013-141, "NCS Qualification," September 26, 2013.

2.5 Nuclear Critically Safety Event Review and Follow-up (IP 88015 & 88016)

- A62-16-01 Rev. 1, "Licensing Correspondence Review and Approval," September 4, 2013.
- CA-201301456, July 17, 2013.
- CA-201301568, August 1, 2013.
- CA 201301622, January 7, 2014.
- CA-201302030, September 1, 2013.
- CA-201302070, October 7, 2013.
- CA-201302387, November 15, 2013.
- Evaluation of Unusual Event for CA-201301568, August 1, 2013.
- Evaluation of Unusual Event for CA-201301456, July 17, 2013.
- CR-1033472 N-530 Rev. 2, "Investigative Report," August 9, 2013.

- CR-1037143 N-554 Rev. 3, “Critique Meeting Minutes,” August 12, 2013.
- N-79 Rev. 10, “Evaluation of Unusual Incidents,” August 21, 2013.
- NCS-2013-112, NCS Safety Concern Analysis, July 23, 2013.
- NCS-2013-120, NCS Safety Concern Analysis, August 7, 2013.
- NCS-2013-123, NCS Safety Concern, August 15, 2013.
- NCS-2013-151, NCS Safety Concern Analysis, October 18, 2013.
- NCS-2013-161, NCS Miscellaneous Memo, December 13, 2013.
- NCS-2013-180, NCS Safety Concern, December 13, 2013.

2.6 Criticality Alarm Systems (IP 88017)

- RP-07-103, “Functionality Test of Speakers and NAWLS,” December 16, 2013.
- NCS-TR-00004 Rev. 2, “Placement of Detectors for the CIDAS System,” December 19, 2013.

2.7 Open Items

- NCS-2013-166, NCS Safety Analysis, December 12, 2013.
- NCS-2013-173, NCS Safety Concern, December 19, 2013.
- NCS-2013-178, NCS Safety Concern, January 6, 2014.
- NCS-2013-188, NCS Safety Analysis, December 19, 2013.
- NCS-2013-189, NCS Safety Release, December 19, 2013.
- NCS-2013-190, NCS Safety Concern, December 19, 2013.

2.8 Plant Activities

Documents listed in other sections were reviewed related to facility walkdowns.

2.9 Exit Meeting

Not Applicable

3.0 Inspection Procedures Used

IP 88015	Nuclear Criticality Safety Program
IP 88016	Nuclear Criticality Safety Evaluations and Analyses
IP 88017	Criticality Alarm Systems

4.0 Key Points of Contact

B&W NOG

J. Burch	Vice President and General Manager
D. Faidley	Manager, Nuclear Criticality Safety

K. Kirby	Engineer, Licensing and Safety Analysis
S. Nagley	Manager, Uranium Processing and Research Reactors
D. Spangler	Manager, Nuclear Safety & Licensing
D. Ward	Manager, Environmental, Safety, Health and Safeguards

NRC

P. Glenn	Fuel Facility Inspector, NRC RII
J. Munson	Criticality Safety Inspector, NRC HQ
S. Subosits	Senior Resident Inspector, NRC RII
C. Tripp	Criticality Safety Inspector, NRC HQ

5.0 List of Acronyms and Abbreviations

ADAMS	Agencywide Documents Access and Management System
B&W NOG	Babcock and Wilcox Nuclear Operations Group, Inc. (Licensee)
CAAS	criticality accident alarm system
CFR	*Code of Federal Regulations*
CIDAS	criticality incident detection and alarm system
EN	event notice
H/X	Hydrogen-to-fissile material ratio
IP	inspection procedure
IROFS	item relied on for safety
ISA	integrated safety analysis
LER	licensee event report
LTC	Lynchburg Technology Center
MAVRIC	Monaco with automated variance reduction using importance calculations
NCS	nuclear criticality safety
NCSE	nuclear criticality safety evaluation
NRC	Nuclear Regulatory Commission
SER	safety evaluation request
SNM	special nuclear material
URI	unresolved Item