UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
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February 10, 2012

Mr. Michael J. Pacilio
Senior Vice President, Exelon Generation Company, LLC
President and Chief Nuclear Officer (CNO), Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2, NUCLEAR REGULATORY COMMISSION INTEGRATED INSPECTION REPORT 05000456/2011005; 05000457/2011005

Dear Mr. Pacilio:

On December 31, 2011, the U. S. Nuclear Regulatory Commission (NRC) completed an inspection at your Braidwood Station, Units 1 and 2. The enclosed inspection report documents the results of this inspection, which were discussed on January 5, 2012, with Mr. M. Kanavos and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Eight NRC-identified Severity Level IV violations or findings of very low safety significance (Green) were identified during this inspection.

Three of the findings were determined to involve violations of NRC requirements. Further, two licensee-identified violations which were determined to be of very low safety significance are listed in this report. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission - Region III, 2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and to the Senior Resident Inspector Office at Braidwood Station.

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region III, and to the Senior Resident Inspector at Braidwood Station.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records System (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Website at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Eric R. Duncan, Chief
Branch 3
Division of Reactor Projects

Docket Nos. 50-456; 50-457
License Nos. NPF-72; NPF-77

Enclosure: Inspection Report 05000456/2011005; 05000457/2011005
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos:	50-456; 50-457
License Nos:	NPF-72; NPF-77
Report No:	05000456/2011005; 05000457/2011005
Licensee:	Exelon Generation Company, LLC
Facility:	Braidwood Station, Units 1 and 2
Location:	Braceville, IL
Dates:	October 1, 2011, through December 31, 2011
Inspectors:	J. Benjamin, Senior Resident Inspector A. Garmoe, Resident Inspector B. Bartlett, Senior Resident Inspector, Byron A. Dunlop, Senior Reactor Inspector T. Go, Health Physics Inspector R. Jickling, Senior Emergency Preparedness Inspector M. Learn, Reactor Engineer V. Meghani, Reactor Inspector J. Nance, Reactor Engineer G. O'Dwyer, Reactor Inspector B. Palagi, Senior Operations Engineer M. Perry, Resident Inspector Illinois Emergency Management Agency
Approved by:	E. Duncan, Chief Branch 3 Division of Reactor Projects

Enclosure

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SUMMARY OF FINDINGS

Inspection Report 05000456/2011005, 05000457/2011005; 10/01/2011 – 12/31/2011; Braidwood Station, Units 1 & 2; Equipment Alignment; Maintenance Effectiveness; Operability Determinations and Functional Assessments; Surveillance Testing; Other Activities

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. Five Green findings and three Severity Level IV violations were identified by the inspectors. Three of the findings were considered Non-Cited Violations (NCVs) of NRC regulations. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, “Significance Determination Process” (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC’s program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, “Reactor Oversight Process,” Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealed Findings

Cornerstone: Miscellaneous

Severity Level IV. The inspectors identified a Severity Level IV NCV of Title 10 of the Code of Federal Regulations (CFR) 72.146, “Design Control,” when licensee personnel failed to perform adequate evaluations of the Independent Spent Fuel Storage Installation (ISFSI) pad, ISFSI components, and the effects of ISFSI loading operations on the operating plant. Specifically, the inspectors identified three examples in which licensee personnel failed to perform adequate evaluations to ensure compliance with 10 CFR 72.212(b)(5)(ii); 10 CFR 72.212(b)(8); and the Safety Analysis Report (SAR) referenced in the Holtec Certificate of Compliance (CoC). The licensee entered these issues into their Corrective Action Program (CAP) as Issue Report (IR) 1280650, IR 1278520, and IR 1245756. Corrective actions included revisions to calculations.

Because this violation was related to an ISFSI license, it was dispositioned using the Traditional Enforcement (TE) process in accordance with Section 2.2 of the Enforcement Policy. The inspectors determined that the deficiency was of more than minor significance because the licensee’s evaluation did not assure structural integrity of the affected components under the design basis loads, and required extensive revisions to the calculations. The inspectors determined that the issue represented a Severity Level IV violation. Reactor Oversight Process (ROP) cross-cutting aspects do not apply to TE issues or licensee-identified ROP findings of very low safety significance, therefore, none was identified. (Section 4OA5.1)

Severity Level IV. The inspectors identified a Severity Level IV NCV of 10 CFR 72.150, "Instructions, Procedures, and Drawings," when licensee personnel failed to adhere to procedures to ensure that the design pressure limit for the multi-purpose canister (MPC) would not be exceeded during loading operations. The licensee entered this issue into their CAP as IR 01279837, IR 01286670, and IR 01285354. The licensee imposed an ISFSI stand-down to reinforce and correct procedure use and adherence as a corrective action to restore compliance.

The issue was determined to be of more than minor significance using IMC 0612, “Power Reactor Inspection Reports,” Appendix E, “Examples of Minor Issues,” Example 2h, in that multiple examples of a failure to follow procedures were identified. Although the violation contributed to the likelihood of the canister design pressure being exceeded, it was verified that the canister was within its design pressure. Therefore, the inspectors determined that the issue represented a Severity Level IV violation. Reactor Oversight Process cross-cutting aspects do not apply to TE issues or licensee-identified ROP findings of very low safety significance, therefore, none was identified. (Section 4OA5.2)

Severity Level IV. The inspectors identified a Severity Level IV NCV of 10 CFR 50.73(a)(2)(vii) when licensee personnel failed to report events where a single cause or condition could have caused two safety-related instrument channels to become inoperable in a single system designed to shutdown the reactor and maintain it in a safe shutdown condition. Specifically, on March 8, 2011, the licensee had identified errors in the station's High Energy Line Break (HELB) calculations of record. On March 14, 2011, the licensee completed an Operability Evaluation and concluded that the equipment rollup doors for the Division 11 and Division 21 Miscellaneous Electric Equipment Rooms (MEERs) could not be opened in Modes 1-4 without declaring the safety-related instrument inverters within the rooms inoperable. The licensee implemented administrative compensatory actions to prevent these doors from being opened in Modes 1-4. On April 7, 2011, the inspectors identified that the licensee did not have plans to review this issue for 10 CFR 50.73 reporting requirements. The inspectors notified the licensee that they were aware of previous instances when these doors had been opened in Modes 1-4. Following the inspectors' discussion with the licensee, the licensee initiated a CAP assignment to conduct a formal License Event Report (LER) review. The due date for this assignment was revised numerous times. The inspectors challenged the timeliness of this review based on the previous conclusions in the Operability Evaluation and the historic practice of not restricting access to these doors in any operational mode. On December 22, 2011, the licensee submitted an LER to report multiple historic events. The inspectors concluded that the licensee failed to submit the LER within 60 days of the discovery of the event on March 14, 2011, based upon a review of 10 CFR 50.73 and NUREG-1022, Revision 2. This issue was entered into the licensee's CAP as IR 1299906. Corrective actions included submitting an LER to the NRC on December 22, 2011.

The inspectors determined that the failure to submit an LER in accordance with NRC regulations was a performance deficiency. Since this issue impacted the regulatory process, it was dispositioned through the TE process. The inspectors determined that this issue was a Severity Level IV violation based on a similar example referenced in Supplement I, Example D.4 of the NRC Enforcement Policy. The inspectors reviewed the technical issue related to the HELB calculation errors using the Reactor Oversight Process and documented a licensee-identified NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," which was of very low safety significance. Reactor Oversight Process cross-cutting aspects do not apply to traditional enforcement issues, or licensee-identified ROP findings of very low safety significance, therefore, none was identified. (Section 1R15.1)

Cornerstone: Mitigating Systems

Green. The inspectors identified a finding of very low safety significance when licensee personnel failed to adhere to Operability Determination Process standards after identifying a non-conservative assumption related to closure times for hazard barrier dampers separating the Turbine Building from various safety-related rooms within the Auxiliary Building. In particular, the issues raised by the inspectors during their review of Operability Evaluation 11-006, Revision 1, resulted in the station re-evaluating the non-conservative assumptions against aspects of the Current Licensing Basis (CLB) not previously considered, and substantially revising Operability Evaluation 11-006, Revision 1. The licensee entered these issues into their CAP as IR 1185016, IR 1199223, IR 1237395, IR 1237140, IR 1242942, IR 1246918, IR 1276888, IR 1277627, and IR 1279543. In addition to revising Operability Evaluation 2011-006, Revision 1, corrective actions included an assignment to reconstitute design basis calculation records and plans to re-design the hazard barrier dampers. This finding did not involve enforcement action because no regulatory requirement was violated.

The finding was determined to be more than minor because it was associated with the Design Control attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The inspectors determined that the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," Table 4a, for the Mitigating Systems Cornerstone. The inspectors answered "No" to all of the Mitigating Systems Cornerstone questions in Table 4a of IMC 0609.04, and, as a result, the finding screened as having very low safety significance (Green). This finding had a cross cutting aspect in the Corrective Action Program component of the Problem Identification and Resolution cross-cutting area [P.1(c)] because the licensee failed to thoroughly evaluate the impact on operability of a non-conforming condition associated with hazard barrier damper closure times. (Section 1R15.2)

Green. The inspectors identified a finding of very low safety significance (Green) and an associated NCV of 10 CFR 50.65(a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," when the licensee's process for the control of hazard barriers failed to manage the risk of temporarily impairing barriers under certain circumstances. Specifically, the licensee's Risk Management and Plant Barrier Impairment (PBI) Processes provided generic approval for the impairment of a hazard barrier door function to permit movement of heavy equipment through the door provided the duration was less than 30 minutes and the door was not blocked open. The inspector's were concerned that this would not restrict activities in which the equipment being moved would prevent the door from closing and providing its hazard barrier function during the 30 minute time frame. The licensee communicated to the inspector's that the 30 minutes had no regulatory basis, but was used, in part, because it was reasonable. In addition to this example, the inspectors identified two examples in which licensee personnel failed to adhere to the station's PBI Program, which adversely affected the station's ability to manage risk. The licensee entered this issue into their CAP as IR 1282782 and IR 1307401. As a result of the inspectors' observations, the licensee revised procedure BwAP 1110-03, "Plant Barrier Impairment Program," to include additional guidance on the control of hazard barriers. The licensee was also considering whether additional training of personnel on the control of hazard barriers was warranted.

The finding was determined to be more than minor because it was associated with the Design Control attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The inspectors determined that the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," Table 4a, for the Mitigating Systems Cornerstone. The inspectors answered 'No' to all of the Mitigating Systems Cornerstone questions in Table 4a and, as a result, the finding screened as having very low safety significance. This finding had a cross-cutting aspect in the Corrective Action Program component of the Problem Identification and Resolution cross-cutting area [P.2(b)] since licensee personnel failed to adequately utilize operating experience (i.e., Regulatory Information Summary 2001-009, "Control of Hazard Barriers") to ensure that station procedures provided adequate controls for effectively managing risk when hazard barrier doors could be impaired during activities to facilitate maintenance. (Section 1R15.3)

Green. The inspectors identified a finding of very low safety significance when licensee personnel failed to adhere to licensee procedure ER-AA-310, "Implementation of the Maintenance Rule." Specifically, procedural requirements for the use of operator restoration actions to credit availability of auxiliary feedwater, main steam dump valves, or emergency diesel generator ventilation during certain surveillances were not met. The licensee entered this issue into their CAP as IR 1249723, IR 1251652, IR 1291692, IR 1293440, and IR 1293998. Immediate corrective actions included a review of all risk management actions and implementation of new Operations Standing Order requirements to enhance discussions of risk management actions and to formally log dedicated operator assignments. The licensee was also improving the method of documenting and using restoration actions such that the actions would be more formally documented and referenced in controlled procedures. This finding did not involve enforcement action because no regulatory requirement was violated.

The finding was determined to be more than minor because it was associated with the Procedure Quality attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The inspectors determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Phase - 1 Initial Screening and Characterization of Findings," Table 4a, for the Mitigating Systems Cornerstone. The inspectors answered 'No' to all of the Mitigating Systems Cornerstone questions in Table 4a of IMC 0609.04 and, as a result, the finding screened as having very low safety significance. This finding had a cross-cutting aspect in the Resources component of the Human Performance cross-cutting area [H.2(c)] because the documented restoration actions for several surveillances were not in accordance with licensee procedures or industry generic guidance. (Section 1R22)

Cornerstone: Emergency Preparedness

Green. The inspectors identified a finding of very low safety significance and an associated NCV of 10 CFR 50.65(a)(1) when licensee personnel failed to adequately monitor the performance of nonsafety-related systems and components that exceeded performance criteria against pre-established goals. Specifically, inadequate tracking of failures in the Emergency Communication (CQ) system resulted in the failure to evaluate corrective actions by the Maintenance Rule Expert Panel when 10 CFR 50.65(a)(1) performance criteria were unknowingly exceeded. In addition, once the system was placed in an (a)(1) status for an unrelated reason, the Action Plan did not address all of the performance criteria that had been unknowingly exceeded. The licensee entered this issue into their CAP as IR 1251652. Immediate corrective actions included revising the (a)(1) Action Plan to address the additional failures and to determine why the previously unknown failures were not included in the maintenance rule database.

The finding was determined to be more than minor because it was associated with the Facilities and Equipment attribute of the Emergency Preparedness Cornerstone and adversely affected the cornerstone objective of ensuring that the licensee is capable of implementing adequate measures to protect the health and safety of the public in the event of a radiological emergency. The inspectors determined that the finding could be evaluated using the SDP in accordance with IMC 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings." Because this finding was associated with the Emergency Preparedness area, further evaluation was completed using IMC 0609, Appendix B, "Emergency Preparedness Significance Determination Process." Using the examples of findings associated with Planning Standard 10 CFR 50.47(b)(6) and Planning Standard 10 CFR 50.47(b)(8), the inspectors concluded that the finding was of very low safety significance. The inspectors determined that there was no cross-cutting aspect associated with this finding since none of the cross-cutting aspects in IMC 0310 were determined to be appropriate for this issue. (Section 1R12.1.b)

Cornerstone: Public Radiation Safety

- Green. The inspectors identified a finding of very low safety significance and an associated NCV of Technical Specification 5.4.1, "Procedures," when licensee personnel failed to adequately maintain procedure BwOP CW-12, "Circulating Water Blowdown System Fill, Startup, Operations, and Shutdown." The Circulating Water Blowdown system was used during certain liquid radiological releases. Specifically, the licensee's procedure did not provide sufficient guidance to prevent the system from being operated outside analyzed limits. The potential consequence of not operating this system within the design assumptions was an unplanned and unmonitored release of radioactive material to the environment. This issue was entered into the licensee's CAP as IR 1299273. Corrective actions included the implementation of an Operations Standing Order to prohibit the operation of the Circulating Water Blowdown lineup and an assignment to formally revise the procedure.

  The finding was determined to be more than minor because it was associated with the Programs and Processes attribute of the Public Radiation Safety cornerstone and adversely affected the cornerstone objective of ensuring the adequate protection of public health and safety from exposure of radioactive materials released into the public domain as a result of routine civilian nuclear reactor operations. The inspectors determined that the finding could be evaluated in accordance with IMC 0609, Appendix D, "Public Radiation Safety Significance Determination Process," since the finding was associated with the licensee's Radioactive Effluent Release program. This finding was determined to be of very low safety significance since it was not a failure to implement the effluent program and no unplanned or unmonitored release actually occurred. This finding had a cross-cutting aspect in the Decision Making component of the Human Performance cross-cutting area [H.1(a)] since licensee personnel failed to demonstrate that nuclear safety was an overriding priority. Specifically, licensee personnel failed to make risk-significant decisions when faced with uncertain or unexpected plant conditions to ensure safety was maintained. (Section 1R04.1)

B. Licensee-Identified Violations

Violations of very low safety significance that were identified by the licensee have been reviewed by the inspectors. Corrective actions planned or taken by the licensee have been entered into the licensee's CAP. These violations and corrective action tracking numbers are listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

Unit 1 operated at or near full power for the duration of the inspection period.

Unit 2 operated at or near full power for the duration of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

.1 Winter Seasonal Readiness Preparations

a. Inspection Scope

The inspectors conducted a review of the licensee's preparations for winter conditions to verify that the plant's design features and implementation of procedures were sufficient to protect mitigating systems from the effects of adverse weather. Documentation for selected risk-significant systems was reviewed to ensure that these systems would remain functional when challenged by inclement weather. During the inspection, the inspectors focused on plant specific design features and the licensee's procedures used to mitigate or respond to adverse weather conditions. Additionally, the inspectors reviewed the Updated Final Safety Analysis Report (UFSAR) and performance requirements for systems selected for inspection, and verified that operator actions were appropriate as specified by plant specific procedures. Cold weather protection, such as heat tracing and area heaters, was verified to be in operation where applicable. The inspectors also reviewed Corrective Action Program (CAP) items to verify that the licensee was identifying adverse weather issues at an appropriate threshold and entering them into their CAP in accordance with station corrective action procedures. Specific documents reviewed during this inspection are listed in the Attachment. The inspectors' reviews focused specifically on procedure revisions to address maintenance activity scheduling and performance during adverse weather condition. This inspection constituted one winter seasonal readiness preparations sample as defined in Inspection Procedure (IP) 71111.01-05.

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04)

.1 Quarterly Partial System Walkdowns

a. Inspection Scope

The inspectors performed partial system walkdowns of the following risk-significant systems:

- 2B Essential Service Water (SX) System when the 2A SX System was Out-of-Service (OOS) for Planned Maintenance;
- 2A SX System when the 2B SX System was OOS for Planned Maintenance;
- 2B Containment Spray (CS) System when the 2A CS System was OOS for Planned Maintenance; and
- Circulating Water Blowdown System.

The inspectors selected these systems based on their risk significance relative to the Reactor Safety at the time they were inspected. The inspectors attempted to identify any discrepancies that could impact the function of the system and, therefore, potentially increase risk. The inspectors reviewed applicable operating procedures, system diagrams, the UFSAR, Technical Specification (TS) requirements, outstanding work orders (WOs), issue reports (IRs), and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have rendered the systems incapable of performing their intended functions. The inspectors also walked down accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no obvious deficiencies. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the CAP with the appropriate significance characterization. Documents reviewed are listed in the Attachment.

These activities constituted four partial system walkdown samples as defined in IP 71111.04-05.

b. Findings

Failure to Maintain Adequate Circulating Water Blowdown Procedure During Liquid Radiological Releases

Introduction: The inspectors identified a finding of very low safety significance (Green) and an associated Non-Cited Violation (NCV) of TS 5.4.1, "Procedures," when licensee personnel failed to adequately maintain procedure BwOP CW-12, "Circulating Water Blowdown System Fill, Startup, Operations, and Shutdown."

Description: The station's lake blowdown line is used to maintain chemistry in the cooling lake, as a dilution source for liquid releases, and in the remediation of spills. The blowdown line is about 5 miles long and terminates at the Kankakee River. In the past, flow changes in the line caused the vacuum breakers to periodically open, and occasionally these valves failed to reseat properly. The failure of these vacuum breaker valves to fully reseat resulted in unmonitored releases of radioactive material to the environment. Engineering Change (EC) 380017, "Elimination of Vacuum Breakers 2 – 11 on CW [Circulating Water] Blowdown Line," was performed to eliminate the potential for leaks that had occurred in the past. A major revision to station calculation BRW-06-0073-M, "Hydraulic Transient Analysis of the Circulating Water Blowdown Piping," was completed to support EC 380017. The EC was approved on December 16, 2010.

On September 26, 2011, following a loss of both CW blowdown booster pumps, the licensee operated the blowdown line with a pressure at the discharge throttle valves of 20 pounds per square inch gauge (psig). Engineering judgment was used by the licensee to continue to operate the system in this lineup and a formal review was assigned through the CAP as IR 1270526, Assignment 2. On October 14, 2011, this assignment was completed and Engineering personnel concluded that this CW blowdown lineup was acceptable. Operations accepted this review and continued CW blowdown without blowdown booster pump operation. The inspector's reviewed the acceptability of this lineup against the design requirements and concluded that this lineup was not acceptable since it did not provide an adequate system backpressure as required in the design based on the following:

- The design change to eliminate all but one of the vacuum breakers was completed as described in EC 380017, Revision 1. The System Backpressure section of the design change summary stated the following:

  "The decrease in throttled pressure must be limited to keep the pressure at each point in the blowdown line above vapor pressure (~-14 psig) and the pressure at Vacuum Breaker Number 1 sufficiently above atmospheric pressure to keep the vacuum breaker closed. It is therefore acceptable to reduce the back pressure of 32 psig at valves 0CW152A/B or 0CW260A/B by an amount equal to the change in elevation between vacuum breaker five and vacuum breaker one."

- Calculation BRW-06-0073-M, Revision 4, Section 7.1 stated the following:

  "The initial condition is established such that the pressure upstream of the discharge valves, 0CW152A/B or 0CW260A/B is maintained to at least 32 psig per BwOP CW-12."

- BwOP CW-12, Revision 56, "Circulating Water Blowdown System Fill, Startup, Operation, and Shutdown," Limitations and Actions Number 21, stated the following:

  "Restriction orifices are installed in each leg of the CW Blowdown piping at the discharge structure for providing system back pressure (EC 363388, Calculation BRW-06-0174-M). Throttling of the globe valves, 0CW152A/B and/or 0CW260A/B, may still be necessary for additional back pressure to ensure the number one vacuum breaker is properly seated."

- Per Calculation BRW-06-0073-M Table 2.1, the centerline elevation of Vacuum Breaker Number 5 was 610.9 feet and the centerline elevation of Vacuum Breaker Number 1 was 594.9 feet. The difference in height elevation between these vacuum breakers is therefore 16 feet, which provided a static head of 6.9 psi. If this static head is subtracted from the minimum pressure analyzed to maintain Vacuum Breaker Number 1 closed, the result is 25.1 psig.

Therefore, the inspectors concluded that the system was operated on September 26, 2011, with a pressure at the discharge line that was below the minimum pressure analyzed to maintain Vacuum Breaker 1 closed.

The inspector's discussed the issue with the licensee and presented the basis of their conclusions as described above. The licensee agreed with the inspector's conclusions and entered the issue into their CAP as IR 1299273. Corrective actions included the creation and implementation of an Operations Standing Order preventing this particular CW blowdown lineup and a planned action to revise the procedure.

During this time the licensee conducted several liquid releases through the blowdown line, but no inadvertent releases out of Vacuum Breaker Number 1 (or any vacuum breaker) occurred.

Analysis: The inspectors determined that the failure to maintain an adequate BwOP CW-12, "Circulating Water Blowdown System Fill, Startup, Operation, and Shutdown," procedure was a performance deficiency.

The finding was determined to be more than minor because it was associated with the Programs and Processes attribute of the Public Radiation Safety Cornerstone and adversely affected the cornerstone objective of ensuring the adequate protection of public health and safety from exposure of radioactive materials released into the public domain as a result of routine civilian nuclear reactor operations.

The inspectors determined that the finding could be evaluated in accordance with IMC 0609, Appendix D, "Public Radiation Safety Significance Determination Process," since the finding was associated with the licensee's Radioactive Effluent Release program. This finding was determined to be of very low safety significance (Green) since it was not a failure to implement the effluent program and no unplanned or unmonitored release actually occurred

This finding had a cross-cutting aspect in the Decision Making component of the Human Performance cross-cutting area [H.1(a)] since licensee personnel failed to demonstrate that nuclear safety was an overriding priority. Specifically, licensee personnel failed to make risk-significant decisions when faced with uncertain or unexpected plant conditions to ensure safety was maintained.

Enforcement: Technical Specification 5.4.1, "Procedures," stated, in part, that "Written procedures shall be established, implemented, and maintained covering the following activities… a. The applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978."

Regulatory Guide 1.33, Revision 2, Appendix A, 1978, Section 7, "Procedures for Control of Radioactivity" (for limiting materials released to the environment and limiting personnel exposure) included procedures for…(3) Discharge of Effluents.

Contrary to this requirement, on December 16, 2010, licensee personnel failed to maintain an adequate CW Blowdown operating procedure as required by TS 5.4.1 because the procedure of record, BwOP CW-12, "Circulating Water Blowdown System Fill, Startup, Operation, and Shutdown," which was a procedure for limiting materials released to the environment and was therefore included within Regulatory Guide 1.33, did not contain adequate guidance to ensure the CW Blowdown system was operated within the assumptions of the design. Corrective actions included the creation and implementation of an Operations Standing Order preventing this particular CW blowdown lineup and a planned action to revise the procedure. Because this issue was of very low safety significance and because it was entered into the licensee's CAP as IR 1299273, the NRC is treating this violation as a NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. **(NCV 05000456/2011005-01; 05000457/2011005-01,**

Failure to Maintain Adequate Circulating Water Blowdown Procedure During Liquid Radiological Releases)

1R05 Fire Protection (71111.05)

.1 Routine Resident Inspector Tours (71111.05Q)

a. Inspection Scope

The inspectors conducted fire protection walkdowns which were focused on the availability, accessibility, and the condition of firefighting equipment in the following risk-significant plant areas:

- Unit 2 Lower Cable Spreading Room (LCSR) Area (Fire Zones 3.2B-1, 3.2A-1, and 3.2A-1/2);
- Unit 2 Upper Cable Spreading Room Area (Fire Zone 3.2A-1);
- 1B Auxiliary Feedwater (AF) Pump Room Area (Fire Zone 11.4A-1); and
- Electrical Penetration Area (Fire Zone 11.5A-1).

The inspectors reviewed these areas to assess if the licensee had implemented a fire protection program that adequately controlled combustibles and ignition sources within the plant, effectively maintained fire detection and suppression capability, maintained passive fire protection features in good material condition, and implemented adequate compensatory measures for OOS, degraded, or inoperable fire protection equipment, systems, or features in accordance with the licensee’s fire plan. The inspectors selected fire areas based on their overall contribution to internal fire risk as documented in the plant’s Individual Plant Examination of External Events (IPEEE) with later additional insights, their potential to impact equipment which could initiate or mitigate a plant transient, or their impact on the plant’s ability to respond to a security event. Using the documents listed in the Attachment, the inspectors verified that fire hoses and extinguishers were in their designated locations and available for immediate use; that fire detectors and sprinklers were unobstructed; that transient material loading was within the analyzed limits; and that fire doors, dampers, and penetration seals appeared to be in satisfactory condition. The inspectors also verified that minor issues identified during the inspection were entered into the licensee’s CAP.

These activities constituted four quarterly fire protection inspection samples as defined in IP 71111.05-05.

b. Findings

No findings were identified.

.2 Annual Fire Protection Drill Observation (71111.05A)

a. Inspection Scope

On October 5, 2011, the inspectors observed a fire brigade activation for Drill Scenario: Fire in Unit 1 6.9kV Switchgear Room. Based on this observation, the inspectors evaluated the readiness of the plant fire brigade to fight fires. The inspectors verified that the licensee staff identified deficiencies; openly discussed them in a self-critical manner at the drill debrief, and took appropriate corrective actions. Specific attributes evaluated were:

- proper wearing of turnout gear and self-contained breathing apparatus (SCBA);
- proper use and layout of fire hoses;
- employment of appropriate fire fighting techniques;
- sufficient firefighting equipment brought to the scene;
- effectiveness of fire brigade leader communications, command, and control;
- search for victims and propagation of the fire into other plant areas;
- smoke removal operations;
- utilization of pre-planned strategies;
- adherence to the pre-planned drill scenario; and
- drill objectives.

Documents reviewed are listed in the Attachment. These activities constituted one annual fire protection inspection sample as defined in IP 71111.05-05.

b. Findings

No findings were identified. However, an example of an NRC-identified performance deficiency related to this fire drill entitled "Failure to Follow and Establish Adequate Hazard Barrier Impairment Procedures" is discussed in Section 1R15.3 of this report.

1R07 Annual Heat Sink Performance (71111.07T)

.1 Triennial Review of Heat Sink Performance

a. Inspection Scope

The inspectors reviewed operability determinations, completed surveillances, vendor manual information, calculations, performance test results, and cooler inspection results associated with the 2B Emergency Diesel Generator (DG) Jacket Water Heat Exchanger upper and lower coolers. These heat exchangers/coolers were chosen based on their risk significance in the licensee's probabilistic safety analysis, their important safety-related mitigating system support functions, and their operating history.

For the 2B DG Jacket Water Heat Exchanger upper and lower coolers, the inspectors verified that testing, inspection, maintenance, and monitoring of biotic fouling and macro-fouling programs were adequate to ensure proper heat transfer. This was accomplished by verifying the test method used was consistent with accepted industry practices, or equivalent; the test conditions were consistent with the selected methodology; the test acceptance criteria were consistent with the design basis values; and results of heat exchanger performance testing. The inspectors also verified that the test results appropriately considered differences between testing conditions and design conditions, the frequency of testing based on trending of test results was sufficient to detect degradation prior to loss of heat removal capabilities below design basis values, and test results considered test instrument inaccuracies and differences.

For the 2B DG Jacket Water Heat Exchanger upper and lower coolers, the inspectors reviewed the methods and results of heat exchanger performance inspections. The inspectors verified the methods used to inspect and clean heat exchangers were consistent with as-found conditions identified and expected degradation trends and industry standards, the licensee's inspection and cleaning activities had established acceptance criteria consistent with industry standards, and the as-found results were recorded, evaluated, and appropriately dispositioned such that the as-left condition was acceptable. During this inspection, the inspectors observed 1A DG Operability Surveillance, 1BwOSR 3.8.1.2-1.

In addition, the inspectors verified the condition and operation of the 2B DG Jacket Water Heat Exchanger upper and lower coolers were consistent with design assumptions in heat transfer calculations and as described in the UFSAR. This included verification that the number of plugged tubes was within pre-established limits based on capacity and heat transfer assumptions. The inspectors verified the licensee evaluated the potential for water hammer and established adequate controls and operational limits to prevent heat exchanger degradation due to excessive flow-induced vibration during operation. In addition, eddy current test reports and visual inspection records were reviewed to determine the structural integrity of the heat exchanger.

The inspectors verified the performance of ultimate heat sink and safety-related service water systems and their subcomponents such as piping, intake screens, pumps, valves, etc. by tests or other equivalent methods to ensure availability and accessibility to the in-plant cooling water systems.

The inspectors reviewed the licensee's operation of the service water system and ultimate heat sink. This included the review of licensee's procedures for a loss of the service water system or ultimate heat sink and the verification that instrumentation, which was relied upon for decision-making, was available and functional. In addition, the inspectors verified that macro-fouling was adequately monitored, trended, and controlled by the licensee to prevent clogging. The inspectors verified that licensee's biocide treatments for biotic control were adequately conducted and the results monitored, trended, and evaluated. The inspectors also reviewed strong pump-weak pump interaction and design changes to the service water system and the ultimate heat sink.

The inspectors performed a system walkdown on the essential service water system to verify the licensee's assessment of structural integrity. In addition, the inspectors reviewed available licensee testing and inspections results, licensee disposition of any active through-wall pipe leaks, and the history of through-wall pipe leakage to identify any adverse trends since the last NRC inspection. For buried or inaccessible piping, the inspectors reviewed the licensee's pipe testing, inspection, or monitoring programs to verify structural integrity, and ensured that any leakage or degradation had been appropriately identified and dispositioned by the licensee. The inspectors verified that the periodic piping inspection program adequately detected and corrected protective coating failure, corrosion, and erosion.

In addition, the inspectors reviewed issue reports related to the heat exchangers/coolers and heat sink performance issues to verify that the licensee had an appropriate threshold for identifying issues and to evaluate the effectiveness of the corrective actions. The documents that were reviewed are listed in the Attachment.

These inspection activities constituted two heat sink inspection samples as defined in IP 71111.07-05.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11)

.1 Annual Operating Test Results (71111.11B)

a. Inspection Scope

The inspectors reviewed the overall pass/fail results of the Annual Operating Test administered by the licensee from August 25, 2011 through September 29, 2011, required by 10 CFR 55.59(a). The results were compared to the thresholds established in Inspection Manual Chapter (IMC) 0609, Appendix I, "Licensed Operator Requalification Significance Determination Process (SDP)," to assess the overall adequacy of the licensee's Licensed Operator Requalification Training program to meet the requirements of 10 CFR 55.59.

This inspection constituted one biennial and one annual licensed operator requalification inspection sample as defined in IP 71111.11B and IP 71111.11A.

b. Findings

No findings were identified.

.2 Resident Inspector Quarterly Review (71111.11Q)

a. Inspection Scope

On November 1, 2011, the inspectors observed a crew of licensed operators in the plant's simulator during licensed operator requalification examinations to verify that operator performance was adequate, evaluators were identifying and documenting crew performance problems, and training was being conducted in accordance with licensee procedures. The inspectors evaluated the following areas:

- licensed operator performance;
- crew's clarity and formality of communications;
- ability to take timely actions in the conservative direction;
- prioritization, interpretation, and verification of annunciator alarms;
- correct use and implementation of abnormal and emergency procedures;
- control board manipulations;
- oversight and direction from supervisors; and
- ability to identify and implement appropriate TS actions and Emergency Plan actions and notifications.

The crew's performance in these areas was compared to pre-established operator action expectations and successful critical task completion requirements. Documents reviewed are listed in the Attachment.

This inspection constituted one quarterly licensed operator requalification program sample as defined in IP 71111.11.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12)

.1 Routine Quarterly Evaluations (71111.12Q)

a. Inspection Scope

The inspectors evaluated degraded performance issues involving the following risk-significant systems:

- Emergency Communication (CQ) System; and
- Turbine Building/Auxiliary Building "L-Wall" Fire Dampers.

The inspectors reviewed events including those that involved ineffective equipment maintenance that resulted in valid or invalid automatic actuations of Engineered Safety Features (ESF) systems, and independently verified the licensee's actions to address system performance or condition problems in terms of the following:

- implementing appropriate work practices;
- identifying and addressing common cause failures;
- scoping of systems in accordance with 10 CFR 50.65(b) of the maintenance rule;
- characterizing system reliability issues for performance;
- charging unavailability for performance;
- trending key parameters for condition monitoring;
- ensuring 10 CFR 50.65(a)(1) or (a)(2) classification or re-classification; and
- verifying appropriate performance criteria for structures, systems, and components (SSCs)/functions classified as (a)(2), or appropriate and adequate goals and corrective actions for systems classified as (a)(1).

The inspectors assessed performance issues with respect to the reliability, availability, and condition monitoring of the system. In addition, the inspectors verified maintenance effectiveness issues were entered into the CAP with the appropriate significance characterization. Documents reviewed are listed in the Attachment.

This inspection constituted two quarterly maintenance effectiveness samples as defined in IP 71111.12-05.

b. Findings

Failure to Evaluate Emergency Communication System Performance Against Maintenance Rule Criteria

Introduction: The inspectors identified a finding of very low safety significance (Green) and an associated NCV of 10 CFR 50.65(a)(1) when licensee personnel failed to adequately monitor the performance of nonsafety-related systems and components that exceeded performance criteria against pre-established goals. Specifically, inadequate tracking of failures in the Emergency Communication (CQ) system resulted in the failure to evaluate corrective actions by the Maintenance Rule Expert Panel when 10 CFR 50.65(a)(1) performance criteria were unknowingly exceeded.

Description: Through a routine review of CAP documents the inspectors noted an elevated number of IRs documenting various failures of CQ equipment including the plant public address system, telephones, and radio communications. As a result, the inspectors performed an inspection sample to review the licensee's Maintenance Rule Program monitoring of the CQ system. The Maintenance Rule at Braidwood was implemented through procedure ER-AA-310, "Implementation of the Maintenance Rule." The CQ system had the following condition monitoring goals, which required an evaluation for increased monitoring and corrective actions in accordance with 10 CFR 50.65(a)(1) when exceeded:

- Public Address Group: 18 failures per 2 years;
- Radio Group: 13 failures per 2 years;
- Regulatory Agency Phones: 14 failures per 2 years; and
- Other Telephones: 38 failures per 2 years.

The licensee's Maintenance Rule program documentation revealed that between July 2009 and July 2011 there were 15 failures in the Public Address group, 2 failures in the Radio group, 2 failures in the Regulatory Agency Phones group, and 20 failures in the Other Telephones group. These failures did not exceed the established condition monitoring goals for the CQ system.

However, the inspectors' review of IRs for the same period revealed potential equipment failures that were not included in the licensee's Maintenance Rule documentation. The inspectors also noted that some IRs documented a single condition monitoring event, but actually discussed multiple simultaneous failures. The inspectors questioned the discrepancies and, as a result, the licensee generated IR 1291411.

The licensee reviewed the information provided by the inspectors and concluded that eight of the additional IRs identified by the inspectors should have been counted as condition monitoring events. In addition, the licensee determined that three IRs initially counted as a single condition monitoring event should have been counted as multiple condition monitoring events. In each of the three cases the condition monitoring goal was exceeded and an evaluation to consider increased monitoring under 10 CFR 50.65(a)(1) should have been performed. These occurrences were:

- The loss of half of all site phone lines (475 phone lines lost) on December 8, 2009 (IR 1002902);
- Multiple auxiliary building public address speaker failures during testing on March 22, 2011 (IR 1190309); and
- Public Address System not working in multiple buildings during testing on April 12, 2011 (IR 1201712).

The CQ system was placed in Maintenance Rule (a)(1) status for an unrelated functional failure on November 16, 2010. Thus, IRs 1190309 and 1201712, which resulted in condition monitoring goals being exceeded, occurred after the system was in an (a)(1) status. For those instances, the licensee initiated a corrective action to revise the (a)(1) Action Plan to include the additional equipment issues. However, IR 1002902, which also resulted in condition monitoring goals being exceeded, occurred prior to the CQ system being placed in (a)(1) status and no (a)(1) evaluation was completed at the time. The licensee generated IR 1296823 to perform this evaluation.

Licensee Procedure ER-AA-310-1005, "Maintenance Rule – Dispositioning Between (a)(1) and (a)(2)," stated in Step 4.1 that when performance criteria have been exceeded; are met but are exhibiting an adverse trend; or if a repeat maintenance preventable functional failure occurs, then an IR should be generated to perform an (a)(1) determination. The inspectors concluded that there were three instances where the licensee's monitoring of the CQ system under the Maintenance Rule (10 CFR 50.65) did not recognize that condition monitoring goals were exceeded. As a result, the failures that resulted in condition monitoring goals being exceeded were not evaluated for appropriate corrective actions by the Maintenance Rule Expert Panel, in accordance with 10 CFR 50.65(a)(1) and licensee procedure ER-AA-310-1005. The licensee entered this issue into their CAP as IR 1251652. Corrective actions included revising the (a)(1) Action Plan to address the additional failures and determining why the failures were not included in the Maintenance Rule database.

Analysis: The inspectors determined that the failure to adequately monitor the performance of the CQ system against Maintenance Rule condition monitoring goals was a performance deficiency.

The finding was determined to be more than minor in accordance with IMC 0612, Appendix B, "Issue Screening," because it was associated with the Facilities and Equipment attribute of the Emergency Preparedness Cornerstone and adversely affected the cornerstone objective of ensuring the licensee is capable of implementing adequate measures to protect the health and safety of the public in the event of a radiological emergency.

The inspectors determined that the finding could be evaluated using the SDP in accordance with IMC 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings." Because this finding was associated with the Emergency Preparedness area, further evaluation was completed using IMC 0609, Appendix B, "Emergency Preparedness Significance Determination Process." The inspectors determined that the finding represented a failure to comply with a regulatory requirement rather than an actual event implementation problem. The finding was determined to be associated with Planning Standard 10 CFR 50.47(b)(6), which required establishment of systems for prompt communication among principle emergency response organizations and to emergency response personnel. Using the examples of findings associated with Planning Standard 10 CFR 50.47(b)(6), the inspectors concluded that the finding screened as Green because communications equipment for key emergency response organization members in an emergency facility was degraded at the time of discovery without compensatory measures. Additionally, the finding was associated with Planning Standard 10 CFR 50.47(b)(8), which required that facilities and equipment were maintained to support emergency response. The inspectors again concluded, using the examples of findings associated with Planning Standard 10 CFR 50.47(b)(8), that the finding screened as Green because a significant amount of equipment necessary to implement the Emergency Plan was not available or functional to the extent that any key emergency response organization member could not perform his/her assigned functions in the absence of compensatory measures. These two Planning Standard functions were not defined as Risk-Significant Planning Standards and the failure did not involve a loss of the Planning Standard Function.

The inspectors determined that there was no cross-cutting aspect associated with this finding since none of the cross-cutting aspects in IMC 0310 were determined to be appropriate for this issue.

Enforcement: Title 10 CFR Part 50.65(a)(1) required, in part, that the holders of an operating license shall monitor the performance or condition of SSCs within the scope of the rule against licensee-established goals in a manner sufficient to provide reasonable assurance that such SSCs are capable of fulfilling their intended functions. Contrary to the above, between July 2009 and July 2011 the licensee failed to perform adequate monitoring for the CQ system. Specifically, inadequate tracking of failures in the CQ system resulted in the failure to evaluate for corrective actions by the Maintenance Rule Expert Panel when (a)(1) performance criteria were unknowingly exceeded. In addition, once the system was placed in an (a)(1) status for an unrelated reason, the Action Plan did not address all of the performance criteria that had been exceeded. Corrective actions included revising the (a)(1) Action Plan to address the additional failures and determining why the failures were not included in the Maintenance Rule database. Because this violation was of very low safety significance and because this issue was entered into the licensee's CAP as IR 1251652, this violation is being treated as a NCV consistent with Section 2.3.2 of the NRC Enforcement Policy.
(NCV 05000456/2011005-02; 05000457/2011005-02, Failure to Evaluate Emergency Communication System Performance Against Maintenance Rule Criteria)

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)

.1 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors reviewed the licensee's evaluation and management of plant risk for the maintenance and emergent work activities affecting risk-significant and safety-related equipment listed below to verify that the appropriate risk assessments were performed prior to removing equipment for maintenance:

- 1B DG Maintenance Outage (Planned Yellow Risk);
- Jumpering Around ESF Battery 111, Cell 23, (Operational Risk Activity);
- 2B SX Pump Work Window (Planned Yellow Risk); and
- Unit 1 T-ave Loop Card Replacement (Operational Risk Activity)

These activities were selected based on their potential risk significance relative to the Reactor Safety Cornerstones. As applicable for each activity, the inspectors verified that risk assessments were performed as required by 10 CFR 50.65(a)(4) and were complete and accurate. When emergent work was performed, the inspectors verified that plant risk was promptly reassessed and managed. The inspectors reviewed the scope of maintenance work, discussed the results of the assessment with the licensee's probabilistic risk analyst or shift technical advisor, and verified plant conditions were consistent with the risk assessment. The inspectors also reviewed TE requirements and walked down portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met. Documents reviewed are listed in the Attachment.

These maintenance risk assessments and emergent work control activities constituted four samples as defined in IP 71111.13-05.

b. Findings

No findings were identified.

1R15 Operability Determinations and Functional Assessments (71111.15)

.1 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following issues:

- Bypass of Station CW Pumps Differential Water Level Trips Impact on SX Suction Source Seismic Analysis;
- Potential Diesel-Driven AF Pump Cooling Issue During a Station Blackout;
- Diesel-Driven AF Pump Cycling Issue During a Loss of Condensate Storage Tank Event;
- AF005 Flow Control Valve Trim Clearance Low Margin Issue; and
- Unresolved Item (URI) 05000456/2011004-04; 05000457/2011004-04, “Operability Evaluation Not Performed in Accordance with Station Standards.”

The inspectors selected these potential operability issues based on the risk significance of the associated components and systems. The inspectors evaluated the technical adequacy of the evaluations to ensure that TS operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the TS and the UFSAR to the licensee’s evaluations to determine whether the components or systems were operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled. The inspectors determined, where appropriate, compliance with bounding limitations associated with the evaluations. Additionally, the inspectors reviewed a sample of corrective action documents to verify that the licensee was identifying and correcting any deficiencies associated with operability evaluations. Documents reviewed are listed in the Attachment.

This operability inspection constituted four samples as defined in IP 71111.15-05. The URI 05000456/2011004-04; 050004572011004-04 review under this inspection did not constitute a new sample.

b. Findings

Failure to Submit Licensee Event Report Per 10 CFR 50.73(a)(2)(vii)

Introduction: A Severity Level IV NCV of 10 CFR 50.73(a)(2)(vii) was identified by the inspectors when the licensee failed to submit a LER within 60 days after identifying instances in which a single cause (or condition) would cause two safety-related instrument channels to become inoperable in a single system designed to shutdown the reactor and maintain it in a safe shutdown condition.

Description: On March 8, 2011, the licensee identified a non-conservative assumption used in the station's Turbine Building High Energy Line Break (HELB) analysis of record in that the calculations were not updated for a historic power uprate. On March 14, 2011, the station completed an Operability Evaluation that examined how a HELB in the Turbine Building could affect safety-related equipment since many safety-related rooms had ventilation connections to the Turbine Building and shared a barrier wall with the Turbine Building. One of the errors identified by the licensee was associated with non-conservative HELB temperature and pressure parameters used in determining break flows. The licensee concluded that the higher break flows did not affect the operability of the safety-related rooms in a normal configuration, but concluded that the presence of open equipment rollup doors for the ESF Switchgear Rooms and MEERs could cause unacceptable temperatures. Therefore, the station instituted compensatory actions to control these rollup doors shut with equipment status tags when operating in Modes 1-4.

On April 7, 2011, the inspectors identified that the station did not have any plans to review 10 CFR 50.73 reportability requirements regarding this issue. The inspectors notified the licensee that they had personally observed large breakers being moved through the rollup doors within the past 3 years. Based on these observations and conclusions reached in the operability determination, the inspectors specifically questioned if these conditions required the submittal of an LER. The station entered the inspectors' observations into the CAP and created an assignment to review past reportability in IR 1199223. This LER evaluation assignment had an original due date of May 9, 2011, but the due date was later changed to July 29, 2011, based upon an on-going review to update the HELB model. The July 29, 2011 due date was also later changed to October 31, 2011 because the HELB model required substantially more work that originally believed.

On October 31, 2011, the licensee completed the CAP assignment and concluded that with the Division 11 (or Division 21) Miscellaneous Electric Equipment Room (MEER) rollup door(s) open and the unit(s) operating in Modes 1-4, there was reasonable doubt that the safety-related instrument inverters inside of these rooms would have remained functional in the event of a concurrent HELB on the 451' elevation of the Turbine Building. This would have impacted operation of Instrument Bus 111 and 113 (or Instrument Bus 211 and 213). Based on this conclusion, and a formal review of when the associated rollup doors had been open within the past 3 years, the licensee concluded that four events were reportable under 10 CFR 50.73(a)(2)(vii). These events represented instances in which a Turbine Building HELB would have caused two safety-related instrument channels to become inoperable in a single system designed to shutdown the reactor and maintain it in a safe shutdown condition. Furthermore, the licensee concluded that the October 31, 2011, discovery marked the start of the 60-day reporting requirement specified in the regulations.

The inspectors reviewed the reportability aspects associated with this issue from the March 8, 2011, date when the issue was first discovered and treated as an adverse condition affecting the operability of equipment through the time the LER was submitted to the NRC on December 22, 2011. The inspectors reviewed the NRC's event reporting guidelines contained in NUREG-1022, Revision 2, "Event Reporting Guidelines 10 CFR 50.72 and 10 CFR 50.73," and discussed the report timeliness with NRC Office of Nuclear Reactor Regulation (NRR) experts. The inspectors concluded that the discovery date should have started when the licensee lost reasonable expectation that the equipment in question was not operable with the rollup doors open and the licensee understood that the doors had been opened within the past 3 years. Based on discussions with station staff, the licensee should have reported this event within 60 days of March 14, 2011. The licensee entered this issue into their CAP as IR 1299906.

Analysis: The inspectors determined that the failure to report this LER in accordance with NRC regulations was a performance deficiency. Specifically, the licensee should have created a CAP assignment to review the 10 CFR 50.73 reportability aspects of this issue without prompting from the inspectors and should have reported the issue in a timely manner.

This violation had the potential to impact the regulatory process based upon the generic communication that LERs serve, the required Reactor Oversight Process (ROP) reviews that the NRC perform on all LERs, and the potential impact on licensee performance assessment. Since the issue impacted the regulatory process, it was dispositioned through the TS process. The inspectors determined that this issue was a Severity Level IV violation based on a similar example referenced in Supplement I, Example D.4, of the NRC Enforcement Policy.

The inspectors evaluated the actual non-conforming technical condition through the ROP. The inspectors determined that the issue was licensee-identified and a violation of 10 CFR 50, Appendix B, Criterion III, "Design Control." This issue is described in Section 4OA7 of this report.

Reactor Oversight Process cross-cutting aspects do not apply to traditional enforcement issues or licensee-identified ROP findings of very low safety significance, therefore, none was identified.

Enforcement: Title 10 CFR 50.73(a), "Reportable Events," required, in part, that "The holder of an operating license under this part or a combined license under Part 52 of this chapter (after the Commission has made the finding under §52.103(g) of this chapter) for a nuclear power plant (licensee) shall submit a LER for any event of the type described in this paragraph within 60 days after the discovery of the event." In addition this section of the code requires that, "Unless otherwise specified in this section, the licensee shall report an event if it occurred within 3 years of the date of discovery regardless of the plant mode or power level, and regardless of the significance of the structure, system, or component that initiated the event."

Title 10 CFR 50.73(a)(2)(vii) described event(s) where a single cause or condition caused at least one independent train or channel to become inoperable in multiple systems or two independent trains or channels to become inoperable in a single system designed to: (A) Shutdown the reactor and maintain it in a safe shutdown condition; (B) Remove residual heat; (C) Control the releases of radioactive material; or (D) Mitigate the consequences of an accident.

Contrary to the above, the licensee failed to report two Unit 1 and two Unit 2 conditions in which a Turbine Building HELB would have rendered two independent safety-related instrument channels inoperable in a single system designed to safely shutdown the reactor and maintain it in a safe shutdown condition within 60 days from the date when the condition was discovered. This information was known or available since March 14, 2011, but was not reported until December 22, 2011. Corrective actions included submitting an LER to the NRC on December 22, 2011. Because this violation was entered into the licensee's CAP as IR 1299906, it is being treated as a Severity Level IV NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. Corrective actions included the issuance of LER 05000456/2011-004-00 on December 22, 2011. **(NCV 05000456/2011005-03; 05000457/2011005-03, Failure to Submit Licensee Event Report Per 10 CFR 50.73(a)(2)(vii))**

.2 <u>(Closed) Unresolved Item 05000456/2011004-004; 05000457/2011004-004, Operability Evaluation Not Performed in Accordance with Station Standards</u>

<u>Introduction</u>: The inspectors identified a finding of very low safety significance (Green) and an associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," when licensee personnel failed to adhere to numerous Operability Determination Process standards after identifying a non-conservative assumption related to closure times for hazard barrier dampers separating the Turbine Building from various safety-related rooms within the Auxiliary Building.

<u>Description</u>: On July 6, 2011, the licensee identified non-conservative assumptions in the actuation time for fusible links used in hazard barrier dampers for the ESF Switchgear Rooms, Non-ESF Switchgear Rooms, MEERs and Emergency DG Rooms. These dampers protected these rooms from the effects of a Turbine Building fire or High Energy Line Break (HELB) event. The applicable calculations of record assumed that these dampers shut within about 5 seconds of reaching a temperature of 165 degrees fahrenheit (°F). These dampers utilized a fusible link which was required to meet Underwriters Laboratories (UL) specifications (Heat Responsive Links for Fire Protection Service: UL 33). This specification provided a formula for calculating an acceptable fusible link response time as a function of temperature. Using the UL formula, licensee personnel calculated that the expected thermal link response times were up to 100 seconds for the ESF Switchgear Room dampers and 200 seconds for the MEER and Non-ESF Switchgear Room dampers based on projected HELB temperatures outside of these rooms. Therefore, the station calculations of record assumed that these dampers would isolate the affected rooms from a Turbine Building HELB much sooner than UL specifications. The licensee evaluated this non-conservative condition in Operability Evaluation 11-006, Revision 1, and concluded that there was reasonable assurance that the equipment affected in the identified rooms would remain operable during a licensing basis HELB event. This conclusion was reached after the licensee had completed and approved Operability Evaluation 11-006, Revision 1, in accordance with OP-AA-108-115, "Operability Evaluation Standard," Revision 9.

The inspectors reviewed Operability Evaluation 11-006, Revision1, and identified a number of examples in which the evaluation did not meet the standards in OP-AA-108-115. Specifically, Section 4.4.2 of OP-AA-108-115, "Operability Evaluation Standard," Revision 9 included the following requirements:

The OpEval [Operability Evaluation] should contain sufficient detail for a knowledgeable individual to independently reach the same conclusions as the Preparer (i.e., the OpEval must be able to stand alone).

1. The Preparer should examine the CLB [Current Licensing Basis] requirements or commitments, including the TSs and Updated Final Safety Analysis Report (UFSAR), to establish the conditions and performance requirements to be met for determining operability, as necessary. The scope of an OpEval needs to be

sufficient to address the capability of the SSC to perform its specified safety functions.

The OpEval should address the following, as applicable . . . Determine the extent of condition for all similarly affected SSCs.

The inspectors identified the following examples that did not meet this standard:

- Operability Evaluation 11-006, Revision 1, did not evaluate the non-conforming condition against CLB single failure criterion. This single failure criterion was discussed in NRC Standard Review Plan (SRP) Section 3.6.1, Branch Technical Position (BTP) ASB 3-1, Section B.3.b(2). Branch Technical Position ASB 3-1, Section B.3.b(2) discussed how a single active component failure should be assumed in systems used to mitigate the consequences of a postulated piping failure to shut down the reactor. After the inspectors discussed this requirement with the licensee, licensee personnel determined that the dampers needed to be considered for single failure during a HELB event. This CLB single failure criterion was readily available when the licensee examined the CLB requirements for this issue during the development of Operability Evaluation 11-006, Revision 1. The licensee entered this issue into their CAP as IR 1244251.

- Operability Evaluation 11-006, Revision 1, did not adequately consider a pipe crack in accordance with the CLB. The CLB requirements for a pipe crack included an assumed lower allowable stress threshold than for a broken or severed pipe. Specifically, Operability Evaluation 11-006, Revision 1, did not address leakage cracks in accordance with Section III of the American Society of Mechanical Engineers (ASME) Code for Class 2 and Class 3 piping as referenced in Section 3.6.2.1.2.1.1, "Fluid System Piping Not in the Containment Penetration Area," of the UFSAR. In particular, Section d of Section 3.6.2.1.2.1.1 stated, in part, "[L]eakage cracks in high energy ASME Section III Class 2 and 3 piping and seismically analyzed and supported ANSI [American Nuclear Standards Institute] B31.1 piping are postulated at locations where the stresses under the loadings resulting from normal and upset plant conditions and an OBE [Operating Basis Earthquake] event as calculated by equations (9) and (10) in Paragraph NC-3652 of ASME Section III exceed 0.4 (1.2 multiplied times Sh + Sa).

- Operability Evaluation 11-006, Revision 1, did not address the extent of condition review for all similarly affected SSCs. The inspectors identified a number of safety-related rooms that utilized the same (or similar) style dampers in which the non-conforming condition applied that were not evaluated. Those rooms included the Unit 1 and Unit 2 Lower Cable Spreading Room Non-Segregated Bus Duct areas; an electrical cable chase located above the "B" Emergency Diesel Generator; the station Emergency Diesel Generator Diesel Oil Storage Tank Rooms; and the Control Room Ventilation Makeup System, which could be aligned to take makeup air from the Turbine Building.

- Operability Evaluation 11-006, Revision 1, as associated with MEER 12 and MEER 22, did not identify a potential common mode failure after the inspectors determined that the licensee had not adequately considered single failure. These rooms contained both trains of Unit 1 and Unit 2 reactor trip and reactor trip bypass breakers, respectively. The event of concern was a Turbine Building HELB combined with the failure of either the MEER 12 or MEER 22 hazard barrier dampers to shut, which would expose both trains of reactor trip breakers to a harsh steam environment. This equipment was not environmentally qualified in accordance with 10 CFR 50.49.

- The inspectors were not able to reach the same conclusions as the Preparer when reviewing Operability Evaluation 11-006, Revision 1, since Operability Evaluation 11-006, Revision 1, lacked the necessary detail regarding assumptions and limitations for the inspectors to determine if the evaluation was consistent with station design. The inspectors concluded that Operability Evaluation 11-006, Revision 1 did not meet the licensee's "stand alone" requirement in OP-AA-108-115.

On November 17, 2011, the licensee completed a substantial revision to Operability Evaluation 11-006, Revision 1, which addressed the issues previously identified by the inspectors.

In addition to the issues described above, the inspectors identified that the station's applicable HELB calculations of records had not considered the licensing basis single failure. The inspectors determined that this historic issue contributed to the licensee's misunderstanding of their CLB.

The licensee entered these issues into their CAP as IR 1185016, IR 1199223, IR 1237395, IR 1237140, IR 1242942, IR 1246918, IR 1276888, IR 1277627, and IR 1279543. Corrective actions include two revisions of Operability Evaluation 11-006, an assignment to reconstitute the applicable design basis calculation records, and plans to re-design the hazard barrier dampers to provide additional margin.

Analysis: The inspectors determined that the failure to adhere to Operability Determination process standards outlined in OP-AA-108-115, "Operability Evaluation Standard," Revision 9, during the evaluation of a non-conforming condition was a performance deficiency.

This finding was determined to be more than minor because it was similar to the "not minor if" aspect of Example 3j in IMC 0612, Appendix E, "Example of Minor Issues" since the errors in Operability Evaluation 11-006, Revision 1 resulted in a condition in which there was a reasonable doubt on the operability of the systems and components that were the subject of the evaluation and dissimilar from the "minor because" aspect of this example since the impact of the errors on Operability Evaluation 11-006, Revision 1 was not minimal. In addition, the performance deficiency was determined to be more than minor because it was associated with the Design Control attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage).

The inspectors determined that the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," Table 4a, for the Mitigating Systems Cornerstone. The inspectors answered "No" to all of the Mitigating

Systems Cornerstone questions in Table 4a of IMC 0609.04, and, as a result, the finding screened as having very low safety significance (Green).

This finding has a cross-cutting aspect in the CAP component of the Problem Identification and Resolution cross-cutting area [P.1(c)] since the licensee failed to thoroughly evaluate the impact on operability of a non-conforming condition associated with hazard barrier closure times.

Enforcement: This finding did not involve enforcement action because no regulatory requirement was violated. **(FIN 05000456/2011005-04; 05000457/2011005-04: Operability Evaluation Not Performed in Accordance with Station Standards)**

.3 (Closed) Unresolved Item 05000456/2011003-005; 05000457/2011003-005, Potential Design Control Violation Related to Safety-Related Structures

Failure to Follow and Establish Adequate Hazard Barrier Impairment Procedures

Introduction: The inspectors identified a finding of very low safety significance (Green) and an associated NCV of 10 CFR 50.65(a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," when the licensee's process for control of hazard barriers failed to manage the risk of temporarily impairing a hazard barrier under certain circumstances.

Description: While reviewing IR 1185016 regarding errors in the assumptions for a Turbine Building HELB, the inspectors questioned the licensee on the policy for moving equipment through a door that physically protected safety-related equipment from the effects of fire, flooding, or HELB; or that provided a ventilation barrier needed to support a safety function. The function of barrier doors, as defined in the licensee's Maintenance Rule program, was to close and latch, without manual intervention, as required. The controlling procedure, BwAP 1110-03, "Plant Barrier Impairment Program," Revision 20, was in use at the time. Step C.10 of that procedure stated:

- "Doors MAY be opened without a PBI PERMIT during normal passage (30-minutes maximum) of personnel or equipment. The door SHOULD be closed at termination of attendance. If the door must be blocked or tied open, then a PBI PERMIT SHALL be required. Plant alarms or special controls SHOULD be considered before holding a door open."

The inspectors questioned the allowance of moving large pieces of equipment through a hazard barrier for up to 30 minutes without consideration of the risk of the evolution based on plant conditions at a particular time. The inspectors were concerned that large pieces of equipment that were not quickly or easily moved, such as breakers, structural steel beams, or scaffold carts, could prevent the barrier door from shutting and fulfilling its barrier function for a timeframe up to 30 minutes without consideration of TS implications and management of risk consistent with Maintenance Rule requirements.

Although the inspectors questioned the general practice of the licensee's approach, the inspectors focused upon the area of the plant called the "L-Wall," which contained multiple hazard barrier doors that separated the Turbine Building from safety-related and/or risk-significant electrical equipment. The inspectors noted that a HELB in the Turbine Building would present additional challenges to ensuring a hazard barrier door that was impaired by an inanimate object was cleared and closed. The licensee's barrier control program, as written and implemented, did not provide assurance that redundant equipment would be protected from the hazard or would not be OOS for an unrelated reason.

The inspectors continued to question the licensee about moving large equipment through the barrier doors without a risk analysis or controls on redundant equipment. The licensee stated that the 30 minute allowance was not based on any regulatory requirement or standard, but was chosen as a reasonable amount of time to allow movement of equipment through hazard barrier doors. Additionally, the licensee stated that the 30 minute allowance was consistent with standard practices in the nuclear industry. This position was formally entered into the CAP and an assignment was created to benchmark other utilities for operating experience.

The inspectors identified that Regulatory Issue Summary (RIS) 2001-009, "Control of Hazard Barriers," provided clarification for controlling the removal of hazard barriers to facilitate maintenance activities under Technical Specifications and the Maintenance Rule (10 CFR 50.65(a)(4)). Specifically, RIS 2001-009 stated, "Prior to removing a hazard barrier for maintenance purposes (either to facilitate plant maintenance or to perform maintenance on the barrier), the risk associated with the maintenance activity must be controlled and managed in accordance with paragraph 50.65(a)(4) of the maintenance rule." Attachment 1 of RIS 2001-009 provided several examples of control of hazard barriers and TS implications. The inspectors discussed the issue and RIS guidance with NRR technical experts and concluded that the activities to transport equipment through a hazard barrier to facilitate maintenance should be considered under the rule if the activity could prevent the barrier from fulfilling its safety function.

In addition to this issue, the inspectors identified two specific instances in which the licensee failed to adhere to the station's Plant Barrier Impairment (PBI) procedure and manage risk.

- On October 5, 2011, during the conduct of a planned fire drill in the Unit 1 Non-ESF Switchgear Room, the inspectors identified that a fire hose was pulled from a hose station inside of the Turbine Building into the Non-ESF Switchgear Room. This resulted in an impaired HELB barrier door in the L-Wall because the door could not close with the hose routed through the doorway. Upon questioning, the licensee informed the inspectors that this was allowed per Step C.10 of BwAP 1110-03 and a PBI evaluation was not required. The inspectors noted that this was in direct conflict with RIS 2001-009, Attachment 1, Example 3, which concluded that an impaired HELB door due to an air line running through it would result in inoperability of equipment that could not withstand a HELB environment in the room. During the fire drill, the licensee did not consider the operability of equipment in the room given the blocked HELB door due to a fire hose.

- On December 28, 2011, the inspectors observed repairs to the access door between the Auxiliary Building and the Turbine Building, which was a security door, fire door, and a HELB barrier. Safety-related motor control center (MCC) 231X3 was in the Auxiliary Building and in close proximity to the access door. The inspector noted that the door was physically blocked open during repairs with a standard door stop and questioned how adequate protection from a HELB was maintained. The licensee followed an outdated PBI evaluation for the door, which required an hourly fire watch and continuous security presence since the door was a fire and security door, but the process did not provide contingency actions for HELB considerations. The inspectors noted that adequate protection from a HELB was not maintained for safety-related MCC 231X3 during the time of the work (about 15 minutes) and the licensee did not manage the risk of the maintenance by implementing compensatory actions or assessing operability.

The issue was entered into the licensee's CAP as IR 1282782 and IR 1307401. As a result of the inspectors' observations, the licensee revised BwAP 1110-03 to include additional guidance on control of hazard barriers. The licensee was also considering whether additional training of personnel on the control of hazard barriers was required.

<u>Analysis</u>: The inspectors determined that the failure to control hazard barrier doors in accordance with the requirements of the Maintenance Rule (10 CFR 50.64(a)(4)) and the failure to follow the station's hazard barrier procedure in two instances was a performance deficiency.

The finding was determined to be more than minor because it was associated with the Design Control attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). A significance evaluation in accordance with IMC 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," was performed by the inspectors. The inspectors answered 'No' to all of the Mitigating Systems Cornerstone questions in Table 4a and, as a result, the finding screened as having very low safety significance (Green).

This finding had a cross-cutting aspect in the CAP component of the Problem Identification and Resolution cross-cutting area [P.2(b)] since licensee personnel failed to adequately utilize operating experience (i.e., Regulatory Information Summary 2001-009, "Control of Hazard Barriers") to ensure that station procedures provided adequate controls for effectively managing risk when hazard barrier doors could be impaired during activities to facilitate maintenance.

<u>Enforcement</u>: Title 10 CFR 50.65(a)(4) required, in part, that before performing maintenance activities the licensee shall assess and manage the increase in risk that may result. Furthermore, RIS 2001-009 stated, in part, that "Prior to removing a hazard barrier for maintenance purposes (either to facilitate plant maintenance or to perform maintenance on the barrier), the risk associated with the maintenance activity must be controlled and managed in accordance with paragraph 10 CFR 50.65(a)(4) of the maintenance rule."

Contrary to the above, on October 5 and December 28, 2011, the licensee failed to manage the risk associated with maintenance activities as required by 10 CFR 50.65(a)(4). Specifically, licensee personnel impaired the function of HELB barrier doors such that the doors were blocked from closing. As a result of the inspectors' observations, the licensee revised procedure BwAP 1110-03, "Plant Barrier Impairment Program," to include additional guidance on control of hazard barriers. The licensee was also considering whether additional training of personnel on the control of hazard barriers was required. Because this violation was of very low safety significance and because this issue was entered into the licensee's CAP as IR 1282782 and IR 1307401, this violation is being treated as a NCV consistent with Section 2.3.2 of the NRC

Enforcement Policy. **(NCV 05000456/2011005-05; 05000457/2011005-05, Failure to Follow and Establish Adequate Hazard Barrier Impairment Procedures)**

1R19 Post-Maintenance Testing (71111.19)

.1 Post-Maintenance Testing

a. Inspection Scope

The inspectors reviewed the following post-maintenance activities to verify that procedures and test activities were adequate to ensure system operability and functional capability:

- 2A SX Suction Valve and Oil Cooler Following Maintenance;
- 2B SX Pump Following Maintenance Work Window; and
- 2CS001A Valve Actuator Worm Gear Replacement.

These activities were selected based upon the SSC's ability to impact risk. The inspectors evaluated these activities for the following (as applicable): the effect of testing on the plant had been adequately addressed; testing was adequate for the maintenance performed; acceptance criteria were clear and demonstrated operational readiness; test instrumentation was appropriate; tests were performed as written in accordance with properly reviewed and approved procedures; equipment was returned to its operational status following testing (temporary modifications or jumpers required for test performance were properly removed after test completion); and test documentation was properly evaluated. The inspectors evaluated the activities against TSs, the UFSAR, 10 CFR Part 50 requirements, licensee procedures, and various NRC generic communications to ensure that the test results adequately ensured that the equipment met the licensing basis and design requirements. In addition, the inspectors reviewed corrective action documents associated with post-maintenance tests to determine whether the licensee was identifying problems and entering them in the CAP and that the problems were being corrected commensurate with their importance to safety. Documents reviewed are listed in the Attachment.

This inspection constituted three post-maintenance testing samples as defined in IP 71111.19-05.

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22)

.1 Surveillance Testing

a. Inspection Scope

The inspectors reviewed the test results for the following activities to determine whether risk-significant systems and equipment were capable of performing their intended safety function and to verify testing was conducted in accordance with applicable procedural and TS requirements:

- 1B DG Slave Start and Monthly Surveillance (Routine);
- 1A DG Monthly Slow Start Surveillance (Routine);
- Unit 2 Containment Purge Local Leak Rate Test (Isolation Valve); and
- 2B SX Pump ASME Test (Inservice Testing).

The inspectors observed in-plant activities and reviewed procedures and associated records to determine the following:

- did preconditioning occur;
- were the effects of the testing adequately addressed by control room personnel or engineers prior to the commencement of the testing;
- were acceptance criteria clearly stated, demonstrated operational readiness, and consistent with the system design basis;
- plant equipment calibration was correct, accurate, and properly documented;
- as-left setpoints were within required ranges; and the calibration frequency was in accordance with TSs, the UFSAR, procedures, and applicable commitments;
- measuring and test equipment calibration was current;
- test equipment was used within the required range and accuracy; applicable prerequisites described in the test procedures were satisfied;
- test frequencies met TS requirements to demonstrate operability and reliability; tests were performed in accordance with the test procedures and other applicable procedures; jumpers and lifted leads were controlled and restored where used;
- test data and results were accurate, complete, within limits, and valid;
- test equipment was removed after testing;
- where applicable for inservice testing activities, testing was performed in accordance with the applicable version of Section XI, ASME Code, and reference values were consistent with the system design basis;
- where applicable, test results not meeting acceptance criteria were addressed with an adequate operability evaluation or the system or component was declared inoperable;
- where applicable for safety-related instrument control surveillance tests, reference setting data were accurately incorporated in the test procedure;
- where applicable, actual conditions encountering high resistance electrical contacts were such that the intended safety function could still be accomplished;
- prior procedure changes had not provided an opportunity to identify problems encountered during the performance of the surveillance or calibration test;
- equipment was returned to a position or status required to support the performance of its safety functions; and
- all problems identified during the testing were appropriately documented and dispositioned in the CAP.

Documents reviewed are listed in the Attachment.

This inspection constituted two routine surveillance testing samples, one inservice testing sample, and one containment isolation valve sample as defined in IP 71111.22, Sections -02 and -05.

b. Findings

Failure to Adhere to Maintenance Rule Implementation Procedures

Introduction: The inspectors identified a finding of very low safety significance (Green) when licensee personnel failed to adhere to licensee procedure ER-AA-310, "Implementation of the Maintenance Rule." Specifically, procedural requirements to use dedicated operator manual restoration actions to credit availability of AF, main steam dump valves, or DG ventilation during certain surveillances were not met.

Description: On November 22, 2011, the inspectors observed routine surveillance testing of the 2B SX pump in accordance with procedure 2BwOSR 5.5.8.SX-3B, Revision 3, "Group A Inservice Testing Requirements for 2B SX Pump (2SX01PB)." Prior to the surveillance, the inspectors reviewed the impact to plant online risk and noted that the licensee planned to credit operator actions to restore the equipment if an auto-start signal was received during the surveillance. Crediting operator restoration actions for equipment availability was a method of managing the increase in plant risk from surveillance activities as required by 10 CFR 50.65(a)(4). Guidance for crediting operator restoration actions was contained in NUMARC 93-01, Revised Section 11, "Assessment of Risk from Performance of Maintenance Activities." The licensee implemented the NUMARC guidance using procedure ER-AA-310, "Implementation of the Maintenance Rule."

Procedure ER-AA-310 included the following definition for unavailability: "SSCs OOS for testing are considered unavailable, unless the test configuration is automatically overridden by a valid start signal, or the function can be restored either by an operator in the control room or by a dedicated operator stationed locally for that purpose. Restoration actions must be contained in a written procedure, must be uncomplicated (a single action or a few simple actions), and must not require diagnosis or repair," and "The intent of this paragraph is to allow licensees to take credit for restoration actions that are virtually certain to be successful (i.e., probability nearly equal to 1) during accident conditions." At Braidwood, credited restoration actions were contained in an Excel spreadsheet controlled by licensee probabilistic risk analysts and accessed from the Operations Department website. The site work schedule directed Operations staff to access the spreadsheet for applicable surveillances and the restoration actions in the spreadsheet would be discussed at the pre-job briefing.

The inspectors observed the pre-job briefing of all individuals involved in the 2B SX surveillance and noted that there was no discussion of operator restoration actions and no assignment of a dedicated operator. Once the pre-job briefing was completed the inspectors discussed their observations with the Unit Supervisor leading the briefing. The operators were called back to the control room and one control room operator and one local operator were assigned to perform the documented restoration actions, if emergency restoration was necessary. This was documented in the licensee's CAP as IR 1293440.

The inspectors observed the operators in the field during the surveillance activity and developed concerns over the ability of the local dedicated operator to promptly complete the restoration actions being credited in the surveillance. The actions included monitoring the SX strainer to initiate manual backwash and operation of valves on other plant elevations, depending on which section of the surveillance was being performed.

Because the action to monitor SX strainer backwash status required near continuous observation and the other restoration actions assigned to the local dedicated operator must be taken on different elevations, the inspectors questioned whether the actions being credited could be performed with certainty by the local dedicated operator and whether they met the criteria set forth in NUMARC 93-01, Revised Section 11.

The inspectors' concerns with the restoration actions were documented in IR 1293998, which assigned an extent of condition review of all manual restoration actions. Regarding procedures _BwOSR 5.5.8.SX-3A/B and _BwOSR 5.5.8.SX-6A/B, the extent of condition review stated, "Multiple field operators are assigned to the surveillance to cover all manipulations. Manipulations are limited to two actions per operator and are in the location for the surveillance." The extent of condition review identified the following other procedures that contained restoration actions that did not meet the criteria in NUMARC 93-01, Revised Section 11:

- AF battery capacity tests (BwVSR 3.7.5 procedures) based on the need to perform repair activities (re-landing leads) to restore the system,
- Main Steam dump quarterly surveillances (procedure _BwOS MS-Q1) based on requiring manipulation of 12 valves to restore the system, and
- DG ventilation damper inspections (procedure BwMP 3300-052) due to requiring repair activities to restore the system.

The licensee was taking a number of corrective actions based on the inspectors' observations documented in IR 1249723, IR 1251652, IR 1291692, IR 1293440, and IR 1293998. For the three procedures identified in the extent of condition review, the licensee was no longer crediting restoration actions and removed the restoration actions from the Excel speadsheet. Existing Standing Order 11-19 was revised to enhance discussion of restoration actions for scheduled activities at Operations pre-shift briefings. Standing Order 11-26 was created to require formal logging of dedicated operator assignees and to clarify the expectations placed on dedicated operators. The licensee was also improving the method of documenting and using restoration actions such that the actions would be more formally documented and referenced in controlled procedures. This corrective action was ongoing at the conclusion of the inspection period.

<u>Analysis</u>: The inspectors determined that the failure to adhere to Procedure ER-AA-310, "Implementation of the Maintenance Rule," was a performance deficiency.

The finding was determined to be more than minor because it was associated with the Procedure Quality attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, procedural requirements to use operator restoration actions to credit availability of AF, main steam dump valves, or DG ventilation during certain surveillances were not met. The inspectors determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Phase - 1 Initial Screening and Characterization of Findings," Table 4a, for the Mitigating Systems Cornerstone. The inspectors answered "No" to all of the Mitigating Systems Cornerstone questions in Table 4a of IMC 0609.04 and, as a result, the finding screened as having very low safety significance (Green).

This finding had a cross-cutting aspect in the Resources component of the Human Performance cross-cutting area [H.2(c)] because the documented restoration actions for several surveillances were not in accordance with licensee procedures or industry generic guidance.

Enforcement: This finding did not involve enforcement action because no regulatory requirement was violated. **(FIN 05000456/2011005-06; 05000457/2011005-06, Failure to Adhere to Maintenance Rule Implementation Procedures)**

Cornerstone: Emergency Preparedness

1EP4 Emergency Action Level and Emergency Plan Changes (71114.04)

.1 Emergency Action Level and Emergency Plan Changes

a. Inspection Scope

Since the last NRC inspection of this program area, Emergency Action Levels (EALs) and Emergency Plan Revisions 26 and 27 were implemented based on the licensee's determination, in accordance with 10 CFR 50.54(q), that the changes resulted in no decrease in effectiveness of the Plan, and that the revised Plan as changed continued to meet the requirements of 10 CFR 50.47(b) and Appendix E to 10 CFR Part 50. The inspectors conducted a review of the Emergency Action Level changes to determine whether there was a potential decrease in the effectiveness of the Emergency Plan. Also, the inspectors reviewed the corrective actions to restore compliance in response to Violation (VIO) 05000456/2010503-01; 05000457/2010503-01, dated February 28, 2011. However, these reviews do not constitute formal NRC approval of the changes. Therefore, these changes remain subject to future NRC inspection in their entirety.

This EAL and Emergency Plan changes inspection constituted one sample as defined in IP 71114.04-05.

b. Findings

No findings were identified.

(Closed) VIO 05000456/2010503-01; 05000457/2010503-01, Changes to Emergency Action Level Basis Decreases the Effectiveness of the Plan without Prior NRC Approval.

This violation is closed.

1EP6 Drill Evaluation (71114.06)

.1 Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of a routine licensee emergency drill on November 10, 2011, to identify any weaknesses and deficiencies in classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations during the Emergency Response Organization Table-Top PI Drill held in the Technical Support Center to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the licensee drill critique to compare any inspector-observed weakness with those identified by the licensee staff in order to evaluate the critique and to determine whether the licensee staff was properly identifying weaknesses and entering them into the CAP. As part of the inspection, the inspectors reviewed the drill package and other documents listed in the Attachment.

This emergency preparedness drill inspection constituted one sample as defined in IP 71114.06-05.

b. Findings

No findings were identified.

2. RADIATION SAFETY

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01)

The inspection activities supplement those documented in Inspection Report 05000456/2011003; 05000457/2011003 and constitute one complete sample as defined in IP 71124.01-05.

.1 Inspection Planning (02.01)

a. Inspection Scope

The inspectors reviewed all licensee performance indicators for the Occupational Exposure Cornerstone for followup. The inspectors reviewed the results of radiation protection program audits (e.g., licensee's quality assurance audits or other independent audits). The inspectors reviewed any reports of operational occurrences related to occupational radiation safety since the last inspection. The inspectors reviewed the results of the audit and operational report reviews to gain insights into overall licensee performance.

b. Findings

No findings were identified.

.2 Radiological Hazard Assessment (02.02)

a. Inspection Scope

The inspectors reviewed the last two radiological surveys from selected plant areas and evaluated whether the thoroughness and frequency of the surveys were appropriate for the given radiological hazard.

b. Findings

No findings were identified.

.3 Instructions to Workers (02.03)

a. Inspection Scope

The inspectors selected various containers holding non-exempt licensed radioactive materials that may cause unplanned or inadvertent exposure of workers, and assessed whether the containers were labeled and controlled in accordance with 10 CFR 20.1904, “Labeling Containers,” or met the requirements of 10 CFR 20.1905(g), “Exemptions To Labeling Requirements.”

b. Findings

No findings were identified.

.4 Contamination and Radioactive Material Control (02.04)

a. Inspection Scope

The inspectors reviewed the licensee’s procedures and records to verify that radiation detection instrumentation was used at its typical sensitivity level based on appropriate counting parameters. The inspectors assessed whether or not the licensee had established a de facto “release limit” by altering the instrument’s typical sensitivity through such methods as raising the energy discriminator level or locating the instrument in a high radiation background area.

The inspectors selected several sealed sources from the licensee’s inventory records and assessed whether the sources were accounted for and verified to be intact.

The inspectors evaluated whether any transactions, since the last temporary inspection, involving nationally tracked sources were reported in accordance with 10 CFR 20.2207.

b. Findings

No findings were identified.

.5 Radiological Hazards Control and Work Coverage (02.05)

a. Inspection Scope

The inspectors reviewed the application of dosimetry to effectively monitor exposure to personnel in high radiation work areas with significant dose rate gradients.

The inspectors examined the licensee’s physical and programmatic controls for highly activated or contaminated materials (non-fuel) stored within the spent fuel or other storage pools. The inspectors assessed whether appropriate controls (i.e., administrative and physical controls) were in place to preclude inadvertent removal of these materials from the pool.

b. Findings

No findings were identified.

.6 Risk-Significant High Radiation Area and Very High Radiation Area Controls (02.06)

a. Inspection Scope

The inspectors evaluated licensee controls for very high radiation areas and areas with the potential to become very high radiation areas to ensure that an individual was not able to gain unauthorized access to the very high radiation area.

b. Findings

No findings were identified.

.7 Radiation Worker Performance (02.07)

a. Inspection Scope

The inspectors reviewed radiological problem reports since the last inspection that found the cause of the event to be human performance errors. The inspectors evaluated whether there was an observable pattern traceable to a similar cause. The inspectors assessed whether this perspective matched the corrective action approach taken by the licensee to resolve the reported problems. The inspectors discussed with the radiation protection manager any problems with the corrective actions planned or taken.

b. Findings

No findings were identified.

.8 Radiation Protection Technician Proficiency (02.08)

a. Inspection Scope

The inspectors reviewed radiological problem reports since the last inspection that found the cause of the event to be radiation protection technician error. The inspectors evaluated whether there was an observable pattern traceable to a similar cause. The inspectors assessed whether this perspective matched the corrective action approach taken by the licensee to resolve the reported problems.

b. Findings

No findings were identified.

.9 Problem Identification and Resolution (02.09)

a. Inspection Scope

The inspectors evaluated whether problems associated with radiation monitoring and exposure control were being identified by the licensee at an appropriate threshold and were properly addressed for resolution in the licensee's corrective action program. The inspectors assessed the appropriateness of the corrective actions for a selected sample of problems documented by the licensee that involved radiation monitoring and exposure controls. The inspectors assessed the licensee's process for applying operating experience to the plant.

b. Findings

No findings were identified.

2RS2 Occupational As-Low-As-Is-Reasonably-Achievable Planning and Controls (71124.02)

The inspection activities supplement those documented in Inspection Reports 05000456/2011003; 05000457/2011003 and 05000456/2010005; 05000457/2010005. These current and above reports constitute one complete sample as defined in IP 71124.02-05.

.1 Radiological Work Planning (02.02)

a. Inspection Scope

The inspectors determined whether post-job reviews were conducted and if identified problems were entered into the licensee's CAP.

b. Findings

No findings were identified.

.2 Problem Identification and Resolution (02.06)

a. Inspection Scope

The inspectors evaluated whether problems associated with As-Low-As-Is-Reasonably-Achievable (ALARA) planning and controls were being identified by the licensee at an appropriate threshold and were properly addressed for resolution in the licensee's CAP.

b. Findings

No findings were identified.

2RS7 Radiological Environmental Monitoring Program (71124.07)

This inspection constituted one complete sample as defined in IP 71124.07-05.

.1 Inspection Planning (02.01)

a. Inspection Scope

The inspectors reviewed the annual radiological environmental operating reports and the results of any licensee assessments since the last inspection to assess whether the Radiological Environmental Monitoring Program (REMP) was implemented in accordance with the TSs and Offsite Dose Calculation Manual. This review included reported changes to the Offsite Dose Calculation Manual with respect to environmental monitoring, commitments in terms of sampling locations, monitoring and measurement frequencies, land use census, the inter-laboratory comparison program, and analysis of data.

The inspectors reviewed the Offsite Dose Calculation Manual to identify locations of environmental monitoring stations.

The inspectors reviewed the FSAR for information regarding the environmental monitoring program and meteorological monitoring instrumentation.

The inspectors reviewed quality assurance audit results of the program to assist in choosing inspection "smart samples" and audits and technical evaluations performed on the vendor laboratory program.

The inspectors reviewed the annual effluent release report and the 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste," report, to determine if the licensee was sampling, as appropriate, for the predominant and dose-causing radionuclides likely to be released in effluents.

b. Findings

No findings were identified.

.2 Site Inspection (02.02)

a. Inspection Scope

The inspectors walked down select air sampling stations and thermo-luminescent dosimeter (TLD) monitoring stations to determine whether they were located as described in the Offsite Dose Calculation Manual and to determine the equipment material condition. Consistent with smart sampling, the air sampling stations were selected based on the locations with the highest X/Q, D/Q wind sectors, and TLD dosimeters were selected based on the most risk-significant locations (e.g., those that have the highest potential for public dose impact).

For the air samplers and TLD dosimeters selected, the inspectors reviewed the calibration and maintenance records to evaluate whether they demonstrated adequate operability of these components. Additionally, the review included the calibration and maintenance records of select composite water samplers.

The inspectors assessed whether the licensee had initiated sampling of other appropriate media upon loss of a required sampling station.

The inspectors observed the collection and preparation of environmental samples from different environmental media (e.g., ground and surface water, milk, vegetation, sediment, and soil) as available to determine if environmental sampling was representative of the release pathways as specified in the Offsite Dose Calculation Manual and if sampling techniques were in accordance with procedures.

Based on direct observation and a review of records, the inspectors assessed whether the meteorological instruments were operable, calibrated, and maintained in accordance with guidance contained in the FSAR, NRC Regulatory Guide 1.23, "Meteorological Monitoring Programs for Nuclear Power Plants," and licensee procedures. The inspectors assessed whether the meteorological data readout and recording instruments in the control room and, if applicable, at the tower were operable.

The inspectors evaluated whether missed and/or anomalous environmental samples were identified and reported in the annual environmental monitoring report. The inspectors selected events that involved a missed sample, inoperable sampler, lost TLD dosimeter, or anomalous measurement to determine if the licensee had identified the cause and had implemented corrective actions. The inspectors reviewed the licensee's assessment of any positive sample results (i.e., licensed radioactive material detected above the lower limits of detection) and reviewed the associated radioactive effluent release data that was the source of the released material.

The inspectors selected SSCs that involved or could reasonably involve licensed material for which there was a credible mechanism for licensed material to reach ground water, and assessed whether the licensee had implemented a sampling and monitoring program sufficient to detect leakage of these SSCs to ground water.

The inspectors evaluated whether records, as required by 10 CFR 50.75(g), of leaks, spills, and remediation since the previous inspection were retained in a retrievable manner.

The inspectors reviewed any significant changes made by the licensee to the Offsite Dose Calculation Manual as the result of changes to the land census, long-term meteorological conditions (3-year average), or modifications to the sampler stations since the last inspection. The inspectors reviewed technical justifications for any changed sampling locations to evaluate whether the licensee performed the reviews required to ensure that the changes did not affect their ability to monitor the impacts of radioactive effluent releases on the environment.

The inspectors assessed whether the appropriate detection sensitivities with respect to TSs/Offsite Dose Calculation Manual where used for counting samples (i.e., the samples meet the TSs/Offsite Dose Calculation Manual required lower limits of detection). The licensee used a vendor laboratory to analyze the radiological environmental monitoring program samples; therefore, the inspectors reviewed the results of the vendor's quality control program, including the inter-laboratory comparison, to assess the adequacy of the vendor's program.

The inspectors reviewed the results of the licensee's inter-laboratory comparison program to evaluate the adequacy of environmental sample analyses performed by the licensee. The inspectors assessed whether the inter-laboratory comparison test included the media/nuclide mix appropriate for the facility. If applicable, the inspectors reviewed the licensee's determination of any bias to the data and the overall effect on the radiological environmental monitoring program.

b. Findings

No findings were identified.

.3 Identification and Resolution of Problems (02.03)

a. Inspection Scope

The inspectors assessed whether problems associated with the radiological environmental monitoring program were being identified by the licensee at an appropriate threshold and were properly addressed for resolution in the licensee's CAP. Additionally, the inspectors assessed the appropriateness of the corrective actions for a selected sample of problems documented by the licensee that involved the radiological environmental monitoring program.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, and Emergency Preparedness

4OA1 Performance Indicator Verification (71151)

.1 Mitigating Systems Performance Index - High Pressure Injection Systems

a. Inspection Scope

The inspectors sampled licensee submittals for the MSPI - High Pressure Injection Systems Performance Indicator (PI) for Braidwood Unit 1 and Unit 2 for the period from the fourth quarter 2010 to the fourth quarter 2011. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, was used. The inspectors reviewed the licensee's operator narrative logs, issue reports, MSPI derivation reports, event reports and NRC Integrated Inspection Reports for the period of the fourth quarter 2010 to the fourth quarter 2011 to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's IR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator. Documents reviewed are listed in the Attachment.

This inspection constituted two MSPI high pressure injection system samples as defined in IP 71151-05.

b. Findings

No findings were identified.

.2 Reactor Coolant System Leakage

a. Inspection Scope

The inspectors sampled licensee submittals for the Reactor Coolant System Leakage PI for Braidwood Unit 1 and Unit 2 for the period from the fourth quarter 2010 to the fourth quarter 2011. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, was used. The inspectors reviewed the licensee's operator logs, RCS leakage tracking data, IRs, event reports and NRC Integrated Inspection Reports for the period of the fourth quarter 2010 to the fourth quarter 2011 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's IR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator. Documents reviewed are listed in the Attachment.

This inspection constituted two Reactor Coolant System Leakage samples as defined in IP 71151-05.

b. Findings

No findings were identified.

.3 Occupational Exposure Control Effectiveness

a. Inspection Scope

The inspectors sampled licensee submittals for the occupational radiological occurrences PI for the period from the 1st quarter 2010 through the 3rd quarter 2011. The inspectors used PI definitions and guidance contained in the NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, to determine the accuracy of the PI data reported during those periods. The inspectors reviewed the licensee's assessment of the PI for occupational radiation safety to determine if indicator-related data was adequately assessed and reported. To assess the adequacy of the licensee's PI data collection and analyses, the inspectors discussed with radiation protection staff the scope and breadth of the data reviewed and the results of those reviews. The inspectors independently reviewed electronic personal dosimetry dose rate and accumulated dose alarms and dose reports and the dose assignments for any intakes that occurred during the time period reviewed to determine if there were potentially unrecognized occurrences. The inspectors also conducted walkdowns of locked high radiation area entrances to determine the adequacy of the controls in place for these areas. Documents reviewed are listed in the Attachment.

This inspection constituted one occupational exposure control effectiveness sample as defined in IP 71151-05.

b. Findings

No findings were identified.

4OA2 Identification and Resolution of Problems (71152)

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Emergency Preparedness, Public Radiation Safety, Occupational Radiation Safety, and Physical Protection

.1 Routine Review of Items Entered into the Corrective Action Program

a. Inspection Scope

As part of the various baseline inspection procedures discussed in previous sections of this report, the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify that they were being entered into the licensee's CAP at an appropriate threshold, that adequate attention was being given to timely corrective actions, and that adverse trends were identified and addressed. Attributes reviewed included whether identification of the problem was complete and accurate; whether timeliness was commensurate with the safety significance; whether evaluation and disposition of performance issues, generic implications, common causes, contributing factors, root causes, extent-of-condition reviews, and previous occurrences reviews were proper and adequate; and whether the classification, prioritization, focus, and timeliness of corrective actions were commensurate with safety and sufficient to prevent recurrence of the issue. Minor issues entered into the licensee's CAP as a result of the inspectors' observations are included in the Attachment.

These routine reviews for the identification and resolution of problems did not constitute any additional inspection samples. Instead, by procedure they were considered an integral part of the inspections performed during the quarter and documented in Section 1 of this report.

b. Findings

No findings were identified.

.2 Daily Corrective Action Program Reviews

a. Inspection Scope

In order to assist with the identification of repetitive equipment failures and specific human performance issues for followup, the inspectors performed a daily screening of items entered into the licensee's CAP. This review was accomplished through inspection of the station's daily issue report packages.

These daily reviews were performed by procedure as part of the inspectors' daily plant status monitoring activities and, as such, did not constitute any separate inspection samples.

b. Findings

No findings were identified.

.3 Semiannual Trend Review

a. Inspection Scope

The inspectors performed a review of the licensee's CAP and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on repetitive equipment issues, but also considered the results of daily inspector CAP item screening discussed in Section 4OA2.2 above, licensee trending efforts, and licensee human performance results. The inspectors' review nominally considered the 6 month period of January 2011 through June 2011, although some examples expanded beyond those dates where the scope of the trend warranted.

The review also included issues documented outside the normal CAP in major equipment problem lists, repetitive and/or rework maintenance lists, departmental problem/challenges lists, system health reports, quality assurance audit/surveillance reports, self-assessment reports, and Maintenance Rule assessments. The inspectors compared and contrasted their results with the results contained in the licensee's CAP trending reports. Corrective actions associated with a sample of the issues identified in the licensee's trending reports were reviewed for adequacy.

This review constituted one semiannual trend inspection sample as defined in IP 71152-05.

b. Findings

No findings of significance were identified.

Based on a review of plant performance and inspection results over about the past year, the inspectors identified an adverse trend in previously unknown or incorrectly analyzed plant design issues and modifications, which in many cases resulted in the failure to satisfy 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requirements. The inspectors noted that while many of these issues have some historical nature to them, there were often missed opportunities to discover the issues. In addition, most of these issues represented challenges to equipment operability and required significant emergent licensee and NRC resources to address. The inspectors concluded that the number of design and legacy issues that had been identified raised questions about whether additional design or analysis issues remain undiscovered. The inspectors discussed these issues at length, both individually and as a collective adverse trend, with licensee management. The licensee recently planned a number of actions to address the inspectors' concerns. These actions include Technical Issues Meetings between the Braidwood and Byron engineering personnel, increased focus on potential trends or common aspects between the issues, and consideration of corrective actions to address trends or themes that may be identified. Additionally, the licensee planned to perform a review to specifically identify latent design issues.

The specific design issues, with references to the enforcement action, including the following:

- Effects of Non-Conservatisms in the Turbine Building High Energy Line Break Analysis on Safety-Related Equipment (Section 1R15 of this Inspection Report);

- Inadequately Analyzed Auxiliary Feedwater Motor and Breaker Cycling (Braidwood Inspection Report 2010-006);
- Effects of Single Failure Assumptions on Steam Generator Margin-to-Overfill Analysis (Braidwood Inspection Reports 2011-009 and 2011-010);
- Auxiliary Feedwater Suction Standpipe Overflows onto Turbine Deck by Design (Braidwood Inspection Report 2010-010);
- Discovery of Asiatic Clam Shells in 2A Auxiliary Feedwater Alternate Suction Piping (Braidwood Inspection Report 2011-004);
- Inaccurate Analysis of Component Cooling Water System Configuration (Braidwood Inspection Report 2011-004);
- Inadequately Analyzed Auxiliary Feedwater Alternate Suction Line Voided Region (Braidwood Inspection Reports 2011-004 and 2011-012);
- Inadequate Review of Modification to Remove Carbon Dioxide Fire Suppression from the Upper Cable Spreading Room (Braidwood Inspection Report 2008-004); and
- Inadequate Review of Auxiliary Feedwater Unit Cross-Tie Modification (Braidwood Inspection Report 2011-004).

The inspectors planned to continue to monitor the licensee's efforts in identifying and correcting any common themes that may exist in these issues, as well as validating that appropriate technical resolutions to the issues have been implemented.

.4 Selected Issue for Followup Inspection: Review of Corrective Actions Associated with Multiple NRC-Identified Secured Material Storage Zone Findings

a. Scope

The inspectors reviewed the corrective actions associated with the following NRC-identified findings:

- 05000456/2011003-01; 05000457/2011003-01, "Failure to Follow Procedural Standards Related to the Storage of Outside Material that Could Impact Offsite Power Availability"; and

- 05000456/2011004-01; 05000457/2011004-01, "Failure to Adhere to Standards of Outdoor Secured Material Zones."

These findings shared a common theme in that they represented licensee performance issues with maintaining the outdoor secured material zone free of debris in accordance with station standards. These standards were established based upon corrective actions from a 1998 Braidwood Unit 1 Loss-of-Offsite-Power (LOOP) event. The cause of this event was related to high winds blowing material into an energized station auxiliary transformer.

b. Findings

No findings were identified.

However, corrective actions to date have not been effective at preventing numerous additional instances in which the licensee was not meeting procedural standards. The inspectors searched through the station's CAP records and identified 15 IRs documented in the fourth quarter of 2011 pertaining to the identification of inappropriate storage of unsecured material inside of the secured material storage zone. The majority of the IRs cited multiple examples. Material identified in the IRs varied vastly in size and weight, but, in general, represented failures to meet the same procedural standards documented in the findings above. The inspectors noted that the performance issues were widespread across at least ten departments representing a station cultural weakness in the staff understanding the procedural requirements and supervision ensuring the standards were maintained. The majority of the issues were identified by managers and senior managers during their periodic “Day in the Plant” walkdown activities.

The inspectors determined that, individually, these issues were of minor significance because they did not occur during high wind or tornado watch conditions as the NRC-identified findings referenced above. However, the inspector’s identified that the station’s corrective actions, thus far, had not been effective.

The inspectors discussed these observations with licensee management. Planned station corrective actions included plans for additional markings within the secured material zone to alert personnel of the area, shrinking the secured material storage zone to credit permanent structures as barriers to the transformers, and additional communication to the staff regarding the procedural requirements.

This review constituted one in-depth problem identification and resolution sample as defined in IP 71152-05.

4OA3 Followup of Events and Notices of Enforcement Discretion (71153)

.1 (Closed) Licensee Event Report 05000456/2010-001-01, Reactor Trip Due to Water Intrusion in Breakers Causing Circulating Water Pump Trips and Resulting in a Loss of Condenser Vacuum

This event, which occurred on August 16, 2010, was initially reported in LER 05000456/2010-001-00 on October 15, 2010. The inspectors documented their review of the initial LER in Section 4OA3 of Inspection Report 05000456/2010005; 05000457/2010005. The initial LER was closed to the inspection results that were documented in Special Inspection Report 05000456/2010010; 05000457/2010010.

Revision 1 of the LER, which was submitted on March 2, 2011, provided updated information related to the root cause and corrective actions. The inspectors reviewed the updated root cause and corrective action information and did not identify any new violations.

Documents reviewed are listed in the Attachment. This LER is closed.

This event followup review constituted one sample as defined in IP 71153-05.

.2 (Withdrawn/Closed) Licensee Event Report 05000456/2011-003-00; 05000457/2011-003-00, Drained Sections of Piping in Auxiliary Feedwater Suction Lines Result in System Inoperability Due to Inadequate Technical Evaluation

On March 29, 2011, the licensee received a vendor analysis which concluded that voided portions of the alternate suction to the AF pumps would result in void fractions at the pump suction that exceeded industry acceptance criteria. As a result, operability of the AF pumps could not be supported with the voids present. The licensee implemented modifications to fill and vent the voided sections of suction piping. Full scale testing was conducted by the licensee and observed by the NRC, which ultimately demonstrated that the voids would not have prevented the AF pumps from performing their safety function. Based on a review of the full-scale testing results, the licensee withdrew the LER on October 7, 2011.

This issue was the subject of an NRC Special Inspection, the results of which were documented in Braidwood/Byron Special Inspection Report 05000456/2011012; 05000457/2011012; 05000454/2011015; 05000455/2011015. The issue was further discussed in Section 4OA2 of Braidwood Inspection Report 05000456/2011004; 05000457/2011004. The inspectors did not identify any additional violations.

Documents reviewed are listed in the Attachment. Based on the inspection results documented in the Inspection Reports referenced in this section, this LER is closed.

This event followup review constituted one sample as defined in IP 71153-05.

4OA5 Other Activities

.1 Pre-operational Testing of an Independent Spent Fuel Storage Facility Installation at Operating Plants (60854.1)

a. Inspection Scope

(1) Control of Heavy Loads

The inspectors reviewed the licensee's implementation of the control of heavy loads program for Independent Spent Fuel Storage Facility Installation (ISFSI) operations. The inspectors reviewed inspection, testing, and maintenance documentation associated with the Fuel Handling Building crane, (transfer cask) HI-TRAC lifting trunnion, lift yoke, Low Profile Transporter, and Vertical Cask Transporter to ensure compliance with industry standards, station procedures and design specifications. The inspectors observed the licensee perform heavy load movements inside and outside of the fuel handling building. The inspectors observed the licensee perform daily and weekly inspections and the inspectors performed an independent walk down of the Fuel Handling Building crane.

(2) Dry Run Activities

The licensee performed pre-operational dry run activities to fulfill the requirements of the Certificate of Compliance (CoC). The NRC inspectors were onsite to observe dry run activities from September 9 through September 15, 2011 and October 20 through October 25, 2011. These activities included multi-purpose canister (MPC) processing, heavy loads operations inside and outside of the Fuel Handling Building, review of the licensee's 10 CFR 72.212 Report, crane walkdown inspections, and document review.

The inspectors observed the licensee place the HI-TRAC containing the MPC into the spent fuel pool (SFP) wet pit. The inspectors observed the loading and unloading of dummy fuel bundles into the MPC basket. The licensee demonstrated removal of a dummy fuel assembly from the SFP storage rack, placement of the assembly into the

MPC, and retrieval of the fuel assembly from the MPC to the SFP rack. The inspectors observed the licensee remove a HI-TRAC containing a MPC from the SFP and subsequent placement of the HI-TRAC in the wash down pit.

The inspectors observed the licensee perform MPC processing activities. The licensee demonstrated MPC hydrostatic testing, blowdown, forced helium dehydration, and helium backfilling. The inspectors observed the licensee demonstrate MPC unloading dry run activities.

The inspectors observed transfer of the MPC from the HI-TRAC cask to the storage cask (HI-STORM) in a restrained support structure in the Fuel Handling Building and the subsequent movement of the HI-STORM outside of the Fuel Handling Building on a low profile transporter.

The inspectors observed transfer of the HI-STORM overpack from the Fuel Handling Building to the ISFSI pad via the haul path and placement on its proper location on the ISFSI pad using the vertical cask transporter.

The inspectors observed communication between Reactor Services, Operations, Radiation Protection, and Security staff. The inspectors verified adequate communication and coordination between departments and adherence to procedures.

The inspectors attended licensee briefings during dry run operations including infrequently performed test or evolution briefs, pre-job briefs, post-job briefs, ALARA radiation dose briefs, and in-field briefs.

The inspectors reviewed loading and unloading procedures to ensure that they contained commitments and requirements specified in the CoC, the TS, the UFSAR, and 10 CFR Part 72.

(3) Fuel Selection

The inspectors reviewed the licensee's program associated with fuel characterization and selection for storage. The inspectors reviewed the licensee's procedure to characterize fuel as fuel debris, damaged, or intact fuel. The licensee did not plan to load any damaged fuel assemblies or fuel debris during this initial campaign. The inspectors reviewed licensee procedure NF-AA-622, "Fuel Selection and Documentation for Dry Cask Loading Byron and Braidwood," Revision 3, to verify that the procedure contained adequate instructions for licensee staff to select fuel assemblies in accordance with the CoC approved contents. The inspectors reviewed the initial campaign cask fuel selection packages to verify that the licensee was loading fuel in accordance with the CoC approved contents.

(4) Radiation Protection

The inspectors evaluated the licensee's Radiation Protection Program pertaining to the operation of the ISFSI. The inspectors reviewed the licensee's procedures describing the methods and techniques used when performing dose rate and surface contamination surveys and verified that they ensured dose rate limits and surveillance requirements of the TS were met. The inspectors verified that the licensee's Radiation Protection staff considered lessons learned from other utilities' spent fuel loading campaigns during development of the radiological controls for loading, storage and unloading operations.

The inspectors interviewed licensee personnel to verify their knowledge regarding the scope of the work and the radiological hazards associated with transfer and storage of spent fuel. The inspectors reviewed licensee dose rate calculations to verify that the licensee's ISFSI was in compliance with 10 CFR 72.104, "Criteria for Radioactive Materials in Effluents and Direct Radiation from an ISFSI or MRS [Monitored Retrievable Storage Installation]." The inspectors verified that the licensee had a radiation monitoring program in place to ensure compliance with 10 CFR 20.1301, "Dose Limits for Individual Members of the Public," and interviewed staff on the implementation of this program in regards to ISFSI storage operations.

(5) Training

The inspectors reviewed the licensee's ISFSI Training Program, which consisted of classroom and on-the-job training to ensure involved staff were adequately trained for the work they were responsible to perform. The inspectors also reviewed training records and qualifications of individuals performing work activities associated with the ISFSI. The inspectors interviewed licensee personnel in various departments to verify that they were knowledgeable of the scope of work that was being performed.

(6) Quality Assurance

The inspectors reviewed the licensee's Quality Assurance Program, as it applied to the ISFSI. In a letter from Exelon Nuclear to the NRC on January 21, 2009, the Braidwood Station communicated their intent to incorporate the ISFSI Quality Assurance Program into their established 10 CFR Part 50 Quality Assurance Program as allowed by 10 CFR 72.140(d).

The inspectors reviewed procedures pertaining to the receipt inspection of MPCs and HI-STORM overpacks. The inspectors observed the license integrate their Materials and Test Equipment program into ISFSI activities. The inspectors observed that gauges were within their calibration date, and that the use of 99.995 percent pure helium was used during backfilling. The inspectors reviewed the calibration dates of various components used for ISFSI operations.

(7) Emergency Preparedness and Fire Protection

The inspectors reviewed the licensee's Emergency Preparedness Plan required by 10 CFR 50.47 for conformance with 10 CFR 72.32(c). The inspectors verified that the licensee incorporated Emergency Action Levels into the Emergency Plan to address the emergency scenarios, their classification, and recovery actions associated with the ISFSI. The inspectors reviewed the licensee's procedure that addressed contingency actions, including a fire at the ISFSI.

b. Findings

No violations of NRC requirements were identified.

.2 Review of 10 CFR 72.212(b) Evaluations at Operating Plants

a. Inspection Scope

(1) Review of Licensee Evaluations

The inspectors reviewed the licensee's ISFSI pad evaluations for compliance with the requirements in 10 CFR 72.212 (b)(5)(ii) during ISFSI inspections documented in NRC Inspection Reports 072-00073/09-01, 050-00456/09-08, and 050-00457/09-08. During this initial review not all of the licensee's calculations pertaining to the subject were available at the time of the inspection.

The inspectors reviewed the licensee's evaluations that were used to demonstrate that the ISFSI pad was designed to adequately support the static and dynamic loads of the stored casks, considering potential amplification of earthquakes through soil-structure interaction, soil liquefaction potential, or other soil instability due to vibratory ground motion. The licensee's evaluation allowed a maximum of ten casks due to an NRC identified violation at Byron Station (IR 05000454/2010004; 05000455/2010004; 07200068/2010001) and LaSalle County Station (IR 05000373/2010005; 05000374/2010005; and 07200070/2010001). The licensee was evaluating an option to perform additional calculations to increase the capacity of the ISFSI pad.

(2) Review of Site Characteristics Against SAR and SER

The inspectors evaluated the licensee's compliance with the requirements of 10 CFR 72.212 and 10 CFR 72.48. The inspection consisted of interviews with cognizant personnel and review of documentation. The licensee was required, as specified in 10 CFR 72.212(b)(1), to notify the NRC of the intent to store spent fuel at the Braidwood Nuclear Power Station, Units 1 and 2 ISFSI facility at least 90 days prior to the first storage of spent fuel. The licensee notified the NRC on April 28, 2011, of their intent to store spent fuel using the Holtec HI-STORM 100 Cask System according to CoC No. 72-1014, Amendment 3.

A written evaluation was required per 10 CFR 72.212(b)(6), prior to use, to establish that the conditions of the CoC have been met. "Braidwood Nuclear Power Station, Units 1 and 2, 10 CFR 72.212 Evaluation Report," Revision 0, dated October 25, 2011 documented the evaluations performed by the licensee prior to use of the 10 CFR Part 72 general license.

The inspectors reviewed and assessed the licensee's 10 CFR 72.212 Evaluation Report. The inspectors determined whether applicable reactor site parameters, such as fire and explosions, tornadoes, wind-generated missile impacts, seismic qualifications, lightning, flooding, and temperature, had been evaluated for acceptability with bounding values specified in the Holtec HI-STORM 100 FSAR and associated analyses.

(3) Review of Independent Spent Fuel Storage Installation Activities for Determination of No Adverse Impact on Site Operation or Technical Specifications

The inspectors reviewed documentation associated with the fuel handling building crane, crane support structure, and cask lay down areas. The review included structural evaluations associated with the seismic design of the new trolley, hoist/reeving equipment, miscellaneous components, crane bridge girders, supporting structural steel, modifications affecting the operating plant, and floor loading in cask lay down areas. The inspectors also reviewed seismic restraints used during placement of the HI-TRAC on top of the HI-STORM during MPC transfer operations. The associated safety evaluations and screenings were also reviewed.

b. Findings

(1) Failure to Perform Adequate Evaluations to Facilitate Independent Spent Fuel Storage Installation Activities

Introduction: The inspectors identified a Severity Level IV NCV of 10 CFR 72.146, "Design Control," with three examples when licensee personnel failed to perform adequate evaluations to ensure compliance with 10 CFR 72.212(b)(5)(ii); 10 CFR 72.212(b)(8); and the FSAR referenced in the CoC.

Description: Title 10 CFR 72.212(b)(5)(ii), "Conditions of General License Issued Under 72.210," stated that the general licensee must perform written evaluations which established that "The cask storage pads and areas have been designed to adequately support the static and dynamic loads of the stored casks, considering potential amplification of earthquakes through soil-structure interaction, and soil liquefaction potential or other soil instability due to vibratory ground motion."

Title 10 CFR 72.212(b)(8), "Conditions of General License Issued Under 72.210," stated that the general licensee must, "Before use of the general license, determine whether activities related to storage of spent fuel under this general license involve a change in the facility TSs or require a license amendment for the facility pursuant to §50.59(c) of this chapter. Results of this determination must be documented in the evaluations made in paragraph (b)(5) of this section."

The Holtec International FSAR for the HI-STORM 100 Cask System, Table 8.1.6 stated, in part, that the HI-STORM lifting devices and the HI-TRAC lift yoke/lift links shall be provided in accordance with ANSI [American National Standards Institute] N14.6.

The licensee performed calculations to demonstrate adequacy of the pad, adequacy of the plant structures licensed under 10 CFR Part 50, and the special lifting devices used for handing of the HI-STORM storage and HI-TRAC transfer casks. The inspectors identified deficiencies in the licensee calculations as described below.

The liquefaction assessment of the ISFSI pad was contained in calculations 2.4.4-BRW-09-0027-S, Revision 0, and 2.4.4-BRW-09-0066, Revision 1. The NRC guidance on the assessing the seismic soil liquefaction assessment was provided in Regulatory Guide (RG) 1.198. Section 3.2 of RG 1.198 recommended that with a Factor of Safety (FS) of less than or equal to 1.1, the soil elements would achieve conditions wherein soil liquefaction should be considered to have been triggered, and that for a FS value between 1.1 and 1.4, reduced strength values be assigned in the further stability and deformation analyses. Regulatory Guide 1.198, Section 3.3.1 recommended that the uncertainty in the geotechnical input parameters such as soil types, layer thicknesses, and soil strengths, should be addressed in the analyses. The inspectors identified that the licensee calculations used a FS of 1.05 as the acceptance criteria against liquefaction potential under the Safe Shutdown Earthquake load case, did not consider use of reduced soil strength values in analyses, and also did not address the uncertainty in the geotechnical soil parameters. The licensee calculations did not provide adequate justifications for the use of less conservative criteria than those recommended in RG 1.198 or reference an alternate industry code or standard. Upon identification, the licensee captured the issue in IR 01280650 and subsequently performed more refined evaluations of the post vibro-compaction soil conditions in new calculation 2.4.4-BRW-11-0125-S, Revision 0, demonstrating compliance with RG 1.198 guidance.

The licensee performed evaluations to demonstrate dynamic stability of the various cask configurations during fuel transfer from the SFP to the ISFSI pad. The evaluations also addressed the adequacy of the structures to remain within their design bases stress limits described in the UFSAR when subjected to the additional loads due to cask storage configurations, including the seismic loads. Stability analyses for the free-standing configurations in the Spent Fuel Pool (SFP) storage cask area at elevation 385'; in the Fuel Handling Building elevation 401' while staged on a Low Profile Transporter; and in the decontamination pit in the Fuel Handling Building, were performed in calculation 4.1.1-BRW-10-0156-S, Revision 0. The inspectors noted that the evaluations indicated that under a seismic event the casks could rotate, thereby lifting at one end. Such uplifting and dropping during a seismic event could result in additional loading on the floors due to repeated impact. Upon questioning by the inspectors, the licensee realized that such a load was not included in their structural evaluations of the Fuel Handling Building and the SFP floors as well as in design of the low profile transporter. The calculations were then revised to evaluate the concrete floors for the impact loads using an energy balance approach that would allow plastic deformation. In response to additional questions by the inspectors regarding the methodology being consistent with the plant UFSAR and the need for an evaluation per 10 CFR 50.59, the licensee decided not to use the energy balance methodology and instead performed additional new rigorous finite element analyses to determine the stability and displacements/rotations for cask storage configurations as well as structural adequacy of the supporting floors. The issue associated with not considering the impact load was documented in IR 1245756.

The inspectors also identified technical deficiencies in the licensee's calculations demonstrating compliance with the ANSI N14.6-1993, "Special Lifting Devices for Shipping Containers Weighing 10000 Pounds (4500kg) or More," and NUREG 0612, "Control of Heavy Loads at Nuclear Power Plants." These calculations included HI-2012797, Revision 3 (Structural Analysis of the HI-TRAC Lift Links); HI-2094252, Revision 1 (Structural Analysis of 125-Ton HI-TRAC Lift Yoke); and HI-992272, Revision 13 (Calculation Package for Cask Miscellaneous Items used for Evaluation of HI-STORM Lifting Bracket). The licensee used allowable stresses in accordance with ANSI N14.6, however the standard did not specify the methods for calculating the stresses in individual components. For lifting devices, the standard methods for determining such stresses were provided in publications such as American Institute of Steel Construction (AISC) Specifications, and ASME BTH-1 entitled "Design of Below-the-Hook Devices." The inspectors identified that in the calculation of pin bending stress, the licensee used clear span between the supporting plates instead of using the center-to-center distance between the plates. The ASME BTH-1 recommended use of center-to-center span unless a more rigorous analysis that accounted for local deformations was performed. The AISC specification did not explicitly state the use of center-to-center span, but a review of examples in technical references identified that to be the standard practice. Similarly the licensee used non-conservative formulas for calculating tear out length from the pin hole to the free edge in determination of shear stresses on planes beyond the pin-holes and parallel to the direction of load application. The methods for designing pin connections were prescribed in AISC Specification (9th Edition, Section D3, Pin-Connected Members) and in the ASME BTH-1 (2005, or 2008, Section 3.3.3). The licensee calculations were non-conservative with respect to the above requirements and the licensee did not provide any other standard or technical reference to justify the methodology. The inspectors noted that without more refined evaluations, use of center-to-center span and correct formulas for shear check could have resulted in safety factors smaller than those required by ANSI N14.6. The licensee documented the calculation deficiencies in IR 1278520 and subsequently issued new and revised calculations using methods consistent with the common engineering practices to demonstrate compliance with ANSI N14.6.

Analysis: The inspectors determined that the failure to perform adequate calculations evaluating the potential for soil liquefaction of the ISFSI pad area, evaluating the adequacy of the existing plant structures for the loading from the cask loads, and evaluating the adequacy of the lifting devices was a violation that warranted a significance evaluation. Consistent with the guidance in Section 2.2 of the NRC Enforcement Policy, ISFSIs are not subject to the SDP and, thus, traditional enforcement is used for these facilities. The violation was determined to be of more than minor significance using IMC 0612, "Power Reactor Inspection Reports," Appendix E, "Examples of Minor Issues," Example 3j, in that the licensee's lack of evaluation did not assure structural integrity of the affected components under the design basis loads, requiring extensive revisions to the calculations.

Consistent with the guidance in Section 2.6.D of the NRC Enforcement Manual, if a violation does not fit an example in the Enforcement Policy Violation Examples, it should be assigned a severity level: (1) Commensurate with its safety significance; and (2) Informed by similar violations addressed in the violation examples. The violation screened as having very low safety significance (Severity Level IV). Specifically, the revised calculations demonstrated adequacy of the design without field modifications.

Reactor Oversight Process cross-cutting aspects do not apply to traditional enforcement issues or licensee-identified ROP findings of very low safety significance, therefore, none was identified.

Enforcement: Title 10 CFR 72.146(b), "Design Control," stated, in part, that "The design control measures must provide for verifying or checking the adequacy of design by methods such as design reviews, alternate or simplified calculational methods, or by a suitable testing program.."

Contrary to the above, during the period between February 2009 and August 2011, the licensee failed to verify the adequacy of the design for soil liquefaction potential under the ISFSI pad, for structural evaluation of the FHB and SFP floors, and for evaluation of the special lifting devices used for handling of the storage and transfer casks. Specifically:

- On May 12, 2009, in calculation 2.4.4-BRW-09-0027-S, Revision 0, and on September 15, 2009, in calculation 2.4.4-BRW-09-0066, Revision 1, licensee personnel failed to verify that adequate safety factors were used and that uncertainty in the geotechnical input parameters such as soil types, layer thicknesses, and soil strengths, were addressed in their analyses to demonstrate that the ISFSI cask pad and the areas would be adequately supported for static and dynamic loads considering soil liquefaction potential.

- During the period between March 9, 2011 and August 18, 2011, in Revisions 0 through 2 of calculation 4.1.1-BRW-10-0156, licensee personnel identified that during various stages of fuel transfer operations inside the plant, the casks would uplift during a seismic event resulting in additional impact loads on the structural floors as well as the low profile transporter. The licensee, however, did not evaluate the affected structures for the additional impact loads.

- During the period between February 6, 2009 and March 17, 2011, in calculations HI-2012797 Revision 3 (Structural Analysis of the HI-TRAC Lift Links); HI-2094252, Revision 1 (Structural Analysis of 125-Ton HI-TRAC Lift Yoke); and HI-992272, Revision 13 (Calculation Package for Cask Miscellaneous Items used for Evaluation of HI-STORM Lifting Bracket); licensee personnel failed to adequately determine the bending stresses in lifting pins and shear stresses in the pin supporting plates in order to demonstrate structural adequacy of the special lifting devices used in ISFSI cask handling operations.

Corrective actions included revisions to the calculations to correct the issues. Because this violation was of very low safety significance and because this issue was entered into the licensee's CAP as IR 1245756, IR 1278520, and IR 1280650, this violation is being treated as a NCV consistent with Section 3.1.1 of the NRC Enforcement Policy. **(NCV 05000456/2011005-07; 05000457/2010005-07, 07200073/2011001-01; Failure to Perform Adequate Evaluations for ISFSI).**

.2 <u>Initial Loading Campaign - Operation of an Independent Spent Fuel Storage Installation at Operating Plants (60855.1)</u>

a. <u>Inspection Scope</u>

The inspectors observed and evaluated the licensee's loading of the first and third canisters during the licensee's initial spent fuel storage loading campaign to verify compliance with the Certificate of Compliance, TSs, regulations, and associated procedures.

The inspectors observed heavy load movements inside the Fuel Handling Building including lifting of the transfer cask (HI-TRAC) into the spent fuel pool, lifting of the HI-TRAC from the spent fuel pool to the dry decontamination pit, lifting of the HI-TRAC from the dry decontamination pit to the Fuel Handling Building railway location, and transfer of the multi-purpose canister (MPC) from the HI-TRAC to the storage cask (HI-STORM) while the casks were stacked on one another in a restrained configuration. The inspectors observed loading of spent fuel assemblies from the Spent Fuel Pool into the MPC. The inspectors observed MPC processing operations including decontamination and surveying, MPC welding, non-destructive weld examinations, hydrostatic testing, MPC draining, forced helium dehydration, and helium backfilling. The inspectors also observed heavy load operations outside of the Fuel Handling Building including transfer of the storage cask from inside of the Fuel Handling Building to outside of the Fuel Handling Building on a low profile transporter, and transfer of the HI-STORM to the ISFSI pad using a vertical cask transporter.

In addition the inspectors observed the licensee implement contingency procedures during a forced helium dehydration system failure during drying operations on the first canister and again during a vent port cap leak during backfilling operations on the third canister.

During performance of the activities, the inspectors evaluated the licensee staff's familiarity with procedures, supervisory oversight, and communication and coordination between the groups involved. The inspectors reviewed loading and monitoring procedures and evaluated the licensee's adherence to these procedures.

The inspectors verified that contamination and radiation levels from the HI-TRAC and HI-STORM were below the regulatory, TS, and administrative limits. The inspectors performed walkdowns of the licensee's ISFSI pad to assess the material condition of the pad and HI-STORMs.

The inspectors attended licensee briefings during dry run operations including infrequently performed test or evolution briefings, pre-job briefs, post-job briefs, ALARA radiation dose briefs, and in-field briefs to assess the licensee's ability to identify critical steps of the evolution, potential failure scenarios, and tools to prevent errors. The inspectors reviewed IRs and the associated follow-up actions that were generated during the loading campaign. The inspectors also reviewed the licensee's 10 CFR 72.48 screenings. The inspectors reviewed the licensee's registration of MPC Type 32, Serial Number 147 and HI-STORM 100S Serial Number 454 in accordance with 10 CFR 72.212(b)(2).

b. Findings

Failure to Follow Procedures to Ensure Multi-Purpose Canister Design Basis Pressure is Not Exceeded

Introduction: The inspectors identified a Severity Level IV NCV of 10 CFR 72.150, "Instructions, Procedures, and Drawings," when licensee personnel failed to adhere to procedures to ensure that the design basis pressure limit for the MPC would not be exceeded during canister loading operations.

Description: On November 2, 2011, the licensee was performing an equipment line-up in preparation to conduct the MPC lid weld pressure hydrostatic test on the first MPC of the loading campaign. The line-up actions were being performed under the direction of licensee procedure BwFP FH-71, "MPC Processing," Revision 2, Section 4.7, "MPC Pressure Test." Step 4.7.2(3)(D) of BwFP FH-71 directed the licensee to configure the pressure test equipment in accordance with Figure FH-71-4.

The licensee completed step 4.7.2(3)(D), however the licensee failed to configure the equipment per Figure FH-71-4. Specifically the license failed to route a discharge line from the 135/140 psig relief valve mounted on the drain removable valve operating assembly to the floor drain and instead left a cap on the 135/140 psig relief valve which could impair the function of the relief valve.

At the completion of this step neither the vent or drain air-operated valve (AOV) had been connected to its nitrogen supply which caused the AOVs to position closed as designed. The AOVs positioned closed compounded with the relief valve's function being defeated caused the canister to be placed in an isolated condition.

An isolated MPC containing both fuel and water was not analyzed in the HI-STORM 100 FSAR, Revision 5. In addition, a relief valve was required during hydrostatic testing (which had not yet been started).

The inspectors who were observing activities in the field performed a system walkdown and questioned the licensee on the configuration of the system and whether the licensee had configured the system in accordance with Procedure BwFP FH-71. The inspector verified that pressure in the MPC was 0 psig.

The technicians immediately removed the cap on the relief valve and connected the drain hose as specified by Figure FH-71-4.

The licensee entered this issue into their CAP as IR 01279837, IR 01286670, and IR 01285354. The MPC containing spent nuclear fuel was placed in a safe condition. The alternate cooling system was placed in service thereby providing continuous cooling water flow to the fuel and all work was stopped.
Plant management imposed a stand-down for the licensee to analyze, assess, and understand why errors were taking place and to implement corrective actions before work resumed. Those actions included crew debrief interviews, ISFSI management team and supervisor oral boards, procedure use and adherence evaluations, reinforcement of human performance expectations, work area control plans, and a multi-disciplined detailed review of the ISFSI processing procedures for accuracy and depth of prescription. When all corrective actions were completed, and following senior management review, work was resumed.

<u>Analysis</u>: The inspectors determined that the failure to adhere to procedures was a violation that warranted a significance evaluation. Consistent with the guidance in Section 2.2 of the NRC Enforcement Manual, ISFSIs are not subject to the SDP and traditional enforcement is used. The violation was dispositioned in accordance with the traditional enforcement process using Section 2.3 of the Enforcement Policy.

The violation was determined to be of more than minor significance using IMC 0612, "Power Reactor Inspection Reports," Appendix E, "Examples of Minor Issues," Example 2h, in that multiple examples of failures to follow procedures related to the ISFSI (IR 01279837, 01286670, and 01285354) were identified.

Consistent with the guidance in Section 2.6.D of the NRC Enforcement Manual, if a violation does not fit an example in the enforcement policy violation examples, it should be assigned a severity level: (1) Commensurate with its safety significance; and (2) informed by similar violations addressed in the violation examples. The inspectors found no similar violations in the violation examples. The inspectors verified that the design basis canister pressure was not exceeded; therefore, the violation was determined to be of very low safety significance (Severity Level IV).

Reactor Oversight Process cross-cutting aspects do not apply to traditional enforcement issues or licensee-identified ROP findings of very low safety significance, therefore, none was identified.

Enforcement: Title 10 CFR 72.150, "Instructions, Procedures, and Drawings," stated, in part, that the licensee shall prescribe activities affecting quality by documented instructions, procedures, or drawings of a type appropriate to the circumstances and shall require that these instructions, procedures, and drawings be followed.

Contrary to the above, on November 2, 2011, the licensee failed to follow procedures to ensure that the design basis pressure limit for the MPC would not be exceeded during canister loading operations.

The licensee entered this issue into their CAP as IR 01279837, IR 01286670, and IR 01285354. This Severity Level IV Violation is being treated as a NCV consistent with Section 3.1.1 of the NRC Enforcement Manual. **(NCV 05000456/2011005-0X; 05000457/2011005-0X; 07200073/2011001-2, Failure to Follow Procedures to Ensure MPC Design Basis Pressure is Not Exceeded)**. .

4OA6 Management Meetings

.1 Exit Meeting Summary

On January 5, 2012, the inspectors presented the inspection results to Mr. M. Kanavos, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

.2 Interim Exit Meetings

Interim exits were conducted for:

- The annual review of Emergency Action Level and Emergency Plan changes with Mr. J. Gerrity, Emergency Preparedness Manager, via telephone on October 19, 2011;
- The inspectors presented the results of the ISFSI Dry Run Readiness Inspection on October 27, 2011;
- The Radiological Environmental Monitoring Program inspection with Mr. M. Kanavos, Braidwood Plant Manager, on November 18, 2011;
- Licensed Operator Requalification Inspection results with Mr. R. Cameron, Licensed Operator Requalification Training Program Lead, via telephone on November 29, 2011;
- The triennial heat sink inspection with Mr. D. Enright, Braidwood Site Vice President, on December 2, 2011;
- The Radiological Hazard Assessment/Exposure Controls, ALARA Planning/Controls and Occupational Exposure Control Effectiveness PI verification inspection with Mr. M. Kanavos, Braidwood Plant Manager, on December 9, 2011; and
- The ISFSI Initial Loading Operational Inspection on January 5, 2012.

Licensee personnel acknowledged the information presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary. Proprietary material received during the inspection was returned to the licensee.

4OA7 Licensee-Identified Violations

The following violations of very low safety significance (Green) were identified by the licensee and are violations of NRC requirements which meet the criteria of the NRC Enforcement Policy, for being dispositioned as an NCV."

- 10 CFR Part 50, Appendix B, Criterion III, "Design Control," required, in part, that design control measures shall provide for verifying or checking the adequacy of the design. Contrary to the above, as of November 1, 2011, the licensee's design control measures failed to verify the adequacy of the auxiliary feedwater (AF) design. Specifically, licensee personnel identified that for a design basis event with the switchyard and condensate storage tank unavailable, multiple diesel-driven AF pump starts could occur. At the time the issue was identified, the licensee had not evaluated the potential adverse consequences (i.e., draining the battery used for starting the machine, exceeding the starter motor starting duty limitations, and ensuring AF supply to the steam generators within the timeframe assumed in the accident analysis.) The licensee performed an operability evaluation and concluded that the pump was operable. This finding was determined to be Green based upon the conclusions reached in the operability evaluation and inspector's review of those conclusions. This issue was entered into the licensee's CAP as IR 1285319. Corrective actions included an assignment to review eliminating or minimizing multiple AF starts.

- 10 CFR Part 50, Appendix B, Criterion III, "Design Control," required, in part, that design control measures shall provide for verifying or checking the adequacy of the design. Contrary to the above, as of July 6, 2011, the licensee's design control measures failed to verify the adequacy of L-Wall rollup door fusible link melt times associated with the ESF Switchgear Rooms, Non-ESF Switchgear Rooms, DG Rooms, and MEERs. Specifically, the licensee identified that the assumed melt time of approximately 5 seconds did not conform to the UL-33 specification of up to 100 seconds for the ESF Switchgear Room rollup doors and up to 200 seconds for the MEERs and Non-ESF Switchgear Room rollup doors. The licensee performed an operability determination and concluded that the equipment in these rooms would remain operable during a licensing basis HELB event. This finding was determined to be Green based upon the conclusions reached in the operability evaluation and the inspector's review of those conclusions. This issue was entered into the licensee's CAP as IR 1185016 and IR1237140. Corrective actions included implementing an Operations Standing Order to prevent the rollup doors from being opened in Modes 1-4.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

D. Enright, Site Vice President
M. Kanavos, Plant Manager
P. Boyle, Maintenance Director
D. Burton, Simulator Coordinator
R. Cameron, Licensed Operator Requalification Training Program Lead
J. Dawn, ISFSI Project Manager
G. Dudek, Training Director
A. Ferko, Engineering Director
J. Gerrity, Emergency Preparedness Manager
D. Hartung, Dry Cask Storage Startup Coordinator
J. Kuchenbecker, ISFSI Project Manager
R. Leasure, Radiation Protection Manager
D. Lesnick, Emergency Preparedness Manager
M. Marchionda-Palmer, Operations Director
R. Radulovich, Nuclear Oversight Manager
C. VanDenburgh, Regulatory Assurance Manager

Nuclear Regulatory Commission

E. Duncan, Chief, Reactor Projects Branch 3

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

05000456/2011005-01 05000457/2011005-01	NCV	Failure to Maintain Adequate Circulating Water Blowdown Procedure During Liquid Radiological Releases (Section 1R04.1.b)
05000456/2011005-02 05000457/2011005-02	NCV	Failure to Evaluate CQ System Performance Against Maintenance Rule Criteria (Section 1R12.1.b)
05000456/2011005-03 05000457/2011005-03	NCV	Failure to Submit Licensee Event Report Per 10 CFR 50.73(a)(2)(vii)) (Section 1R15.1.b)
05000456/2011005-04 05000457/2011005-04	FIN	Operability Evaluation Not Performed in Accordance with Station Standards (Section 1R15.2)
05000456/2011005-05 05000457/2011005-05	NCV	Failure to Follow and Establish Adequate Hazard Barrier Impairment Procedures (Section 1R15.3)
05009456/2011005-06 05000457/2011005-06	FIN	Failure to Adhere to Maintenance Rule Implementation Procedures (Section 1R22.1b)
05000456/2011005-07 05000457/2011005-07 07200070/2011001-01	NCV	Failure to Perform Adequate Evaluations to Facilitate Independent Spent Fuel Storage Installation Activities (Section 4OA5.1.b)
05000456/2011005-08 05000457/2011005-08 07200070/2011001-02	NCV	Failure to Follow Procedures to Ensure Multi Purpose Canister Design Basis Pressure is Not Exceeded (Section 4OA5.2)

Closed

05000456/2011005-01 05000457/2011005-01	NCV	Failure to Maintain Adequate Circulating Water Blowdown Procedure During Liquid Radiological Releases (Section 1R04.1.b)
05000456/2011005-02 05000457/2011005-02	NCV	Failure to Evaluate CQ System Performance Against Maintenance Rule Criteria (Section 1R12.1.b)
05000456/2011005-03 05000457/2011005-03	NCV	Failure to Submit License Event Report per 10 CFR 50.73(a)(2)(vii)) (Section 1R15.1.b)
05000456/2011004-04 05000457/2011004-04	URI	Operability Evaluation Not Performed in Accordance with Station Standards (Section 1R15.2)
05009456/2011005-04 05000457/2011005-04	FIN	Operability Evaluation Not Performed in Accordance with Station Standards (Section 1R15.2)
05000456/2011003-05 05000457/2011003-05	URI	Potential Design Control Violation to Safety-Related Structures (Section 1R15.3)
05000456/2011005-05 05000457/2011005-05	NCV	Failure to Follow and Establish Adequate Hazard Barrier Impairment Procedures (Section 1R15.3)
05000456/2011005-06 05000457/2011005-06	FIN	Failure to Adhere to Maintenance Rule Implementing Procedure (Section 1R22.1.b)
05000456/2010503-01 05555457/2010503-01	VIO	Changes to Emergency Action Level Basis Decreases the Effectiveness of the Plan Without Prior NRC Approval (Section 1EP4.1)
05000456/2010-001-01	LER	Reactor Trip Due to Water Intrusion in Breakers Causing Circulating Water Pump Trips and Resulting in Loss of Condenser Vacuum (Section 4OA3.1)
05000456/2011-003-00 05000457/2011-003-00	LER	Drained Sections of Piping in Auxiliary Feedwater Suction Lines Result in System Inoperability Due to Inadequate Technical Evaluation (Section 4OA3.2)

05000456/2011005-07 05000457/2011005-07 07200070/2011001-01	NCV	Failure to Perform Adequate Evaluations to Facilitate Independent Spent Fuel Storage Installation Activities (Section 4OA5.1.b)
05000456/2011005-08 05000457/2011005-08 07200070/2011001-02	NCV	Failure to Follow Procedures to Ensure Multi Purpose Canister Design Basis Pressure is Not Exceeded (Section 4OA5.2)

Discussed

LIST OF DOCUMENTS REVIEWED

The following is a partial list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspector reviewed the documents in their entirety, but rather that selected sections or portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

<u>1R01 Adverse Weather Protection</u>

- IR 1171251; Lessons Learned Entering 1A DG Work Window; January 30, 2011
- IR 1296251; Winter Readiness Item Not Completed by 12/1/11; December 1, 2011
- IR 1298206; Inter Readiness Work Status; December 5, 2011
- IR 1287031; 1B DG Ventilation Concerns for Winter; November 7, 2011
- IR 1296808; Two Winter Readiness Items Not Completed by 12/1/2011; December 1, 2011
- BwOS XFT-AI; Unit Common Freezing Temperature Equipment Protection Surveillance; Revision 18
- OP-AA-108-111-1001; Severe Weather and Natural Disaster Guidelines; Revision 6
- Exelon Braidwood Certification Letter for Winter Readiness; November 15, 2011

<u>1R04Q Equipment Alignment</u>

- IR 1269820; Issue Written as Directed in BwOP CW-12; September 29, 2011
- IR 1270526; Conflict in BwOP CW-12; September 29, 2011
- IR 1280304; Unable to Meet Requirement to Start Pond Pump; October 23, 2011
- IR 1297050; NRC/IEMA Question about the CW Blowdown Operations; December 2, 2011
- IR 1296825; Is it Acceptable to have the CW Blowdown Discharge Pressure at 20 psig?; December 1, 2011
- IR 1299273; Limiting CW Blowdown Discharge Pressure; December 7, 2011
- EC 380017; Design Considerations Summary Eliminating Vacuum Breakers 2-11 on CW Blowdown Line; Revision 001
- BwOP CS-M2, Operating Mechanical Line Up – Unit 2 Containment Spray System; Revision 7
- BwOP CW-12; Circulating Water Blowdown System Fill, Startup, Operation, and Shutdown; Revision 56
- BwOP CW-28; Operation of the Exelon Remediation Pond Pump and Vacuum Breakers #1 and #2 Remediation Pumps; Revision 25
- BwOP SX-E2; Electrical Lineup – Unit 2 Essential Service Water System; Revision 10
- BwOP SX-M2; Operating Mechanical Lineup Unit 2; Revision 29

<u>1R05 Fire Protection</u>

- IR 0825193; S Hook is Installed Backwards on Damper – 2VX26U; October 1, 2008
- EP-AA-112-F-08; ERO Position Log; October 5, 2011
- BwAP 1100-16; Fire/HazMat Response/Checklist; Revision 26
- EP-MW-114-100-F-01; Nuclear Accident Reporting System Form; October 5, 2011
- OP-AA-201-003; Fire Drill Scenario; October 4, 2011
- BOP FR-1T27; Fire Zones 3.2A-1 & -2 U1/U2 Non-Segregated Bus Duct Area (Lower Cable Spreading Rooms) 1D-49/1D-50/2D-49/2D-50; Revision 4
- BwOP FP-100T27; Fire Zones 3.2A-1 & -2 U1/U2 Non-Segregated Bus Duct Area (Lower Cable Spreading Rooms) 1D-49, 1D-50, 1S-43, 2D-49, 2D-50, 2D-43; Revision 6
- BwOP FP-100T50; 3.2-0 Auxiliary Building 439’ LCSR Entry Area 2D-61; Revision 5
- Braidwood – FPR; Unit 1 Safe Shutdown functions; Amendment 24 – December 2010

- Fire Plan #21, FZ 3.2B-1, 436’ LCSR Zone B-1
- Fire Plan #29, FZ 3.3A-1, 463’ UCSR Zone A-1

<u>1R07 Heat Sink Performance</u>

- BRW-99-0306-M; EDG JWHX Maximum Tube Plugging Calculation; March 3, 2000
- BRW-96-031-DG-M Evaluation of DG JW Discharge Piping Missing Support; Revision 00
- BRW-96-047-DG-M Evaluation of EDG JW and L.O. Sample Lines Missing Parts; Revision 0
- Assignment 1131216-03; Pre-NRC Triennial Heat Sink and GL 89-13 FASA; June 21, 2011
- IR 809032; 2DG01KB-X2: Schedule Head Weld Repair at Next PM Window; August 18, 2008
- IR 1245760; Skewed SX Pipe Support Identified In 2A DB Room; July 29, 2011
- IR 1131216; GL 89-13 FASA Assignments; October 27, 2010
- IR 1227448; GL 89-13 FASA Deficiency 3 - HX Test Methods Not EPRI Latest; June 10, 2011
- IR 1027220; Retube 1B DG-X2 SX-JW Cooler to Recover Margin; February 8, 2010
- IR 1227372; GL 89-13 FASA Deficiency 1 – RCFC Tube Plugging Limit Uncertain; June 10, 2011
- IR 1227396; GL 89-13 FASA Deficiency 2: BRW-97-0965-M and EC 357161; June 10, 2011
- IR 1255301; 1A DG JW Cooler Leak Degrading; August 25, 2011
- IR 1266362; 2DG JW Cooler Leak Actions Needed - 2DG01KA-X1.pdf
- Inspection Report for EDG JW Upper Cooler 2B-X1; August 18, 2008
- Inspection Report for EDG JW Lower Cooler 2B-X2; August 18, 2008
- 0BwOA ENV-3 BWD; Cooling Lake Low Level; Revision 101
- 1BwOA ENV-3 BWD; Cooling Lake Low Level; Revision 7
- 0BwOA PRI-8; Aux Building Flooding; Revision 6
- 1Bw0A PRI-8; Essential Service Water Malfunction; Revision 103
- BwCP 323-30; CW, WS, and SX Systems Surveillance and Sampling Procedure; Revision 8
- BwVP 850-15; Essential Service Water System Performance Monitoring Program; Revision 6
- CY-AA-120-410; Circulating-Service Water Chemistry; Revision 3
- ER-AA-5400; Buried Piping and Raw Water Corrosion Program (BPRWCP) Guide; Revision 4
- ER-AA-5400-1001; Raw Water Corrosion Program Guide; Revision 4
- ER-AA-5400-1002; Buried Piping Examination Guide; Revision 3
- ER-AA-340; GL 89-13 Program Implementing Procedure; Revision 6
- ER-AA-340-1001; GL 89-13 Program Implementation Instructional Guide; Revision 8
- GL 89-13 Program Health Reports; Fourth Quarter of 2008 through the Third Quarter of 2011
- IR00949970; 0SX165A Valve Pit Piping and Valve Inspection Results; August 5, 2009
- IR00952693; 0SX165B Valve Pit Piping and Valve Inspection Results; August 12, 2009
- IR 1253461; Inspection Criteria for Biological Growth 2B CW Bay; August 19, 2011
- IR 1256746; Biological Accumulation Criteria 1CW01PA; August 29, 2011
- IR 1236673; 0SX115A Leak Through Valve Stem; July 5, 2011
- IR 1296847; Potential Crack in Wall in 1A/2A SX Pump Room; December 1, 2011
- IR 1296854; Potential Incomplete Guidance in 1(2)BWOS SX-1; December 1, 2011
- IR 1296866; Vacuum 1A SX PP Cubicle Cooler Fins; December 1, 2011
- IR 1296879; Comments on Plant Engineering ACIT Closures; December 1, 2011
- 1A Lake Screen House Forebay Inspection Report; August 28, 2011
- 2B Lake Screen House Forebay Inspection Report; August 18, 2011
- EC376317; CW Forebay Inspection Acceptance Criteria for Bryozoa; Revision 0
- WO 1449872; Lake Screenhouse Forebay Diver Inspection 1A; August 26, 2011
- WO 1449881; Lake Screenhouse Forebay Diver Inspection 2B; August 18, 2011
- WO 1297777; VT-2 Exam Unit 1 SX System; August 17, 2011
- WO 1170803; 1SX03A-30” Verify Pipe Wall Thickness; May 17, 2010

- WO 1166788; Verify Pipe Wall Thickness 1SX25AA-6; June 3, 2010
- WO 1168514; Verify Pipe Wall Thickness 1SX93AA-8; May 17, 2010

1R11 Licensed Operator Requalification Program

- Out of the Box Scenario Training Session; November 1, 2011

1R12 Maintenance Effectiveness

- IR 0050422; A2001-01179 1A DG Vent Damper Failed Open; April 24, 2001
- IR 0124841; Multiple VD System Damper Equipment Failures; September 27, 2002
- IR 0225936; Performing Fire Damper Surveillance; June 4, 2004
- IR 0738633; 0VC089Y Fire Damper Found Closed; February 20, 2008
- IR 0801307; 0VA437Y Damper Failure; July 29, 2008
- IR 0825193; S Hook is Installed Backwards on Damper – 2BX26Y; October 1, 2008
- IR 0996288; NOS ID Predefine Frequency Does Not Match Procedure; October 17, 2002
- IR 0996458; NOS ID, A Discrepancy in EP Monthly Health Report; November 20, 2009
- IR 1031840; Bwd Aux Building PA System Test Not Performed at Required Frequency; February 17, 2010
- IR 1031970; NOS ID PA System Work Orders Untimely Not Properly Tracked; February 17, 2010
- IR 1039941; NOS Id EP Warning Systems (PA) Not Properly Maintained; February 26, 2010
- IR 1041394; EP-AA-120-F-03 Needs Clarification for Plant PA Speaker Test; March 3, 2010
- IR 1063347; Damper Failed Inspection (2VX23Y); April 29, 2010
- IR 1094830; Yellow NE for PA Speakers ATI Improperly Closed; July 23, 2010
- IR 1116673; 2VE02Y Damper Not Functioning Properly; September 23, 2010
- IR 1117910; Constant Buzzing Noise in the Plant Page System; September 24, 2010
- IR 1122370; NOS IDs Events that Should Have Resulted in Prompt Investigation; October 4, 2010
- IR 1123297; PA System Needs MR Expert Panel (A)(1) Determination; October 7, 2010
- IR 1131784; Damper Not Closing Completely (1VP27Y); October 28, 2010
- IR 1165681; Fire Damper Fusible Link is Broke; January 22, 2011
- IR 1190309; Results of Aux Building PA System PM Testing; March 22, 2011
- IR 1190162; Damper Not Fully Closed as Required; March 21, 2011
- IR 1191319; Debris Found Upstream of Damper 0VA448Y; March 23, 2011
- IR 1273286; 2A DG Room Fire Damper Inspection Not Bundled in DG Window; October 6, 2011
- IR 1289606; Plant Communicate (CQ) Maintenance Rule Discussion with NRC/IEMA; November 8,2011
- IR 1291411; CQ Maintenance Rule Discussion with NRC/IEMA; November 16, 2011
- IR 1291992; Enhancements to CQ (PA) System Surveillance Procedure; November 17, 2011
- IR 1292466; CQ System (PA) Testing – Lessons Learned; November 18, 2011
- IR 1293217; CQ (PA) System Work Package Review – Lessons Learned; November 21, 2011
- IR 1295438; Damper Actuator PM Needs Deferral to Preserve Scope Stability; November 29, 2011
- IR 1298184; 0VA305Y Damper Actuator is Defective, Repair/Replace; December 5, 2011
- IR 1239056; Eval SR to Prevent 2A DG Inoperability for FD Damper Inspection; July 12, 2011
- EP-AA-121; Emergency Response Facilities and Equipment Readiness; Revision 10
- ER-AA-310; Implementation of the Maintenance Rule; Revision 8
- ER-AA-310-1001; Maintenance Rule – Scoping; Revision 4
- ER-AA-310-1005; Maintenance Rule – Dispositioning Between (a)(1) and (a)(2); Revision 5

- MA-BR-723-140; Test of the Station Public Address System; Revision 9
- Determination Issue Report Number 01123297; (a)(1) Action Plan Development and Action Plan (Monitoring) Goal Setting Template; January 10, 2011
- 10 CFR 50.65 Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants
- Search of IR Subject; PA, Radio and Phone; August 19, 2011

1R13 Maintenance Risk Assessments and Emergent Work Control

- 2B SX Pump Work Window – November 2011 Protected Equipment
- IR 1249723; NRC Question on PRA Assignee; August 10, 2011
- IR 1251652; NRC Question on PRA for 2B AFW ASME Testing; August 15, 2011
- IR 1286270; TCCP #386514 Battery 111 Jumper Crimps Certifications; November 4, 2011
- IR 1286692; Inverter Alarm – 1-4-A5, Bus 11 Inverter Trouble; November 5, 2011
- IR 1287208; Procedure Deficiencies Results in Near Miss; November 5, 2011
- IR 1290957; Protected Equipment Not Accurate for Work Window; November 14, 2011
- IR 1291692; NRC Green Finding – Failure to Adhere to Proc. – Maint Rule; November 9, 2011
- IR 1293440; NRC Id'd PRA Discussion Required Prompting at Brief; November 22, 2011
- IR 1293998; NRC Id'd Perform Extent of Condition Review for PRA Actions; November 23, 2011
- OP-AA-102-104; Actions to Improve Operations Performance – Log Number 11-019; Revision 3
- OP-AA-102-104; Interim PRA Actions – Log Number 11-026; Revision 0
- 11.0 Assessment of Risk Resulting from Performance of Maintenance Activities
- BwMP 3300-052; 18-Month Visual Inspection of SR (VD) Fire Dampers
- BwISR 3.3.2.10-217 & BwISR 3.3.2.10-218; Operational Test/Surv Calibration of AFW PP Suction Loop
- 10 CFR Part 50; Monitoring the Effectiveness of Maintenance at NPPs; RIN 3150-AF95

1R15 Operability Evaluations

- IR 1039274; Non-Conservative Input Used in Calc BRW-97-0340-E; March 4, 2010
- IR 1088364; Potential Design Vulnerability on Auxiliary Feedwater System; July 7, 2010
- IR 1199223; HELB Past Operability Review; April 7, 2011
- IR 1263228; 2A CW Forebay Screens Unexpected HI HI Alarm and Backwash; September 15, 2011
- IR 1265614; Flow Circulation Issue of 1SX04P During Loss of All AC Scenario September 13, 2011
- IR 1264955; SOER 7-02 Event Readiness – CW Pump Trip Lifted; September 19, 2011
- IR 1264955; CW Pump Trips Defeated for Traveling Screens Differential Instrumentation; September 26, 2011
- IR 1277627; NRC Question on HELB – Presence of Openings; October 17, 2011
- IR 1279759; Added Scope to Turb Bldg HELB Effort; August 12, 2011
- IR 1284080; Past Operability Review of HELB Rollup Doors; October 31, 2011
- IR 1284681; Past Operability Review of Div 11 1P (HELB); March 9, 2009
- IR 1285004; Documentation of Dry Cask Storage NRC Question; November 1, 2011
- IR 1285319; Potential Multiple Starts of Diesel-Driven AF Pump; November 1, 2011
- IR 1293173; AF005 Flow Control Valve Trim Clearance Low Margin Issue; November 21, 2011
- IR 1299906; NRC Identified Missed 10 CFR 50.73 Notification for HELB Design; March 8, 2011

- LS-AA-1020; Reportability Reference Manual Volume I; Revision 17
- OP-AA-108-115; Operability Determinations – Screen Wash & Essential Service Water; Revision 10
- ER-AA-600-1011; Risk Management Program; Revision 11
- ER-AA-600-1021, Risk Management Program Application Methodologies; Revision 4

1R19 Post-Maintenance Testing

- WO 01157558; "2CS001A Valve Actuator Worm Gear Replacement"; November 30, 2011
- WO 01303977; 2B SX System Modification/Maintenance Window
- WO 01351525; Actuator Overhaul on 2SX001A; November 2, 2011
- WO 01481847; IST For 2SX002A – ASME Surveillance Requirements for 2A SX PP; November 2, 2011
- WO 00972133; 2A SX System Modification/Maintenance Window
- 1BwOSR 3.8.1.14-2; 1B Diesel Generator 24 Hour Endurance Run; Revision 5
- IR 1277489; Schedule Impacts from 2B SX Modification; October 17, 2011
- IR 1284333; 2SX01AA: 2A SX PP Lube Oil Cooler As-Found w/Dead Bryozoa; November 1, 2011
- IR 1284634; 2SX01AA: 2A SX PP L.O. CLR Eddy Current Test Not Successful; November 1, 2011
- IR 1285283; Actuator to Yoke Alignment Issue on 2SX001A; November 2, 2011
- IR 1286448; Delays Encountered During Testing on 2SX001A; November 2, 2011
- IR 1287111; Rebuild Old Actuator for – SX001- Future Replacement; November 7, 2011
- IR 1290513; 2B SX Project Lessons Learned – MMD/Ops Coordination; November 15, 2011
- IR 1290516; 2B SX Project Lessons Learned – BWOP SX-3 Typo; November 15, 2011
  IR 1293174; 2B SX Work Window Lessons Learned for 11-14-2011 Week; November 21, 2011

1R22 Surveillance Testing

- IR 1293440; PRA Discussion Required Prompting at Brief; November 22, 2011
- IR 1293751; Flow Anomaly Noted on Ultrasonic Flowmeter During 1B SX ASME; November 22, 2011
- IR 1293998; Perform Extent of condition Review for PRA Actions; November 23, 2011
- 1BwOSR 3.3.2.8-611B, Unit One ESFAS Instrumentation Slave Start Surveillance B Train Automatic Injection – K611, Revision 9
- 1BwOSR 3.8.1.2-2, Unit 1 B Diesel Generator Operability Surveillance, Revision 31
- 1BwOSR 5.5.8.SX-3B; Group AIST Requirements for 1B Essential Service Water Pump (1SX01PB); Revision 3
- 2BwOSR 3.6.3.6 Primary Containment Type C Local Leakage Rate Tests of Containment Miniflow Purge Isolation Valves (VQ); Revision 7
- ER-AA-310; Implementation of the Maintenance Rule; Revision 8
- Surveillance Observed; 2BwOSR 5.5.8.SX-3B
- WO 1461858 01; IST-LT-2VQ003/004A/B – Primary Containment Type C LLRT of Containment Miniflow Purge; November 9, 2011

1EP4 Emergency Action Level & Emergency Plan Changes

- EP-AA-1001; Exelon Nuclear Radiological Emergency Plan Annex for Braidwood Station; Revisions 25, 26, and 27

- EP-AA-120-1001; 50.54(q) Program Evaluation and Effectiveness Reviews; Revisions 26 and 27
- EP-AA-120-F-01; EP Document Approval Forms; Revisions 26 and 27

1EP6 Drill Evaluation

EP-MW-114-100; Midwest Region Offsite Notifications; Revision 11
EP-AA-114-F-01; PWR Release in Progress Determination Guidance – PWR Airborne; Revision E
EP-AA-111-F-02; Braidwood Plant Based PAR Flowchart; Revision D
EP-AA-122-1001-F-11; Drill & Exercise Comment & Feedback Form; Revision D
EP-MW-114-100-F-01; Nuclear Accident Reporting System (NARS) Form – Initial Roll Call complete 11:54 on November 10, 2011
EP-MW-114-100-F-01; Nuclear Accident Reporting System (NARS) Form – Initial Roll Call complete 11:38 on November 10, 2011

2RS1 Radiological Hazard Assessment and Exposure Controls

- RP-AA-800; Source Leak Test Record; July 8, 2011
- Braidwood Radioactive Source Inventory; June 17, 2011
- NF-AA-390; Spent Fuel Pool Material Log; dated from January 2011 through October 2011
- RP-AA-300; Radiological Survey Program; Revision 7
- RP-AA-301; Radiological Air Sampling Program; Revision 4
- RP-AA-302; Determination of Alpha Levels and Monitoring; Revision 4
- RP-AA-460; Controls for High and Locked High Radiation Areas; Revision 20
- RP-AA-503; Unconditional Release Survey Method; Revision 5
- A2R15 Containment Down Posting Plan; Revision 1
- RP-AA-203-1001; Personnel Exposure Investigation; EIDPOUND-9910; April 28, 2011; Survey Maps 50647, 50686 and 50687
- IR 1209669; ED Dose Alarm during Decontamination of 2CV03F Filter Vault
- RP-AA-700-1501; Operation and Calibration of Model SAM-9/11 Small Article Monitor; Revision 1b
- IR 1298716; Evaluate Practice of Using Nylon in Spent Fuel Pool; December 6, 2011
- IR 1299722; NRC Observation during Walkdown of Radioactive Material Areas; December 8, 2011
- Survey Map A-364-7-A; 364’ Aux Bldg Floor Drain Tanks; December 9, 2011
- MEMME2090; Individual Used EDE Dosimetry during Job Evolutions during A2R15 Results and Investigations
- MAJOR6474; Individual Used EDE Dosimetry during Job Evolutions during A2R15 Results and Investigations
- LENNHO0532; Individual Used EDE Dosimetry during Job Evolutions during A2R15 Results and Investigations
- Current RAM Outside Conditions; December 7, 2011

2RS2 Occupational ALARA Planning and Controls (71124.02)

- RP-AA-400; ALARA Program; Revision 7
- RP-AA-401; Operational ALARA Planning and Controls; Revision 12
- Braidwood Station A2R15 RP/ALARA Refuel Post Outage Report Spring 2011
- IR 1141574-19; A2R15 Phase 2 ALARA Readiness Assessment; April 13, 2011
- Nuclear Oversight (NOS) Completed Management Directed Assessment to Assess ALARA Plan A2R15

- NOSMDA-BW-11-09; NOS Assessment of Braidwood Station Readiness to Execute A2R15
- IR 1141574; A2R15 ALARA Readiness Phase 2; May 9, 2011
- RWP/ALARA Plan 10011789; Containment Scaffold Activities; AR-01136983
- RWP/ALARA Plan 10011816; Rx Head Disassembly and Reassembly
- RWP/ALARA Plan 10011824; Primary Drain
- RWP/ALARA Plan 10012577; 2ARH Motor Replacement and Associated Work
- IR 1206983; NOS ID Deficiencies with Outage WIP Review; June 25, 2011
- IR 1206153; A2R15 Additional Dose Required RWP 10011820; June 19, 2011
- IR 1211137; A2R15 RWP 10011816 Exceeds Initial Dose Estimate; June 19, 2011
- IR 1206245; A2R15 Reactor Service Dose Is Tracking Over Estimate; April 22, 2011

2RS7 Radiological Environmental Monitoring Program

- BwOP WX-526T1; Liquid Release Tank 01WX01T Release Form; Revision 64
- BwOP WX-526T2; Liquid Release Window Determination for City of Wilmington; Revision 6
- Teledyne Brown Engineering, Inc.: Report of Water Analysis L47762; Station BD-22 Wilmington; October 17, 2011
- 2010 Radiological Environmental Monitoring Program for Braidwood Station by Exelon
- CY-BR-170-301; Off Site Dose Calculation Manual; Braidwood Stations; Revision 6
- Braidwood Station, Unit 1 and 2; 2010 Radioactive Effluent Release Report; April 29, 2011
- BwOP CW-28; Operation of the Exelon Remediation Pond Pump and Vacuum Breaker No. 1 and No. 2 Remediation Pumps; Revision 24
- REMP Sampling Procedures Manual; Environmental Incorporated Midwest Laboratory; Revision 13
- CY-AA-170-0100; Personnel Familiarization Guide for REMP, MET, RGPP and REC Programs; Revision 2
- CY-AA-170-100; Radiological Environmental Monitoring Program; Revision 2
- Murray and Trettel, Inc.; Monthly Report on the Meteorological Monitoring Program at the Braidwood Nuclear Station from October 2010 through July 2011
- CY-AA-170-1000; Radiological Environmental Monitoring Program and Meteorological Program Implementation; Revision 5
- IR 1136983; 0PR01J is Inoperable-Secure All Releases-Special Report; November 7, 2011
- IR 1289717; Chemistry “H” Ditch Sample was Found Greater than 200 pci/liter; November 11, 2011
- IR 01227468; EXELON Pond ODCM Composite – No Sample for One Week; June 10, 2011
- IR 1145905; Vacuum Breaker -1 Compositor Has No Power because the GFCI Power Outlet Tripped; November 29, 2010
- IR-01175902; Missed REMP Samples for Record in the 2010 AREOR; Due to Frozen Water; February 16, 2011
- IR-01154740; Vacuum Breaker -1 Compositor Bottle was Found Overfilled; December 20, 2011
- IR-01151955; 0FQ-WX001 Calibration Issues Need Resolved Prior to Releases; December 14, 2010
- IR-01153651; “H” Ditch Sampling Station was not able to be Sampled; December 16, 2010
- IR-01215971; 0PR05J Liquid Effluent Monitoring Skid Tripped on Loss of Flow Requiring RETS Entry; May 14, 2011
- Teledyne Brown Engineering; L46105; Report of Analysis Certificate of Conformance; “H” Ditch; June 21, 2011
- Teledyne Brown Engineering; L47360; Report of Analysis Certificate of Conformance; North Oil Separator, and “H” Ditch; August 16, 2011

- Teledyne Brown Engineering; L46262; Report of Analysis Certificate of Conformance; for MW-4, MW-BW-2021, and MW-142D Wells, June 27, 2011
- Teledyne Brown Engineering; L47134; Report of Analysis Certificate of Conformance; for Vacuum Breakers and Wells Samples; September 8, 2011
- Teledyne Brown Engineering; L47925; Report of Analysis Certificate of Conformance; November 10, 2011
- List of Reports for 50.75(g) Files; November 15, 2011
- EN-BR-408-4160; Radiological Groundwater Protection Program Reference Material; Revision 1
- ER-AA-5400; Buried Piping and Raw Water Corrosion Program Guide; Revision 4
- ER-AA-5400-1002; Buried Piping Examination Guide; Revision 3
- NES-MS-15.2; Guidance for Determining Reasonable Assurance for Structural and/or Leakage Integrity for Buried Piping; Revision 0

4OA1 Performance Indicator Verification

- IR 1101873; Unplanned Entry Into LCO 3.3.9 & 3.0.3; August 16, 2010
- IR 1113296; Boric Acid Leakage (Line 1CV72AB-0.75") Potential Through Wall; September 15, 2010
- IR 1157586; Water Spill During Pump Fill and Vent; January 1, 2011
- IR 1204922; Water Leaking Into U2 VCT Valve Aisle Onto 2CV112B; April 19, 2011
- LS-AA-2140; Monthly Data Element for NRC Occupational Exposure Control Effectiveness; Revision 4
- Monthly Data Element for NRC Occupational Exposure Control Effectiveness from First Quarter 2010 through Third Quarter 2011
- NEI 99-02; Reactor Coolant System Leakage; Revision 6
- BW-MSPI-001; High Pressure Safety Injection; Revision 5
- Braidwood Generating Station Maintenance Rule Scope and Performance Monitoring; Chemical and Volume Control
- BRW Failure Report; 1 July 2010 thru 17 November 2011
- Braidwood Generating Station; Performance Monitoring Summary

4OA2 Identification and Resolutions of Problems

- IR 0863432 Assign #05; Raise Awareness to Control Room Operators of New Potential Toxic Gas Threats; February 10, 2009
- IR 0863432 Assign #6; Investigate Rev to 0BwOA ENV-6 and BwOP VC-16 as Required in Regards to Donning SCBA;s Until Toxicity Limit Verified; February 10, 2009
- IR 0863432 Assign #8; Revise BwOP VC-16 and 0BwOA ENV-6 to State Don SCBAs Instead of Issuing Protective Respiratory Equipment; June 10, 2009
- IR 1237889; Extension Re-Question for OP Eval 1237140; July 11, 2011
- IR 1265792; 2DC04E: Found K1 Relay Cracked with Signs of Heat Stress; September 21, 2011
- IR 1266113; K3 Relay Defective – 2DC04E; September 21, 2011
- IR 1266445; R1 Resistors Found Degraded – 2DC04E; September 22, 2011
- IR 1268443 Assign #4; Review K1 Relay Installation History to Determine When the Relay with the DC Coil Was Installed to Address Legacy Question; October 27, 2011
- IR 1273864; 1A EDG Cooling Valve Opened Unexpectedly; October 7, 2011
- IR 1274401; 4 Pallets of 3M 54A Roll Mats in Secured Material Zone; October 9, 2011
- IR 1276786; 1SH15AX Thermals Found Tripped During 0BwOS XFT-A2A; October 14, 2011
- IR 1276791; CCP – Robust Operational Barrier for MCC 231X3 (2AP22E); October 14, 2011

- IR 1276850; INPO IER 11-4 Recommendation for DD AF Improvements; October 14, 2011
- IR 1276888; NRC Question – Effect of TB HELB on Reactor Trip Breakers; October 14, 2011
- IR 1277142; Key Missing from Shift Managers Key Locker; October 16, 2011
- IR 1277152; Evaluate Improvements in Fire Seal Repair; October 16, 2011
- IR 1277251; Foreign Material in Cable Tray; October 14, 2011
- IR 1277620; DIP Observation: Secured Material Zone; October 14, 2011
- IR 1277627; NRC Question on HELB – Presence of Openings; October 17, 2011
- IR 1277886; DIP Observation of Exclusion Zone and Secured Material Zone Walkdown; October 17, 2011
- IR 1282071; Elevated Temp of 2CS02JC Autotransformer Contact Area; October 26, 2011
- IR 1282217; PRA Changes for October 10, 2011 Work Week; October 27, 2011
- IR 1282267; Lake Screen House Enhancements; October 27, 2011
- IR 1282315; U2 Rounds Point UNSAT; October 27, 2011
- IR 1282322; 2TE-DG050B Erratic; October 25, 2011
- IR 1282351; BwIS ATWS-FW447 Procedure Enhancement; October 27, 2011
- IR 1282355; MPC Delivery Driver Unaware of Entry Process Requirements; October 26, 2011
- IR 1282399; Lack of Interdepartmental Communication/Wasted Resources; October 27, 2011
- IR 1282415; Channel Check Greater than 4 Percent Difference; October 27, 2011
- IR 1282416; PCRA Fatal Flaw in 1BwOA PRI-1; October 27, 2011
- IR 1282518; Beacons Inop for Emergency Paging System; October 28, 2011
- IR 1282918; DIP Transformer Secured/Exclusion Area Walkdown; October 27, 2011
- IR 1288359; Results of Exclusion Area/Secured Material Zone Walkdown; November 8, 2011
- IR 1289778; Loose Debris Found in Unit 1 Transformer Yard; November 12, 2011
- IR 1293606; Unsecured Material in Transformer Secured Material Zone; November 22, 2011
- IR 1297361; DIP Observation – Loose Material in Secured Material Zone; December 2, 2011
- IR 1298695; Loose Material Identified in the Secured Material Area; December 6, 2011
- IR 1299316; DIP Transformer Exclusion/Secure Area Walkdown; December 7, 2011
- IR 1299722; NRC Observations During Walkdown of Rad Material Areas; December 8, 2011
- IR 1300741; UCSR CO2/Halon; December 10, 2011
- IR 1300814; Byron CCA for Design analysis Issues (IR 1270400); December 10, 2011
- IR 1300846; 1RE-AR022B (Main Steam Line Rad Monitor) Failure; December 22, 2011
- IR 1301034; U2 Containment Drain Leak Detect Flow High Alarm; December 11, 2011
- IR 1301037; TA (Technical Advisor) Not in the Field During DCS Activities; December 11, 2011
- IR 1301070; Steam Leak at Union or Close By – 1GS046B; December 11, 2011
- IR 1301713; 12KV Service Line Inspection Results; December 13, 2011
- IR 1301766; Dry Cask Storage Procedure Change Needed; December 13, 2011
- IR 1301833; Dry Cask Storage Suspected Port Cap Leak; December 13, 2011
- IR 1302000; Unit 1 RCS Leakrate Exceeds Level 3 Limits in ESOMS; December 13, 2011
- IR 1302195; Need Emergent Dose for Unit 2 Seal Injection Adjustment; December 14, 2011
- IR 1302235; NOS ID: Untimely Documentation of Operability (VC & CRE); December 12, 2011
- IR 1302306; Request Procedure Revision Related to Votes Activities; December 14, 2011
- IR 1302309; Roof Leaking in 2B MSIV Room; December 14, 2011
- IR 1302368; Groundwater Intrusion in 2B CV Pump Room; December 14, 2011
- IR 1302466; 1B DG Turbocharger Outlet Temperature Not Stable; December 14, 2011
- IR 1302514; Lockout Relay Replacement – 1AP08EN; December 14, 2011
- IR 1302515; Lockout Relay Replacement – 1AP08EP; December 14, 21011
- IR 1302516; Lockout Relay Replacement – 1AP08EQ; December 14, 2011
- IR 1302557; January Level 3 C&T Event Not Added to Corporate Indicators; December 14, 2011

- IR 1302559; Ownership of RST Berm Liner Inspection; December 14, 2011
- IR 1302570; Smoke Detectors Failed to Actuate During Surveillance; December 14, 2011
- IR 1302592; CCP: Paint Config Control Zone on Floor – 2DC09E; December 14, 2011
- IR 1302593; CCP: Paint Config control Zone on Floor – 2DC08E; December 14, 2011
- IR 1302597; Limited Scope Tactical Response Drill Feedback; December 14, 2011
- IR 1302611; 0BwOS GD-M1 Failed Acceptance Criteria; December 13, 2011
- IR 1302686; Walkdown of Remote Monitoring Equipment; December 15, 2011
- IR 1302728; NRC Initiated Plant Status Call Connection Trouble; December 15, 2011
- IR 1302732; 0WS01PC-M Rotated Backwards on Rotation Check; December 15, 2011
- IR 1202744; 2D SG FW Tempering flow Oscillation; December 15, 2011
- IR 1302762; LL DG Starting Sys Lockout Test – Replace 1FSV-DG5212B; December 14, 2011
- IR 1303879; DIP Observation of Exclusion Zone and Secured Material Zone Walkdowns; December 16, 2011
- IR 1305179; Day in the Plant Transformer Area Walkdown Observations; December 20, 2011Ire 1305906; Required: Re-Perform Quarterly Battery Surveillance for 250VDC; December 22, 2011
- IR 1306011; DIP Observation: Transformer Material Exclusion Area; December 22, 2011
- IR 1306066; Correction to Wano PI Data Due to TLD Readings; December 22, 2011
- IR 1306069; Abrupt Grinding Mark on Side of Valve Body; December 21, 2011
- IR 1306070; Main Turbine Impulse Pressure Transmitters Sensitive to Temperature; December 22, 2011
- IR 1306086; NOS Comments for ODM on 1/2CW049 Valves; December 22, 2011
- IR 1306174; U2 Seal Injection Adjustment Failed Attempt Do Over; December 23, 2011
- IR 1306215; Thermography Concern on 2CW02JA Autotransformer; December 23, 2011
- IR 1307411; Question on Validity of CW Reports for Nov and Dec; December 28, 2011
- IR 1307623; Small Air Void Found in 1B AF Suction; December 29, 2011
- IR 1307657; Main Condenser Tube Leak 1A Hotwell Sodium Elevated; December 14, 2011
- IR 1307661; 1D Hotwell Outlet Sodium Concentration is Elevated; December 14, 2011
- IR 1307709; U2 ATWS Surveillance Not Performed Due to Venting of Aux Feed; December 29, 2011
- IR 1307818; Unexpected Heat Tracing Trouble Alarm (1HT02J); December 30, 2011
- IR 1307823; 2MS5008A Furmanite Box has 15 DPM Leak; December 30, 2011
- IR 1307834; Supply Filter 0VA01FC Differential Press High Alarm Received; December 30, 2011
- IR 1308208; Surveillance Enhancements for Unit Rounds Modes 1-3; December 31, 2011
- IR 1308216; Ops Shift Minimum Staffing Due to NSO Illness; December 31, 2011
- IR 1308240; Ops ID: Ultra Low Flow Releases Unreasonably Restrictive; December 31, 2011
- BwFP FH-71; MPC Processing; Revision 9
- Drawing 3753; MPC-32 Enclosure Vessel Construction Coversheet; Sheets 1 thru 9
- EC 372671; Table of Chemical Screening; Revision 000
- EC 373490; CREHP 2008 Chemical Survey and Analysis
- OP-AA-108-115; Operability Evaluation #09-001; Actions as a Result of Chemical Survey for Control Room Envelope Habitability Program – IR 863432; VC (Control Ventilation; Revision 7
- URS-Washington Div Project #28062-BRW0127, Study #BRW0127-15STUDY-001; Year 2008 Offsite Hazardous Chemical Surveys for Control Room Habitability

<u>4OA3 Followup of Events & Notices of Enforcement Discretion</u>

- IR 0165551; Environmental Conditions Review for DG HELB Analysis; June 24, 2003
- IR 1185016; Non-Conservatisms in the Turbine Building HELB Analysis; March 8, 2011

- IR 1199223; HELB Past Operability Review; April 7, 2011
- IR 1194703; HELB Concerns with ESF Switchgear Room Will Prevent Breaker Swaps; March 30, 2011
- IR 1223422; Resident NRC Questions on PBI Program; May 31, 2011
- IR 1233283; NRC Questions Movement of Equipment Thru Barrier Doors; June 27, 2011
- IR 1237140; Non-Conservative Input to HELB Analysis; July 6, 2011
- IR 1237395; NRC Resident Inspector Questions on IR 1237140; July 7, 2011
- IR 1238611; Inoperability of ESF Components Due to HELB; July 11, 2011
- IR 1242942; NRC Comments on Op Eval 11-006 Revision 1; July 22, 2011
- IR 1240173; Op Eval Completion Date Extended; July 15, 2011
- IR 1276072; Closure of Long-Standing CA's Require the Creation of New CA; October 13, 2011
- IR 1277644; Operations Services Group Missed Phone Call; October 17, 2011
- IR 1277791; Pre-Conditioning Concern for Hydrogen Monitoring Valve Stroke; October 18, 2011
- IR 1277852; 0BwOS XFT0A5 Inaccuracy and Needs Revision; October 18, 2011
- BwAP 330-10; Operability Assessment Process Form; Weaknesses Identified in the HELB Analysis; Revision 2
- BwAP 1110-3; Plant Barrier Impairment Program; Revision 21
- CC-AA-1003; Owners Acceptance Review Checklist for External Design Analysis #BRW-11-0101-M/BYR11-036; Revision 6
- CC-AA-201; Plant Barrier Control Program; Revision 8
- CC-AA-309-1001; Turbine Building HELB and Room Heat Up Analyses for MUR PU; Revision 6
- EC 383599; Op Eval 11-005, Turbine Building HELB Analysis Errors; Revision 3
- EC 73559; Evaluate Impact of Open Roll-Up Fire Doors on HELB Analysis; Closed February 12, 1997
- LER 05000456/2011-003-00; Drained Sections of Piping in Auxiliary Feedwater Suction Lines Result in System Inoperability Due to Inadequate Technical Evaluation; March 29, 2011
- Withdrawal of LER 05000456/2011-003-00 by Letter Dated October 7, 2011
- LS-AA-125-1001; Addendum to Root Cause Report Asiatic Clam Shells in SX Supply Piping to 2A Auxiliary Feedwater Pump Result in Auxiliary Feedwater System Inoperability; October 3
- OP-AA-108-115; Operability Determinations (CM-1); Revision 9
- OP-AA-108-115; Operability Determinations (CM-1); Revision 10
- Braidwood Station NRC & NOS Inquiry 0 HELB Response (2011); What are Requirements for EQ at Byron/Braidwood?; August 4, 2011
- Braidwood Station NRC & NOS Inquiry 0 - HELB Response (2011); How are the Stations Meeting Requirements for Harsh Conditions Imposed by HELB?; August 4, 2011
- Braidwood Station NRC & NOS Inquiry 0 - HELB Response (2011); Did NRC Review and Approve Our Mild Environment Classification Following Issues That Were Addressed in 1990-1991 Timeframe?; August 4, 2011
- Braidwood Station NRC & NOS Inquiry 0 - HELB Response (2011); Provide Copy of EC 385208 Revision 1 That Was Performed to Evaluate Bounding Temperature Effects on Equipment; August 4, 2011
- Braidwood Station NRC & NOS Inquiry 0 - HELB Response (2011); UFSAR Section 3.11.1.b(3) States That Room Ventilation Is Expected To Be Restored Within 2 hours. Was This Statement Included In Original FSAR?; August 4, 2011
- Reg Guide 1.89; Environmental Qualification of Certain Electric Equipment Important to Safety for Nuclear Power Plants; June 1984
- Braidwood Op Eval 11-006 – IR 1185016-04; Turbine Building HELB Analysis Input Errors; Revision 0

- S&L Inter-Office Memo; Moody's Critical Flow Tables (RELAP 4); October 22, 1976
- Technical Requirements Manual 3.7.d; Area Temperature Monitoring; Revision 1
- NUREG-0800; Determination of Rupture Locations and Dynamic Effects Associated with the Postulated Rupture of Piping; Revision 1 – July 1981
- NUREG 0800; Plant Design for Protection Against Postulated Piping Failures in Fluid systems Outside Containment; Revision 2 – October 1990
- Braidwood Operability Evaluation 11-006; Turbine Building HELB Analysis Input Errors; Revisions 2 and 3
- Sargent & Lundy; Calculations for Turbine Building Siding Pressure; September 10, 2011
- Sargent & Lundy & Exelon Byron & Braidwood Turbine Building HELB Analysis Summary; October 4, 2011
- AEC Letter to Northern States Power Co.; Re Postulated Steam Pipe Break Outside of Containments of Prairie Island Nuclear Plant; December 12, 1972
- GDS Consulting Engineers; Diesel Generator Electrical Component Thermal Endurance Evaluation; April 8, 1992
- Metal Technologies Inc.; Fusible Link Performance Test Results Fusible Links Used on Dropout Registers at Davis Besse ; Revision 0 July 3, 2003
- Changes to Elevation 401' Model (Draft); July 11, 2011
- Operability Assessment Form; High Energy Line Break Analysis; Revision 2
- Drawing M-6; Main Floor at El. 451' Braidwood Unit 1 & 2; Revision L
- Drawing M-7; General Arrangement Mezzanine Floor at El. 426' Units 1 & 2; May 12, 1976
- Drawing M-8; General Arrangement Grade Floor at El. 401' Units 1 & 2; May 12, 1978
- Drawing M-35; Diagram of Main Steam Unit 1; July 19, 1978
- Drawing M-41; Diagram of Feedwater Drains Turbine Cycle; September 10, 1976
- Drawing M-98; Diagram of Diesel Generator Rooms 2A & 2B Ventilation System; December 29, 1977
- Drawing M-115; Diagram of Essential & Non-Essential Switchgear, Miscellaneous Electrical Equipment Room, Ventilation System; Revision V
- Drawing C-5630; 295 Gallon High Pressure Re-Heater Drain Tank; July 16, 1975
- Drawing C-5632; 470 Gallon Moisture Separator Shell Drain Tank; July 28, 1975
- Drawing 13989-02-D; Air Cylinder Balanced Shaft, Integral Stuff Box; December 9, 1977
- Drawing 13989-05-D; Side Air Cyl. – Lever & Weight-Outside Stuffing Room with Leakoff – Tapered; October 19, 1977
- Drawing 13989-07; F.F.R.C.V. w/Side Air Cyl.-Lever & Weight-Outside Stuffing Box w/leakoff-Tapered; May 23, 1978

4OA5 Other

- IR 1194703; HELB Concerns with ESF Switchgear Room Will Prevent Breaker Swaps; March 30, 2011
- IR 1223422; Resident NRC Questions on PBI Program; May 3, 2011
- IR 1233283; NRC Questions Movement of Equipment Thru Barrier Doors; June 27, 2011
- IR 1238789; Extension Re-question for Op Eval 1237140; July 11, 2011
- BwAP 110-3; Plant Barrier Impairment Program; Revision 20, 21, and 22
- CC-AA-201; Plant Barrier Control Program; Revision 8
- CC-AA-309-1001; BRW-11-0101-M/BYR11-036 Turbine Building HELB and Room Heat Up analyses for MUR PU; June 2, 2011
- NUREG-0800; Determination of Rupture Locations and Dynamic Effects Associated with the Postulated Rupture of Piping; July 1981
- Regulatory Issue Summaries 2001-01-009; Control of Hazard Barriers; April 2, 2011

- LER 05000483/2010-009-02 (Callaway Plant Unit 1); High Energy Line Break Program Deficiencies; December 1, 2010
- Letter from Technical Specifications Task Force to USNRC; Subj: TSTF-427 Rev 1, Allowance for Non TS Barrier Degradation on Supported System Operability; February 3, 2006
- Letter from NEI to NRR; Risk Informed TS Initiative 7a, Allowance for Non TS Barrier Degradation on Supported System OPERABILITY (TSTF-427); April 4, 2006
- Letter to Detroit Edison from NRR; Subj: FERMI 2 – Issuance of Amendment Re: Consolidated Line Item Improvement Process Application tor TS Change (TSTF-427) to Add LCO 3.0.9 Regarding Unavailability of Barriers; August 1, 2007
- 10 CFR 72.212 Evaluation Report, Braidwood Nuclear Power Stations, Units 1 and 2; Revision 1
- 72.48-001; 72.212 Evaluation Report Change; October 27, 2011
- Dry Cask Storage Project Improvement Plan; November 8, 2011
- Dry Cask Storage Campaign Readiness to Restart PORC [Slides]; November 1, 2011
- Apparent Cause Report; Moved Empty MPC But Later Found to be Approximately One-Third Full of Water
- Registration of Use of Casks to Store Spent Fuel [Cask Serial Number 147]; December 1, 2011
- NOSA-BRW-11-14; [Nuclear Oversight] ISFSI Audit; November 18, 2011

Calculations:

- 2.4.4-BRW-09-0012-S; Evaluation of Buried Utilities Located along the Transporter Haul Path for Dry Cask Storage; Revision 0
- 2.4.4-BRW-09-0012-S; Reinforced Concrete Foundation Design for HI-STORM Cask Construction Pads # 1 and # 2; Revision 12.4.4-BRW-09-0027-S; Seismic Liquefaction Assessment for the ISFSI Pad; Revision 0
- 2.4.4-BRW-09-066-S; Post Vibro Compaction Acceptance Criteria Analysis for the ISFSI Pad; Revisions 0, 1
- 4.1.1-BRW-10-0156-S; Stability Evaluations for the HI-STORM and HI-TRAC Casks Inside the Fuel Handling Building; Revisions 0, 1, 2
- BRW-08-0118-S; Cask Handling Weight and Cask Handling Dimensions for Byron and Braidwood and LaSalle; Revision 001
- BRW-09-0028; Dry Cask Storage Project – Fire Radiant Heat and Explosion Overpressure Analysis; Revision 000A
- BRW-09-0029; Dry Cask Storage Project – Fire Hazards Report; Revision 000
- BRW-09-0056-S; Tornado Evaluation for Byron Braidwood and LaSalle Nuclear Generating Station Dry Storage Projects; Revision 001
- BRW-10-0155-S; Structural Evaluations Associated with the Cask Stack-up Restraint System; Revision 1
- BRW-10-0167-S; HI-STORM and HI-TRAC Evaluations Under Seismic Restraints Loads at Braidwood; Revisions 0, 1
- HI-2012797; Structural Analysis of HI-TRAC Lift Link; Revision 3
- HI-2084120; HI-STORM CoC Radiation Protection Program Dose Rate Limits; Revision 002
- HI-2094252; Structural Analysis of 125-Ton HI-TRAC Lift Yoke; Revision 1
- HI-2114975; Dynamic Analysis of HI-STORM on LPT to Obtain Peak Loads on LPT Rollers; Revision 0
- HI-2114988; Structural Evaluation of HI-Storm Lifting Bracket; Revisions 0 through 4
- HI-992272; Calculation Package for Cask Miscellaneous Items; Revision 13
- WR-BR-PF-10; Effects of Local Probable Maximum Precipitation (PMP) at Plant Site
- HI-2022966; Forced Helium Dehydrator Sourcebook; Revision 4

- HI-2084113; Dose Versus Distance from a HI-STORM 100S Version B Containing the MPC-32; Revision 3
- HI-2084113; Dose Versus Distance from a HI-STORM 100S Version B Containing the MPC-32; Revision 6
- HI-2084120; HI-STORM CoC Radiation Protection Program Dose Rate Limits; Revision 3
- HI-2114973; Thermal Evaluation of HI-TRAC Placed in the Byron and Braidwood Decon Pits; Revision 000
- NRC's Concerns with Holtec's ISFSI Pad Analyses and Associated Short and Long Term Resolution Plans at Braidwood; April 15, 2011
- HI-2083447; MPC Steam Discharge Capacity at Design Conditions

Issue Reports:

- IR 01149550; Unable to Perform Annual FH Crane PM Procedure as Written; December 7, 2010
- IR 01155121; Vendor Recommendation and Certification – 0HC03G; December 22, 2010
- IR 01220130; Unclear all Steps Completed in Annual Crane Inspection; May 24, 2011
- IR 01253421; Discrepancies in Holtec Dose Analysis for ISFSI Project; August 19, 2011
- IR 01254485; ISFSI Tornado Evaluation of HI-STORM; August 23, 2011
- IR 01258844; ISFSI Project Vertical Cask Transporter (VCT) OPEX Review; September 2, 2011
- IR 01263923; ISFSI Lessons Learned; September 16, 2011
- IR 01279280; Worker Under a Suspended Load During Dry Cask Activities; October 20, 2011
- IR 01281833; Needed Guidance on Total Cask Heat Load Calculation; October 26, 2011
- IR 01245756; ISFSI Cask Rocking Potential Impact Factors; July 29, 2011
- IR 01280650; NRC Has Concerns on Not Using Regulatory Guide 1.198 for ISFSI Pad; September 20, 2011
- IR 01278520; ISFSI Calculation Missing Tensile Stress Checks; October 19, 2011
- AR 01279837; Moved Empty MPC But Later Found to be Approximately One-Third Full of Water; October 21, 2011
- AR 01283393; 240 VAC Outlet Breakers on TPU on 426 Elevation Trip; October 30, 2011
- AR01282943; New Thermal Analysis Needed for ISFSI Cask Spacing; October 28, 2011
- AR01285004; Documentation of Dry Cask Storage NRC Question; November 2, 2011
- AR01285354; Two Occurrences of Procedure Steps Not Followed; November 2, 2011
- AR01286670; Procedure Adherence Issues During ISFSI MPC Processing; November 4, 2011
- AR01289287; Unclear 72.48 Process Guidance; November 11, 2011AR01291551; DCS FHD System Tripped During Drying of Cask #1 MPC#0147; November 17, 2011
- AR01292000; DCS Lessons Learned on Procedures during Blowdown and FHD; November 17, 2011
- AR01292162; NOS ARMA: ISFSI DCS Procedure Use and Adherence; November 18, 2011
- AR01292922; Procedure Use and Adherence in BWFP FH-71; November 21, 2011
- AR01293254; Dry Cask Storage First Cask Lesson Learned; November 21, 2011
- AR01293710; DCS Lessons Learned Technical Challenge; November 11, 2011

Procedures:

- 0BwOSR 0.1-0; Unit Common All Modes/At All Times Shiftly and Daily Operating Surveillance; Revision 30
- BWFP FH-20; Operation of the Fuel Handling Building Crane; Revision 17
- BWFP FH-20; Operation of the Fuel Handling Building Crane; Revision 18
- BWFP FH-63; HI-STORM Inspection; Revision 1

- BWFP FH-64; Transporter Operations; Revision 0
- BWFP FH-65; Spent Fuel Cask Site Transportation; Revision 0
- BWFP FH-67; Trackmobile Operations; Revision 0
- BWFP FH-68; HI-TRAC Preparation; Revision 0
- BWFP FH-69; HI-TRAC Movement with the Fuel Building; Revision 0
- BWFP FH-71; MPC Processing; Revision 0a
- BWFP FH-72; HI-STORM Processing; Revision 0
- BWFP FH-75; MPC Inspection
- BWFP FH-76; Transporter Undocumented Visual Inspection; Revision 0
- BWFP FH-77; MPC Processes; Revision 0
- BWFP FH-79; MPC Alternate Cooling; Revision 0
- BWFP FH-80; Haul Path and ISFSI Dry Run Operations; Revision 0
- BWFP FH-82; MPC Unloading Operations; Revision 0
- BWFP FH-83; Spent Fuel Cask Contingency Actions;
- BWFP FH-84; HI-TRAC Operations with the Fuel Building; Revision 0
- BWFP FH-85; Dry Cask Storage Special Lifting Device Annual Testing; Revision 0
- HI-2114540; Forced Helium Dehydrator Operations and Maintenance Manual for Byron/Braidwood; Revision 1
- LS-AA-114; Exelon 72.48 Review Process; Revision 0
- LS-BR-105; 72.48 Review Process for Dry Cask Storage; Revision 0
- MA-AA-716-021; Rigging and Lifting Program; Revision 17
- MA-AA-716-022; Control of Heavy Loads Program; Revision 7
- MA-AA-716-022; Control of Heavy Loads Program; Revision 8
- MMH-36272-10; Exelon Braidwood Fuel Handling Building Single Failure Proof Trolley Factory Acceptance Test Procedure; January 11, 2010
- MMH-36272-44; Exelon Braidwood Fuel Handling Building Single Failure Proof Trolley Site Acceptance Test Procedure; April 12, 2010
- NF-AA-620-1000; Classification of Fuel Assemblies for Dry Storage/Transport; Revision 002
- NF-AP-622; Fuel Selection and Documentation for Dry Cask Loading Byron and Braidwood; Revision 3
- OM421; Supplementary Cooling System, Ancillary 421 Operations and Maintenance Manual; Revision 1
- OU-AA-630-1000; Spent Fuel Loading Campaign Management; Revision 0
- RP-BR-304-1001; HI-TRAC Radiation Survey; Revision 0
- RP-BR-304-1002; HI-STORM Radiation Survey; Revision 0
- RP-BR-304-1002; HI-STORM Radiation Survey; Revision 1
- RP-BR-304-1003; Independent Spent Fuel Storage Installation Radiation Survey; Revision 0
- RP-BR-304-1003; Independent Spent Fuel Storage Installation Radiation Survey; Revision 2
- BWFP FH-65; Spent Fuel Cask Site Transportation; Revision 2
- BWFP FH-68; HI-TRAC Preparation; Revision 3
- BWFP FH-69; HI-TRAC Movement with the Fuel Building; Revision 4
- BWFP FH-71; MPC Processing; Revision 6
- BWFP FH-71; MPC Processing; Revision 8
- BWFP FH-74; MPC Reflood; Revision 1
- BWFP FH-79; MPC Alternate Cooling; Revision 4
- BWFP FH-83; Spent Fuel Cask Contingency Actions; Revision 4
- HI-2114540; Forced Helium Dehydrator Operations and Maintenance Manual for Byron/Braidwood; Revision 1
- LS-AA-114; Exelon 72.48 Review Process; Revision 0
- LS-BR-105; 72.48 Review Process for Dry Cask Storage; Revision 0
- RP-BR-304-1001; HI-TRAC Radiation Survey; Revision 0

- RP-BR-304-1002; HI-STORM Radiation Survey; Revision 0
- RP-BR-304-1002; HI-STORM Radiation Survey; Revision 1
- RP-BR-304-1003; Independent Spent Fuel Storage Installation Radiation Survey; Revision 0
- RP-BR-304-1003; Independent Spent Fuel Storage Installation Radiation Survey; Revision 2

Work Orders

- WO 01277621; 0HC03G Overhead Crane Yearly Inspection; December 22, 2010
- WO 01286682; 0HC03G Inspection of Fuel Handling Building Crane; December 10, 2010
- WO 01415120; 0HC03G Monthly Crane Inspection; March 24, 2011

Other Documents:

- [HI-TRAC] Trunnion Support Lug Load Test Data Record; July 14, 2010
- 29487-BRW0154-VIBRO-001; Specification for Vibro Compaction; Revision 0
- ALARA Plan – Dry Cask Storage and Support Activities
- Braidwood Nuclear Power Station Units 1 and 2, 10 CFR 72.212 Evaluation Report; Revision 0
- Byron – Braidwood Procedures Comparison [Gap Analysis from Byron to Braidwood for Welding Operations]
- Certificate of Conformance [Vertical Cask Transporter]; December 7, 2009
- EP-AA-1001; Radiological Emergency Plan Annex for Braidwood Station; March 11, 2011
- Exelon Nuclear/Airgas Certificate of Conformance – Helium
- FASA Self-Assessment Report – NRC Pre-Operational Independent Spent Fuel Storage Installation Inspection
- ISFSI Worker Training Matrix
- Konecranes Bottom Block Adjustment Procedure
- Konecranes Preventative Maintenance Manual
- Konecranes Work Order Sheet [Fuel Handling Building Crane Periodic Inspection] December 20, 2010
- Konecranes Work Order Sheet [Clarification of Fuel Handling Building Crane Periodic Inspection] July 22, 2011
- Letter from Holtec International to Exelon Generating Company; Unconditional VCT Release; August 15, 2011
- NF1100195; Nuclear Fuels Transmittal of Design Information; Revision 0
- NO-AA-10; Quality Assurance Topical Report; Revision 85
- NOSMDA-NCS-11-01; Dry Cask Storage Campaign Readiness [Nuclear Oversight Audit]; March 9, 2011
- Temperature and Pressure Comparison Table from NRC Dry Run
- VCT Plan Based on Wheel Failure at Commanche Peak; July 22, 201

LIST OF ACRONYMS USED

ADAMS	Agencywide Document Access Management System
AF	Auxiliary Feedwater
AISC	American Institute of Steel Construction
ALARA	As-Low-As-Is-Reasonably-Achievable
ANSI	American National Standards Institute
AOV	Air-Operated Valve
ASME	American Society of Mechanical Engineers
BTP	Branch Technical Position
BwOP	Braidwood Operating Procedure
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CLB	Current Licensing Bases
CoC	Certificate of Compliance
CS	Containment Spray
CSR	Cable Spreading Room
CQ	Emergency Communication
CW	Circulating Water
CY	Calendar Year or Cycled Condensate
DG	Emergency Diesel Generator
EAL	Emergency Action Level
EC	Engineering Change
ESF	Engineered Safety Feature
FSAR	Final Safety Analysis Report
HELB	High Energy Line Break
HI-STORM	Storage Cask
HI-TRAC	Transfer Cask
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IPEEE	Individual Plant Examination and External Events
IR	Inspection Report
IR	Issue Report
ISFSI	Independent Spent Fuel Storage Installation
ISI	Inservice Inspection
LCO	Limiting Condition for Operation
LCSR	Lower Cable Spreading Room
LER	Licensee Event Report
LOOP	Loss-Of-Offsite-Power
MCC	Motor Control Center
MEER	Miscellaneous Electric Equipment Room
MPC	Multi-Purpose Canister
MSIV	Main Steam Isolation Valve
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
NUMARC	Nuclear Management and Resources Council
OOS	Out-of-Service
PARS	Publicly Available Records System
PBI	Plant Barrier Impairment
PI	Performance Indicator

psig	Pounds Per Square Inch Gauge
RG	Regulatory Guide
RIS	Regulatory Issue Summary
SCBA	Self-Contained Breathing Apparatus
SDP	Significance Determination Process
SFP	Spent Fuel Pool
SRP	Standard Review Plan
SSC	Systems, Structures, or Components
SX	Essential Service Water
TE	Traditional Enforcement
TLD	Thermo-Luminescent Detector
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
WO	Work Order

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Sincerely,

/RA/

Eric R. Duncan, Chief
Branch 3
Division of Reactor Projects

Docket Nos. 50-456; 50-457
License Nos. NPF-72; NPF-77

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Letter to M. Pacilio from E. Duncan dated February 10, 2012.

SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2, NUCLEAR REGULATORY COMMISSION INTEGRATED INSPECTION REPORT 05000456/2011005; 05000457/2011005

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