



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, IL 60532-4352

February 7, 2012

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

**SUBJECT: BYRON STATION, UNITS 1 AND 2, NRC INTEGRATED INSPECTION
REPORT 05000454/2011005; 05000455/2011005**

Dear Mr. Pacilio:

On December 31, 2011, the U.S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Byron Station, Units 1 and 2. The enclosed inspection report documents the inspection findings which were discussed on January 12, 2012, with Mr. B. Youman 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.

Three NRC-identified findings of very low safety significance (Green) were identified during this inspection.

These findings were determined to involve violations of NRC requirements. Further, a licensee-identified violation which was determined to be of very low safety significance is listed in this report. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2 of the NRC 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 the Resident Inspector Office at the Byron 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 the NRC Resident Inspector at the Byron Station.

M. Pacilio

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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 (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site 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. 50-454; 50-455
License Nos. NPF-37; NPF-66

Enclosure: Inspection Report No. 05000454/2011005 and 05000455/2011005
w/Attachment: Supplemental Information

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U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos: 50-454; 50-455
License Nos: NPF-37; NPF-66

Report Nos: 05000454/2011005 and 05000455/2011005

Licensee: Exelon Generation Company, LLC

Facility: Byron Station, Units 1 and 2

Location: Byron, IL

Dates: October 1, 2011, through December 31, 2011

Inspectors: B. Bartlett, Senior Resident Inspector
J. Robbins, Resident Inspector
R. Ng, Project Engineer
J. Dalzell-Bishop, DRS Emergency Response Specialist
J. Cassidy, Senior Health Physicist
R. Jickling, Senior Emergency Preparedness Inspector
B. Palagi, Senior Operations Engineer
J. Nance, Reactor Engineer
J. Benjamin, Braidwood Senior Resident Inspector

C. Thompson, 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 (IR) 05000454/2011005, 05000455/2011005; 10/01/2011 - 12/31/2011; Byron Station, Units 1 & 2; Operability Evaluations and Functional Assessments; Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. Three Green findings were identified by the inspectors. 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). Assigned cross-cutting aspects were determined using IMC 0310, "Components Within the Cross-Cutting Areas." 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: Mitigating Systems

Green. The inspectors identified a finding of very low safety significance and an associated NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," when licensee personnel failed to identify voided piping between Unit 1 valves 1AF006B and 1AF017B and Unit 2 valves 2AF006B and 2AF017B of the auxiliary feedwater (AF) system. The piping between these valves had been historically voided until they were recently re-designed to be filled and maintained filled with water to address an NRC-identified Green finding and an associated NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control." The licensee entered this issue into their Corrective Action Program (CAP) as IR 1296819, IR 1292337, and IR 1295760. Corrective actions included instituting an Operations Standing Order, replacing the Unit 1 AF drain valve, and the isolation of the Unit 2 AF drain valve.

This 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. Specifically, the inspectors answered "Yes" to Question 1 – Is the finding a design or qualification deficiency confirmed not to result in a loss of operability or functionality? Based upon this Phase 1 screening, the inspectors concluded that the finding was of 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 licensee did not have adequate procedures to ensure that piping between Unit 1 valves 1AF006B and 1AF017B and Unit 2 valves 2AF006B and 2AF017B were maintained filled with water. (Section 1R15)

Green. The inspectors identified a finding of very low safety significance and an associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," 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 the Operability Evaluation. The licensee entered these issues into their CAP as IR 1184258, IR 1237133, IR 1238611, IR 1240295, IR 1244251, and IR 1276895. In addition to revising Operability Evaluation 2011-006, corrective actions included an assignment to reconstitute design basis calculation records and plans to re-design the hazard barrier dampers.

This 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. Specifically, the inspectors answered "No" to all of the Mitigating Systems Cornerstone questions in Table 4a. Based upon this Phase 1 screening, the inspectors concluded that the finding was of 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)

Cornerstone: Public Radiation Safety

Green. A self-revealed finding of very low safety significance and an associated NCV of 10 CFR 71.5, "Transportation of Licensed Material," was identified when licensee personnel failed to comply with 49 CFR 172.203(c) and shipped packages of radioactive material with transport manifests that did not document all applicable hazardous substances. The issue was entered in the licensee's CAP as IR 1285148. Immediate corrective actions included providing a corrected copy of the transport manifest to the waste processor. Further, the licensee placed locks on the shipping containers to control items placed in the packages and to ensure that the manifest accurately represented the hazards contained in the shipping packages.

This finding was determined to be more than minor because it was associated with the Program and Process attribute of the Public Radiation Safety Cornerstone and adversely affected the cornerstone objective of ensuring adequate protection of public health and safety from exposure to radioactive materials released into the public domain as a result of routine civilian nuclear reactor operation, in that, providing incorrect information, as part of hazards communications, could impact the actions of response personnel. The inspectors determined that the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Appendix D, "Public Radiation

Safety Significance Determination Process.” Using the Public Radiation Safety SDP, the inspectors determined: (1) radiation limits were not exceeded; (2) there was no breach of a package during transit; (3) this issue did not involve a certificate of compliance; (4) this issue was not a low level burial ground nonconformance; and (5) this issue did not involve a failure to make notifications or provide emergency information. As a result, the finding screened as having very low safety significance (Green). This finding had a cross-cutting aspect in the Work Control component of the Human Performance cross-cutting area [H.3(b)] since the licensee failed to coordinate work activities by incorporating actions to address the impact of the work on different job activities, and the need for work groups to maintain interfaces with offsite organizations, and communicate, coordinate, and cooperate with each other during activities in which interdepartmental coordination was necessary to assure adequate human performance. Specifically, these events occurred because the licensee did not control the items placed in the waste packages and was not present when the boxes were loaded. (Section 2RS8)

B. Licensee-Identified Violations

One violation of very low safety significance that was identified by the licensee has been reviewed by the inspectors. Corrective actions planned or taken by the licensee have been entered into the licensee’s CAP. This violation and the associated corrective action tracking number are listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

Unit 1 operated at or near full power from the beginning of the inspection period until November 11, 2011, when power was reduced to 89 percent to perform scheduled turbine throttle and governor valve testing. The unit was returned to full power the following day and operated at full power for the remainder of the assessment period.

Unit 2 began the inspection period shut down and in a planned refueling outage. The unit was restarted and returned to service on October 10, 2011. On November 5, 2011, reactor power was reduced to 96 percent to perform feedwater heater maintenance. The unit was returned to full power on November 14, 2011, and operated at full power for the remainder of the inspection period.

1. REACTOR SAFETY

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

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 the following plant systems due to their risk significance or susceptibility to cold weather issues:

- Station Heating System (SH);
- Auxiliary Building Heating, Ventilation, and Air-Conditioning (HVAC) [VA]; and
- Refueling Water Storage Tanks (RWSTs).

This inspection constituted one winter seasonal readiness preparation 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:

- Unit 2 Train A Residual Heat Removal System Following Restoration to its Standby Line-Up;
- Unit 2 Train B Essential Service Water (SX) with the Unit 2 Train A SX Out-of-Service (OOS);
- Unit 2 Train B Auxiliary Feedwater (AF) with the Unit 2 Train A AF OOS; and
- Unit 1 Train A AF with the Unit 1 Train B AF OOS.

The inspectors selected these systems based on their risk significance relative to the Reactor Safety Cornerstones 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, UFSAR, Technical Specification (TS) requirements, outstanding work orders (WOs), condition reports, 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

No findings were identified.

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 availability, accessibility, and the condition of firefighting equipment in the following risk-significant plant areas:

- Unit 1 426' Turbine Building (Fire Zone 8.5-1);
- Unit 1 426' Turbine Building (Fire Zone 8.5-1);
- Unit 1 Train B Auxiliary Feedwater Pump Room (Fire Zone 11.4A-1); and
- Unit 2 Train B Auxiliary Feedwater Pump Room (Fire Zone 11.4A-2).

The inspectors reviewed 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 out-of-service, 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 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 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. Documents reviewed are listed in the Attachment.

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 November 11, 2011, and December 17, 2011, the inspectors observed a fire brigade activation Fire Drill in the Unit 1 Auxiliary Boiler Room, 401' Elevation (Fire Zone 8.3-1 SE). 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;
- 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 to this report.

These activities constituted one annual fire protection inspection sample as defined in IP 71111.05-05.

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification 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 October 18, 2011 through December 8, 2011, required by 10 CFR 55.59(a). The results were compared to the thresholds established in IMC 0609, Appendix I, "Licensed Operator Regualification Significance Determination Process (SDP)," to assess the overall adequacy of the licensee's Licensed Operator Regualification Program (LORT) to meet the requirements of 10 CFR 55.59.

This inspection constitutes one biennial and one annual licensed operator regualification inspection sample as defined in IP 71111.11B and IP71111.11A.

b. Findings

No findings were identified.

.2 Resident Inspector Quarterly Review (71111.11Q)

a. Inspection Scope

On November 16, 2011, the inspectors observed a crew of licensed operators in the plant's simulator during licensed operator regualification 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.

In addition, the inspectors observed licensed operator performance in the actual plant and the main control room during this calendar quarter.

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:

- Unit 1 Rod Drive Motor Generator (MG) Set High Vibrations; and
- High Energy Line Break (HELB) Dampers.

The inspectors reviewed events including those in which ineffective equipment maintenance had resulted in valid or invalid automatic actuations of engineered safeguards 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 sample as defined in IP 71111.12-05.

b. Findings

No findings were identified.

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 work:

- Shutdown Safety Associated with Cavity Drain;
- Unit Common B Fire Pump OOS With SX as its Backup While One Train of SX was OOS;
- Review of Planned Risk Significant Activities During Elevated Winds and Low River Level; and
- Unit 2 Train B Auxiliary Feedwater Pump OOS.

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 accurate and complete. When emergent work was performed, the inspectors verified that the 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 TS requirements and walked down portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

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 Evaluations (71111.15)

.1 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following issues:

- Unit 1 Embedment Plate 1SI06025V Due to Questions Regarding Supporting Analysis/Calculations;
- Unit 1 Seismic Support 1FW01147X Due to Questions Regarding Impact to HELB Analysis;
- Unit 1 and Unit 2 Train B AF Pumps Due to Questions Regarding Multiple Starts;
- Unit 1 Leading Edge Flow Monitor Due to Identified Anomaly in Trended Data;
- Unit 1 and Unit 2 Train B AF Pumps Due to Potential Pipe Voids in Cross-Tie Piping; and
- Unit 1 Engineered Safety Features Switchgear Rooms Division 11 and 12 Due to Questions Regarding 1VX20Y and 1VX17Y Fire Damper “S” Hooks Preventing Closure of Dampers

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 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 six samples as defined in IP 71111.15-05.

b. Findings

.1) Failure to Identify Auxiliary Feedwater Pump Suction Voids

Introduction: The inspectors identified a finding of very low safety significance (Green) and an associated NCV of 10 CFR Part 50, Appendix B, Criterion XVI, “Corrective Action,” when licensee personnel failed to identify voided piping between Unit 1 valves 1AF006B and 1AF017B and Unit 2 valves 2AF006B and 2AF017B of the auxiliary feedwater system. The piping between these valves had been historically voided until they were recently re-designed to be filled and maintained filled with water to address an NRC-identified Green finding and an associated NCV of 10 CFR Part 50, Appendix B, Criterion III, “Design Control” (NCV 05000454/2011004-04; 05000455/-2011004-04, Design of Auxiliary Feedwater System Included Voids in Safety-Related Alternate Suction Flow Paths).

Description: On November 16, 2011, the inspectors notified licensee staff that there appeared to be no visible water in tygon tubing attached to vent valves between Unit 1 valves 1AF006B and 1AF017B and Unit 2 valves 2AF006B and 2AF017B. Visible water in tygon tubing attached to these vent valves was being used as an indication that the piping between these valves was filled with water. The inspectors could not determine whether there was water within the tygon tubing because the inside of the tubing was coated with a brown and black substance suspected to be mold. The inspectors concluded that without visible water in the tygon tubing, the space between these valves could be voided, contrary to plant design requirements. The piping between Unit 1 valves 1AF006B and 1AF017B and Unit 2 valves 2AF006B and 2AF017B had been historically voided, but were recently re-designed and filled with water to address an NRC-identified Green finding and associated NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control" (NCV 05000454/2011004-04; 05000455/-2011004-04, Design of Auxiliary Feedwater System Included Voids in Safety-Related Alternate Suction Flow Paths). The basis for this Green finding and associated NCV was that the licensee had not performed design reviews, calculations, or suitable tests that demonstrated the voided piping between Unit 1 valves 1AF006B and 1AF017B and Unit 2 valves 2AF006B and 2AF017B would not adversely impact the ability of the AF system to perform its design function. This piping was downstream of the safety-related essential service water (SX) supply for the diesel-driven AF pumps. The inspectors did observe standing water in the tygon tubing between Unit 1 valves 1AF006A and 1AF017A and Unit 2 valves 2AF006A and 2AF017A associated with the Unit 1 and Unit 2 motor-driven AF pumps.

On November 17, 2011, the inspectors reviewed the Inspection Reports (IRs) generated the previous day and did not identify any that documented the issue discussed above. The inspectors re-inspected the tygon tubing between Unit 1 valves 1AF006B and 1AF017B and Unit 2 valves 2AF006B and 2AF017B and could not determine whether there was water in the tygon tubing. Licensee management was subsequently notified of the inspector's observations. The licensee performed a system walkdown and confirmed that there was no visible water level in the tygon tubing between Unit 1 valves 1AF006B and 1AF017B. The section of piping between the valves was subsequently filled with water and verified full through ultrasonic testing.

On November 18, 2011, the inspectors re-inspected the tygon tubing between Unit 1 valves 1AF006B and 1AF017B and Unit 2 valves 2AF006B and 2AF017B and could not determine whether there was water in the tygon tubing. The inspectors notified licensee management and questioned the licensee's actions to address the inspector's previous questions and concerns. The licensee performed a walkdown of the system and confirmed the inspector's concern that the tygon tube was again empty, which indicated that the section of piping between Unit 1 valves AF006B and AF017B was likely voided. The licensee entered this issue into their CAP. The section of piping between the valves was again re-filled and verified full.

On November 29, 2011, the inspectors performed field walkdowns and identified, again, that the tygon tubing attached to the vent line between Unit 2 valves 2AF006B and 2AF017B did not have a visible water level. The inspectors notified licensee management and concluded that the licensee did not have adequate measures in place to monitor or ensure the sections of piping between Unit 1 valves 1AF006B and 1AF017B and Unit 2 valves 2AF006B and 2AF017B were maintained full of water. The licensee performed a walkdown of the system, confirmed the inspector's concerns, and

filled the voided sections of piping as before. In addition, the Operations department instituted an Operations Standing Order that required a verification that the tygon tubing was filled with water multiple times a shift. The licensee entered this issue into their CAP as IR 1296819, IR 1292337, and IR 1295760. Corrective actions included instituting the Operations Standing Order, replacing the Unit 1 AF drain valve, and isolating the Unit 2 AF drain valve.

Analysis: The inspectors determined that the failure to identify voided sections of AF piping prior to and following the inspector's observations and interactions with licensee management was a performance deficiency.

This 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). Specifically, the unverified configuration might have rendered the Unit 1 and Unit 2 diesel-driven AF pumps inoperable.

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. Specifically, the inspectors answered "Yes" to Question 1 – Is the finding a design or qualification deficiency confirmed not to result in a loss of operability or functionality? This conclusion was reached after conservatively assuming that both sections of piping for Unit 1 and Unit 2 were completely voided and after reviewing tests performed by the licensee in response to the previously documented design control Green finding and associated NCV. These tests demonstrated that under the existing plant conditions, and even if the piping between Unit 1 valves 1AF006B and 1AF017B and Unit 2 valves 2AF006B and 2AF017B was completely voided, that the diesel-driven AF pumps were not inoperable. However, these tests were not of sufficient scope to demonstrate that under all possible plant conditions that the diesel-driven AF pumps would have remained operable. Therefore, although the existing void did not render the diesel-driven AF pumps inoperable, there remained the possibility that under some conditions the unverified configuration discussed above could have rendered the diesel-driven AF pumps inoperable. Based upon this Phase 1 screening, the inspectors concluded that the finding was of 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 licensee did not ensure that procedures were adequate to ensure nuclear safety. In particular, licensee procedures did not ensure that the sections of piping between Unit 1 valves 1AF006B and 1AF017B and Unit 2 valves 2AF006B and 2AF017B were maintained filled with water as required to support nuclear safety.

Enforcement: 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and non-conformances are promptly identified and corrected.

Contrary to the above, licensee personnel failed to identify non-conforming conditions associated with the station's safety-related diesel-driven AF systems. Specifically, the

space between Unit 1 valves 1AF006B and 1AF017B and Unit 2 valves 2AF006B and 2AF017B had been re-designed to be full of water and was identified by the inspectors prior to November 16, 2011; November 17, 2011; November 18, 2011; and November 29, 2011 to be voided.

Corrective actions included filling the voided piping sections, replacing the Unit 1 drain valve, isolating the Unit 2 drain valve, and monitoring tygon tubing water level on a more frequent basis. Because this violation was of very low safety significance and was entered into the licensee's CAP as IR 1296819, IR 1292337, and IR 1295760, this violation is being treated as a NCV consistent with Section 2.3.2 of the NRC Enforcement Policy. **(NCV 05000454/2011005-01; 05000455/2011005-01, Failure to Identify Voided Sections of AF Piping)**

.2) Operability Evaluation Not Performed in Accordance with Station Standards

Introduction: 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.

Description: On July 6, 2011, the licensee identified non-conservative assumptions in the actuation time for fusible links used in hazard barrier dampers for the Engineered Safety Feature (ESF) Rooms, Non-ESF Switchgear Rooms, Miscellaneous Electrical Equipment Rooms (MEERs) and Emergency Diesel Generator (DG) Rooms. These dampers protected these rooms from the effects of a Turbine Building fire or 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 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, 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 in accordance with OP-AA-108-115, "Operability Evaluation Standard," Revision 9.

The inspectors reviewed Operability Evaluation 11-006, Revision 1, and identified a number of examples in which the evaluation did not meet the standards in OP-AA-108-115. Specifically, OP-AA-108-115, "Operability Evaluation Standard," Revision 9 included the following requirements:

Section 4.4.2

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 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 the 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. 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 $S_h + S_a$). The licensee entered this issue into their CAP as IR 1240295.
- 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. The licensee entered this issue into their CAP as IR 1279759 and IR 12776277.

- 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 licensee entered this issue into their CAP as IR 1276895.
- 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, that 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 1184258, IR 1237133, IR 1238611, IR 1240295, IR 1244251, and IR 1276895. 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 meet the station 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 performance deficiency 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 Determination 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. Specifically, the inspectors answered “No” to all of the Mitigating Systems Cornerstone questions in Table 4a. 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: 10 CFR Part 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” requires, in part, that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstance and shall be accomplished in accordance with these instructions, procedures or drawings.

Contrary to the above, the inspectors identified examples during the development of Operability Evaluation 11-006, Revision 1, in which licensee personnel failed to adhere to quality procedure OP-AA-108-115, “Operability Determinations (CM-1),” Revision 9.

In particular, OP-AA-108-115, Revision 9, stated in part:

“The OpEval 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).

The Preparer should examine the CLB [Current Licensing Basis] requirements or commitments, including the TSs and 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.”

Contrary to this requirement:

- On July 15, 2011, the licensee did not adequately examine the applicable CLB requirements or commitments to establish the performance requirements to be met

for determining operability in the case of single failure, common mode, and leakage crack assumptions.

- On July 15, 2011, the licensee's "OpEval" did not adequately address the extent of condition for all similarly affected SSCs.
- On July 15, 2011, the "OpEval" did not contain sufficient detail for a knowledgeable individual to independently reach the same conclusions as the Preparer.

Because this violation was of very low safety significance and it was entered into the licensee's corrective actions program, this violation is being treated as a NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. **(NCV 05000454/2011005-02; 05000455/2011005-02, Operability Evaluation Not Performed in Accordance with Station Standards)**

1R19 Post-Maintenance Testing (71111.19)

.1 Post-Maintenance Testing

a. Inspection Scope

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

- Unit 2 AF Check Valves 2AF014E, 2AF014G, and 2AF014H Following Disassembly and Inspection;
- Unit 2 Reactor Coolant Pump Motor - 2D Following Refuel Maintenance and Inspection;
- Unit 2 Charging Valve Stroke Time and Position Indication Test 2CV8804A Following Circuit Modification;
- Unit 2 Solid State Protection System Following Unit 2 Refueling Outage Preventive Maintenance;
- Unit 2 Train B Containment Spray Following Replacement of Timer Relay;
- Unit 1 Train A Rod Drive Motor-Generator Following Bearing Replacement; and
- Surveillance 2BOSR 0.5-2.RH.4-1 Following Maintenance on Valve 2RH610

These activities were selected based upon the structure, system, or component'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 TSSs, 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 seven post maintenance testing samples as defined in IP 71111.19-05.

a. Findings

No findings were identified.

1R20 Outage Activities (71111.20)

.1 Refueling Outage Activities

a. Inspection Scope

The inspectors reviewed the Outage Safety Plan (OSP) and contingency plans for the Unit 2 refueling outage (RFO) B2R16, conducted September 18 through October 10, 2011, to confirm that the licensee had appropriately considered risk, industry experience, and previous site-specific problems in developing and implementing a plan that assured maintenance of defense-in-depth. During the RFO, the inspectors observed portions of the shutdown and cooldown processes and monitored licensee controls over the outage activities listed below. Documents reviewed during the inspection are listed in the Attachment to this report.

- Licensee configuration management, including maintenance of defense-in-depth commensurate with the OSP for key safety functions and compliance with the applicable TS when taking equipment out of service.
- Implementation of clearance activities and confirmation that tags were properly hung and equipment appropriately configured to safely support the work or testing.
- Installation and configuration of reactor coolant pressure, level, and temperature instruments to provide accurate indication, accounting for instrument error.
- Controls over the status and configuration of electrical systems to ensure that TS and OSP requirements were met, and controls over switchyard activities.
- Monitoring of decay heat removal processes, systems, and components.
- Controls to ensure that outage work was not impacting the ability of the operators to operate the spent fuel pool cooling system.
- Reactor water inventory controls including flow paths, configurations, and alternative means for inventory addition, and controls to prevent inventory loss.
- Controls over activities that could affect reactivity.
- Maintenance of secondary containment as required by TS.
- Licensee fatigue management, as required by 10 CFR 26, Subpart I.
- Refueling activities, including fuel handling and sipping to detect fuel assembly leakage.
- Startup and ascension to full power operation, tracking of startup prerequisites, walkdown of the drywell (primary containment) to verify that debris had not been left which could block emergency core cooling system suction strainers, and reactor physics testing.
- Licensee identification and resolution of problems related to RFO activities.

This inspection constituted one RFO sample as defined in IP 71111.20-05.

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:

- Unit 2 Train B Diesel Generator Sequence Test;
- Unit 1 Train B AF Pump ASME Surveillance;
- Unit 1 Train B AF Valve Strokes for 1AF013E-H;
- Unit 1 Train B Residual Heat Removal (RHR) Check Valve 1SI8958B;
- Unit 2 Reactor Coolant System (RCS) Water Inventory Balance Surveillance (Leak Detection); and
- 0BMSR FP-5, Fire Hydrant Yard Loop Annual Flush

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 were in accordance with TSs, the USAR, 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 (IST) activities, testing was performed in accordance with the applicable version of Section XI of the 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 four routine surveillance testing samples, one IST sample, and one RCS Leak Detection sample, as defined in IP 71111.22, Sections -02 and -05.

b. Findings

No findings were identified.

2. REACTOR SAFETY

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 27 and 28 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 sampling review of the Emergency Plan changes and a review of the EAL changes to evaluate for potential decreases in effectiveness of the Plan. 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.

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 15, 2011, to identify any weaknesses and deficiencies in classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the Simulator Control Room and 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 verify 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.

3. RADIATION SAFETY

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01)

The inspection activities supplement those documented in Inspection Report 05000454/2011002; 05000455/2011002 and constitute one complete sample as defined in IP 71124.01-05.

.1 Inspection Planning (02.01)

a. Inspection Scope

The inspectors reviewed licensee performance indicators for the occupational exposure cornerstone for follow-up. The inspectors reviewed the results of radiation protection program audits (e.g., licensee quality assurance audits or other independent audits). The inspectors reviewed 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 Instructions to Workers (02.03)

a. Inspection Scope

The inspectors reviewed selected occurrences where a worker's electronic personal dosimeter noticeably malfunctioned or alarmed. The inspectors evaluated whether workers responded appropriately to the off-normal condition. The inspectors assessed whether the issue was included in the CAP and dose evaluations were conducted as appropriate.

b. Findings

No findings were identified.

.3 Radiological Hazards Control and Work Coverage (02.05)

a. Inspection Scope

The inspectors examined the licensee's physical and programmatic controls for highly activated or contaminated materials (nonfuel) stored within spent fuel and 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.

The inspectors examined the posting and physical controls for selected high radiation areas and very high radiation areas to verify conformance with the occupational radiation performance indicator.

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors discussed with the radiation protection manager the controls and procedures for high-risk high radiation areas and very high radiation areas. The inspectors discussed methods employed by the licensee to provide stricter control of very high radiation area access as specified in 10 CFR 20.1602, "Control of Access to Very High Radiation Areas," and Regulatory Guide 8.38, "Control of Access to High and Very High Radiation Areas of Nuclear Plants." The inspectors assessed whether any changes to licensee procedures substantially reduced the effectiveness and level of worker protection.

The inspectors discussed the controls in place for special areas that have the potential to become very high radiation areas during certain plant operations with health physics supervisors (or equivalent positions having backshift health physics oversight authority). The inspectors assessed whether these plant operations required communication beforehand with the health physics group, so as to allow corresponding timely actions to

properly post, control, and monitor the radiation hazards including re-access authorization.

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.

.5 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.

.6 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.

.7 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 CAP. 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 their plant.

b. Findings

No findings were identified.

2RS3 In-Plant Airborne Radioactivity Control and Mitigation (71124.03)

The inspection activities supplement those documented in Inspection Report 05000454/2011002; 05000455/2011002 and constitute one complete sample as defined in IP 71124.03-05.

.1 Engineering Controls (02.02)

a. Inspection Scope

The inspectors reviewed the licensee's use of permanent and temporary ventilation to determine whether the licensee used ventilation systems as part of its engineering controls (in-lieu of respiratory protection devices) to control airborne radioactivity. The inspectors reviewed procedural guidance for use of installed plant systems, such as containment purge, spent fuel pool ventilation, and auxiliary building ventilation, and assessed whether the systems were used, to the extent practicable, during high-risk activities (e.g., using containment purge during cavity flood-up).

The inspectors selected installed ventilation systems used to mitigate the potential for airborne radioactivity, and evaluated whether the ventilation airflow capacity, flow path (including the alignment of the suction and discharges), and filter/charcoal unit efficiencies, as appropriate, were consistent with maintaining concentrations of airborne radioactivity in work areas below the concentrations of an airborne area to the extent practicable.

The inspectors selected temporary ventilation system setups (high efficiency particulate air/charcoal negative pressure units, down draft tables, tents, metal "Kelly buildings," and other enclosures) used to support work in contaminated areas. The inspectors assessed whether the use of these systems was consistent with licensee procedural guidance and the As-Low-As-Reasonably-Achievable (ALARA) concept.

The inspectors reviewed airborne monitoring protocols by selecting installed systems used to monitor and warn of changing airborne concentrations in the plant and evaluating whether the alarms and setpoints were sufficient to prompt licensee/worker action to ensure that doses were maintained within the limits of 10 CFR Part 20 and the ALARA concept.

The inspectors assessed whether the licensee had established trigger points (e.g., the Electric Power Research Institute's "Alpha Monitoring Guidelines for Operating Nuclear Power Stations") for evaluating levels of airborne beta-emitting (e.g., plutonium-241) and alpha-emitting radionuclides.

b. Findings

No findings were identified.

.2 Use of Respiratory Protection Devices (02.03)

a. Inspection Scope

For those situations where it was impractical to employ engineering controls to minimize airborne radioactivity, the inspectors assessed whether the licensee provided respiratory protective devices such that occupational doses were ALARA. The inspectors selected work activities where respiratory protection devices were used to limit the intake of radioactive materials, and assessed whether the licensee performed an evaluation concluding that further engineering controls were not practical and that the use of respirators was ALARA. The inspectors also evaluated whether the licensee had established means (such as routine bioassay) to determine if the level of protection (protection factor) provided by the respiratory protection devices during use was at least as good as that assumed in the licensee's work controls and dose assessment.

b. Findings

No findings were identified.

2RS4 Occupational Dose Assessment (71124.04)

The inspection activities supplement those documented in Inspection Report 05000454/2011002; 05000455/2011002 and constitute one complete sample as defined in IP 71124.04-05.

.1 External Dosimetry (02.02)

a. Inspection Scope

The inspectors evaluated whether the licensee's dosimetry vendor was National Voluntary Laboratory Accreditation Program (NVLAP) accredited and if the approved irradiation test categories for each type of personnel dosimeter used were consistent with the types and energies of the radiation present and the way the dosimeter was being used (e.g., to measure deep dose equivalent, shallow dose equivalent, or lens dose equivalent).

b. Findings

Introduction: The inspectors identified that the licensee's use of dosimeters (TLDs) may not be consistent with the methods used by the NVLAP accreditation process. As a result, the inspectors identified an Unresolved Item (URI) for the apparent non-compliance with 10 CFR 20.1501(c)(2) because the accreditation process for the types of radiation included in the NVLAP program may not approximate the types of radiation for which the individual wearing the dosimeter is monitored.

Discussion: The licensee used a vendor to supply and process dosimeters used to measure radiation exposure for the monitored workers. This vendor was NVLAP accredited for beta, gamma, neutron, mixture of beta/gamma, and mixture neutron/gamma radiations. However, the licensee used the dosimeters when workers may be exposed to beta, gamma, and neutron radiations within the same monitoring

period. The inspectors determined that this mixture of three radiation types may not be aligned with the accreditation process.

The issue was categorized as a URI pending NRC evaluation of this practice and determination whether a single TLD can accurately measure occupational dose to three types of radiation (URI 05000454/2011005-03; 05000455/2011005-03; Use of TLDs May Not be Consistent with the Methods Used by the NVLAP Accreditation Process)

2RS5 Radiation Monitoring Instrumentation (71124.05)

The inspection activities supplement those documented in Inspection Report 05000454/2011002; 05000455/2011002 and constitute one complete sample as defined in IP 71124.05-05.

.1 Inspection Planning (02.01)

a. Inspection Scope

The inspectors reviewed the area radiation monitor alarm setpoint values and setpoint bases as provided in the TSs and the Final Safety Analysis Report.

The inspectors reviewed effluent monitor alarm setpoint bases and the calculation methods provided in the Offsite Dose Calculation Manual (ODCM).

b. Findings

No findings were identified.

2RS6 Radioactive Gaseous and Liquid Effluent Treatment (71124.06)

This inspection constituted one complete sample as defined in IP 71124.06-05.

.1 Inspection Planning and Program Reviews (02.01)

Event Report and Effluent Report Reviews

a. Inspection Scope

The inspectors reviewed the radiological effluent release reports issued since the last inspection to determine if the reports were submitted as required by the ODCMI/TSs. The inspectors reviewed anomalous results, unexpected trends, or abnormal releases identified by the licensee for further inspection to determine if they were evaluated, were entered in the CAP, and were adequately resolved.

The inspectors identified radioactive effluent monitor operability issues reported by the licensee in effluent release reports and reviewed these issues during the onsite inspection, as warranted, and determined if the issues were entered into the CAP and adequately resolved.

b. Findings

No findings were identified.

Offsite Dose Calculation Manual and Final Safety Analysis Report Review

c. Inspection Scope

The inspectors reviewed Final Safety Analysis Report descriptions of the radioactive effluent monitoring systems, treatment systems, and effluent flow paths so they could be evaluated during inspection walkdowns.

The inspectors reviewed changes to the ODCM made by the licensee since the last inspection against the guidance in NUREG-1301, NUREG-0133, and Regulatory Guides 1.109, 1.21 and 4.1. When differences were identified, the inspectors reviewed the technical basis or evaluations of the change during the onsite inspection to determine whether they were technically justified and maintain effluent releases ALARA.

The inspectors reviewed licensee documentation to determine if the licensee had identified any non-radioactive systems that had become contaminated as disclosed either through an event report or the ODCM since the last inspection. This review provided an intelligent sample list for the onsite inspection of any 10 CFR 50.59 evaluations and allowed a determination if any newly contaminated systems had an unmonitored effluent discharge path to the environment, whether any required ODCM revisions were made to incorporate these new pathways and whether the associated effluents were reported in accordance with Regulatory Guide 1.21.

d. Findings

No findings were identified.

Groundwater Protection Initiative Program

e. Inspection Scope

The inspectors reviewed reported groundwater monitoring results and changes to the licensee's written program for identifying and controlling contaminated spills/leaks to groundwater.

f. Findings

No findings were identified.

Procedures, Special Reports, and Other Documents

g. Inspection Scope

The inspectors reviewed Licensee Event Reports, event reports and/or special reports related to the effluent program issued since the previous inspection to identify any additional focus areas for the inspection based on the scope/breadth of problems described in these reports.

The inspectors reviewed effluent program implementing procedures, particularly those associated with effluent sampling, effluent monitor setpoint determinations, and dose calculations.

The inspectors reviewed copies of licensee and third party (independent) evaluation reports of the effluent monitoring program since the last inspection to gather insights into the licensee's program and aid in selecting areas for inspection review (smart sampling).

h. Findings

No findings were identified.

.2 Walkdowns and Observations (02.02)

a. Inspection Scope

The inspectors walked down selected components of the gaseous and liquid discharge systems to evaluate whether equipment configuration and flow paths aligned with the documents reviewed in 02.01 above and to assess equipment material condition. Special attention was made to identify potential unmonitored release points (such as open roof vents in boiling water reactor turbine decks, temporary structures butted against turbine, auxiliary or containment buildings), building alterations which could impact airborne or liquid effluent controls, and ventilation system leakage that communicated directly with the environment.

For equipment or areas associated with the systems selected for review that were not readily accessible due to radiological conditions, the inspectors reviewed the licensee's material condition surveillance records, as applicable.

The inspectors walked down filtered-ventilation systems to assess for conditions such as degraded high-efficiency particulate air/charcoal banks, improper alignment, or system installation issues that would impact the performance or the effluent monitoring capability of the effluent system.

As available, the inspectors observed selected portions of the routine processing and discharge of radioactive gaseous effluent (including sample collection and analysis) to evaluate whether appropriate treatment equipment was used and the processing activities aligned with discharge permits.

The inspectors determined if the licensee had made significant changes to their effluent release points (e.g., changes subject to a 10 CFR 50.59 review or requiring NRC approval of alternate discharge points).

As available, the inspectors observed selected portions of the routine processing and discharge of liquid waste (including sample collection and analysis) to determine if appropriate effluent treatment equipment was being used and whether radioactive liquid waste was being processed and discharged in accordance with procedure requirements and aligned with discharge permits.

b. Findings

No findings were identified.

.3 Sampling and Analyses (02.03)

a. Inspection Scope

The inspectors selected effluent sampling activities, consistent with smart sampling, and assessed whether adequate controls had been implemented to ensure representative samples were obtained (e.g., provisions for sample line flushing, vessel recirculation, composite samplers, etc.)

The inspectors selected effluent discharges made with inoperable (declared out-of-service) effluent radiation monitors to assess whether controls were in place to ensure compensatory sampling was performed consistent with the radiological effluent TSs/ODCM and that those controls were adequate to prevent the release of unmonitored liquid and gaseous effluents.

The inspectors determined whether the facility was routinely relying on the use of compensatory sampling in lieu of adequate system maintenance, based on the frequency of compensatory sampling since the last inspection.

The inspectors reviewed the results of the inter-laboratory comparison program to evaluate the quality of the radioactive effluent sample analyses and assessed whether the inter-laboratory comparison program included hard-to-detect isotopes as appropriate.

b. Findings

No findings were identified.

.4 Instrumentation and Equipment (02.04)

Effluent Flow Measuring Instruments

a. Inspection Scope

The inspectors reviewed the methodology the licensee used to determine the effluent stack and vent flow rates to determine if the flow rates were consistent with radiological effluent TSs/ODCM or Final Safety Analysis Report values, and that differences between assumed and actual stack and vent flow rates did not affect the results of the projected public doses.

b. Findings

No findings were identified.

Air Cleaning Systems

c. Inspection Scope

The inspectors assessed whether surveillance test results since the previous inspection for TS required ventilation effluent discharge systems (high-efficiency particulate air and charcoal filtration), such as the Standby Gas Treatment System and the Containment/Auxiliary Building Ventilation System, met TS acceptance criteria.

d. Findings

No findings were identified.

.5 Dose Calculations (02.05)

a. Inspection Scope

The inspectors reviewed all significant changes in reported dose values compared to the previous radiological effluent release report (e.g., a factor of 5, or increases that approach Appendix I criteria) to evaluate the factors which may have resulted in the change.

The inspectors reviewed radioactive liquid and gaseous waste discharge permits to assess whether the projected doses to members of the public were accurate and based on representative samples of the discharge path.

The inspectors evaluated the methods used to determine the isotopes that were included in the source term to ensure all applicable radionuclides were included within detectability standards. The review included the current Part 61 analyses to ensure hard-to-detect radionuclides were included in the source term.

The inspectors reviewed changes in the licensee's offsite dose calculations since the last inspection to evaluate whether changes were consistent with the ODCM and Regulatory Guide 1.109. The inspectors reviewed meteorological dispersion and deposition factors used in the ODCM and effluent dose calculations to evaluate whether appropriate factors were being used for public dose calculations.

The inspectors reviewed the latest Land Use Census to assess whether changes (e.g., significant increases or decreases to population in the plant environs, changes in critical exposure pathways, the location of nearest member of the public or critical receptor, etc.) had been factored into the dose calculations.

For the releases reviewed above, the inspectors evaluated whether the calculated doses (monthly, quarterly, and annual dose) were within the 10 CFR Part 50, Appendix I, and TS dose criteria.

The inspectors reviewed, as available, records of any abnormal gaseous or liquid tank discharges (e.g., discharges resulting from misaligned valves, valve leak-by, etc) to ensure the abnormal discharge was monitored by the discharge point effluent monitor. Discharges made with inoperable effluent radiation monitors, or unmonitored leakages were reviewed to ensure that an evaluation was made of the discharge to satisfy 10 CFR 20.1501 so as to account for the source term and projected doses to the public.

b. Findings

No findings were identified.

.6 Groundwater Protection Initiative Implementation (02.06)

a. Inspection Scope

The inspectors reviewed monitoring results of the Groundwater Protection Initiative to determine if the licensee had implemented its program as intended and to identify any anomalous results. For anomalous results or missed samples, the inspectors assessed whether the licensee had identified and addressed deficiencies through its CAP.

The inspectors reviewed identified leakage or spill events and entries made into 10 CFR 50.75 (g) records. The inspectors reviewed evaluations of leaks or spills and reviewed any remediation actions taken for effectiveness. The inspectors reviewed onsite contamination events involving contamination of ground water and assessed whether the source of the leak or spill was identified and mitigated.

For unmonitored spills, leaks, or unexpected liquid or gaseous discharges, the inspectors assessed whether an evaluation was performed to determine the type and amount of radioactive material that was discharged by:

- Assessing whether sufficient radiological surveys were performed to evaluate the extent of the contamination and the radiological source term and assessing whether a survey/evaluation had been performed to include consideration of hard-to-detect radionuclides.
- Determining whether the licensee completed offsite notifications, as provided in its Groundwater Protection Initiative implementing procedures.

The inspectors reviewed the evaluation of discharges from onsite surface water bodies that contained or potentially contained radioactivity, and the potential for ground water leakage from these onsite surface water bodies. The inspectors assessed whether the licensee was properly accounting for discharges from these surface water bodies as part of their effluent release reports.

The inspectors assessed whether on-site ground water sample results and a description of any significant on-site leaks/spills into ground water for each calendar year were documented in the Annual Radiological Environmental Operating Report for the radiological environmental monitoring program or the Annual Radiological Effluent Release Report for the Radiological Effluent TSs.

For significant, new effluent discharge points (such as significant or continuing leakage to ground water that continued to impact the environment if not remediated), the inspectors evaluated whether the ODCM was updated to include the new release point.

b. Findings

No findings were identified.

.7 Problem Identification and Resolution (02.07)

a. Inspection Scope

Inspectors assessed whether problems associated with the effluent monitoring and control program were being identified by the licensee at an appropriate threshold and were properly addressed for resolution in the licensee CAP. In addition, the inspectors evaluated the appropriateness of the corrective actions for a selected sample of problems documented by the licensee involving radiation monitoring and exposure controls.

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 was implemented in accordance with the TSs and ODCM. This review included reported changes to the ODCM with respect to environmental monitoring, commitments in terms of sampling locations, monitoring and measurement frequencies, land use census, inter-laboratory comparison program, and analysis of data.

The inspectors reviewed the ODCM to identify locations of environmental monitoring stations.

The inspectors reviewed the Final Safety Analysis Report 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 thermoluminescent dosimeter monitoring stations to determine whether they were located as described in the ODCM 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 thermoluminescent 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 thermoluminescent 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 ODCM and if sampling techniques were in accordance with procedures.

Based on direct observation and review of records, the inspectors assessed whether the meteorological instruments were operable, calibrated, and maintained in accordance with guidance contained in the Final Safety Analysis Report; 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 thermoluminescent 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 structures, systems, or components 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 structures, systems, or components 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 ODCM 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 the ability to monitor the impact of radioactive effluent releases on the environment.

The inspectors assessed whether the appropriate detection sensitivities with respect to TSs/ODCM were used for counting samples (i.e., the samples met the TSs/ODCM required lower limits of detection). The inspectors reviewed quality control charts for maintaining radiation measurement instrument status and actions taken for degrading detector performance. The licensee used a vendor laboratory to analyze the radiological environmental monitoring program samples so the inspectors reviewed the results of the vendor's quality control program, including the interlaboratory comparison, to assess the adequacy of the vendor's program.

The inspectors reviewed the results of the licensee's interlaboratory comparison program to evaluate the adequacy of environmental sample analyses performed by the licensee. The inspectors assessed whether the interlaboratory 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.

2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation (71124.08)

This inspection constituted one complete sample as defined in IP 71124.08-05.

.1 Inspection Planning (02.01)

a. Inspection Scope

The inspectors reviewed the solid radioactive waste system description in the Final Safety Analysis Report, the process control program, and the recent radiological effluent release report for information on the types, amounts, and processing of radioactive waste disposed.

The inspectors reviewed the scope of any quality assurance audits in this area since the last inspection to gain insights into the licensee's performance and inform the "smart sampling" inspection planning.

b. Findings

No findings were identified.

.2 Radioactive Material Storage (02.02)

a. Inspection Scope

The inspectors selected areas where containers of radioactive waste were stored, and evaluated whether the containers were labeled in accordance with 10 CFR 20.1904, "Labeling Containers," or controlled in accordance with 10 CFR 20.1905, "Exemptions to Labeling Requirements," as appropriate.

The inspectors assessed whether the radioactive material storage areas were controlled and posted in accordance with the requirements of 10 CFR Part 20, "Standards for Protection against Radiation." For materials stored or used in controlled or unrestricted areas, the inspectors evaluated whether they were secured against unauthorized removal and controlled in accordance with 10 CFR 20.1801, "Security of Stored Material," and 10 CFR 20.1802, "Control of Material Not in Storage," as appropriate.

The inspectors evaluated whether the licensee established a process for monitoring the impact of long term storage (e.g., buildup of any gases produced by waste decomposition, chemical reactions, container deformation, loss of container integrity, or re-release of free-flowing water) that was sufficient to identify potential unmonitored, unplanned releases or nonconformance with waste disposal requirements.

The inspectors selected containers of stored radioactive material, and inspected the containers for signs of swelling, leakage, and deformation.

b. Findings

No findings were identified.

.3 Radioactive Waste System Walkdown (02.03)

a. Inspection Scope

The inspectors walked down accessible portions of select radioactive waste processing systems to assess whether the current system configuration and operation agreed with

the descriptions in the Final Safety Analysis Report, ODCM, and process control program.

The inspectors reviewed administrative and/or physical controls (i.e., drainage and isolation of the system from other systems) to assess whether the equipment which was not in service or abandoned in place would contribute to an unmonitored release path and/or affect operating systems or be a source of unnecessary personnel exposure. The inspectors assessed whether the licensee reviewed the safety significance of systems and equipment abandoned in place in accordance with 10 CFR 50.59, "Changes, Tests, and Experiments."

The inspectors reviewed the adequacy of changes made to the radioactive waste processing systems since the last inspection. The inspectors evaluated whether changes from what was described in the Final Safety Analysis Report were reviewed and documented in accordance with 10 CFR 50.59, as appropriate and to assess the impact on radiation doses to members of the public.

The inspectors selected processes for transferring radioactive waste resin and/or sludge discharges into shipping/disposal containers and assessed whether the waste stream mixing, sampling procedures, and methodology for waste concentration averaging were consistent with the process control program, and provided representative samples of the waste product for the purposes of waste classification as described in 10 CFR 61.55, "Waste Classification."

For those systems that provided tank recirculation, the inspectors evaluated whether the tank recirculation procedures provided sufficient mixing.

The inspectors assessed whether the licensee's process control program correctly described the current methods and procedures for dewatering and waste stabilization (e.g., removal of freestanding liquid).

b. Findings

No findings were identified.

.4 Waste Characterization and Classification (02.04)

a. Inspection Scope

The inspectors selected the following radioactive waste streams for review:

- Primary Resin;
- Secondary Resin;
- Secondary Radwaste Filter; and
- Dry Active Waste (DAW).

For the waste streams listed above, the inspectors assessed whether the licensee's radiochemical sample analysis results (i.e., "10 CFR Part 61" analysis) were sufficient to support radioactive waste characterization as required by 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste." The inspectors evaluated whether the licensee's use of scaling factors and calculations to account for difficult-to-

measure radionuclides was technically sound and based on current 10 CFR Part 61 analyses for the selected radioactive waste streams.

The inspectors evaluated whether changes to plant operational parameters were taken into account to: (1) maintain the validity of the waste stream composition data between the annual or biennial sample analysis update; and (2) assure that waste shipments continued to meet the requirements of 10 CFR Part 61 for the waste streams selected above.

The inspectors evaluated whether the licensee had established and maintained an adequate quality assurance program to ensure compliance with the waste classification and characterization requirements of 10 CFR 61.55 and 10 CFR 61.56, "Waste Characteristics."

b. Findings

No findings were identified.

.5 Shipment Preparation (02.05)

a. Inspection Scope

The inspectors observed shipment packaging, surveying, labeling, marking, placarding, vehicle checks, emergency instructions, disposal manifest, shipping papers provided to the driver, and licensee verification of shipment readiness. The inspectors assessed whether the requirements of applicable transport cask certificates of compliance had been met. The inspectors evaluated whether the receiving licensee was authorized to receive the shipment packages. The inspectors evaluated whether the licensee's procedures for cask loading and closure were consistent with the vendor's current approved procedures.

The inspectors observed radiation workers during the conduct of radioactive waste processing and radioactive material shipment preparation and receipt activities. The inspectors assessed whether the shippers were knowledgeable of the shipping regulations and whether shipping personnel demonstrated adequate skills to accomplish the package preparation requirements for public transport with respect to the licensee's response to NRC Bulletin 79-19, "Packaging of Low-Level Radioactive Waste for Transport and Burial," dated August 10, 1979; and Title 49 CFR Part 172, "Hazardous Materials Table, Special Provisions, Hazardous Materials Communication, Emergency Response Information, Training Requirements, and Security Plans," Subpart H, "Training."

Due to limited opportunities for direct observation, the inspectors reviewed the technical instructions presented to workers during routine training. The inspectors assessed whether the licensee's training program provided training to personnel responsible for the conduct of radioactive waste processing and radioactive material shipment preparation activities.

b. Findings

No findings were identified.

.6 Shipping Records (02.06)

a. Inspection Scope

The inspectors evaluated whether the shipping documents indicated the proper shipper name; emergency response information and a 24-hour contact telephone number; accurate curie content and volume of material; and appropriate waste classification, transport index, and UN number for the following radioactive shipments:

- Shipment RWS10-011; Dewatered Bead Resin; low specific activity (LSA-II);
- Shipment RWS10-013; DAW Trash and TR Pond Sludge; low specific activity (LSA-II);
- Shipment RWS10-012; DAW Trash; low specific activity (LSA-II);
- Shipment RMS09-094; Rx Vessel Dosimetry; Type A Package; and
- Shipment RMS11-078; Dirty Laundry; low specific activity (LSA-II).

Additionally, the inspectors assessed whether the shipment placarding was consistent with the information in the shipping documentation.

b. Findings

Introduction: A self-revealed finding of very low safety significance (Green) and an associated NCV of 10 CFR 71.5, "Transportation of Licensed Material," was identified when licensee personnel failed to comply with 49 CFR 172.203(c) and shipped packages of radioactive material with transport manifests that did not document all applicable hazardous substances.

Description: On multiple dates, the licensee shipped containers of radioactive material to a waste processor with incomplete information on the transport manifest. Specifically, the transport manifest that accompanied the shipments failed to identify hazardous materials, including asbestos, lead, and other chemicals that were contained in the packages. Upon arrival at the waste processor's facility, the waste processor identified the non-conformances in the shipping containers and notified the licensee. Follow-up actions by the licensee included performing a revised characterization of the shipped packages. The revised radiological characterization identified negligible impact relative to the initial radiological assessment and package characterization. This event was documented in the licensee's CAP as:

- IR 1221229; RWS 11-006 Contained Un-Manifested Asbestos;
- IR 1173307; RWS 10-013 Contained Unapproved Mixed Waste;
- IR 928393; Non-Conforming Metal Shipped to Bear Creek Processing;
- IR 1015646; Non-Conforming Waste Found in Radwaste Shipment; and
- IR 1067394; Non-Conforming Radioactive Waste in Shipment.

Immediate corrective actions included providing a corrected copy of the transport manifest to the waste processor. Additionally, the licensee initiated IR 1285148 to evaluate the human performance issues associated with the shipping non-conformances. Further, the licensee placed locks on the shipping containers to control items placed in the packages and to ensure that the manifest accurately represented the hazards contained in the shipping package.

Analysis: The failure to completely identify all required package contents on a transport manifest was a performance deficiency. The finding was determined to be more than minor because it was associated with the Program and Process 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 to radioactive materials released into the public domain as a result of routine civilian nuclear reactor operation, in that, providing incorrect information, as part of hazard communication, could impact the actions of response personnel. The finding involved an occurrence of the licensee's radioactive material transportation program that was contrary to NRC regulatory requirements. The inspectors determined that the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Appendix D, "Public Radiation Safety Significance Determination Process." Using the Public Radiation Safety SDP, the inspectors determined: (1) radiation limits were not exceeded; (2) there was no breach of a package during transit; (3) it did not involve a certificate of compliance issue; (4) it was not a low level burial ground nonconformance; and (5) it did not involve a failure to make notifications or provide emergency information. As a result, the finding screened as having very low safety significance (Green).

This finding has a cross-cutting aspect in the Work Control component of the Human Performance cross-cutting area [H.3(b)] since the waster shipper failed to coordinate work activities by incorporating actions to address the impact of the work on different job activities, and the need for work groups to maintain interfaces with offsite organizations, and communicate, coordinate, and cooperate with each other during activities in which interdepartmental coordination is necessary to assure adequate human performance. Specifically, these events occurred because the radioactive material shipper did not control the items placed in the waste packages and was not present when the boxes were loaded.

Enforcement: Title 10 CFR 71.5, "Transportation of Licensed Material," requires licensees to comply with the Department of Transportation (DOT) regulations in 49 CFR Parts 170 through 189 relative to the transportation of licensed material. Title 49 CFR 172.203, "Additional Description Requirements," required, in part, that hazardous materials be listed on the transport manifest.

Contrary to the above, between May 10, 2010 and May 26, 2011, the licensee failed to list relevant hazardous materials on the transport manifest for a shipment also containing DAW. This violation was entered into the licensee's CAP as IR 1285148. Because this violation was of very low safety significance and it was entered into the licensee's CAP, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. **(NCV 05000454/2011005-04, Failure to Identify Hazardous Materials on Transportation Manifest)**

.7 Identification and Resolution of Problems (02.07)

a. Inspection Scope

The inspectors assessed whether problems associated with radioactive waste processing, handling, storage, and transportation, were being identified by the licensee at an appropriate threshold, were properly characterized, and were properly addressed for resolution in the licensee CAP. Additionally, the inspectors evaluated whether the corrective actions were appropriate for a selected sample of problems documented by the licensee that involve radioactive waste processing, handling, storage, and transportation.

The inspectors reviewed results of selected audits performed since the last inspection of this program and evaluated the adequacy of the licensee's corrective actions for issues identified during those audits.

b. Findings

No findings were identified.

4. **OTHER ACTIVITIES**

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

40A1 Performance Indicator Verification (71151)

.1 Reactor Coolant System Leakage

a. Inspection Scope

The inspectors sampled licensee submittals for the Unit 1 and Unit 2 RCS Leakage Performance Indicator (PI) for the period from the third quarter 2010 through the second 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 logs, RCS leakage tracking data, issue reports, event reports and NRC Integrated Inspection Reports for the period of June 2010 through June 2011 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report 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 RCS leakage samples as defined in IP 71151-05.

b. Findings

No findings were identified.

.2 Unplanned Transients Per 7000 Critical Hours

a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Transients per 7000 Critical Hours performance indicator for Unit 1 and Unit 2 for the period from the second quarter of 2010 through the 3rd quarter of 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 narrative logs, issue reports, maintenance rule records, event reports and NRC Integrated Inspection Reports for the period of April 2010 through September 2011 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report 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 unplanned transients per 7000 critical hours samples as defined in IP 71151-05.

b. Findings

No findings were identified.

.3 Safety System Functional Failures

a. Inspection Scope

The inspectors sampled licensee submittals for the Safety System Functional Failures performance indicator for Unit 1 and Unit 2 for the period from the second quarter of 2010 through the third quarter of 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, and NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 50.73" definitions and guidance, were used. The inspectors reviewed the licensee's operator narrative logs, operability assessments, maintenance rule records, maintenance work orders, issue reports, event reports and NRC Integrated Inspection Reports for the period of June 2010 through September 2011 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report 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 safety system functional failures samples as defined in IP 71151-05.

b. Findings

No findings were identified.

.4 Reactor Coolant System Specific Activity

a. Inspection Scope

The inspectors sampled licensee submittals for the RCS specific activity PI for Unit 1 and Unit 2 for the period from the 4th quarter of 2010 through the 3rd quarter of 2011. The inspectors used PI definitions and guidance contained in 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 reactor coolant system chemistry samples, TS requirements, issue reports, event reports, and NRC Integrated Inspection Reports for the period of the 4th quarter 2010 through the 3rd quarter of 2011 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator. In addition to record reviews, the inspectors observed a chemistry technician obtain and analyze a reactor coolant system sample. Documents reviewed are listed in the Attachment.

This inspection constituted two RCS specific activity samples as defined in IP 71151-05.

b. Findings

No findings were identified.

.5 Mitigating Systems Performance Index - Heat Removal System

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index (MSPI) - Heat Removal System performance indicator for Unit 1 and Unit 2 for the period from the fourth quarter of 2010 through the third quarter of 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 narrative logs, issue reports, event reports, MSPI derivation reports, and NRC Integrated IRs for the period of October 2010 through September 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 issue report 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 heat removal system samples as defined in IP 71151-05.

b. Findings

No findings were identified.

.6 Mitigating Systems Performance Index - Cooling Water Systems

a. Inspection Scope

The inspectors sampled licensee submittals for the MSPI - Cooling Water Systems performance indicator for Unit 1 and Unit 2 for the period from the fourth quarter of 2010 through the third quarter of 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 narrative logs, issue reports, MSPI derivation reports, event reports and NRC Integrated Inspection Reports for the period of October 2010 through September 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, whether the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's issue report 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 cooling water system samples as defined in IP 71151-05.

b. Findings

No findings were identified.

.7 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 for Unit 1 and Unit 2 for the period from the fourth quarter of 2010 through the third quarter of 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, were 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 October 2010 through September of 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 issue report 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.

.8 Occupational Exposure Control Effectiveness

a. Inspection Scope

The inspectors sampled licensee submittals for the occupational radiological occurrences PI for the period from the fourth quarter of 2010 through the 3rd quarter of 2011. To determine the accuracy of the PI data reported during these periods, the inspectors used PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009. 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 its data review 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 numerous locked high and very 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.

.9 Radiological Effluent Technical Specification/Offsite Dose Calculation Manual
Radiological Effluent Occurrences

a. Inspection Scope

The inspectors sampled licensee submittals for the radiological effluent TS/ODCM radiological effluent occurrences PI for the period from the fourth quarter of 2010 through the third quarter of 2011. To determine the accuracy of the PI data reported during these periods, the inspectors used PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009. The inspectors reviewed the licensee's issue report database and selected individual reports generated since this indicator was last reviewed to identify any potential occurrences such as unmonitored, uncontrolled, or improperly calculated effluent releases that may have impacted offsite dose. The inspectors reviewed gaseous effluent summary data and the results of associated offsite dose calculations for selected dates between the fourth quarter of 2010 through the third quarter of 2011 to determine if indicator results were accurately reported. The inspectors also reviewed the licensee's methods for quantifying gaseous and liquid effluents and determining effluent dose. Documents reviewed are listed in the Attachment.

This inspection constituted one Radiological Effluent TS/ODCM radiological effluent occurrences 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: the complete and accurate identification of the problem; that timeliness was commensurate with the safety significance; that evaluation and disposition of performance issues, generic implications, common causes, contributing factors, root causes, extent-of-condition reviews, and previous occurrence reviews were proper and adequate; and that 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 attached List of Documents Reviewed.

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 follow-up, 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 condition 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 Selected Issue Follow-Up Inspection: Licensee Issue Report on Auxiliary Feedwater System Crosstie Modification

a. Inspection Scope

The inspectors performed a review of the item below that was identified by an NRC inspector at a different but similar facility:

- Auxiliary Feedwater System Modification.

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

b. Findings

No findings were identified.

.4 Annual Sample: Review of Operator Workarounds

a. Inspection Scope

The inspectors evaluated the licensee's implementation of their process used to identify, document, track, and resolve operational challenges. Inspection activities included, but were not limited to, a review of the cumulative effects of the operator workarounds (OWAs) on system availability and the potential for improper operation of the system, for potential impacts on multiple systems, and on the ability of operators to respond to plant transients or accidents.

The inspectors performed a review of the cumulative effects of OWAs. The documents listed in the Attachment were reviewed to accomplish the objectives of the inspection procedure. The inspectors reviewed both current and historical operational challenge records to determine whether the licensee was identifying operator challenges at an appropriate threshold, had entered them into their CAP, and proposed or implemented appropriate and timely corrective actions which addressed each issue. Reviews were conducted to determine if any operator challenge could increase the possibility of an Initiating Event, if the challenge was contrary to training, required a change from long-standing operational practices, or created the potential for inappropriate compensatory actions. Additionally, all temporary modifications were reviewed to identify any potential effect on the functionality of Mitigating Systems, impaired access to equipment, or required equipment uses for which the equipment was not designed. Daily plant and equipment status logs, degraded instrument logs, and operator aids or tools being used to compensate for material deficiencies were also assessed to identify any potential sources of unidentified operator workarounds.

This review constituted one operator workaround annual inspection sample as defined in IP 71152-05.

b. Findings

No findings were identified.

40A3 Follow-Up of Events and Notices of Enforcement Discretion (71153)

.1 (Closed) Licensee Event Report 05000455/2011-001, Revision 0 and Revision 1, "Unit 2 Emergency Diesel Generator Inoperable for Longer Than Allowed by Technical Specifications Due to Inadequate Work Instructions"

The Licensee Event Report (LER) involved a Unit 2 DG that was unknowingly inoperable for approximately 6 months due to loose bolting on the upper lubricating oil cooler. During a routine surveillance on November 17, 2010, a significant oil leak was identified by the equipment operator. The DG was shut down before damage could occur. The licensee determined that a bolted flanged connection was misaligned during reinstallation following maintenance in January of 2010.

NRC Follow-Up inspection 05000455/2011011 determined that the issue was an apparent violation and a White Finding (EA-11-014). The IR was issued February 11, 2011. On October 4, 2011, an NRC IP 95001 Supplemental IR was issued documenting the closure of finding 05000455/2011011-01. As the enforcement actions have been issued, and the Supplemental Inspection has been completed with no significant issues identified, these LERs are closed.

.2 (Closed) Licensee Event Report 05000455/2011-002, Revision 0, "Containment Pressure Not Within Limits Longer than Allowed By Technical Specifications Due to Personnel Error"

The LER involved a licensee-identified mistaken plugging of a pressure sensor inside of containment during the previous refueling outage. The plugged was placed during a routine surveillance on September 28, 2011 and on October 13, 2011, licensee personnel determined that while the instrument indicated that Unit 2 containment pressure was within limits, that, in fact containment pressure was above the TS limit. A containment entry was made, the plug was removed, containment pressure was reduced and the peak pressure was determined to be approximately 1.91 pounds per square inch gauge (psig). The TS allowed value was 1.0 psig and the amount of time that the pressure could be above the limit was 1 hour with the plant required to be shut down within the following 42 hours. By the time the situation was identified, understood, and corrected a total time of 95 hours and 48 minutes had elapsed.

The licensee determined and the inspectors verified that the licensee's safety margin between peak containment pressure and the initial maximum allowed pressure was 10 psig. The technicians' error and the delay in correcting the error resulted in 0.91 psig of the 10 psig margin being used. There was a minor adverse safety consequence due to the licensee personnel's error.

The technicians' error identified by the licensee resulted in a minor failure to comply with TS 3.6.4, "Containment Pressure". This LER is closed.

4OA6 Management Meetings

.1 Exit Meeting Summary

On January 12, 2012, the inspectors presented the inspection results to Mr. B. Youman, 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 results of an Operator Licensing inspection with the Lead Operations Training staff instructor, Mr. M. McCue, via telephone on December 8, 2011.
- The results of an annual review of Emergency Action Level and Emergency Plan changes with the Emergency Preparedness Coordinator, Mr. R. Kartheiser, via telephone on December 7, 2011.
- The results of Occupational and Public Radiation Safety programs inspections with the Site Vice President, Mr. T. Tulon, on November 10, 2011 and with the Acting Plant Manager, E. Hernandez, on December 28, 2011.

The licensee acknowledged the issues 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 violation of very low safety significance was identified by the licensee. The violation met the criteria of Section VI of the NRC Enforcement Policy for being dispositioned as a Non-Cited Violation.

.1 Effluent Monitors Alarms Setpoints Incorrectly Established

Technical Specification 5.5.1 states that the ODCM shall contain the methodology and parameters used in the calculation of offsite doses resulting from radioactive gaseous and liquid effluents, and in the calculation of gaseous and liquid monitoring alarm and trip setpoints.

Contrary to the above, on August 26, 2010, the licensee identified a potential for non-conservative alarm setpoints for effluent monitors. Subsequently, the licensee calculated new setpoints for these monitors using the methodology prescribed in the ODCM and determined that the previous alarm setpoints were incorrectly established and were non-conservative (too high). The inspectors determined that this finding was of more than minor significance because it was similar to Example 6.c in IMC 0612, Appendix E, "Example of Minor Issues". Specifically, the effluent monitors with its alarm set points would have failed to perform its intended function (i.e., trip or isolation function) to prevent an instantaneous effluent release in excess of the applicable TS instantaneous dose rate limits for gases. In accordance with IMC 0609, Appendix D,

“Public Radiation Safety,” the inspectors determined the violation to be of very low safety significance, (Green) because the dose impact to a member of the public from the radiological release was less than the dose values in Appendix I to 10 CFR Part 50 and 10 CFR 20.1301(e). This violation of TS 5.5.1 is being treated as a NCV consistent with Section 2.3.2 of the NRC Enforcement Policy. The licensee entered this issue into their CAP as IR 1106461.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

T. Tulon, Site Vice President
B. Youman, Plant Manager
D. Coltman, Operations Manager
J. Feimster, Design Engineering Manager
D. Dampitz, Acting Maintenance Director
S. Swanson, Nuclear Oversight Manager
R. Gayheart, Training Director
B. Barton, Radiation Protection Manager
K. Anderson, Acting Radiation Protection Manager
A. Creamean, Chemistry Manager
D. Gudger, Regulatory Assurance Manager
R. Cameron, Licensed Operator Requalification Lead

Nuclear Regulatory Commission

E. Duncan, Chief, Branch 3, Division of Reactor Projects

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000454/2011005-001	NCV	Failure to Identify Voided Sections of AF Piping (Section 1R15)
05000455/2011005-001	NCV	Failure to Identify Voided Sections of AF Piping (Section 1R15)
05000454/2011005-002	NCV	High Energy Line Break Operability Evaluation (Section 1R15)
05000455/2011005-002	NCV	High Energy Line Break Operability Evaluation (Section 1R15)
05000454/2011005-003	URI	Use of TLDs May Not be Consistent with the Methods Used by the NVLAP Accreditation Process (Section 2RS4)
05000455/2011005-003	URI	Use of TLDs may not be consistent with the methods used by the NVLAP accreditation process (Section 2RS4)
05000454/2011005-004	NCV	Failure to Identify Hazardous Materials on Transportation Manifest (Section 3RS8)

Closed

05000455/2011011-00	LER	Unit 2 Emergency Diesel Generator Inoperable for Longer Than Allowed by Technical Specifications Due to Inadequate Work Instructions, Revision 0
05000455/2011011-01	LER	Unit 2 Emergency Diesel Generator Inoperable for Longer Than Allowed by Technical Specifications Due to Inadequate Work Instructions, Revision

LIST OF DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspectors reviewed the documents in their entirety, but rather, that selected sections of 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.

Section 1R01: Adverse Weather Protection (Quarterly)

- IR 1067880; Byron 2010/2011 Winter Readiness Critique, March 30, 2011
- IR 1186291; 2010/2011 Winter Readiness Critique, March 11, 2011
- IR 1193076; Action Tracking Process Versus Work Control Process, December 2, 2010
- IR 1238947; SX Chemical Feed Lines Need Insulating, July 12, 2011
- IR 1262839; Winter Readiness Work Rescheduled, September 14, 2011
- IR 1265348; Unable to Resolve Parts Required Issue, September 14, 2011
- IR 1265934; Winter Readiness Challenge – No CST Heaters Available, September 21, 2011
- IR 1280434; Switchyard Winter Readiness PM, October 24, 2011
- IR 1280750; Freeze Protection – CWPB Louvers LV48, 142 Stuck Open, October 24, 2011
- IR 1280755; Freeze Protection – Electric Heater 0VV37C Fan Motor, October 24, 2011
- IR 1280755; Freeze Protection: Electric Heater 0VV37C Fan Motor, October 24, 2011
- IR 1280757; 0VH09Y – Damper Stuck Open, October 24, 2011
- IR 1281870; Roof Access Hatch Will Not Remain Closed, October 26, 2011
- IR 1285676; Winter Readiness Walkdown, November 2, 2011
- IR 1286684; 0VT17J LV-82 Has a Louver Broke Preventing Set From Closing, November 5, 2011
- IR 1286686; 0VT11J LV-8 Has a Set of Louvers Not Fully closed, November 5, 2011
- IR 1286687; 0VT16J LV-80 Has a Broken Louver Preventing Set From Closing, November 5, 2011
- IR 1286688; 0VT13J LV-17 Has 2 Sets of Louvers Not Fully Closed, November 5, 2011
- IR 1286689; 0VT18J LV-83 Has Broken Louvers Preventing Set From Closing, November 5, 2011
- IR 1286693; 0VT20J LV-86 Sets of Louvers Not Fully Closed, November 5, 2011
- IR 1286904; 0VT07J LV-4 Has Broken Louvers, November 5, 2011
- IR 1286907; 0VT08J LV-5 Has 2 Sets of Louvers Not Fully Closed, November 5, 2011
- IR 1286908; 0VT10J LV-7 Has One Broken Louver, November 5, 2011
- IR 1286910; 0VT14J LV-18 Has a Set of Louvers Not Fully Closed, November 5, 2011
- IR 1286912; 0VT12J LV-9 Has Broken Louvers and Sets Not Fully Closed, November 5, 2011
- IR 1289988; Freeze Protection Concern, November 13, 2011
- IR 1293508; Winter Readiness System Review Work Removed From 2011, November 15, 2011
- IR 1297625; 0BOSR XFT-A1, SH Area Heaters Testing Discrepancies, December 3, 2011
- Unit 2 Standing Order; Station Heat Coil Degradation in Unit 2 VA Plenum, Log #11-053
- 0BOSR XFT-A1; Freezing Temperature Equipment Protection SH and Department Support Requirements, Revision 13
- 0BOSR XFT-A3; Freezing Temperature Equipment Protection Plant Ventilation Systems, Revision 8
- 0BOSR XFT-A4; Freezing Temperature Equipment Protection Area Buildings Ventilation Systems and Tanks, Revision 7
- 0BOSR XFT-A5; Freezing Temperature Equipment Protection Non-Protected Area Buildings Ventilation Systems, Revision 6

- BOP XFT-1; Cold Weather Operations, Revision 2
- IR 1298335; 0BOSR XFT-A3 Freezing Temperature Protection Discrepancies, December 05, 2011

Section 1R04: Equipment Alignment (Quarterly)

- Drawing M-62; Diagram of Residual Heat Removal, Revision BD
- BAP 300-1A1; At The Controls Area, Revision 52
- BOP RH-E2A; Unit 2 Residual Heat Removal System Train A Electrical Lineup, Revision 4
- BOP RH-M2A; Unit 2 Residual Heat Removal System Train A Valve Lineup, Revision 10
- IR 0332862; 1B AF Pump Air Box Leakage, May 07, 2005
- IR 1289049; Fireproofing on Column Outside 1B AF Pump Room Degraded, November 10, 2011
- IR 1299293; AF005 Flow Control Valve Trim Clearance Low Margin Issue, November 21, 2011
- IR 1304078; Fire Drill Observation – SCBA Voice Amplifiers Not Working, December 17, 2011
- EC 355468; Evaluation of Diesel Driven Auxiliary Feedwater Air Box Gaps, Revision 0
- SPEC. L-2722 Proposed Seal for 2AB-1086 Unit 2; Sheet Numbers 1A, 1, 2, and 3, Revision 1

Section 1R04: Complete System Walkdown (Semi-Annual)

- BOP AF-M2B; Auxiliary Feedwater Train B Valve Lineup, Revision 4

Section 1R05: Fire Protection (Quarterly)

- IR 1076490; Fire Damper 2VE04Y Access Door Hinge Tack Welds Broken, May 28, 2011
- IR 1075765; Electro-Thermo-Link Separated, June 1, 2010
- IR 1077737; Need CO2 OSS for 2 ICSRs on the T.S. Fire Tamper Surveillance, June 7, 2010
- IR 1072592; 2VD23YA Flexible Conduit Support Clip not Holding Conduit, May 24, 2010
- IR 1072640; Debris in Tray Below Damper 2VD63Y, May 24, 2010
- IR 1073509; Flexible Conduit Loose at Upper, South ETL on Fire Damper, May 26, 2010
- IR 1081618; Difficult to Access Damper, 1VE06Y for Surveillance/Repair, June 17, 2010
- IR 1289049; Fireproofing on Column Outside 1B AF Pump Room Degraded, November 10, 2011
- IR 1250346; Fire Brigade Leader Training Issue, August 12, 2011
- Fire Drill Scenario No. 11-04; Unit 1 Auxiliary Boiler Room Fire, September 16, 2011
- Pre-Fire Plan; Fire Area/Zone – FZ 8.3-1 Southeast, Revision 1
- EC 350613; Evaluation of Fire Damper S-Hook Orientation Impact on Dampers 2VD24&B, VC191Y, and 0VC193Y, Revision 0
- WO 1197473; Tech Spec Fire Damper 18-Month Visual Inspection, December 3, 2009
- WO 1028736; Tech Spec Fire Damper 18-Month Visual Inspection, August 4, 2008
- WO 1124519; Tech Spec Fire Damper 18-Month Visual Inspection, April 14, 2008
- WO 0848826; Tech Spec Fire Damper 18-Month Visual Inspection, December 15, 2006
- 0BMSR 3.10.g.7; TRM Fire Damper 18-Month Visual Inspection, Revision 13
- IR 1304076; Fire Drill Observation – Personnel Walking Through SIM Smoke, December 17, 2011
- RM-AA-101; Records Management Program, Revision 9
- OP-AA-201-003; Fire Drill Performance, Revision 12

Corrective Action Documents As a Result of NRC Inspection

IR 1291986; NRC Identified Fire Damper S-Hook Orientation Issue, November 17, 2011
IR 1304063; NRC Identified Issues with S-Hooks Not Resolved, December 17, 2011

Section 1R12: Maintenance Effectiveness (Quarterly)

- IR 1058790; Bad Fuse Found in 2RD06J Panel, April 20, 2011
- IR 1061760; MG Set Motor Smoked on Attempted PM Start, April 26, 2011
- IR 1062164; Motor Cutoff Switch Replaced for 2RD 05E-1B, April 27, 2011
- IR 1065922; Unit 2 Rods Will Not Manually Withdraw, May 5, 2010
- IR 1066455; Unit 2 RD07J Cabinet Capacitor Found Broken, May 6, 2011
- IR 1066490; 2A RD MG Set 1 OVT Timer Failed, May 6, 2011
- IR 1067031; Vibrations Levels on 2B Rod Drive MG Set Remain Unchanged, May 8, 2011
- IR 1290831; 1A RD MG Set Increased Vibrations, November 15, 2011
- BOP RD-5; Control Rod Drive MG Set Up and Paralleling to Operating Control Rod Drive MG Set, Revision 10

Section 1R13: Maintenance Risk Assessments and Emergent Work Control (Quarterly)

- ER-AA-600-1042; On-Line Risk Management, Revision 7
- ER-AA-600-1021; Risk Management Application Methodologies, Revision 4
- PC-AA-1014; Risk Management, Revision 2
- 0BOA ENV-1; Adverse Weather Conditions Unit 0, Rev. 108
- 1BOA ENV-1; Adverse Weather Conditions Unit 0, Rev. 102
- 0BOA ENV-2; Rock River Abnormal Water Level Unit 0, Rev. 100
- IR 1285254; Rock River Level Low, November 2, 2011

Section 1R15: Operability Evaluations (Quarterly)

- IR 240597; Unplanned LOCAR Entry for 2A Emergency Diesel Generator Due to 2VD024YB Damper
- IR 240972; Fire Damper "S" Hook Installed Improperly, August 2, 2004
- IR 240985; Need Work Request for Fire Damper Inspections, August 2, 2004
- IR 248940; Fire Damper Issues Identified by NRC, August 31, 2004
- IR 249486; Fire Damper "S" Hook Issue Identified by NRC, September 2, 2004
- IR 297682; NRC Question About Fire Damper S-Hooks, February 4, 2005
- IR 757875; Fire Damper S-Hooks, April 1, 2008
- IR 1285361; Potential Multiple Starts of Diesel Driven AF Pump, November 2, 2011
- IR 1291986; NRC Identified Fire Damper S-Hook Orientation Issue, November 17, 2011
- IR 1292337; Piping Between 2AF006B and 2AF017B Found Not Full, November 18, 2011
- IR 1295958; AF Improvement Suggestion, November 18, 2011
- IR 1295958; AF Improvement Suggestion, November 18, 2011
- IR 1295488; EOC Review of Byron IP 1291986 Fire Damper S-Hooks, November 29, 2011
- Three Mile Island Corrective Action Program Number TI999-0943 linked to ETTS # 25169; One Section of Fire Damper AH-FD-22 Did Not Close During Test, October 1, 1999
- EC 350613; Evaluation of Fire Damper S-Hook Orientation Impact on Dampers 2VD24YB, VC191Y and OVC193Y, August 11, 2004
- EC 350550; Evaluation of Fire Damper S-Hook Orientation Impact, August 31, 2004
- WO 1197473 01; Technical Specification Fire Damper 18 Month Visual Inspection, December 3, 2009

- EC 383229; Fill Empty Pipe Between 1AF006A and 1AF017A, Close Drain Valve 1AF018A, and Throttle Open Vent Valve 1AF030A, Revision 0
- EC 383308; OP EVAL 11-003, Small Voids in 2A and 2B SX to AF Suction Piping, Revision 0
- EC 386578; OP Evaluation 11-009 Multiple Starts of Diesel AF Pump, November 8, 2011
- WO 1124519 01; Technical Specification Fire Damper 18 Month Visual Inspection, April 14, 2008
- WO 848828 01; Technical Specification Fire Damper 18 Month Visual Inspection, December 15, 2006
- BOP AF-3, Filling and Venting the Auxiliary Feedwater System, Revision 4
- M-1FW01147X; Drawing, Byron Unit 1 Support M-1FW01147X, Rev. D
- M-1SI06010X; Drawing, Byron Unit 1 M-1SI06010X Sub. E
- 13.1.29; Calculation for Mechanical Component Support M-1SI06010X, Rev. D
- 13.1.29; Calculation for Mechanical Component Support M-1SI06010X, Rev. E
- 13.1.29; Calculation for Mechanical Component Support M-1SI06025V, Rev. F
- 13.1.29-BYR97-359; 1SI06010X, 1SI06012X, 1SI06031X, 1SI06075X, 1SI06105X, and 1SI06155X. Evaluate Subsystem 1SI06 Supports for Additional Loads, Rev. 5
- 14.1.18-1FW01147; Calculation for Mechanical Component Support Number M-1FW01147X, Rev. 0
- IR 1272187; Issues Applicable to Byron from Braidwood Mod/50.59 Inspection, October 4, 2011
- BRW-97-0827-M; Piping Evaluation for Lead Shielding on Subsystem 2SI06, Rev. 0
- RH-2; Large Bore Isometric, Residual Heat Removal System, Rev. 22
- IR 1276280; UFSAR Section 3.6 and Piping Design Specifications are Inconsistent, October 13, 2011
- IR 1276069; 1/2FW01 Piping Calculation Revisions Do Not Meet UFSAR Requirements, October 13, 2011
- IR 1272834; Incorrect Coding of Support Skew on 1FW01 Piping, October 5, 2011
- EMD-064195; Calculation, Addendum E to Piping Stress Report for Subsystem 1SI06, Rev. 5
- IR 1262559; BOP ID: Small Shift Trend in Major Plant Parameters, September 13, 2011
- IR 1265515; U1 RX Power Lowered Below 99.5% for LEFM Troubleshooting, September 16, 2011
- IR 1253439; LEFM Computer Point Is Off Normal Per 1BOSR CX-M1, August 19, 2011
- IR 1263929; LEFM Alarms in IR 1241271 and Card Analysis- OEM Review Results, September 16, 2011
- IR 1241271; LEFM Trouble Alarm – Ramp Back, July 19, 2011
- IR 1241629; LEFM Trouble Alarm Causing Unit 1 Ramp Back Again, July 19, 2011
- IR 1277627; NRC Questions on HELB – Presence of Openings, October 17, 2011
- IR 1279759; Added Scope to Turbine Building HELB Effort, October 21, 2011
- IR 1244251; HELB Discussion with the NRC Residents, July 26, 2011
- IR 1240295; Two New Line Break Locations Identified During HELB Analysis, July 15, 2011
- IR 1238611; Inoperability of ESF Components Due To HELB, July 11, 2011
- IR 1237133; Non-Conservatism in Turbine Building HELB Analysis, July 6, 2011
- IR 1184258; Non-Conservatism in Turbine Building HELB Analysis, March 7, 2011
- IR 1276895; NRC Question – Effect of Turbine Building HELB on Reactor Trip Breakers, October 14, 2011

Section 1R19: Post Maintenance Testing (Quarterly)

- IR 1272802; 2B CS Pump Did Not Auto Start During 2B DG Sequence Test, October 5, 2011
- WO 1476986 02; 2B CS Pump Did Not Auto Start During 2B DG Sequence Test, October 5, 2011

- WO 1476986 03; 2B CS Pump Did Not Auto Start During 2B DG Sequence Test, October 5, 2011
- ER-AA-1200; Critical Component Failure Clock, Revision 7
- WO 1324847; 2AF014E IST Disassembly and Inspection, October 5, 2011
- WO 1324407; 2AF014G IST Disassembly and Inspection, October 5, 2011
- WO 1365478; 2AF014H IST Disassembly and Inspection, October 5, 2011
- 2BOSR 7.5.7-2; Unit 2 Train B Auxiliary Feedwater Flow Path Operability Surveillance Following Shutdown, Rev. 6
- IR 1272927; 2B AF Static Pressure Gauge Indication Failed Low, October 5, 2011
- 2BOSR 0.5-2.RH.4-1; Unit 2 ASME Surveillance Requirements for Residual Heat Removal Pump Miniflow Valve 2RH610, Revision 5

Section 1R20: Refueling and Other Outage Activities

- 2BGP 100-1; Plant Heatup, Revision 50
- 2BGP 100-2; Plant Startup, Revision 40
- 2BGP 100-3; Power Ascension, Revision 73

Section 1R22: Surveillance Testing (Quarterly)

- IR 128875; Error in RCS Leakrate Data in MCR Logs, November 10, 2011
- BOP AF-1; Diesel Driven Aux Feedwater Pump Alignment to Standby Condition, Revision 24
- BOP AF-7; Diesel Driven Auxiliary Feedwater Pump 1B Startup on Recirc, Revision 37
- BOP AF-7T1; Diesel Driven Auxiliary Feedwater Pump Operating Log, Revision 21
- BOP AF-8; Diesel Driven Auxiliary Feedwater Pump 1B Shutdown, Revision 22
- WO 1459476 01; 1AF01PB Group B IST Requirements for Diesel Driven AF Pump, October 28, 2011
- 1BOSR 7.5.4-2; Unit 1 Diesel Driven Auxiliary Feedwater Pump Monthly Surveillance, Revision 14
- 2BOSR 8.1.11-2; 2B Diesel Generator Sequencer Test 18 Month, Revision 11
- WO 1337989 01; 2B Diesel Generator Sequencer Test, October 5, 2011
- IR 1281160; 1SI8958B Failed Acceptance Criteria During 1B RH PP IST, October 25, 2011
- IR 1298289; Unit 2 RCS Leakrate Surveillance Needs Improvements, December 05, 2011
- 0BMSR FP-5; Fire Hydrant Yard Loop Annual Flush, Revision 8
- WO 1454082; 1RH01PB Group A IST Requirements for Residual Heat Removal Pump, October 25, 2011
- IR 1281160; 1SI8958B Failed Acceptance Criteria During 1B RH PP IST, October 25, 2011

Corrective Action Documents As a Result of NRC Inspection

- IR 1304054; Surveillance Improvements Needed, December 17, 2011

2RS1: Radiological Hazard Assessment and Exposure Controls (71124.01)

- AR 1214604; NOS ID B1R17 RP Outage Adverse Trend; 5/11/2011
- AR 1243013; RP Response to Fire Alarm Did Not Meet Expectations; 7/22/2011
- AR 1248312; NOS ID Poor Contamination Boundary Controls in FHB; 8/5/2011
- BRP 5800-3; Area Radiation Monitoring System Alert/High Alarm Setpoints; Revision 25
- BRP 5820-14; Process Radiation Monitoring System Alert/High Alarm Setpoints; Revision 42
- RP-AA-460; Controls for High and Locked High Radiation Areas; Revision 20
- RP-AA-460-001; Controls for Very High Radiation Areas; Revision 2

- RP-AA-460-003; Access to HRAs/LHRAs in Response to a Potential or Actual Emergency; Revision 1
- RP-AP-460; Access to Reactor In-Core Sump Area; Revision 2

2RS3: In-Plant Airborne Radioactivity Control and Mitigation (71124.03)

- Work Order 1094446 01; Non Accessible Charcoal Adsorber Operability Test; 8/31/2009
- Work Order 1149597 01; Perform Recirc Charcoal Halide Test Control Room Ventilation System; 3/16/2010

2RS4: Occupational Dose Assessment (71124.04)

- National Voluntary Laboratory Accreditation Program; Selected Records; Various Dates

2RS5: Radiation Monitoring Instrumentation (71124.05)

- AR 1106461; Non-Conservative Liquid Discharge Alarm Setpoints; 8/26/2010
- AR 1107149; Additional Investigation Required for ODCM/LCO Implementation; 8/29/2010
- AR 1302586; Non-Conservative Setpoints Found for TRM Rad Monitors; 12/14/2011
- AR 1303888; Potential RETS Impact Due to Non-Conservative PRM Setpoints; 12/16/2011
- BRP 5800-3; Area Radiation Monitoring System Alert/High Alarm Setpoints; Revision 25
- BRP 5820-12; Response to Area and Process Radiation Monitor LCOARS or Out of Service Conditions; Revision 28
- BRP 5820-14; Process Radiation Monitoring System Alert/High Alarm Setpoints; Revision 42
- BYR-10-001; Calculation of Liquid Process Radiation Monitor Set Points; 8/30/2010
- RP-BR-951; Set Point Changes for Process Radiation Monitors; ODCM (Effluent) Monitors; Revision 0.

2RS6: Radioactive Gaseous and Liquid Effluent Treatment (71124.06)

- 2009 Byron Station Annual Radioactive Effluent Release Report; April 30, 2010
- 2010 Byron Station Annual Radioactive Effluent Release Report; April 29, 2011
- AR 00978684; Effluent Monitor Surveillance Not Performed Per Procedure; dated October 13, 2009
- AR 00996917; Effluent Release Process – Potential Gaps; dated November 22, 2009
- AR 01106461; Non-Conservative Liquid Discharge Alarm Setpoints; dated August 26, 2010
- AR 01107146; Additional Investigation Required for ODCM/LCO Implementation; dated August 29, 2010
- AR 01108146; Treatment of Ar-41 in Gaseous Effluents; dated August 31, 2010
- AR 1247902; 1/2 RE-PR-028 Particulate Filters Could Not Be Located; 8/4/2011
- BCP-400-TWX01; Liquid Radwaste Release from Release Tank OWX01T; Revision 59
- CY-AA-120-400; Closed Cooling Water Chemistry; Revision 13
- CY-AA-120-420; Auxiliary Boiler Chemistry; Revision 10
- CY-AA-130-201; Radiochemistry Quality Control; Revision 1
- CY-AA-170-000; Radioactive Effluent and Environmental Monitoring Programs; Revision 5
- CY-BY-170-301; Offsite Dose Calculation Manual; Revision 6
- CY-BY-170-301; Offsite Dose Calculation Manual; Revision 7
- FASA 1013272; Radioactive Gaseous and Liquid Effluents (RETS); 9/17/2010
- FASA 831375; Radioactive Gaseous and Liquid Effluents (RETS); 3/31/2009
- Gaseous Discharge Permit Number 110411; dated October 13, 2011
- Gaseous Discharge Permit Number 110445; dated October 31, 2011

- Liquid Discharge Permit Number 110437; dated October 25, 2011
- RP-BY-900-1PR29J; 1PR29J Process Radiation Monitor Radiological Air Sampling; Revision 2
- RP-BY-900-2PR29J; 2PR29J Process Radiation Monitor Radiological Air Sampling; Revision 2
- Work Order 1110220 01; Fuel Handling Building Exhaust Charcoal Adsorber Bank Operability Test; 12/21/2009
- Work Order 1236016 01; Perform Calibration of Rad Monitor 1PR28J; 1/18/2011
- Work Order 1249358 01; Perform Surveillance Test of 2PR28J; 4/26/2011

2RS7: Radiological Environmental Monitoring Program (71124.07)

- 2009 Byron Station Annual Radiological Environmental Operating Report; May 2010
- 2010 Byron Station Annual Radiological Environmental Operating Report; May 2011
- 2010 Land Use Census; dated August 30, 2010
- AR 00958298; ODCM Vent Stack Coordinates Inaccurate; dated August 27, 2009
- AR 01034880; REMP Milk Sample – Invalid Result; dated February 24, 2010
- AR 01090911; REMP Groundwater Sample Location No Longer Participating; dated July 15, 2010
- AR 01122156; REMP Sample Results above Detection Limit; dated October 5, 2010
- AR 01129610; Check-In Self-Assessment on the Radiological Environmental Monitoring Program (REMP); Approved June 20, 2011
- AR 01223226; REMP Air Samples – Positive Detects for I-131; dated June 1, 2011
- Environmental, Inc. Sampling Manual, Revision 13

2RS8: Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation (71124.08)

- AR 1015646; Non-Conforming Waste Found in Radwaste Shipment; 1/12/2010
- AR 1067394; Non-Conforming Radioactive Waste in Shipment; 5/10/2010
- AR 1173307; RWS 10-013 Contained Unapproved Mixed Waste; 2/10/2011
- AR 1221229; RWS 11-006 Contained Un-Manifested Asbestos; 5/26/2011
- AR 1231158; RWS 11-001 Manifested for Material Not Present; 6/21/2011
- AR 1233858; NOS ID: Cause of IR Incorrect RW Shipping Paperwork Not Identified; 6/28/2011
- AR 1250262; NOS ID: RP Failed to Address NOS Issues – Finding; 8/11/2011
- AR 1270337; Sea/Land Inventory Not Documented in Accordance with T&RM; 9/30/2011
- AR 1285148; QHPI Request for RP – RWS Manifest; 11/2/2011
- AR 1285591; NRC Identified: DAW Container Inspections Outside of Procedure Guidance; 11/3/2011
- AR 928393; Non-Conforming Metal Shipped to Bear Creek Processing; 6/5/2009
- Course Code N-RPCTAR; DBIG RAM Shipping/Inspection; Revision 0
- FASA 9866572-03; Radioactive Solid Waste Processing and Radioactive Material Handling, Storage and Transportation; 4/26/2011
- Letter BYRON-2008-0123; Report of Changes, Tests, and Experiments; 12/12/2008
- Letter BYRON-2010-0147; Report of Changes, Tests, and Experiments; 12/13/2010
- Module/LP ID RPTI 8.05; Radioactive Material Shipments; Revision 18
- NOSA-BYR-10-04 (AR 969170); Chemistry, Radwaste, Effluent and Environmental Monitoring Audit Report; 6/2/2010
- NOSA-BYR-11-06 (AR 1130876); Radiation Protection; 8/18/2011

- Performance Training and Evaluation; Task 509-004; Provide Radiological Protection Coverage During the Preparation of a Shipment of Radioactive Material; 11/5/2009
- Performance Training and Evaluation; Task 509-010; Perform Surveys on Radioactive Material Transport Vehicles; date not provided
- Performance Training and Evaluation; Task 509-013; Receipt Survey of Radioactive Material;
- Radiation Protection Technician/Continuing Training; DBIG: Waste Acceptance Guidelines; Revision 0
- RP-AA-100; Process Control Program for Radioactive Wastes; Revision 7
- RP-AA-600; Radioactive Material/Waste Shipments; Revision 12
- RP-AA-600-1001; Exclusive Use and Emergency Response Information; Revision 6
- RP-AA-600-1003; Radioactive Waste Shipments to Barnwell and Defense Consolidation Facility (DCF); Revision 7
- RP-AA-600-1004; Radioactive Waste Shipments to Energy Solutions' Clive Utah Disposal Site Containerized Waste Facility; Revision 9
- RP-AA-600-1005; Radioactive Material and Non Disposal Site Waste Shipments; Revision 12
- RP-AA-601; Surveying Radioactive Material Shipments; Revision 13
- RP-AA-605 Attachment 1; Trending for Shifts in Scaling Factors; 01/20/2011
- RP-AA-605 Attachment 1; Trending for Shifts in Scaling Factors; 06/02/2011
- RP-AA-605 Attachment 1; Trending for Shifts in Scaling Factors; 10/03/2009
- RP-AA-605 Attachment 1; Trending for Shifts in Scaling Factors; 10/19/2010
- RP-AA-605 Attachment 1; Trending for Shifts in Scaling Factors; 2/17/2010
- RP-AA-605 Attachment 1; Trending for Shifts in Scaling Factors; 8/18/2010
- RP-AA-605 Attachment 1; Trending for Shifts in Scaling Factors; 9/16/2011
- RP-AA-605 Attachment 2; Waste Stream Results Review; DAW; 1/20/2011
- RP-AA-605 Attachment 2; Waste Stream Results Review; DAW; 3/30/2011
- RP-AA-605 Attachment 2; Waste Stream Results Review; DAW; 4/18/2010
- RP-AA-605 Attachment 2; Waste Stream Results Review; Primary Resin; 3/10/2010
- RP-AA-605 Attachment 2; Waste Stream Results Review; Secondary Radwaste Filter; 4/24/2010
- RP-AA-605 Attachment 2; Waste Stream Results Review; Secondary Resin; 3/25/2010
- RP-AA-605; 10 CFR Part 61 Program; Revision 4
- Shipment RMS09-094; Rx Vessel Dosimetry; Type A Package; 11/18/2009
- Shipment RMS11-078; Dirty Laundry; Low Specific Activity (LSA-II); 4/27/2011
- Shipment RWS10-011; Dewatered Bead Resin; Low Specific Activity (LSA-II); 6/29/2010
- Shipment RWS10-012; DAW Trash; Low Specific Activity (LSA-II); 9/1/2010
- Shipment RWS10-013; DAW Trash and TR Pond Sludge; Low Specific Activity (LSA-II); 9/1/2010

Section 40A1: Performance Indicator Verification (71151)

- IR 1139610; Potential Non-Conservative Tech Specs for Component Cooling; November 12, 2010
- IR 1139728; CC System OLR Impact From IR 1139610; November 12, 2010
- IR 1141591; 2A DG Emergency Stopped Due to Oil Leak; November 17, 2010
- IR 1158910; RH System Issue Resulting in LER – Tracking; January 05, 2011
- IR 1128409; Threshold for SSFF Approaching White Region; June 14, 2011
- IR 1284054; Legacy Issues with Main Steam Tunnel Pressurization Calculation; October 31, 2011
- LS-AA-2080; NRC Safety System Functional Failure – July 2010 to July 2011, Revision 4
- EC 382262; Byron OpEval #10-006 - U-0 CC Pump Potential Non-Conservative Tech Spec

- LER 454/2010-001; Technical Specifications Allowed Outage Time Extension Request for Component Cooling System Contained Inaccurate Design Information that Significantly Impacted the Technical Justification, November 12, 2010
- LER 454/2011-001; Potential Loss of Residual Heat Removal System Safety Function in Mode 4 When Aligned for Shutdown Cooling Due to Potential for Flashing or Voiding of Coolant During a Shutdown Loss of Cooling Accident, January 5, 2011
- LER 455/2011-001; Unit 2 Emergency Diesel Generator Inoperable for Longer than Allowed by Technical Specifications Due to Inadequate Work, November 17, 2011
- NEI 99-02 Revision 6; Regulatory Assessment Performance Indicator Guideline, October 2009
- Reactor Oversight Program MSPI Basis Document Revision 3; December 2006
- Monthly Data Elements for NRC Reactor Coolant System (RCS) Specific Activity, October 2010 – September 2011
- PWR High Pressure Safety Injection Function, October 2010 – September 2011
- Residual Heat Removal Function, October 2010 – September 2011
- PWR Auxiliary Feedwater/Emergency Feedwater Function, October 2010 – September 2011
- Cooling Water Support Function, October 2010 – September 2011
- IR 1154673; Unable to Perform Manual Stroke Surveillance of 1SX150A, December 20, 2010
- IR 1152376; Unit 2 CWS MSPI Exelon At-Risk, December 14, 2010
- IR 1263487; CWS2 (SX) MSPI Low Margin, September 15, 2011
- IR 1090691; Unit 1 CWS MSPI At-Risk, July 14, 2010
- Monthly Data Elements for NRC Unplanned Power Changes Per 7000 Critical Hours, June 2010 – October 2011
- IR 1259684; Byron PI in Variance – P.8.1.2 Unplanned Power Changes, September 6, 2011
- IR 1116305; Runback of Byron Station U-1 Due to 1A FW PP Trip, September 22, 2010

Section 4OA2: Identification and Resolution of Problems (71152)

- IR 1271650; Difference Between Byron & Braidwood PPC Point Calcs Y2021 & Y2022
- IR 1282689; Pin Hole Leak in Area 7 on 2RY8028 P-44
- IR 1289655; IR Indicates DG Fire Pump Started in Over Ride for Test CCP, November 04, 2011
- 2BwOSR 3.8.1.14-2; 2B DG 24 Hour Endurance Run, Revision 5
- WO 1323726; 2B DG 24 Hour Endurance Run 18 Month, September 13, 2011
- Analysis BYR11-036; Turbine Building HELB and Room Heat Up Analyses for MUR PU, Revision 0
- EC 383599; Op Eval 11-005, Turbine Building HELB Analysis Input Errors, Revision 1
- OWA Board Meeting Minutes; Year 2010 Quarter 4, December 28, 2010
- OWA Board Meeting Minutes; Year 2011 Quarter 1, April 5, 2011
- OWA Board Meeting Minutes; Year 2011 Quarter 2, June 30, 2011
- OWA Board Meeting Minutes; Year 2011 Quarter 3, October 14, 2011
- OWA Related IRs; 4Q2010 – 3Q2011
- IR 806396; Both Units SD Systems Degraded for >5 Years, August 12, 2008
- IR 1007239; Review SJAE Strainer Plugging for OWA/OC, December 18, 2009
- IR 1106359; Common Cause – Recommend Venting SD During Stroke Time Surveillance, August 26, 2010
- IR 1118055; 2A Main Feed Pump Recirc Not Modulating Properly, September 26, 2010
- IR 1122751; Missed Fire Watches in the Past, October 06, 2010
- IR 1151298; Unit 1 Tower Overflow, December 12, 2010
- IR 1155725; Caustic Dilution Flow Only Reading 6 GPM, December 24, 2010
- IR 1158940; Multiple Failure of Employee Alarm System, January 1, 2011
- IR 1169182; MMD Support for 2B FW Pump Turning Gear Operation, January 31, 2011

- IR 1172246; 0CW278A, Through Wall Crack on Valve Body, February 08, 2011
- IR 1172509; 0CW220 Flow Control Valve Not Repositioning Upon Demand, February 08, 2011
- IR 1194212; Operator Work Around, March 29, 2011
- IR 1194754; RSH CO2 TK Repair(s) Need to Be Expedited, March 30, 2011
- IR 1194754; Missed Closure of ATI, January 09, 2004
- IR 1211839; 2WG046 Drip Pan is Removed Consider Operator Challenge, May 4, 2011
- IR 1212344; Degradation of RSH CO2 Worsens, May 5, 2011
- IR 1216461; 2B CW PP Intake DP 9" Jumped to 2', May 16, 2011

Corrective Action Documents As a Result of NRC Inspection

- IR 1276895; NRC Question – Effect of TB HELB on Reactor Trip Breakers, October 14, 2011
- IR 1278980; NRC Question – Maintaining VCT Pressure High for Chemistry, October 18, 2011

Section 1EP4: Emergency Action Level and Emergency Plan Changes

- EP-AA-1002; Exelon Nuclear Radiological Emergency Plan Annex for Byron Station; Revisions 26, 27, and 28
- EP-AA-120-1001; 50.54(q) Program Evaluation and Effectiveness Reviews for Revisions 27 and 28
- EP-AA-120-F-01; EP Document Approval Forms for Revisions 27 and 28

LIST OF ACRONYMS USED

ADAMS	Agencywide Document Access Management System
AF	Auxiliary Feedwater
ALARA	As-Low-As-Is-Reasonably-Achievable
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CLB	Current Licensing Basis
DAW	Dry Active Waste
DG	Emergency Diesel Generator
DOT	Department of Transportation
EAL	Emergency Action Level
ESF	Engineered Safety Feature
HELB	High Energy Line Break
HVAC	Heating, Ventilation, and Air Conditioning
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
IR	Issue Report
IST	Inservice Testing
LER	Licensee Event Report
LORT	Licensed Operator Requalification Training
MEER	Miscellaneous Electrical Equipment Room
MG	Motor Generator
NEI	Nuclear Energy Institute
OBE	Operating Basis Earthquake
ODCM	Offsite Dose Calculation Manual
OOS	Out of Service
OpEval	Operability Evaluation
OSP	Outage Safety Plan
OWA	Operator Workaround
psig	pound per square inch gauge
MSPI	Mitigating Systems Performance Index
NCV	Non-Cited Violation
NRC	U.S. Nuclear Regulatory Commission
NVLAP	National Voluntary Laboratory Accreditation Program
PI	Performance Indicator
RCS	Reactor Coolant System
RFO	Refueling Outage
RHR	Residual Heat Removal
RWST	Refueling Water Storage Tank
SDP	Significance Determination Process
SH	Station Heating
SRP	Standard Review Plan
SSC	Structure, System, and Component
SX	Essential Service Water
TLD	Thermoluminescent Detector
TS	Technical Specification

UFSAR	Updated Final Safety Analysis Report
UL	Underwriters Laboratory
URI	Unresolved Item
VA	Auxiliary Building Ventilation
WO	Work Order

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Sincerely,

/RA/

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

Docket Nos. 50-454; 50-455
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SUBJECT: BYRON STATION, UNITS 1 AND 2, NRC INTEGRATED INSPECTION
REPORT 05000454/2011005; 05000455/2011005

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