



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, IL 60532-4352**

May 13, 2009

Mr. Charles G. Pardee
Senior Vice President, Exelon Generation Company, LLC
President and Chief Nuclear Officer (CNO), Exelon Nuclear
4300 Winfield Road
Warrenville IL 60555

**SUBJECT: BYRON STATION, UNITS 1 AND 2, NRC INTEGRATED INSPECTION
REPORT 05000454/2009-002; 05000455/2009-002**

Dear Mr. Pardee:

On March 31, 2009, 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 April 10, 2009, with D. Enright 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.

Based on the results of this inspection, two NRC-identified findings of very low safety significance were identified. The findings involved violations of NRC requirements. However, because of their very low safety significance, and because the issues were entered into your corrective action program, the NRC is treating the issues as non-cited violations (NCVs) in accordance with Section VI.A.1 of the NRC Enforcement Policy.

If you contest the subject or severity of a Non-Cited Violation, 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. In addition, if you disagree with the characterization of any finding 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 Byron Station. The information you provide will be considered in accordance with Inspection Manual Chapter 0305.

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Sincerely,

/RA/

Richard A. Skokowski, Chief
Branch 3
Division of Reactor Projects

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

Enclosure: Inspection Report No. 05000454/2009-002 and 05000455/2009-002
w/Attachment: Supplemental Information

cc w/encl: Site Vice President - Byron Station
Plant Manager - Byron Station
Manager Regulatory Assurance - Byron Station
Senior Vice President - Midwest Operations
Senior Vice President - Operations Support
Vice President - Licensing and Regulatory Affairs
Director - Licensing and Regulatory Affairs
Manager Licensing - Braidwood, Byron, and LaSalle
Associate General Counsel
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Assistant Attorney General
Illinois Emergency Management Agency
J. Klinger, State Liaison Officer,
Illinois Emergency Management Agency
P. Schmidt, State Liaison Officer, State of Wisconsin
Chairman, Illinois Commerce Commission
B. Quigley, Byron Station

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Manager Licensing - Braidwood, Byron, and LaSalle
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Letter to C. Pardee from Richard A. Skokowski dated May 13, 2009

SUBJECT: BYRON STATION, UNITS 1 AND 2 INTEGRATED INSPECTION REPORT
05000454/2009-002; 05000455/2009-002

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REGION III

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

Report Nos: 05000454/2009002 and 05000455/2009002

Licensee: Exelon Generation Company, LLC

Facility: Byron Station, Units 1 and 2

Location: Byron, IL

Dates: January 01, 2009, through March 31, 2009

Inspectors: B. Bartlett, Senior Resident Inspector
J. Robbins, Resident Inspector
J. Cassidy, Senior Health Physicist
J. Dalzell, Reactor Engineer
M. Holmberg, Senior Reactor Inspector
R. Jones, Reactor Engineer
R. Ng, Project Engineer
C. Tilton, Senior Reactor Inspector
C. Thompson, Resident Inspector, Illinois Department of
Emergency Management

Approved by: R. Skokowski, Chief
Branch 3
Division of Reactor Projects

Enclosure

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SUMMARY OF FINDINGS

IR 05000454/2009002, 05000455/2009002; January 1, 2009 – March 31, 2009; Byron Station, Units 1 & 2; Maintenance Risk Assessments and Emergent Work Controls, and Operability Evaluations.

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. Two Green findings were identified by the inspectors. The findings were considered to be Non-Cited Violations (NCV) of NRC regulations. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after Nuclear Regulatory Commission (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 A finding of very low safety significance and associated NCV of 10 CFR 50.65(a)(4) was identified by the inspectors for the licensee's failure to perform a risk assessment that accounted for the inability of the Unit 1 Essential Service Water suction valve 1SX001A to close before performing maintenance. The finding was more than minor because it was similar to NRC IMC 0612, Appendix E, "Examples of Minor Issues," Example 7e, in that the elevated overall plant risk, when correctly assessed, would have required additional risk management actions. This finding had the potential to become a more significant event if the suction valve was required to mitigate flooding in the auxiliary building.

The finding was determined to be of very low safety significance since the Incremental Core Damage Probability (ICDP) was calculated to be $9.44E-7$ given that the condition existed for 14 days. The primary cause of this finding was related to the cross-cutting area of Human Performance for Resources (H.2(c)) because Valve 1SX001A was not added to the Paragon risk assessment computer program to allow the user to make effective risk assessments. The licensee entered this issue into their correction action program as Issue Report (IR) 889131 and performed a risk assessment for the condition. (Section 1R13)

- Green The inspectors identified a finding of very low safety significance and a non-cited violation of Technical Specification 5.4, "Procedures," during a routine inspection of the Auxiliary Building on February 21. The inspectors observed scaffold construction in the containment purge area of Unit 1 that was in close proximity to a safety-related containment pressure instrument. The scaffold construction was determined to be contrary to seismic clearance procedural requirements. As part of their immediate corrective actions, licensee personnel modified the affected scaffolding.

The finding was more than minor because it was associated with the Protection against External Factors attribute of the Mitigating Systems Cornerstone and affected the

cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events in order to prevent undesirable consequences. Specifically, the finding was determined to have placed scaffolding near safety related equipment in an unacceptable seismic configuration. The finding was determined to be of very low safety significance because it was determined not to represent a loss of safety function. This issue was entered into the licensee's corrective action program as Issue Report (IR) 882727. Since the scaffold was installed in 2004, the finding does not represent current licensee performance so there was no cross-cutting aspect to this issue. (Section 1R15.1)

B. Licensee-Identified Violations

None.

REPORT DETAILS

Summary of Plant Status

Unit 1 operated at or near full power throughout the inspection period with two exceptions. On February 14 power was reduced to 88 percent for maintenance activities on Moisture Separator Re-Heater A. Power was restored to 100 percent the following day. On February 21, 2009, power was reduced to approximately 28 percent for a containment entry inside of the bio-shield to evaluate and isolate a small reactor coolant leak (0.007gpm) on a bolted connection. Power was restored to 100 percent the following day.

Unit 2 operated at or near full power throughout the inspection period.

1. REACTOR SAFETY

Cornerstone: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

.1 Readiness For Impending Adverse Weather Condition – Severe Thunderstorm Watch

a. Inspection Scope

Since thunderstorms with potential tornados and high winds were forecast in the vicinity of the facility for March 14, 2009, the inspectors reviewed the licensee's overall preparations/protection for the expected weather conditions. On March 14, 2009, the inspectors walked down the alternating current (AC) and direct current (DC) system(s), in addition to the licensee's emergency AC power systems, because their safety-related functions could be affected or required as a result of high winds or tornado-generated missiles or the loss of offsite power. The inspectors evaluated the licensee staff's preparations against the site's procedures and determined that the staff's actions were adequate. During the inspection, the inspectors focused on plant specific design features and the licensee's procedures used to respond to specified adverse weather conditions. The inspectors also toured the plant grounds to look for any loose debris that could become missiles during a tornado. The inspectors evaluated operator staffing and accessibility of controls and indications for those systems required to control the plant. 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. The inspectors also reviewed a sample of corrective action program (CAP) items to verify that the licensee identified adverse weather issues at an appropriate threshold and dispositioned them through the CAP in accordance with station corrective action procedures. Specific documents reviewed during this inspection are listed in the Attachment.

This inspection constituted one readiness for impending adverse weather condition sample as defined in Inspection Procedure (IP) 71111.01-05.

b. Findings

No findings of significance 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 1 Train B Essential Service Water System while Unit 2 Train B Essential Service Water System was out of service;
- Unit 1 Trains A and B Auxiliary Feed Water System Following Gearbox Maintenance on Train B; and
- Division 11 Engineered Safety Features Switch Gear During the Station Auxiliary Transformer 142-2 Outage.

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, 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 three partial system walkdown samples as defined in IP 71111.04-05.

b. Findings

No findings of significance were identified.

.2 Semi-Annual Complete System Walkdown

a. Inspection Scope

On March 03, 2009, the inspectors performed a complete system alignment inspection of the Unit 1 Battery and DC Distribution System 111 & 112 while System Auxiliary Transformer 142-2 was out of service to verify the functional capability of the system. This system was selected because it was considered both safety-significant and risk-significant in the licensee's probabilistic risk assessment. The inspectors walked down the system to review electrical equipment line ups, electrical power availability, system temperature indications, component labeling, component lubrication, component

and equipment cooling, hangers and supports, operability of support systems, and to ensure that ancillary equipment or debris did not interfere with equipment operation. A review of a sample of past and outstanding work orders (WOs) was performed to determine whether any deficiencies significantly affected the system function. In addition, the inspectors reviewed the CAP database to ensure that system equipment alignment problems were being identified and appropriately resolved. Documents reviewed are listed in the Attachment.

These activities constituted one complete system walkdown sample as defined in IP 71111.04-05.

b. Findings

No findings of significance 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:

- Division 11 ESF Switchgear Room (Fire Zone 5.2-1);
- Division 22 ESF Switchgear Room (Fire Zone 5.1-2);
- Auxiliary Building – 346' Elevation – General Area (Fire Zone 11.2-0); and
- Auxiliary Building – 426' Elevation – General Area (Fire Zone 11.6-0).

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 had 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 to this report.

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

b. Findings

No findings of significance were identified.

.2 Annual Fire Protection Drill Observation (71111.05A)

a. Inspection Scope

On February 11, 2009, the inspectors observed a fire brigade activation for a drill. The drill involved response to simulated smoke in the Turbine Building 401' Elevation, Contractor Lunch Room. Based on this observation, the inspectors evaluated the readiness of the plant fire brigade to fight fires. The inspectors verified that the licensee staff identified deficiencies; openly discussed them in a self-critical manner at the drill debrief, and took appropriate corrective actions. Specific attributes evaluated were: (1) proper wearing of turnout gear and self-contained breathing apparatus; (2) proper use and layout of fire hoses; (3) employment of appropriate fire fighting techniques; (4) sufficient firefighting equipment brought to the scene; (5) effectiveness of fire brigade leader communications, command, and control; (6) search for victims and propagation of the fire into other plant areas; (7) smoke removal operations; (8) utilization of pre planned strategies; (9) adherence to the pre planned drill scenario; and (10) drill objectives. Documents reviewed are listed in the Attachment to this report.

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

b. Findings

No findings of significance were identified.

1R07 Annual Heat Sink Performance (71111.07)

.1 Heat Sink Performance

a. Inspection Scope

The inspectors reviewed the licensee's testing of Unit 2 Train B Centrifugal Charging Pump Gear Oil and Pump Coolers heat exchangers to verify that potential deficiencies did not mask the licensee's ability to detect degraded performance, to identify any common cause issues that had the potential to increase risk, and to ensure that the licensee was adequately addressing problems that could result in initiating events that would cause an increase in risk. The inspectors reviewed the licensee's observations as compared against acceptance criteria, the correlation of scheduled testing and the frequency of testing, and the impact of instrument inaccuracies on test results. Inspectors also verified that test acceptance criteria considered differences between test conditions, design conditions, and testing conditions.

This annual heat sink performance inspection constituted one sample as defined in IP 71111.07-05.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification Program (71111.11)

.1 Resident Inspector Quarterly Review (71111.11Q)

a. Inspection Scope

On March 04, 2009, the inspectors observed a crew of licensed operators in the plant's simulator during licensed operator requalification examinations to verify that operator performance was adequate, evaluators were identifying and documenting crew performance problems, and training was being conducted in accordance with licensee procedures. The inspectors evaluated the following areas:

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

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

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

b. Findings

No findings of significance 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 system:

- Unit 1 Train B Auxiliary Feedwater Pump High Vibration.

The inspectors reviewed events such as where 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 to this report.

This inspection constituted one quarterly maintenance effectiveness sample as defined in IP 71111.12-05.

b. Findings

No findings of significance 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:

- Unit 1 Train A Emergency Diesel Generator Work Window While Station was under Cold Weather Alert;
- Unit 1 Train B Component Cooling Water Pump Work Window While Station Auxiliary Transformer 142-2 was Out of Service; and
- Unit 1 Train B Auxiliary Feedwater Pump Inoperable While Station Auxiliary Transformer 142-1 was Out of Service for Maintenance.

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 three samples as defined in IP 71111.13-05.

b. Findings

Introduction: The inspectors identified a finding of very low safety significance (Green) involving a non-cited violation (NCV) of 10 CFR 50.65(a)(4) for the licensee's failure to perform an adequate risk assessment that accounted for all risk significant components that were unavailable before performing maintenance. Specifically, the inability of the Unit 1 Train A Essential Service Water (SX) suction valve to close was not factored into the risk assessment before performing maintenance activities.

Description: On February 18, 2009, during the Unit 1 Train A SX system work window, the licensee discovered that the Unit 1 Train A SX pump suction isolation valve, 1SX001A, was unable to be closed. The licensee performed an immediate risk evaluation for the condition and determined that there was minimal impact to risk. Subsequently, the licensee completed the work and returned the system to service on February 19, 2009. However, Valve 1SX001A was returned to service without repair.

The SX pump suction isolation valve is a motor-operated valve that is normally de-energized open. This valve needs to be able to close to mitigate flooding in the auxiliary building for several SX system pipe break scenarios and was credited in the licensee's probability risk assessment (PRA) model revised May 2008. However, this component was not added to the Paragon risk assessment program that the licensee used to perform day-to-day risk evaluation.

After Valve 1SX001A was returned to service, the licensee did not perform any further risk assessment taking into account the condition of the valve until the inspectors questioned the licensee about the impact of the valve's inability to close to ongoing maintenance activities. On March 5, 2009, the licensee completed a risk evaluation and prescribed several risk management actions to minimize the risk impact to the plant due to Valve 1SX001A being unable to close. The risk management actions were subsequently implemented through Operation Standing Order 09-15. However, between February 19 and March 5, 2009, the licensee operated the unit and performed several maintenance activities without adequately evaluating the risk of the unavailable safety function of Valve 1SX001A.

Analysis: The inspectors determined that the licensee failed to account for all risk significant SSCs that were unavailable in the risk assessment before performing maintenance. The issue was within the licensee's ability to foresee and correct and the condition could have been prevented. The inspector determined that the failure to consider unavailable equipment in risk assessment for maintenance activities before the maintenance was actually performed was a performance deficiency that warranted a significance determination.

The finding was more than minor because it was similar to NRC IMC 0612, Appendix E, "Examples of Minor Issues," Example 7e, in that the elevated overall plant risk, when

correctly assessed, would have required additional risk management actions. This finding had the potential to become a more significant event if the valve was required to mitigate flooding in the auxiliary building.

IMC 0609, Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process," was used to determine the significance of the finding. The inspector requested that the licensee re-perform the 10 CFR 50.65(a)(4) assessment for the exposure period of the finding assuming the valve was unable to close. The Incremental Core Damage Frequency (ICDF) was calculated to be $2.46E-5/\text{yr}$. Given that the condition existed for 14 days, the Incremental Core Damage Probability (ICDP) was $9.44E-7$.

Since the licensee later performed a standalone risk evaluation, as there were no other maintenance activities affecting flooding, the ICDP is equal to the Incremental Core Damage Probability Deficit (ICDPD). In addition, no risk management actions (RMAs) were specified or taken because no risk evaluation of the actual configuration was performed. Using Flowchart 1 of IMC 0609 Appendix K, a finding with an ICDPD of $9.44E-7$ with no RMAs is assessed as a Green finding (very low safety significance).

This finding has a cross-cutting aspect in the area of Human Performance, Resources Component, because the licensee did not ensure that complete, accurate, and up-to-date processes were available and adequate to assure nuclear safety. Specifically, Valve 1SX001A was not added to the Paragon risk assessment computer program to allow the user to make effective risk assessments since May 2008. (H.2(c))

Enforcement: 10 CFR 50.55(a)(4) requires, in part, that before performing maintenance activities, the licensee assess and manage the increase in risk that may result from the proposed maintenance activities. Contrary to the above, from February 19, 2009 to March 5, 2009, the licensee failed to consider risk significant components that were unavailable in the risk evaluation before performing maintenance. Specifically, the licensee failed to consider the inability of Valve 1SX001A to close in the risk assessments for maintenance performed for the 14 days.

Because this violation was of very low safety significance (Green) and has been entered into the licensee's corrective action program (IR 889131), this violation is being treated as a non-cited violation, consistent with Section VI.A.1 of the NRC Enforcement Policy. (NCV 05000454/2009002-01)

1R15 Operability Evaluations (71111.15)

.1 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following issues:

- Diesel Generator Fuel Oil Storage Tank Vents Failure to Break Before Crushing;
- Unit 1 Train B Diesel Driven Auxiliary Feedwater Pump High Vibration;
- Loose Seismic Restraint for the Auxiliary Feedwater Piping in the Auxiliary Feedwater Tunnel; and

- Scaffolding B4858 at Unit 1 Containment Penetration P-97 Interaction with Safety Related Equipment.

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 USAR 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 also reviewed a sampling 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 to this report.

This operability inspection constituted four samples as defined in IP 71111.15-05

b. Findings

Introduction: The inspectors identified a Green finding of very low safety significance and a NCV of TS 5.4, "Procedures," during a routine inspection of the auxiliary building on February 21, 2009. The inspectors observed scaffold construction in the Unit 1 containment purge area that was contrary to licensee procedures addressing seismic clearance requirements for scaffolding.

Description: On February 21, 2009 the inspectors performed a walkdown of the Auxiliary Building 451' elevation. While in the Unit 1 containment purge area, the inspectors observed scaffold construction that occupied the southern most corner of the room adjacent to the containment structure. The inspectors observed that this scaffold construction was in close proximity to a safety related piece of equipment, Containment Pressure Transducer, 1PT0935. The scaffold was braced at its base between structural surfaces of the auxiliary building and containment.

The inspectors reviewed the scaffold Permanent Scaffold Request Form, Attachment 5 of MA-AA-716-025, Rev. 0, "Scaffold Installation, Modification and Removal Request Process," associated with the affected scaffold. The scaffold was installed and approved on April 1, 2004. Inspectors noted that it had been initialed by licensee personnel for compliance with seismic bracing criteria in accordance with the Procedure MA-AA-716-025, Rev. 0. This procedure incorporated by reference the requirements found in the Nuclear Engineering Standard NES-MS-04.1, "Seismic Prequalified Scaffolds." However, the inspectors noted that NES-MS-04.1, Section 5.2.1, "Horizontal Clearances," stated that, "the distance between the scaffold and the safety related equipment shall be equal to ¼ inch or greater than the distance between the standoff end and the bearing structure." The inspectors noted that the underlying assumption in the procedure was that bracing surfaces, room walls in this instance, were assumed to move in unison with the floor of the affected room for seismic considerations. This assumption is not in accordance with the design basis of the interface between the auxiliary building and containment. A two inch gap exists between the two buildings to

ensure that they do not come in contact with each other during a seismic event. Since each building is of a unique design and of differing masses, the containment building and the auxiliary building will respond differently to the force from a seismic event. The inspectors concluded that containment could provide an impulse to the affected scaffolding during a seismic event that would affect its location in relation to safety related equipment.

Based on the observations, the inspectors determined that licensee personnel failed to adhere to Procedure MA-AA-716-025 during the installation of the scaffold.

Analysis: The inspectors determined that the failure to adhere to scaffold procedures was a performance deficiency warranting a significance evaluation. The inspectors concluded that the finding was more than minor in accordance with Appendix B, "Issue Screening," of IMC 0612, "Power Reactor Inspection Reports," dated September 20, 2007. It was more than minor because it was associated with the Protection against External Factors attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events in order to prevent undesirable consequences. Specifically, the finding was determined to have resulted in a degraded seismic configuration for the safety related component, 1PT0935.

The inspectors performed a significance determination of this issue using IMC 0609, "Significance Determination Process," dated August 05, 2008, Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations," dated January 10, 2008. The finding was of very low safety significance because it did not result in an actual loss of safety function. Since the scaffold was installed in 2004, the finding does not represent current licensee performance so there was no cross-cutting aspect to this issue.

Enforcement: Technical Specification 5.4, "Procedures," required the implementation of the applicable procedures recommended in Regulatory Guide 1.33, "Quality Assurance Program Requirements," Revision 2, dated February 1978. Regulatory Guide 1.33, Appendix A, stated, "Maintenance that can affect the performance of safety-related equipment should be properly preplanned and performed in accordance with written procedures appropriate to the circumstances." NES-MS-04.1, "Seismic Prequalified Scaffolds," Rev. 5, Section 5.2.1, "Horizontal Clearances," stated that, "the distance between the scaffold and the safety related equipment shall be equal to ¼ inch or greater than the distance between the standoff end and the bearing structure." Contrary to this requirement, on April 1, 2004, licensee personnel had placed scaffold in a configuration that did not assure that the requirements established by NES-MS-04.1 would be met. Specifically, scaffold bracing was installed in the Unit 1 containment purge area in such a way that the scaffold would move closer to safety related containment pressure transducer, 1PT0935, during a seismic event. However, because of the very low safety significance of the issue and because the issue has been entered into the licensee's corrective action program as Issue Report (IR) 882727, the issue is being treated as a NCV consistent with Section VI.A.1 of the NRC Enforcement Policy. (NCV 05000454/2009002-02)

1R19 Post-Maintenance Testing (71111.19)

.1 Post-Maintenance Testing

a. Inspection Scope

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

- Instrument Maintenance Test of Unit 2 Train B Auxiliary Feedwater Pump Tachometer Work Order 1109865;
- Diesel Driven Auxiliary Feedwater Pump Start Sequence Test Following Maintenance;
- Unit 2 Train B Centrifugal Charging Pump Work Window; and
- Perform Full Flow Test Following Maintenance on the Unit 1 Train B AF Pump Work Order 01165301.

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 TS, 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 to this report.

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

b. Findings

No findings of significance 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 1 Boric Acid Storage System Alignment Monthly Surveillance (Routine);
- Unit 1 Calorimetric Calculation Daily Surveillance at 40% Power (Routine); and
- Unit 1 Train B Diesel Generator 24 hour Endurance Run (Routine).

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 activities, testing was performed in accordance with the applicable version of Section XI, American Society of Mechanical Engineers 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 to this report.

This inspection constituted three routine surveillance testing sample(s) as defined in IP 71111.22 -05.

b. Findings

No findings of significance were identified.

.2 Inservice Testing (IST) Surveillance

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 A SX American Society of Mechanical Engineers (ASME) Test;
- Comprehensive Inservice Testing Requirements for the Diesel Driven Auxiliary Feedwater Pump; and
- Unit 2 Train B Manual Stroke of Essential Service Water Strainer Backwash Valve.

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

This inspection constituted three inservice inspection samples as defined in Inspection Procedure 71111.22.

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

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 March 4, 2009, to identify any weaknesses and deficiencies in classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the Cycle 09-2, Out of the Box session, 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 corrective action program. As part of the inspection, the inspectors reviewed the drill package and other documents listed in the Attachment to this report.

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

b. Findings

No findings of significance were identified.

2 RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

2OS1 Access Control to Radiologically Significant Areas (71121.01)

1. Plant Walkdowns and Radiation Work Permit Reviews

a. Inspection Scope

The inspectors assessed the adequacy of the licensee's internal dose assessment process for internal exposures in excess of 50 millirem committed effective dose equivalent. There were no internal exposures greater than 50 millirem committed effective dose equivalent.

This inspection constitutes one sample as defined in IP 71121.01-5.

The inspectors also reviewed the licensee's physical and programmatic controls for highly activated and/or contaminated materials (non-fuel) stored within the spent fuel pool or other storage pools.

This inspection constitutes one sample as defined in IP 71121.01-5.

b. Findings

No findings of significance were identified.

2. Problem Identification and Resolution

a. Inspection Scope

The inspectors reviewed a sample of the licensee's self-assessments, audits, Licensee Event Reports (LERs), and Special Reports related to the access control program to verify that identified problems were entered into the CAP for resolution.

This inspection constitutes one sample as defined in IP 71121.01-5.

The inspectors reviewed corrective action reports related to access controls and any high radiation area radiological incidents (issues that did not count as performance indicator (PI) occurrences identified by the licensee in high radiation areas less than 1R/hr). Staff members were interviewed and corrective action documents were reviewed to verify that follow-up activities were being conducted in an effective and timely manner commensurate with their importance to safety and risk based on the following:

- initial problem identification, characterization, and tracking;
- disposition of operability/reportability issues;
- evaluation of safety significance/risk and priority for resolution;
- identification of repetitive problems;
- identification of contributing causes;
- identification and implementation of effective corrective actions;
- resolution of NCVs tracked in the corrective action system; and
- implementation/consideration of risk significant operational experience feedback.

This inspection constitutes one sample as defined in IP 71121.01-5.

The inspectors evaluated the licensee's process for problem identification, characterization, and prioritization and verified that problems were entered into the CAP and resolved. For repetitive deficiencies and/or significant individual deficiencies in problem identification and resolution, the inspectors verified that the licensee's self-assessment activities were capable of identifying and addressing these deficiencies.

This inspection constitutes one sample as defined in IP 71121.01-5.

b. Findings

No findings of significance were identified.

3. Job-In-Progress Reviews

a. Inspection Scope

The inspectors reviewed radiological work in high radiation work areas having significant dose rate gradients to evaluate whether the licensee adequately monitored exposure to personnel and to assess the adequacy of licensee controls. These work areas involved areas where the dose rate gradients were severe; thereby increasing the necessity of providing multiple dosimeters or enhanced job controls.

This inspection constitutes one sample as defined in Inspection Procedure 71121.01-5.

b. Findings

No findings of significance were identified.

4. High Risk Significant, High Dose Rate, High Radiation Area and Very High Radiation Area Controls

a. Inspection Scope

The inspectors held discussions with the Radiation Protection Manager concerning high dose rate, high radiation area and very high radiation area controls and procedures, including procedural changes that had occurred since the last inspection, in order to assess whether any procedure modifications substantially reduced the effectiveness and level of worker protection.

This inspection constitutes one sample as defined in IP 71121.01-5.

The inspectors discussed with radiation protection supervisors the controls that were in place for special areas of the plant that had the potential to become very high radiation areas during certain plant operations. The inspectors assessed if plant operations required communication beforehand with the radiation protection group, to allow corresponding timely actions to properly post and control the radiation hazards.

This inspection constitutes one sample as defined in IP 71121.01-5.

b. Findings

No findings of significance were identified.

5. Radiation Worker Performance

a. Inspection Scope

The inspectors reviewed radiological problem reports for which the cause of the event was due to radiation worker errors to determine if there was an observable pattern traceable to a similar cause and to determine if this perspective matched the corrective action approach taken by the licensee to resolve the reported problems. Problems or issues with planned or completed corrective actions were discussed with the Radiation Protection Manager.

This inspection constitutes one sample as defined in IP 71121.01-5.

b. Findings

No findings of significance were identified.

6. Radiation Protection Technician Proficiency

a. Inspection Scope

The inspectors reviewed radiological problem reports for which the cause of the event was radiation protection technician error to determine if there was an observable pattern traceable to a similar cause and to determine if this perspective matched the corrective action approach taken by the licensee to resolve the reported problems.

This inspection constitutes one sample as defined in IP 71121.01-5.

b. Findings

No findings of significance were identified.

2OS2 As-Low-As-Reasonably-Achievable Planning And Controls (71121.02)

1. Radiological Work Planning

a. Inspection Scope

The inspectors evaluated the licensee's list of work activities ranked by estimated exposure that were completed during the last refueling outage and reviewed the following five work activities of highest exposure significance:

- Steam Generator Equipment Staging in All Radiological Control Areas;
- Steam Generator Platform and Bullpen Set-up/Tear Down and Decontamination Activities;
- Steam Generator Manway and Diaphragm Removal and Reinstallation;
- Steam Generator Nozzle Cover Removal and Reinstallation; and
- Steam Generator Eddy Current Testing and All Tube Repair.

For these five activities, the inspectors reviewed the as-low-as-reasonably-achievable (ALARA) work activity evaluations, exposure estimates, and exposure mitigation requirements in order to verify that the licensee had established procedures and engineering and work controls that were based on sound radiation protection principles in order to achieve occupational exposures that were ALARA. The inspectors also determined if the licensee had reasonably grouped the radiological work into work activities, based on historical precedence, industry norms, and/or special circumstances.

This inspection supplements the samples reported in Inspection Report 05000454/2008002; 05000455/2008002.

The inspectors compared the results achieved (including dose rate reductions and person-rem used) with the intended dose established in the licensee's ALARA planning

for these work activities. Reasons for inconsistencies between intended and actual work activity doses were reviewed.

This inspection supplements the sample reported in Inspection Report 05000454/2008003; 05000455/2008003.

The inspectors evaluated the interfaces between operations, radiation protection, maintenance, maintenance planning, scheduling, and engineering groups to identify interface problems or missing program elements.

This inspection constituted one optional sample as defined in IP 71121.02-5.

The inspectors compared the person-hour estimates, provided by maintenance planning and other groups to the radiation protection group, with the actual work activity time requirements in order to evaluate the accuracy of these time estimates.

This inspection constituted one optional sample as defined in IP 71121.02-5.

The licensee's post-job (work activity) reviews were evaluated to verify that identified problems were entered into the licensee's CAP.

This inspection constituted one optional sample as defined in IP 71121.02-5.

b. Findings

No findings of significance were identified.

2. Source-Term Reduction and Control

a. Inspection Scope

The inspectors reviewed licensee records to evaluate the historical trends and the current status of tracked plant source-terms. The inspectors determined if the licensee was making allowances and had developing contingency plans for expected changes in the source-term due to changes in plant fuel performance issues or changes in plant primary chemistry.

The inspectors verified that the licensee had developed an understanding of the plant source-term, including knowledge of input mechanisms to reduce the source-term. The inspectors evaluated if the licensee had a source-term control strategy in place that included a cobalt reduction strategy, shutdown controls, and operating chemistry plan, which was designed to minimize the source-term external to the core. Other methods used by the licensee to control the source-term including component and system decontamination and the use of shielding were also evaluated.

This inspection supplements the samples reported in Inspection Report 05000454/2008003; 05000455/2008003.

The inspectors reviewed the licensee's identification of specific sources of radiation, along with exposure reduction actions and the priorities the licensee had established for implementation of those actions. The results that had been achieved against these

priorities since the last refueling cycle were reviewed. For the current assessment period, source reduction evaluations were verified along with actions taken to reduce the overall source-term compared to the previous year.

This inspection constituted one optional sample as defined in IP 71121.02-5.

b. Findings

No findings of significance were identified.

3. Problem Identification and Resolutions

a. Inspection Scope

The inspectors verified that identified problems were entered into the CAP for resolution and that they had been properly characterized, prioritized, and resolved. The inspectors' review included dose significant post-job (work activity) reviews and post-outage ALARA report critiques of exposure performance.

This inspection constituted one optional sample as defined in IP 71121.02-5.

b. Findings

No findings of significance were identified.

4. **OTHER ACTIVITIES**

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

4OA1 Performance Indicator Verification (71151)

.1 Unplanned Scrams per 7000 Critical Hours

a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Scrams per 7000 Critical Hours PI for Byron Station Unit 1 and 2 for the period from the second quarter 2008 through the first quarter 2009. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, was used. The inspectors reviewed the licensee's operator narrative logs, issue reports, event reports and NRC Inspection Reports for the period of April 2008 through March 2009, 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 and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two unplanned scrams per 7000 critical hours samples as defined in IP 71151-05.

b. Findings

No findings of significance were identified.

.2 Unplanned Scrams with Complications

a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Scrams with Complications performance indicator for Byron Station Unit 1 and 2 for the period from the second quarter 2008 through the first quarter 2009. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, was used. The inspectors reviewed the licensee's operator narrative logs, issue reports, event reports and NRC Integrated Inspection Reports for the period of April 2008 through March 2009, 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 and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two unplanned scrams with complications samples as defined in IP 71151-05.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152)

.1 Routine Review of items Entered Into the Corrective Action Program

a. 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 occurrences 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 of significance were identified.

.2 Daily Corrective Action Program Reviews

a. 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 of significance were identified.

.3 Selected Issue Follow-Up Inspection: Pressure Testing of Line Stop Blind Flanges

a. Scope

The licensee identified a concern associated with the inability to pressurize portions of the essential service water system where line stop blind flanges had been installed during pressure tests required by the ASME Section XI Code. From January 5, 2009 through February 13, 2009, the inspectors performed a review of licensee corrective actions to resolve this issue as documented in IR 835607 and as documented in subsequent licensee correspondence with the ASME Section XI Code Committee.

The inspectors reviewed the licensee's corrective actions for the issues identified to verify whether: (1) the problems were accurately identified; (2) the causes were adequately ascertained; (3) extent of condition and generic implications were appropriately addressed; (4) previous occurrences were considered; and (5) corrective actions proposed/implemented were appropriately focused to address the problems and were commensurate with the safety significance of the issues. Documents reviewed are listed in the Attachment to this report.

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

b. Findings

No findings of significance were identified.

.4 Selected Issue Follow-Up Inspection: Reactor Coolant Leak Inside Unit 1 Containment

c. Inspection Scope

During a review of items entered in the licensee's CAP, the inspectors observed that the licensee was following up on potential Reactor Coolant System (RCS) leak inside Unit 1 containment. The inspectors selected this issue for a follow-up inspection on problem identification and resolution. Documents reviewed are listed in the Attachment to this report.

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

d. Findings and Observations

In January 2009, the licensee identified a gradual increase in the airborne tritium levels inside the Unit 1 containment. Increasing levels of tritium can indicate an RCS leak into containment atmosphere. Since there was no leakage into the sump and the slow increase in tritium levels, the licensee determined the leak was very small and was possibly a small steam or body to bonnet leak. This was based on previous steam leaks and repairs performed on leaking valves.

The licensee completed a walk down of all areas outside the missile barrier inside containment, and inspected the area inside the missile barrier with a remotely operated crawler. One active leak was found inside missile barrier on the Unit 1 Train A Reactor Coolant Loop Drain Valve, 1RC8037A. On February 21, 2009, the licensee made a containment entry to isolate the leaking valve and verify that the leak was body to bonnet. The licensee plans to repair the valve in the fall refueling outage.

This leak was discovered from corrective actions associated with a different leak that was found in October 2002. As part of their corrective actions the licensee implemented a trending requirement for atmospheric tritium levels in containment. A change in this trending data was used by the licensee to identify any potential RCS leaks. The trending did lead to the identification of the leak; however, the data was only compared during a period of a month and the small leak had caused tritium levels to change only slowly. When compared over a longer base line, it was determined that the leak first started in April 2008 and was not identified until February 21, 2009. The leak was calculated to be 0.007 gpm. The licensee added this issue to the CAP to create a trend over the entire operating cycle. (IR 864942)

No finding of significance was identified.

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

4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153)

- .1 (Closed) Licensee Event Report (LER) 05000454/455-2008-002-00; Technical Specification Non-Compliance Due to Inadequate Design of Auxiliary Feedwater (AF) Tunnel Access Covers Causing AF Valves within the Tunnel to be Inoperable.

This event, with a date of discovery of December 16, 2008, was identified by the licensee as part of the extent of condition review of an NRC identified finding documented in Inspection Report 05000454/2007004; 05000455-2007004 as Non-Cited Violation Number 4. This item was entered into the licensee's corrective action system as IR 606111. The LER was reviewed and determined to be completed in accordance with NRC regulations, with no new information provided, therefore, this LER is closed. Documents reviewed as part of this inspection are listed in the attachment.

This event follow-up review constituted one sample as defined in Inspection Procedure 71153-05.

4OA5 Other Activities

- .1 (Open) VIO¹ (05000454/2008003-07; 05000455/2008003-07); Design Basis Re-Analysis of the Ultimate Heat Sink

As documented in Inspection Reports 05000454/2008008; 05000455/2008008 and 05000454/2008003; 05000455/2008003, the inspectors identified the licensee did not consider spurious failure/opening of the 4160 Vac or 480 Vac as a valid single failure in Amendment No. 95. The inspectors further noted that the licensee did not evaluate the potential for a passive failure of the electrical breakers even though passive failures were required to be evaluated under 10 CFR Part 50, Appendix A. After further review, the inspectors determined that the provisions of 10 CFR 50.109 (a)(4), were applicable and that a modification is necessary to bring a facility into compliance with the rules or orders of the Commission. The licensee was requested to respond with a description of the intended actions to address the noncompliance including a proposed schedule to complete those actions. In a letter dated June 4, 2008, from Mr. D. Hoots (ML081560649), the licensee stated that a design basis re-analysis of the ultimate heat sink would be completed by December 5, 2008.

On November 3, 2008, the licensee determined that the 10 CFR 50.59 evaluation of the re-analysis results concluded that a TS revision would be necessary. Consequently, a License Amendment Request (LAR) is necessary prior to revising the ultimate heat sink design basis.

In letter dated March 5, 2009, from Mr. D. Enright (ML090680514), the licensee stated that submittal of the LAR will be targeted by the end of the second quarter 2009.

Resolution of this non-compliance will continue to be tracked via the licensee's corrective action program. This issue is considered open pending the licensee's submittal of the LAR.

¹ Note: In Inspection Report 05000454/2008003-07; 05000455/2008003-07, the item was identified as "OTHER." In accordance with IMC 0612, the classification was revised to VIO.

.2 (Closed) NRC Order EA-03-009; Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors

On February 11, 2003, the NRC issued Order EA-03-009 that imposes specific interim inspection requirements of the reactor pressure vessel head and associated penetration nozzles at pressurized water reactors. On February 22, 2004, the Order was revised to address revisions to bare metal visual inspections, penetration nozzle inspection coverage, flexibility in combination of non-destructive examination methods, flaw evaluation, and requirements for plants which have replaced their RPV head. The requirements of the Order were expected to remain in effect pending long-term resolution of RPV head penetration inspection requirements.

10 CFR 50.55a(g)(6)(ii)(D), Reactor Vessel Head Inspections, was revised on September 10, 2008 (published in Federal Register 52734) with an implementation date no later than December 31, 2008. The Order was deemed to be withdrawn when the regulation was implemented. Therefore this Order is closed.

.3 Quarterly Resident Inspector Observations of Security Personnel and Activities

a. Inspection Scope

During the inspection period, the inspectors conducted observations of security force personnel and activities to ensure that the activities were consistent with licensee security procedures and regulatory requirements relating to nuclear plant security. These observations took place during both normal and off-normal plant working hours and included:

- multiple tours of operations within the central and secondary security alarm stations;
- owner controlled area and protected area access control posts;
- other security officer posts including the ready room and compensatory posts; and
- security equipment log review.

The inspectors also reviewed a report of the results of a survey of the site security organization relative to its safety conscious work environment. The inspectors considered whether the surveys were conducted in a manner that encouraged candid and honest feedback. The results were reviewed to determine whether adequate number of staff responded to the survey. The inspectors also reviewed Exelon's self-assessment of the survey results and verified that any issues or areas for improvement were entered into the CAP for resolution.

These quarterly resident inspector observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status review and inspection activities.

b. Findings

No findings of significance were identified.

4OA6 Management Meetings

.1 Exit Meeting Summary

On April 10, 2009, the inspectors presented the inspection results to D. Enright, 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:

- Occupational radiation safety program for Access to Radiologically Significant Areas and ALARA Planning and Controls with Mr. B. Adams and other members of the licensee's staff on January 30, 2009

The inspectors confirmed that none of the potential report input discussed was considered proprietary.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

D. Enright, Site Vice President
S. Greenlee, Engineering Director
B. Askren, Security Director
C. Gayheart, Operations Director
B. Spahr, Maintenance Director
B. Youman, Work Management Director
L. Bogue, Training Manager
A. Daniels, Nuclear Oversight Manager
D. Gudger, Regulatory Assurance Manager
D. Thompson, Radiation Protection Manager

Nuclear Regulatory Commission

R. Skokowski, Branch Chief

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

05000454/2009002-01 05000455/2009002-01	NCV	Failure to Perform an Adequate Risk Assessment that Accounted for All Risk Significant Structures, Systems and Components that were Unavailable Prior to Maintenance Activities.
05000454/2009002-02	NCV	Failure to Adhere to Scaffold Procedures
05000454/2008002-00 05000455/2008002-00	LER	Technical Specification Non-Compliance Due to Inadequate Design of Auxiliary Feedwater (AF) Tunnel Access Covers Causing AF Valves Within the Tunnel to be Inoperable

Closed

05000454/2009002-01 05000455/2009002-01	NCV	Failure to Perform an Adequate Risk Assessment that Accounted for All Risk Significant Structures, Systems and Components that were Unavailable Prior to Maintenance Activities.
05000454/2009002-02	NCV	Failure to Adhere to Scaffold Procedures
05000454/2008-002-00 05000455/2008-002-00	LER	Technical Specification Non-Compliance Due to Inadequate Design of Auxiliary Feedwater (AF) Tunnel Access Covers Causing AF Valves Within the Tunnel to be Inoperable
EA-03-009	ORD	Establishing Interim Inspection Requirements for Reactor Pressure Vessel Trends at Pressurized Water Reactors

Discussed

05000454/2008003-07; 05000455/2008003-07	VIO	Design Basis Re-Analysis of the Ultimate Heat Sink
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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 or portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

Section 1R01: Adverse Weather Protection

Corrective Action Documents as a Result of NRC Inspection

- IR 891075; NRC Identified Potential Missile Hazards Pending High Winds

Section 1R04: Equipment Alignment (Quarterly)

- Diagram of Auxiliary Feedwater M-37, August 06, 1998
- BOP AF-M1A; Auxiliary Feedwater System Train A Valve Lineup, Revision 5
- BOP AP-82; Isolating Unit 1 System Auxiliary Transformer 142-2 While Unit is at Power, Revision 9
- Diagram of Essential Service Water, Sheet Numbers 1A, 2A, 3, and 4

Section 1R04S: Equipment Alignment (Semi-Annual)

- Drawing No. 6E.1—4030 DC10; Schematic Diagram 125V DC ESF Dist Center Bus 112 PT3 IDC06E DIST PNL 114 IDC06EB, Revision K
- Sheet Number 6E-1-4001A; Station One Line Diagram, Revision 0
- Sheet Number 6E-1-4030DC05; Schematic Diagram 125 VDC ESF Dist Center BUS 111 Part 1, 1DC05E, Revision U
- IR 876195; Non-Conformance: Installed MCCB Shunt Trip Not Per Design, February 04, 2009

Corrective Action Documents as a Result of NRC Inspection

- IR 88745; Procedure Revision Needed, March 05, 2009

Section 1R05: Fire Protection (Quarterly)

- Pre-Fire Plan; Auxiliary Building Elevation 426'-0", Zone 5.2-1, January 31, 2007
- Pre-Fire Plan; Auxiliary Building elevation 346'-0", Zone 11.2-0 South, January 31, 2007
- Pre-Fire Plan; Auxiliary Building Elevation 346'-0", Zone 11.2-0 North, January 31, 2007
- Pre-Fire Plan; Auxiliary Building Elevation 426'-0", Zone 5.1-2, January 31, 2007
- Pre-Fire Plan; Auxiliary Building Elevation 426'-0", Zone 11.6-0 North, January 31, 2007
- Pre-Fire Plan; Auxiliary Building Elevation 426'-0", Zone 11.6-0 South, January 31, 2007
- Pre-Fire Plan; Auxiliary Building Elevation 426'-0", Zone 11.6-0 West, February 11, 2008
- WO 1198122-01; Monthly Fire Extinguisher Inspection – Auxiliary and Fuel Handling Buildings, January 15, 2009
- IR 879451; ISI Viking Airswitch Regulator Stuck During Fire Drill, February 11, 2009

Section 1R07: Heat Sink Performance

- WO 1022241 01; Heat Exchanger Inspection 2CV03SB, 2B CV Centrifugal Charge Pump Lube Oil Cooler, March 05, 2009
- WO 1022242 01; Heat Exchanger Inspection 2CV02SB, 2B CV Centrifugal Charge Pump Gear Cooler, March 05, 2009

Section 1R11: Licensed Operator Requalification Program

Cycle 09-02, Out of the Box Scenario, Revision 0

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

- Risk Configurations; Week of January 12, 2009
- Major Activities for Week January 12, 2009
- WC-BY-101; On-Line Work Control Process, Revision 1
- OP-AA-108-111-1001; Severe Weather and Natural Disaster Guidelines, Revision 3
- Configuration Risk Management Assessment BY-CRM-007, 1(2)SX001A(B) Unable to Close; Revision 0
- Unit 1/2 Operation Standing Order 09-15, Configuration Risk Management Assessment - 1(2)SX001A(B) Unable to Close; dated March 5, 2009
- IR 802242, PRA Model Rev 6C – Change Management/Rollout Plan Development; July 31, 2008
- IR 882414, Issues with 1SX001A Stroking Closed; February 19, 2009
- IR 882566, Aux Bldg Flooding with 1SX001A Unable to Close; February 19, 2009
- IR 888076, NOS ID Paragon Not Updated for PRA Rev 6X; March 3, 2009
- IR 888184, Risk Evaluation for 3/2/09 Work Week; March 4, 2009
- IR 896841, Paragon Implementation Delays, March 24, 2009
- Protected Equipment Logs; dated March 1, 2009 and March 2, 2009
- Unit 1 & Unit 2 Risk Configuration for Week of 02/23/09; Rev. 0
- Unit 1 & Unit 2 Risk Configuration for Week of 03/02/09; Rev. 2
- Procedure ER-AA-600-1015, FPIE PRA Model Update; Revision 9
- Procedure ER-AA-600-1016, Oram-Sentinel and Paragon Tool Update; Revision 5

Corrective Action Documents as a Result of NRC Inspection

- IR 889131; Supplemental Risk Assessment for SX001 Valves, March 05, 2009
- IR 888072; NRC Identified Issues in Auxiliary Building; March 03, 2009

Section 1R15: Operability Evaluations

- 1BOSR 5.5.8.AF.5-2a; Group A Inservice Testing (IST) Requirements for Diesel Driven Auxiliary Feedwater Pump 1AF01PB, Revision 0
- 1BOSR 5.5.8.AF.5-2C; Unit 1 Comprehensive Inservice testing (IST) Requirements for the Diesel Driven Auxiliary Feedwater Pump 1AF01PB, Revision 0
- Drawing 6E-1-4031CS03; Loop Schematic Diagram Containment Pressure Protection SET III, Revision F
- NES-MS-04.1; Seismic Prequalified Scaffolds, Revision 5
- MA-AA-716-230-1002; Vibration Analysis/Acceptance Guideline, Revision 1
- MA-AA-716-025; Permanent Scaffold Request Form, Revision 0, February 09, 2004
- MA-AA-716-025; Revision 7

- IR 768979; 1B AF Diesel Gear Box and Right Angle Gear Drive Vibrations High, April 28, 2008
- IR 783744; IST Trending Observation for 1SX04P Vibration, May 27, 2008
- IR 879986; 1SX04P Elevated Vibrations-Coupling Inspect Replace Alignment, February 11, 2009
- IR 8800474; 1BOSR 5.5.8.AF.5-2A Needs to be Revised, December 11, 2008
- IR 891900; 1B AF Diesel Gear Box High Vibration Current Status, March 11, 2009
- IR 895172; Procedure Issues Identified During 1B AF Pump Full Flow Test, March 19, 2009
- IR 895937; 1B AFW Pump Work Window Post Job Critique, March 22, 2009
- WO 1001347 01; 1AF01PB Comprehensive IST Requirements for the Diesel Driven AF Pump, April 09, 2008

Corrective Action Documents as a Result of NRC Inspection

- IR 882727; Scaffolding Connecting Auxiliary Building and Fuel Handling Building, February 18, 2009
- IR 884723; Scaffolding Questions, February 24, 2009
- IR 882350; NRC Plant Walkdown issues, February 18, 2009
- IR 891587; NRC & IEMA Identified Issues in Unit 1 AF Tunnel, March 11, 2009
- IR 891643; 1AF07023X Corrosion on Rear Bracket Attachment, March 11, 2009

Section 1R19: Post Maintenance Testing

- 2BOSR Z.7.a.1; Unit 2 Auxiliary Feedwater Diesel Engine Starting Sequence and Overspeed Trip Test, Revision 2
- 1BOSR 5.5.8.AF.5-2a; Group A Inservice Testing (IST) Requirements for Diesel Driven Auxiliary Feedwater Pump 1AF01PB, Revision 0
- 1BOSR 5.5.8.AF.5-2c; Unit 1 Comprehensive Inservice Testing (IST) Requirements for the Diesel Driven Auxiliary Feedwater Pump 1AF01PB, Revision 0
- BOP AF-7; Diesel Driven Auxiliary Feedwater Pump B Startup on Recirc, Revision 34
- BOP AF-8; Diesel Driven Auxiliary Feedwater Pump B Shutdown, Revision 21
- 2B CV Pump; 41 hours of 7 Day AOT
- WO 1060717 03; OPS PMT – 4KV Breaker Swap, March 06, 2009
- WO 1165301; Operations Post Maintenance Test – Full Flow Test 1BOSR 5.5.8.AF.5-2C, March 18, 2009
- WO 1165301; Operations Post Maintenance Test – Full Flow Test 1BOSR 5.5.8.AF.5-2C, March 19, 2009
- WO 1216544; Re-Perform Coupling PM (2) Per BMP 3229-1 Section, February 25, 2009
- WO 125840 02; OPS PMT – Verify Proper Pump Motor Oil Level
- WO 732412 02; PMT Vis For Leakage with Pump Running, March 06, 2009
- WO 746723 02; OPS PMT – Verify No Oil Leakage on the Oil Supply Piping, March 06, 2009
- WO 919195 05; OPS PMT – Verify Fan Operates Normally During Pump Run, March 06, 2009
- Report Number 2009-072; Ultrasonic Water Solid/Sedimentation Examination – 2CV05CB-6"/2CV42AB-2"/2CV08BA-4", March 10, 2009

Section 1R22: Surveillance Testing

- WO 1189335; 2SX01PA, Comprehensive IST Requirements for Essential Service Water Pump, January 21, 2009
- WO 1199248; 2BOSR 0.5-2.SX.1-2, Manual Stroke Test of 2SX150B, March 31, 2009
- 1BOSR 1.b.2-1; Unit 1 Boric Acid Storage System Alignment Monthly Surveillance, Revision 2
- 1BOSR 3.1.2-1; Unit 1 Calorimetric Calculation Daily Surveillance, Revision 16

- 1BOSR 8.1.14-2; 1B DG 24 Hour endurance Run and Hot Restart Test 18 Month, Revision 11
- 1BOSR 5.5.8.AF.5-2C; Unit 1 Comprehensive Inservice Testing Requirements for the Diesel Driven Auxiliary Feedwater Pump 1AF01PB
- 2BVSR 5.5.8.SX.5-1c; Unit 2 Comprehensive IST Requirements for the Essential Service Water (SX) Pump 2SX01PA and Unit 2 SX Pumps Discharge Check Valves, Revision 0
- 1BOSR 5.5.8.AF.5-2c; Unit 1 Comprehensive In-service Testing (IST) Requirements for the Diesel Driven Auxiliary Feedwater Pump 1AF01PB, Revision 0
- 1BGP 100-3; Power Ascension, Revision 68
- 1BGP 100-4; Power Descension, Revision 36
- BOP AF-7; Diesel Driven Auxiliary Feedwater Pump B Startup on Recirc, Revision 34
- BOP AF-8; Diesel Driven Auxiliary Feedwater Pump B Shutdown, Revision 21

Section 71121.01 Access Control to Radiologically Significant Areas

- RP-AA-210; Dosimetry Issue, Usage, and Control; Revision 15
- RP-BY-500-1003; Radiological Controls for Handling Items and Hanging Activated Parts in the Spent Fuel Pool; Revision 1
- RP-AA-220; Bioassay Program; Revision 7
- RP-AA-220 Attachment 3; Annual Bioassay Program Review; November 25, 2008
- IR 759829; Improvement Opportunity for RP Key Control; April 6, 2008
- IR 817242; Attention to Detail – HRA Key Log; October 12, 2008
- IR 806079; NOS Identified Errors on RP-AA-460 HRA/LHRA Key Log; December 1, 2008
- IR 830208; Loss of T-6 High Rad Area Key (Key Number 75); November 12, 2008
- IR 834210; Lost T-6 Key in Laundry; November 21, 2008

Section 71121.02 ALARA Planning and Controls

- B2R14 Refueling Outage Report; Fall 2008; date not provided
- Byron Generating Station; 2008–2012 Five Year Exposure Reduction Plan; date not provided
- Check-In Self-Assessment; Source-Term Reduction; December 12, 2008
- Check-In Self-Assessment; RP Hot Spots Program; May 14, 2008
- RP-AA-270; Prenatal Radiation Exposure; Revision 4
- Radiation Work Permit (RWP) and Associated ALARA Evaluations; RWP 8944; Steam Generator Radiation Protection Activities and Support
- RWP and Associated ALARA Evaluations; RWP 8945; Steam Generator Equipment Staging in All RCAs
- RWP and Associated ALARA Evaluations; RWP 8946; Steam Generator Platform and Bullpen Set-up/Tear Down and Decon Activities
- RWP and Associated ALARA Evaluations; RWP 8947; Steam Generator Manway 7 Diaphragm Removal and Reinstallation
- RWP and Associated ALARA Evaluations; RWP 8948/9831; Steam Generator Nozzle Cover Removal and Reinstallation
- RWP and Associated ALARA Evaluations; RWP 8949; Steam Generator Eddy Current Testing and All Tube Repairs

Section 40A2: Identification and Resolution of Problems

- IR 835607; Question Regarding Line Stop Blind Flange Testing; October 24, 2008.
- IR 863635; Elevated Tritium Levels in Unit 1 Containment, January 07, 2009
- IR 864942; Missed Opportunity – H3 Trend Reviews, January 06, 2009
- IR 867387; Active Leak Appears to be Body to Bonnet, January 15, 2009

- IR 873305; 1BOA TG-1 Entered Due to High Vibration #8 Bearing, January 28, 2009
- TD Williamson Drawing No. 26-2181-4836-CD; F/F Flange 36" - 150 LB Cam with Nipple, Revision C.
- TD Williamson Drawing No. 06-6998-0036; Cam Flange 36" - 150 LB; Revision 0.
- Babcock and Wilcox Drawing No.7720309; Primary Manway Diaphragm; Revision 2.
- Letter to R. Crane (Section XI Code Committee) from Hein Do (Exelon); ASME BPVC Section XI, IWA-4000, IWA-7000, IWA-5000, 1989 Edition through the 2008 Addenda; January 29, 2009.
- Letter from R. Crane (Section XI Code Committee) to Hein Do (Exelon); ASME BPVC Section XI, IWA-4000, IWA-5000 and IWA-7000, 1989 Edition Through 2007 Edition with the 2008 Addenda; February 10, 2009.

Corrective Action Documents as a Result of NRC Inspection

- IR 885741; Open Door and Gate Issue at River Screenhouse, February 26, 2009
- IR 885782; Lessons Learned with Verbal Communications with NRC, February 6, 2009
- IR 894116; Defective Door, March 17, 2009
- IR 894776; Operations Log Error, March 19, 2009
- IR 867171; CAP Issue with B2R14 Containment Closeout, January 15, 2009
- IR 88578; Incorrect Information on IR 883117, February 25, 2009

LIST OF ACRONYMS USED

AC	Alternating Current
ADAMS	Agency Wide Document Access Management System
ALARA	As-Low-As-Is-Reasonably-Achievable
ASME	American Society of Mechanical Engineers
CAP	Corrective Action Program
CFR	Code of Federal Regulations
ICDF	Incremental Core Damage Frequency
ICDP	Incremental Core Damage Probability
ICDPD	Incremental Core Damage Probability Deficit
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
IR	Issue Report
LAR	License Amendment Request
LER	Licensee Event Report
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
PI	Performance Indicator
PRA	Probability Risk Assessment
RCS	Reactor Coolant System
RMA	Risk Management Action
SDP	Significance Determination Process
SSC	Systems, Structures, and Components
SX	Essential Service Water
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
WO	Work Order