UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
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LISLE, IL 60532-4352

July 29, 2011

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

SUBJECT: CLINTON POWER STATION, NRC INTEGRATED INSPECTION REPORT 05000461/2011-003

Dear Mr. Pacilio:

On June 30, 2011, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Clinton Power Station. The enclosed report documents the inspection results, which were discussed on July 13, 2011, with Mr. W. Noll and other members of your staff.

This 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. Both of these findings were determined to involve violations of NRC requirements. Additionally, one licensee-identified violation, which was determined to be of very low safety significance, was reviewed by the inspectors and is listed in this report.

Because of the very low safety significance and because they were entered into your corrective action program, the NRC is treating the above inspector-identified and licensee-identified violations as non-cited violations (NCVs) consistent with Section VI.A.1 of the NRC Enforcement Policy. If you contest any NCV, 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 copies to the Regional Administrator, Region III; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Clinton Power Station. In addition, if you disagree with the cross-cutting aspect assigned to any finding in this report 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 Clinton Power Station. The information you provide will be considered in accordance with Inspection Manual Chapter 0305.

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

Sincerely,

/RA/

Mark A. Ring, Chief
Branch 1
Division of Reactor Projects

Docket No. 50-461
License No. NPF-62

Enclosure: Inspection Report 05000461/2011-003
w/Attachment: Supplemental Information

cc w/encl: Distribution via ListServ

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No:	50-461
License No:	NPF-62
Report No:	05000461/2011-003
Licensee:	Exelon Generation Company, LLC
Facility:	Clinton Power Station, Unit 1
Location:	Clinton, IL
Dates:	April 1 through June 30, 2011
Inspectors:	B. Kemker, Senior Resident Inspector D. Lords, Resident Inspector C. Brown, Reactor Inspector J. Cassidy, Senior Health Physicist A. Dunlop, Senior Reactor Engineer M. Jones Jr., Reactor Inspector R. Winter, Reactor Inspector S. Mischke, Resident Inspector, Illinois Emergency Management Agency
Approved by:	M. Ring, Chief Branch 1 Division of Reactor Projects

Enclosure

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SUMMARY OF FINDINGS

IR 05000461/2011-003, 04/01/11 – 06/30/11, Clinton Power Station, Unit 1, Heat Sink Performance, Surveillance Testing.

This report covers a three-month period of inspection by the resident inspectors and announced baseline inspections by regional inspectors. Two Green findings, both of which had an associated non-cited violation, were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealed Findings

Cornerstone: Mitigating Systems

- Green. The inspectors identified a non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," having very low safety significance for the failure to include all of the applicable heat loads in the Reactor Core Isolation Cooling (RCIC) Room heat up calculation and not having a calculation of record for the RCIC Room heat up under a station blackout (SBO) scenario. The licensee entered this issue into the corrective action program and performed preliminary calculations to verify that the issues did not exceed any design limits.

  The performance deficiency was determined to be more than minor because it was associated with the Mitigating Systems Cornerstone attribute of Equipment Performance, and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The finding screened as very low safety significance because the licensee determined the RCIC Room cooler was capable of removing the additional heat load; and RCIC Room temperature remained within the design limits without the room cooler during a SBO scenario. The inspectors determined that this finding did not represent current licensee performance and no cross-cutting aspect was assigned. (Section 1R07.1.b.(1))

Cornerstone: Initiating Events

- Green. The inspectors identified a finding of very low safety significance (Green) with an associated non-cited violation of Technical Specification Surveillance Requirement (TSSR) 3.4.6.1. The licensee failed to correctly incorporate the required test pressure limits of the TSSR into the surveillance test procedure and subsequently tested multiple reactor coolant system (RCS) pressure isolation valves (PIVs) at pressures greater than the maximum test pressure of 1025 pounds per square inch gauge, invalidating the testing. The licensee performed a risk assessment of the missed surveillance in accordance with TSSR 3.0.3, which determined that completion of the surveillance could be delayed up to the 24-month surveillance interval without a significant increase in plant risk. The licensee also completed an operability evaluation for the TS nonconformance and concluded that there was reasonable assurance that the affected RCS PIVs were operable based on engineering judgment.

The finding was of more than minor significance because it affected the Initiating Events Cornerstone and was associated with the Procedure Quality attribute. Specifically, the licensee did not correctly incorporate the required test pressure limits of TSSR 3.4.6.1 into the surveillance test procedure. This resulted in testing multiple RCS PIVs at pressures greater than the maximum test pressure of 1025 psig. The finding was determined to be a licensee performance deficiency of very low safety significance because the finding would not result in exceeding the TS limit for RCS leakage and would not have likely affected mitigation systems resulting in a loss of safety function. The inspectors concluded that because the licensee's missed opportunity to correct the test pressure discrepancy in its surveillance test procedure occurred in January 2005 and no other more recent opportunities reasonably existed to identify and correct the problem, this issue would not be reflective of current licensee performance and no cross-cutting aspect was identified. (Section 1R22.b.(1))

B. Licensee-Identified Violations

A 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 corrective action program. The violation and corrective action tracking numbers are listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

The unit was operated at or near full power during the inspection period with the following exceptions:

On April 2, 2011, the licensee reduced power to about 48 percent (%) to perform repairs on a main condenser tube leak. The unit was returned to full power the following day.

On April 8, 2011, the licensee reduced power to about 82% to perform control rod pattern adjustments. The unit was returned to full power the same day.

On May 22, 2011, the licensee reduced power to about 80% to perform control rod sequence exchange, scram time testing and recovery of two control rods following hydraulic control unit maintenance, control rod settle testing, and main turbine control/stop/intermediate valve and main steam isolation valve testing. The unit was returned to full power the same day.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

.1 Readiness For Impending Hot Summer Weather Conditions

a. Inspection Scope

The inspectors evaluated the licensee's preparations for hot summer weather conditions, focusing on the electrical distribution system and the plant chilled water system. During the weeks of May 23, 2011, and June 20, 2011, the inspectors performed a detailed review of severe weather and plant de-winterization procedures and performed general area plant walkdowns. The inspectors focused on plant-specific design features and implementation of procedures for responding to or mitigating the effects of hot summer weather conditions on the operation of the plant. The inspectors reviewed system health reports and system engineering summer readiness review documents for the above systems.

Additionally, the inspectors verified that adverse weather related issues were entered into the licensee's corrective action program with the appropriate characterization and significance. Selected action requests were reviewed to verify that corrective actions were appropriate and implemented as scheduled.

This inspection constituted one seasonal extreme weather readiness inspection sample as defined in Inspection Procedure (IP) 71111.01.

b. Findings

No findings were identified.

.2 Summer Readiness of Offsite and Alternate Alternating Current (AC) Power Systems

a. Inspection Scope

The inspectors evaluated the licensee's plant features and procedures for operation and continued availability of offsite and alternate AC power systems. The inspectors interviewed plant personnel and reviewed the licensee's communications protocols between the Transmission System Operator (TSO) and the plant to verify that the appropriate information was being exchanged when issues arose that could impact the offsite power system. Aspects considered in the inspectors' review included:

- The actions to be taken when notified by the TSO that the post-trip voltage of the offsite power system at the plant will not be acceptable to assure the continued operation of the safety related loads without transferring to the onsite power supply;
- The compensatory actions identified to be performed if it is not possible to predict the post-trip voltage at the plant for the current grid conditions;
- The required re-assessment of plant risk based on maintenance activities that could affect grid reliability, or the ability of the transmission system to provide offsite power; and
- The required communications between the plant and the TSO when changes at the plant could impact the transmission system, or when the capability of the transmission system to provide adequate offsite power is challenged.

The inspectors performed a walkdown of the switchyard with a plant maintenance engineer to observe the material condition of the offsite power sources. The inspectors also reviewed the status of outstanding work orders to assess whether corrective actions for any degraded conditions were scheduled with the TSO with the appropriate priority.

This inspection constituted one offsite and alternate AC power systems readiness inspection sample as defined in IP 71111.01.

b. Findings

No findings were identified.

.3 Readiness For Impending Adverse Weather Condition – Tornado/High Winds

a. Inspection Scope

Since thunderstorms with potential tornados and high winds were forecast in the vicinity of the facility for the week of April 18, 2011, the inspectors reviewed the licensee's overall preparations/protection for the expected conditions. The inspectors toured the plant grounds in the vicinity of the main power transformers, unit auxiliary transformer, reserve auxiliary transformers, emergency reserve auxiliary transformer, and static volt amp reactive compensators to look for loose debris, which if present could become missiles during a tornado or with high winds. During the inspections, the inspectors focused on plant-specific design features and the licensee's procedure used to respond to tornado and high winds conditions.

This inspection constituted one readiness for impending adverse weather condition inspection sample as defined in IP 71111.01.

b. Findings

No findings were identified.

.4 Readiness to Cope with External Flooding

a. Inspection Scope

The inspectors reviewed flood protection barriers and procedures for coping with external flooding at the plant. The Clinton Power Station has limited susceptibility to external flooding as described in Section 3.4.1.1 of the Updated Final Safety Analysis Report (UFSAR) and Section 5.2 of the Individual Plant Examination for External Events Report. The inspectors reviewed CPS 4303.02, "Abnormal Lake Level," Revision 10, to assess the adequacy of the licensee response to external flooding conditions.

The inspectors conducted a walkdown of the Lake Screen House, including the shutdown service water pump rooms. The inspectors assessed the condition of water tight door seals; the sealing of equipment floor plugs, electrical conduits, holes or penetrations in floors and walls between the pump rooms; and the condition of room floor drains, sumps, and sump pumps.

Additionally, the inspectors verified that external flooding protection issues were entered into the licensee's corrective action program with the appropriate characterization and significance. Selected action requests were reviewed to verify that corrective actions were appropriate and implemented as scheduled.

This inspection constituted one external flooding readiness inspection sample as defined in IP 71111.01.

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04)

.1 Quarterly Partial System Walkdowns (71111.04Q)

a. Inspection Scope

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

- Standby Gas Treatment (VG) System Train B during planned maintenance on VG System Train A;
- Control Room Ventilation (VC) System Train B during planned maintenance on VC System Train A; and
- AC Power Distribution System (selected portions of risk-significant system).

The inspectors selected these systems based on their risk significance relative to the Reactor Safety Cornerstones. The inspectors reviewed operating procedures, system diagrams, Technical Specification (TS) requirements, and the impact of ongoing work activities on redundant trains of equipment. The inspectors verified that conditions did not exist 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 were aligned correctly and available as necessary.

In addition, the inspectors verified that equipment alignment problems were entered into the licensee's corrective action program with the appropriate characterization and significance. Selected action requests were reviewed to verify that corrective actions were appropriate and implemented as scheduled.

This inspection constituted three partial system walkdown inspection samples as defined in IP 71111.04.

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05)

.1 Routine Resident Inspector Tours (71111.05Q)

a. Inspection Scope

The inspectors performed fire protection tours in the following plant areas:

- Fire Zone A-1e, General Access Area (West) – Elevation 737'0";
- Fire Zone R-1j, Dry Active Waste Baler Room - Elevation 737'0";
- Fire Zone R-1n, Paint and Oil Storage Room - Elevation 737'0"; and
- Fire Zone T-1k, General Access Area (West) - Elevation 781'0".

The inspectors verified that transient combustibles and ignition sources were appropriately controlled and assessed the material condition of fire suppression systems, manual fire fighting equipment, smoke detection systems, fire barriers and emergency lighting units. 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; that the licensee's fire plan was in alignment with actual conditions; and that fire doors, dampers, and penetration seals appeared to be in satisfactory condition.

In addition, the inspectors verified that fire protection related problems were entered into the licensee's corrective action program with the appropriate characterization and significance. Selected action requests were reviewed to verify that corrective actions were appropriate and implemented as scheduled.

This inspection constituted four quarterly fire protection inspection samples as defined in IP 71111.05AQ.

b. Findings

No findings were identified.

.2 Fire Protection – Drill Observation (71111.05A)

a. Inspection Scope

During an announced drill on May 26, 2011, associated with a simulated fire in the Condensate Booster Pump Room, the inspectors assessed the timeliness of the fire brigade in arriving at the scene, the fire fighting equipment brought to the scene, the donning of fire protective clothing, the effectiveness of communications, and the exercise of command and control by the fire brigade leader. The inspectors also assessed the acceptance criteria for the drill objectives; the rigor and thoroughness of the post-drill critique; and verified that fire protection drill issues were being entered into the licensee's corrective action program with the appropriate characterization and significance.

This inspection constituted one annual fire protection drill inspection sample as defined in IP 71111.05AQ.

b. Findings

No findings were identified.

1R06 Flooding Protection Measures (71111.06)

.1 Internal Flooding

a. Inspection Scope

The inspectors reviewed selected risk important plant design features and licensee procedures intended to protect the plant and its safety-related equipment from internal flooding events. The inspectors reviewed flood analyses and design documents, including the UFSAR, engineering calculations, and abnormal operating procedures to identify licensee commitments. In addition, the inspectors reviewed licensee drawings to identify areas and equipment that may be affected by internal flooding caused by the failure or misalignment of nearby sources of water, such as the fire suppression or the service water systems. The inspectors also reviewed the licensee's corrective action documents with respect to past flood-related items identified in the corrective action program to verify the adequacy of the corrective actions. The inspectors performed a walkdown of the following plant areas to assess the adequacy of watertight doors and verify drains and sumps were clear of debris and were operable, and that the licensee complied with its commitments:

- Shutdown Service Water Pump Rooms; and
- Turbine Building Basement – Elevation 702'0".

This inspection constituted one internal flooding inspection sample as defined in IP 71111.06.

b. Findings

No findings were identified.

1R07 Heat Sink Performance (71111.07)

.1 Annual Heat Sink Performance (71111.07A)

a. Inspection Scope

The inspectors reviewed the licensee's maintenance activities for the Division 2 Inverter Room cooler (1VX13SB). Specifically, the review included the program for testing and analysis of the room cooler, which was cleaned, inspected, and evaluated. The inspectors assessed the as-found and as-left condition of the heat exchanger by direct observation and document reviews to verify that no deficiencies existed that would adversely impact the heat exchanger's ability to transfer heat to the shutdown service water system and to ensure that the licensee was adequately addressing problems that could affect the performance of the heat exchanger. The inspectors observed portions of inspection and cleaning activities, and reviewed documentation to verify that the inspection acceptance criteria specified in procedure ER-AA-340-1002, "Service Water Heat Exchanger Inspection Guide," Revision 4, were satisfactorily met.

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

b. Findings

No findings were identified.

.2 Triennial Review of Heat Sink Performance (71111.07T)

a. Inspection Scope

The inspectors reviewed operability determinations, completed surveillances, vendor manual information, associated calculations, performance test results and cooler inspection results associated with the Reactor Core Isolation Cooling (RCIC) Room cooler and Control Room chillers. These heat exchangers/coolers were chosen based on their risk significance in the licensee's probabilistic safety analysis, their important safety-related mitigating system support functions, their operating history, and their relatively low margin.

For the RCIC Room cooler and the Control Room chillers, the inspectors reviewed the methods and results of heat exchanger performance inspections. The inspectors verified the methods used to inspect and clean heat exchangers were consistent with as-found conditions identified and expected degradation trends and industry standards, the licensee's inspection and cleaning activities had established acceptance criteria consistent with industry standards, and the as-found results were recorded, evaluated, and appropriately dispositioned such that the as-left condition was acceptable.

In addition, the inspectors verified the condition and operation of the RCIC Room cooler and the Control Room chillers were consistent with design assumptions in heat transfer calculations and as described in the UFSAR. This included verification that the number

of plugged tubes was within pre-established limits based on capacity and heat transfer assumptions. The inspectors verified the licensee evaluated the potential for water hammer and established adequate controls and operational limits to prevent heat exchanger degradation due to excessive flow-induced vibration during operation. In addition, eddy current test reports and visual inspection records were reviewed to determine the structural integrity of the heat exchanger.

The inspectors also witnessed the inspection of the RCIC Room cooler to look for indications of macrofouling that includes live or dead mussels and clams, plant material, or silt.

The inspectors verified the performance of the ultimate heat sink (UHS) and safety-related shutdown service water (SX) system and their subcomponents, such as piping, intake screens, pumps, valves, etc., by tests or other equivalent methods to ensure availability and accessibility to the in-plant cooling water systems. The inspectors reviewed completed surveillances, associated calculations, buried pipe inspection results, chemistry monitoring program, sedimentation monitoring procedures, condition reports, and work orders to ensure the condition of the UHS and the SX system.

The inspectors also verified pipe stress analyses, direct and indirect buried pipe inspection test results, pump vibration data, and trends associated with the SX system to ensure that acceptance criteria were being satisfied and the as-found inspection results were recorded, evaluated, and appropriately dispositioned, such that the as left condition was acceptable.

The inspectors also conducted walkdowns of the service water intake structure and the SX Pump Rooms to verify the general condition of the system and associated subsystems.

b. Findings

(1) Deficiencies with RCIC Room Heat Up Analyses

Introduction

A finding of very low safety significance and associated non-cited violation of 10 CFR 50, Appendix B, Criterion III, “Design Control,” was identified by the inspectors for the failure to include all of the applicable heat loads in the RCIC Room heat up calculation under loss-of-coolant-accident (LOCA) and not having a calculation of record for the RCIC room heat up under a station blackout (SBO) scenario.

Description

The inspectors reviewed calculation VY-01, “VY System Cooling Load Calculation,” to verify the RCIC Room cooler was capable of removing heat generated in the RCIC Room under various scenarios and that the room temperature would remain within the design limit of 180 degrees Fahrenheit (°F). The inspectors identified that the RCIC water leg pump was not listed as one of the room’s heat sources for several scenarios, including LOCA and shutdown conditions. Although the heat load associated with the pump’s motor was small, under LOCA conditions, the available calculated margin was only 4.6%.

In addition, the inspectors requested the analysis of the RCIC Room under an SBO scenario. The licensee determined that this analysis had been inadvertently deleted from calculation 3C10-1088-001, Revision 4, "SBO Coping Assessment." As such there was no calculation of record to address this scenario.

The licensee initiated action request (AR) 01206227 to address these concerns. Based on the 5 horsepower RCIC water leg pump motor, the licensee determined there was a 3% increase in heat load for the room, which reduced the available margin to approximately 1.7%. During the licensee's review, they also identified two conservatisms in the calculation where pipe temperatures were assumed to be higher than the temperatures that would be experienced during the scenario. Removal of these conservatisms could increase the available margin to approximately 10%. With respect to the SBO scenario, the licensee used the methodology in the calculation inputting conservative room heat up loads and verified that the room temperature would be 157°F, which was below the 180°F limit.

The inspectors concluded that, based on these evaluations, the RCIC Room temperature would remain within the required limits during the various scenarios.

Analysis

The inspectors determined that the failure to include all heat loads in the RCIC Room heat up calculations and to have a calculation of record for the RCIC Room heat up under an SBO scenario was a performance deficiency. The performance deficiency was determined to be more than minor because it was associated with the Mitigating Systems Cornerstone attribute of Equipment Performance, and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the RCIC Room heat up calculation did not include the RCIC water leg pump motor, which would have added an additional 3% heat load reducing the available margin to 1.7%. In addition, no calculation of record existed for the RCIC Room heat up under an SBO scenario to verify the room would remain within the design temperature limits.

The inspectors determined the finding could be evaluated using the Significance Determination Process (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 System Cornerstone. The finding screened as very low safety significance (Green) because the finding was not a design or qualification deficiency, did not represent a loss of system safety function, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. In addition, the licensee performed preliminary calculations to verify that the RCIC Room cooler was capable of removing the additional heat load; and the RCIC Room temperature remained within the design limits without the room cooler during a SBO scenario.

Cross-Cutting Aspects

The inspectors determined there was no cross-cutting aspect associated with this finding because this was a legacy design issue and, therefore, was not reflective of current performance.

Enforcement

10 CFR 50, Appendix B, Criterion III, "Design Control," requires, in part, that measures shall be established to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions.

Contrary to the above, as of April 22, 2011, the licensee did not correctly translate applicable regulatory requirements and the design basis into specifications and procedures. Specifically, the RCIC Room heat up calculation did not include the RCIC water leg pump motor heat load and there was no analysis for the RCIC Room heat up under an SBO scenario. Because this violation was of very low safety significance and it was entered into the licensee's corrective action program as AR 01206227, this violation is being treated as an non-cited violation consistent with Section 2.3.2 of the NRC Enforcement Policy **(NCV 05000461/2011003-01, Deficiencies with RCIC Room Heat Up Analyses)**.

1R11 Licensed Operator Requalification Program (71111.11)

.1 Resident Inspector Quarterly Review (71111.11Q)

a. Inspection Scope

The inspectors observed licensed operators during simulator training on June 22, 2011. The inspectors assessed the operators' response to the simulated events focusing on alarm response, command and control of crew activities, communication practices, procedural adherence, and implementation of Emergency Plan requirements. The inspectors also observed the post-training critique to assess the ability of licensee evaluators and operating crews to self-identify performance deficiencies. The crew's performance in these areas was compared to pre-established operator action expectations and successful critical task completion requirements.

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

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12)

a. Inspection Scope

The inspectors evaluated the licensee's handling of selected degraded performance issues involving the following risk-significant structures, systems, and components (SSCs):

- Radiation Monitoring System.

The inspectors assessed performance issues with respect to the reliability, availability, and condition monitoring of the SSCs. Specifically, the inspectors independently verified the licensee's handling of SSC performance or condition problems in terms of:

- Appropriate work practices;
- Identifying and addressing common cause failures;
- Scoping of SSCs in accordance with 10 CFR 50.65(b);
- Characterizing SSC reliability issues;
- Tracking SSC unavailability;
- Trending key parameters (condition monitoring);
- 10 CFR 50.65(a)(1) or (a)(2) classification and reclassification; and
- Appropriateness of performance criteria for SSC functions classified (a)(2) and/or appropriateness and adequacy of goals and corrective actions for SSC functions classified (a)(1).

In addition, the inspectors verified that problems associated with the effectiveness of plant maintenance were entered into the licensee's corrective action program with the appropriate characterization and significance. Selected action requests were reviewed to verify that corrective actions were appropriate and implemented as scheduled.

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

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors reviewed the licensee's evaluation and management of plant risk for 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:

- Planned maintenance during the week of April 11-15 on the Division 2 Diesel Generator (DG) and SX System;
- Planned maintenance during the week of May 2-6 on the RCIC System;
- Planned maintenance during the week of May 31-June 3 on the Division 1 Automatic Depressurization System, Division 1 VG System, Removal of Control Building Tornado Missile Barrier, and Division 1 Essential Switchgear Heat Removal System; and
- Emergent maintenance during week of June 13-17 to address steam leaks in the Turbine Building Heater Bay.

These activities were selected based on their potential risk significance relative to the Reactor Safety Cornerstones. As applicable for each of the above activities, the inspectors reviewed the scope of maintenance work in the plant's daily schedule, reviewed Control Room logs, verified that plant risk assessments were completed as required by 10 CFR 50.65(a)(4) prior to commencing maintenance activities, discussed the results of the assessment with the licensee's Probabilistic Risk Analyst and/or Shift Technical Advisor, and verified that plant conditions were consistent with the risk assessment assumptions. The inspectors also reviewed TS requirements and walked

down portions of redundant safety systems, when applicable, to verify that risk analysis assumptions were valid, that redundant safety related plant equipment necessary to minimize risk was available for use, and that applicable requirements were met.

In addition, the inspectors verified that maintenance risk related problems were entered into the licensee's corrective action program with the appropriate significance characterization. Selected action requests were reviewed to verify that corrective actions were appropriate and implemented as scheduled.

This inspection constituted four maintenance risk assessment inspection samples as defined in IP 71111.13.

b. Findings

No findings were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors reviewed the following issues:

- AR 01202456, "NRC Question on RCS [Reactor Coolant System] PIV [Pressure Isolation Valve] Surveillance Testing;"
- AR 01204102, "Category 'A' Failure of High Pressure Core Spray [HPCS] Instrument;"
- AR 01219600, "Vibration Levels Increased on 0VC04CB;"
- AR 01194749, "Division 1 DG Slow Start;" and
- AR 1208215, "1E21F303 Abnormal Flow/Indication During LPCS [Low Pressure Core Spray] Clearance Hang."

The inspectors selected these potential operability issues based on the risk significance of the associated components and systems. The inspectors verified that the conditions did not render the associated equipment inoperable or result in an unrecognized increase in plant risk. When applicable, the inspectors verified that the licensee appropriately applied TS limitations, appropriately returned the affected equipment to an operable status, and reviewed the licensee's evaluation of the issue with respect to the regulatory reporting requirements. 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 evaluation.

In addition, the inspectors verified that problems related to the operability of safety-related plant equipment were entered into the licensee's corrective action program with the appropriate characterization and significance. Selected action requests were reviewed to verify that corrective actions were appropriate and implemented as scheduled.

This inspection constituted five operability evaluation inspection samples as defined in IP 71111.15.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18)

.1 Temporary Modifications

a. Inspection Scope

The inspectors reviewed the following temporary plant modification:

- EC 381638, “Temporary Modification to Lift Input from A10 Device to A11 Device for the Division I Diesel Governor.”

The inspectors reviewed the temporary modification and the associated 10 CFR 50.59 screening/evaluation against applicable system design basis documents, including the UFSAR and the TS to verify whether applicable design basis requirements were satisfied. The inspectors reviewed the Control Room logs and interviewed engineering and operations department personnel to understand the impact that implementation of the temporary modification had on operability and availability of the affected plant SSCs.

This inspection constituted one temporary modification inspection sample as defined in IP 71111.18.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope

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

- Work Order 01175527 02, "Replace and Calibrate Capacity Controller 1TCVP013;"
- Work Order 01176252 01, "Test Bus 1A1 Main Feed Breaker Protective Relays;"
- Work Order 01405272-02, “0FP03P Outboard Bearing Elevated Temperature;”
- Work Order 01294892-01, “Replace the Division 2 Emergency Diesel Generator LOCA Bypass Relay 3KL4;”
- Work Order 01278032-02, “Operations PMT [Post-Maintenance Test] for 1E51F030;”
- Work Order 01283985-03, “Operations PMT for 0VC03CA;” and
- Work Order 01298883-01, “Reactor Core Isolation Cooling Valve Operability,” (1E51-F079 and F081 only).

The inspectors reviewed the scope of the work performed and evaluated the adequacy of the specified post-maintenance testing. The inspectors verified that the

post-maintenance testing was performed in accordance with approved procedures; that the procedures contained clear acceptance criteria, which demonstrated operational readiness and that the acceptance criteria was met; that appropriate test instrumentation was used; that the equipment was returned to its operational status following testing; and, that the test documentation was properly evaluated.

In addition, the inspectors verified that problems related to post-maintenance testing were entered into the licensee's corrective action program with the appropriate characterization and significance. Selected action requests were reviewed to verify that corrective actions were appropriate and implemented as scheduled.

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

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

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

- CPS 3822.06, "Operation of the Horizontal Fire Pump;" (Routine Test)
- CPS 9070.01, "Control Room HVAC [Heating, Ventilation and Air Conditioning] Air Filter Package Operability Test Run;" (Routine Test)
- CPS 9051.02, "HPCS Valve Operability Test;" (Inservice Test)
- CPS 9054.01, "RCIC System Operability Checks;" (Inservice Test) and
- CPS 9053.04, "RHR [Residual Heat Removal] A/B/C Valve Operability Checks." (Inservice Test)

The inspectors observed selected portions of the test activities to verify that the testing was accomplished in accordance with plant procedures. The inspectors reviewed the test methodology and documentation to verify that equipment performance was consistent with safety analysis and design basis assumptions, and that testing acceptance criteria were satisfied.

In addition, the inspectors verified that surveillance testing problems were entered into the licensee's corrective action program with the appropriate characterization and significance. Selected action requests were reviewed to verify that corrective actions were appropriate and implemented as scheduled.

This inspection constituted three in-service tests and two routine surveillance tests for a total of five inspection samples as defined in IP 71111.22.

b. Findings

(1) Failure to Meet Surveillance Testing Requirement for Reactor Coolant System (RCS) Pressure Isolation Valves (PIVs)

(Closed) Unresolved Item (URI) 05000461/2011002-04, "Reactor Coolant System Pressure Isolation Valve Leakage Surveillance Test Procedure Questions"

Introduction

The inspectors identified a finding of very low safety significance (Green) with an associated non-cited violation of TS Surveillance Requirement (TSSR) 3.4.6.1. The licensee failed to correctly incorporate the required test pressure limits of the TSSR into the surveillance test procedure and subsequently tested multiple RCS PIVs at pressures greater than the maximum test pressure of 1025 pounds per square inch gauge (psig), invalidating the testing.

Discussion

The inspectors reviewed the licensee's performance of surveillance testing that was accomplished in accordance with CPS 9843.01, "ISI [Inservice Inspection] Category 'A' Valve Leak Rate Test," Revision 35. This surveillance test procedure was performed to satisfy TSSR 3.4.6.1, which required the licensee to verify the equivalent leakage of each RCS PIV is ≤ 0.5 gallon-per-minute (gpm) per nominal inch of valve size up to a maximum of 5 gpm, at an RCS pressure ≥ 1000 psig and ≤ 1025 psig in accordance with the Inservice Testing Program. The licensee's Inservice Testing Program specified testing these valves once every 24-month refueling cycle during an outage.
As described in the Bases for TS 3.4.6.1, the main purpose in establishing a leakage limit for the RCS PIVs is to prevent overpressure failure of the low pressure portions of connecting systems. The leakage limit is an indication of whether the PIVs between the RCS and the connecting systems are degraded or degrading.

During review of CPS 9843.01 and the completed test packages for RCS PIV testing performed during the last refueling outage, the inspectors noted that much of the testing was performed at pressures greater than the TSSR 3.4.6.1 maximum test pressure of 1025 psig. The procedure had the test performers calculate a corrected test pressure to adjust for the elevation differences between the test gage and the valves undergoing testing. This appeared to be appropriate in order to account for an actual pressure difference at the valves as read from the test pressure gage to assure that the valves would be tested at the correct pressure. However, the inspectors found that the test procedure did not ensure that leakage testing was performed within the 1000-1025 psig range specified by TSSR 3.4.6.1. Instead of calculating both an upper and a lower test pressure based on the TSSR 3.4.6.1 limiting pressure range, the procedure had the test performers calculate only one test pressure based on the maximum limit of 1025 psig. Step 8.2.4 of the procedure directed the test performers to pressurize the test volume to 1025 psig (+25/-0 psig), rather than 1025 psig (-25/+0 psig). During review of the completed test packages, the inspectors noted that, not accounting for calculation errors, test performers pressurized the test volume to the calculated test pressure (+25/-0 psig).

The inspectors noted that the Bases for TS 3.4.6 states that leakage testing at a lower pressure differential than between the specified maximum RCS pressure and the normal

pressure of the connected system during RCS operation (the maximum pressure differential) is allowed. The observed rate may be adjusted to the maximum pressure differential by assuming leakage is directly proportional to the pressure differential to the one-half power. However, the inspectors found that the test procedure did not make any allowance by way of calculating a corrected leakage for a lower pressure differential. The inspectors also found no allowance in the TS Bases or in the procedure for testing with a higher pressure differential.

The inspectors discussed these observations with the licensee and questioned whether the required test pressure limits of TSSR 3.4.6.1 had been correctly incorporated into the surveillance test procedure. The inspectors opened URI 05000461/2011002-04 pending additional review and resolution of open questions to determine whether the surveillance test procedure was adequate to satisfy the surveillance testing requirement. The licensee initiated action requests AR 01202456 and AR 01212825 to address the inspectors' questions.

In response to the inspectors' questions, the licensee discovered that five RCS PIVs (1E12-F023, 1E12-F042A, 1E12-F042C, 1E21-F006, and 1E22-F005) had been tested at test pressures greater than the maximum 1025 psig limit specified in TSSR 3.4.6.1. This resulted in invalid surveillance testing results for these five valves. The inspectors noted that since the surveillance test procedure was incorrect, it was simply by chance that only five of the RCS PIVs were found to have been tested above 1025 psig after the licensee re-calculated corrected test pressures. The licensee performed a risk assessment of the missed PIV surveillances in accordance with TSSR 3.0.3, which determined that completion of the surveillances could be delayed up to the 24-month surveillance interval without a significant increase in plant risk. The inspectors reviewed the risk assessment and concurred that there was no unacceptable increase in risk. The licensee also completed an operability evaluation for the TS nonconformance and concluded that there was reasonable assurance that the affected PIVs were operable based on engineering judgment. Although there was no defined relationship available to equate valve seating force to valve seat leakage, the licensee concluded that the relatively small change (decrease) in seating force due to a relatively small increase in test pressure above the maximum test pressure would not result in a significant increase in valve seat leakage such that the limiting leakage rates for the valves would not be exceeded. The inspectors reviewed the operability evaluation and concluded that the licensee's conclusion was reasonable. The highest corrected test pressure calculated for a PIV was 7.8 psi higher than the TSSR maximum test pressure.

The inspectors reviewed the licensee's apparent cause evaluation for the missed surveillance. The licensee's evaluation highlighted that a missed opportunity to correct the test pressure discrepancy had occurred in 2005. In December 2004, AR 00282084 was written to identify that the surveillance test procedure would test the RCS PIVs at pressures up to 25 psig above the maximum pressure specified in TSSR 3.4.6.1. However, the licensee's subsequent evaluation of the described condition completed in January 2005 was incorrect, in that, it concluded that testing at the higher pressure was conservative and therefore acceptable. A change was made to CPS 9843.01 as an "enhancement" to the procedure to add an explanatory statement accounting for the "apparent" test pressure discrepancy. Step 2.1.11 of the test procedure stated, in part, that "[t]o conservatively ensure compliance with TSSR 3.4.6.1 test pressure requirements, functional differential pressures are established at or above the upper bound of pressure defined by TSSR 3.4.6.1, recognizing that TSSR 3.4.6.1 Bases state

that RCS PIV leakage is directly proportional to pressure to the ½ power." However, according to the Bases for TS 3.4.6 this allowance is only for leakage testing at a lower pressure differential between the specified maximum RCS pressure and the normal pressure of the connected system during RCS operation.

The licensee identified that the apparent cause for the incorrect test pressure specified in the surveillance test procedure was due to a technical human error. Engineering judgment that testing at a higher pressure was "conservative" was not challenged as being outside the literal test pressure band specified in the TSSR. The inspectors reviewed AR 00282084 and noted that multiple licensee staff had accepted this flawed engineering judgment, both in Engineering and Operations.

Corrective actions identified by the licensee included changes to CPS 9843.01 to correct identified discrepancies with the test conditions and acceptance criteria. In addition, to address a broader issue highlighted by this and other recent inspection findings involving test control issues, the licensee identified an action from AR 01207467 to evaluate the generic issue involving translation of licensing/design basis requirements into test procedures. The inspectors considered these corrective actions to be appropriate.

The licensee stated in the apparent cause evaluation that the technical human error was made in 2005, prior to the issuance of procedure HU-AA-1212, "Technical Task Risk/Rigor Assessment, Pre-job Brief, Independent Third Party Review, and Post-job Review," which requires additional measures to be taken to identify assumptions during engineering work. Therefore, the licensee did not identify any additional corrective actions to address why the errors were made in the evaluation of AR 00282084.

Analysis

The inspectors determined that the licensee's failure to satisfy the surveillance testing requirement to verify the equivalent leakage of each RCS PIV is ≤ 0.5 gpm per nominal inch of valve size up to a maximum of 5 gpm, at an RCS pressure ≥ 1000 psig and ≤ 1025 psig was a performance deficiency warranting a significance evaluation. The inspectors reviewed the examples of minor issues in IMC 0612, "Power Reactor Inspection Reports," Appendix E, "Examples of Minor Issues," and found no examples related to this issue. Consistent with the guidance in IMC 0612, "Power Reactor Inspection Reports, Appendix B, "Issue Screening," the inspectors determined that the finding affected the Initiating Events Cornerstone and was associated with the Procedure Quality attribute. Specifically, the licensee did not correctly incorporate the required test pressure limits of TSSR 3.4.6.1 into the surveillance test procedure. This resulted in testing multiple RCS PIVs at pressures greater than the maximum test pressure of 1025 psig. The inspectors performed a Phase 1 SDP review of this finding using the guidance provided in IMC 0609, Attachment 0609.04, "Phase 1 – Initial Screening and Characterization of Findings." In accordance with Table 4a, "Characterization Worksheet for IE [Initiating Events], MS [Mitigating Systems], and BI [Barrier Integrity] Cornerstones," the inspectors determined that that this finding was a licensee performance deficiency of very low safety significance (Green) because the finding would not result in exceeding the TS limit for RCS leakage and would not have likely affected mitigation systems resulting in a loss of safety function. Based on consultation and review with the Regional Senior Reactor Analyst, the inspectors concluded that the

testing deficiency did not result in an increase in valve failure probability or the likelihood of an initiating event such as an inter-system LOCA.

Cross-Cutting Aspects

The inspectors concluded that because the licensee's missed opportunity to correct the test pressure discrepancy in its surveillance test procedure occurred in January 2005 and no other more recent opportunities reasonably existed to identify and correct the problem, this issue would not be reflective of current licensee performance and no cross-cutting aspect was identified.

Enforcement

TSSR 3.4.6.1 requires the licensee to verify the equivalent leakage of each RCS PIV is ≤ 0.5 gpm per nominal inch of valve size up to a maximum of 5 gpm, at an RCS pressure ≥ 1000 psig and ≤ 1025 psig in accordance with the Inservice Testing Program. The licensee's Inservice Testing Program specified testing these valves once every 24-month refueling cycle during an outage.

Contrary to the above, during surveillance testing between January 12 and 19, 2010, performed in accordance with CPS 9843.01, "ISI Category 'A' Valve Leak Rate Test," Revision 35, the licensee performed leakage testing of five RCS PIVs (1E12-F023, 1E12-F042A, 1E12-F042C, 1E21-F006, and 1E22-F005) at test pressures greater than the maximum 1025 psig limit specified in TSSR 3.4.6.1. This resulted in invalid surveillance testing results for these five valves for the previous 24-month refueling cycle. Because of the very low safety significance, this violation is being treated as an non-cited violation consistent with Section 2.3.2 of the NRC Enforcement Policy **(NCV 05000461/2011003-02, Failure to Meet Surveillance Testing Requirement for Reactor Coolant System Pressure Isolation Valves)**. The licensee entered this violation into its corrective action program as AR 01202456 and AR 01212825.

URI 05000461/2011002-04 is closed.

(2) Surveillance Testing of Control Room Ventilation (VC) System

Introduction

The inspectors initiated an Unresolved Item pending additional review and resolution of open questions to determine whether the licensee's VC system monthly operability surveillance test procedure contained the appropriate requirements and acceptance limits for intake filtered flow rate from applicable design documents and whether operators appropriately addressed the operability of VC Train 'A' after identifying a degraded condition that could have affected the ability of the system to perform its safety function.

Discussion

The inspectors reviewed the licensee's performance of surveillance testing that was accomplished in accordance with CPS 9070.01, "Control Room HVAC Air Filter Package Operability Test Run," Revision 26d. This surveillance test procedure was performed to satisfy TSSRs 3.7.3.1 and 3.7.3.2, which required the licensee to operate each

VC subsystem with flow through the makeup filter ≥ 10 continuous hours with the heater operating and with flow through the recirculation filter for ≥ 15 minutes, respectively. The surveillance frequency is every 31 days. As described in the Bases for TS 3.7.3, the ability of the VC system to maintain the habitability of the Control Room envelope is an explicit assumption for the safety analyses presented in the UFSAR. The high radiation mode of the VC system is assumed to operate following a design basis accident. The VC system is designed to maintain a habitable environment in the Control Room envelope for a 30-day continuous occupancy after a design basis accident, without exceeding 5 Rem total effective dose equivalent (TEDE) as required by 10 CFR 50, Appendix A, Criterion 19. The UFSAR Chapter 15 accident analyses assumed that for a design basis LOCA, the VC system intake filtered flow rate is 3000 ± 10% cubic feet per minute (cfm).

During testing of VC Train 'A' on April 1, 2011, an operator noted that the filtered make up flow was oscillating between 2300 and 2880 cfm; however, as stated in Step 8.1.2.h of the test procedure, flow should have been 2700 to 3300 cfm. The operator annotated the test procedure with a note stating that the flow was low and initiated AR 01196342 to have the condition evaluated and corrected. Operators reviewed the acceptance criteria in Section 9.1 of the test procedure and did not find any upper or lower limits for flow rate. Operators noted that the Control Room differential pressure remained positive with the degraded flow condition and, therefore, concluded that VC Train 'A' remained operable and signed off the completed test procedure as satisfactory with no further evaluation. Operators did not request a formal operability evaluation from engineering even though the VC system has a required licensing basis function and the degraded condition could have affected the ability of the system to perform its safety function.

During review of the completed surveillance test procedure and AR 01196342, the inspectors questioned: (1) whether VC Train 'A' remained operable with intake filtered flow less than design, and (2) the absence of an appropriate quantitative acceptance criterion for filtered flow rate in the test procedure to assure that the system would be capable of fulfilling its design safety function. The inspectors noted that TSSRs 3.7.3.1 and 3.7.3.2 do not specify upper or lower limits for system intake filtered flow rate, nor do any other VC system TSSRs. Only the administrative program requirement for VC system filter testing in TS 5.5.7 specifies a 3000 cfm intake filtered flow rate, but this testing is performed much less frequently (i.e., every 2 years vice every month). The inspectors reviewed CPS 9866.01, "VG/VC HEPA [High Efficiency Particulate Air] Filter Leak Test," Revision 26 and noted that this procedure for system filter testing contained appropriate filtered flow acceptance criteria.

Because the UFSAR Chapter 15 LOCA analyses assumes that the VC system intake filtered flow rate is 3000 ± 10%, the inspectors determined that system operability would be questionable with system flow not within these limits. For determining the radiological consequences of a design basis LOCA to Control Room operators from external radiation sources, Calculation C-002, "Post LOCA Control Room Operator Dose from External Sources," Revision 2, assumes the intake filtered flow rate is at the upper limit of 3300 cfm. The higher value provides a maximum value for iodine buildup in the charcoal bed under normal conditions. For determining the radiological consequences of a design basis LOCA using the alternate source term methodology, Calculation C-020, "Reanalysis of Loss of Coolant Accident (LOCA) Using the Alternate Source Term Methodology," Revision 3, assumes the intake filtered flow rate is 2700 cfm. Under this analysis, the lower the flow rate the higher the dose to Control Room

operators since less filtered air is being provided to the Control Room envelope. Both of the above calculations support the accident analyses to ensure that post accident dose to Control Room occupants in the event of a LOCA would be less than 5 Rem TEDE.

The licensee investigated the low flow condition two weeks later on April 15th and discovered that the VC Train 'A' flow controller was not functioning properly. The flow controller was replaced with a new one and post-maintenance testing was completed satisfactorily. The licensee documented the flow controller problem in AR 012003343 and subsequently performed a past operability evaluation. The licensee's evaluation concluded that the system remained operable with the degraded flow condition because there was sufficient margin in the Control Room post-LOCA dose analysis. The inspectors reviewed the licensee's evaluation and concluded that the results were reasonable.

In response to the inspectors' questions, the licensee initiated AR 01207896 to review the absence of an appropriate quantitative acceptance criterion for filtered flow rate in the surveillance test procedure. In addition, the licensee initiated AR 01239007 to perform an apparent cause evaluation addressing the timeliness of the formal operability assessment and whether the absence of appropriate acceptance criteria in Section 9.1 of CPS 9070.01 influenced the decision by licensed operators to accept the results of the surveillance test and not request a formal operability evaluation from engineering upon discovery of the degraded condition during testing.

At the end of this inspection period, the licensee had just entered this issue into its corrective action program to investigate the cause and to identify appropriate corrective actions. This issue is considered to be an Unresolved Item (**URI 05000461/2011003-03, Surveillance Testing of Control Room Ventilation System**) pending additional review and resolution of open questions to determine: (1) whether the surveillance test procedure contained the appropriate requirements and acceptance limits for VC system intake filtered flow rate from applicable design documents, and (2) whether operators appropriately addressed the operability of VC Train 'A' after identifying a degraded condition that could have affected the ability of the system to perform its safety function.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation (71114.06)

.1 Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of an emergency preparedness drill on May 17, 2011, to identify any weaknesses and deficiencies in classification, notification, and protective action recommendation development activities. This drill was planned to be evaluated and was included in performance indicator data regarding drill and exercise performance. The inspectors observed emergency response operations in the Technical Support Center to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The operations simulator was not staffed for this drill. The inspectors also attended the licensee's drill critique to compare any inspector-observed weaknesses with those identified by the licensee's staff in order to evaluate the critique and to verify whether the

licensee's staff was properly identifying weaknesses and entering them into the corrective action program.

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

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstones: Occupational Radiation Safety

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

This inspection constituted a partial sample as defined in IP 71124.03.

.1 Inspection Planning (02.01)

a. Inspection Scope

The inspectors reviewed the UFSAR to identify areas of the plant designed as potential airborne radiation areas and any associated ventilation systems or airborne monitoring instrumentation. Instrumentation review included continuous air monitors (continuous air monitors and particulate-iodine-noble-gas-type instruments) used to identify changing airborne radiological conditions such that actions to prevent an overexposure may be taken. The review included an overview of the respiratory protection program and a description of the types of devices used. The inspectors reviewed UFSAR, TS, and emergency planning documents to identify location and quantity of respiratory protection devices stored for emergency use.

Inspectors reviewed the licensee's procedures for maintenance, inspection, and use of respiratory protection equipment including self-contained breathing apparatus (SCBA) as well as procedures for air quality maintenance.

The inspectors reviewed reported performance indicators to identify any related to unintended dose resulting from intakes of radioactive material.

b. Findings

Introduction

The inspectors identified a discrepancy between the SCBA configuration and the Operating and Instruction Manual. Specifically, the licensee procedure for maintaining the respiratory equipment did not specify the authorized battery and the licensee used batteries other than those specified in the Operating and Instruction Manual.

Discussion

The licensee used MSA MMR Air Mask with Firehawk Regulator SCBA units. This model is National Institute for Occupational Safety and Health (NIOSH) approved and includes a heads up display to inform the user of the amount of air remaining in the tank through a series of light emitting diodes and is powered by a series of batteries. The Operating and Instruction Manual includes the NIOSH approval for the equipment as well as the cautions and limitations for that approval. Item "N" states that "Never substitute, modify, add, or omit parts. Use only exact replacement parts in the configuration as specified by the manufacturer." The manufacturer includes a caution to "[U]se only Duracell NEDA 24A or Eveready NEDA 24AC AAA alkaline batteries. Use of other batteries will void the Intrinsic Safety approval." Additionally, the heads up display units were labeled with a similar message; however, the batteries listed were different. Consequently there was another discrepancy between the SCBA Operating and Instruction Manual and the manufacturer labeling on the equipment. The inspectors identified that Rayovac batteries, not listed in the Operating and Instruction Manual or the labels, were used in the SCBA units. The licensee was attempting to obtain clarification from the manufacturer for the correct batteries and impact of using other batteries. The issue remains under review by the NRC and is categorized as an Unresolved Item pending completion of that revised evaluation and NRC review (**URI 05000461/2011003-04, NIOSH Approval of SCBAs**).

.2 Engineering Controls (02.02)

a. Inspection Scope

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.

.3 Use of Respiratory Protection Devices (02.03)

a. Inspection Scope

The inspectors assessed whether respiratory protection devices used to limit the intake of radioactive materials were certified by the National Institute for Occupational Safety and Health/Mine Safety and Health Administration or have been approved by the NRC per 10 CFR 20.1703(b).

The inspectors reviewed records of air testing for supplied-air devices and self-contained breathing apparatus bottles to assess whether the air used in these devices meets or exceeds Grade D quality. The inspectors reviewed plant breathing air supply systems to determine whether they meet the minimum pressure and airflow requirements for the devices in use.

The inspectors selected several individuals qualified to use respiratory protection devices, and assessed whether they have been deemed fit to use the devices by a physician.

The inspectors selected several individuals assigned to wear a respiratory protection device and observed them donning, doffing, and functionally checking the device as appropriate.

The inspectors chose multiple respiratory protection devices staged and ready for use in the plant or stocked for issuance for use. The inspectors assessed the physical condition of the device components (mask or hood, harnesses, air lines, regulators, air bottles, etc.) and reviewed records of routine inspection for each. The inspectors selected several of the devices and reviewed records of maintenance on the vital components (e.g., pressure regulators, inhalation/exhalation valves, hose couplings).

b. Findings

No findings were identified.

.4 Self-Contained Breathing Apparatus for Emergency Use (02.04)

a. Inspection Scope

Based on the UFSAR, TS, and emergency operating procedure requirements, the inspectors reviewed the status and surveillance records of SCBAs staged in-plant for use during emergencies. The inspectors reviewed the licensee's capability for refilling and transporting SCBA air bottles to and from the Control Room and Operations Support Center during emergency conditions.

The inspectors selected several individuals on Control Room shift crews and from designated departments currently assigned emergency duties (e.g., onsite search and rescue duties) to assess whether Control Room operators and other emergency response and radiation protection personnel (assigned in-plant search and rescue duties or as required by emergency operating procedures or the Emergency Plan) were trained and qualified in the use of SCBAs (including personal bottle change out). The inspectors evaluated whether personnel assigned to refill bottles were trained and qualified for that task.

The inspectors determined whether appropriate mask sizes and types are available for use (i.e., in-field mask size and type match what was used in fit-testing). The inspectors determined whether on-shift operators had no facial hair that would interfere with the sealing of the mask to the face and whether vision correction (e.g., glasses inserts or corrected lenses) was available as appropriate.

The inspectors reviewed the past two years of maintenance records for select SCBA units used to support operator activities during accident conditions and designated as "ready for service" to assess whether any maintenance or repairs on any SCBA unit's vital components were performed by an individual, or individuals, certified by the manufacturer of the device to perform the work. The vital components typically are the pressure-demand air regulator and the low-pressure alarm. The inspectors reviewed the onsite maintenance procedures governing vital component work to determine any

inconsistencies with the SCBA manufacturer's recommended practices. For those SCBAs designated as "ready for service," the inspectors determined whether the required, periodic air cylinder hydrostatic testing was documented and up to date, and the retest air cylinder markings required by the U.S. Department of Transportation were in place.

b. Findings

Introduction

The inspectors identified missing spectacle kits for one licensed operator that was required to wear corrective lenses while performing licensed activities. Licensee procedure RP-AA-440, "Respiratory Protection Program" states, "An individual who requires vision correction and may need to wear full facepiece-type respirators is required to obtain the appropriate lenses/spectacle kit, unless the individual is able to wear contact lenses."

Discussion

Spectacle kits are corrective lenses designed to fit inside a respirator that allow the user to wear corrective lenses without compromising the seal integrity of the respirator. A user that requires corrective lenses to complete work activities and does not have a spectacle kit could not perform the work while wearing the respirator. The licensee maintains a central location for licensed operators to store spectacle kits and a separate storage location for members of the fire brigade. These storage locations ensure that the spectacle kits are centrally located to facilitate a rapid response when required (fires, chemical spills, or other emergencies).

The licensee did not have a validation process to ensure that individuals who may need to wear full face-piece-type respirators actually have the required spectacle kits. The licensee indicated that a review/evaluation of this issue would be completed. The issue remains under review by the NRC and is categorized as an Unresolved Item pending completion of that revised evaluation and NRC review **(URI 05000461/2011003-05, Missing Respirator Spectacle Kits)**.

.5 Problem Identification and Resolution (02.05)

a. Inspection Scope

The inspectors evaluated whether problems associated with the control and mitigation of in-plant airborne radioactivity were being identified by the licensee at an appropriate threshold and were properly addressed for resolution in the licensee corrective action program. The inspectors assessed whether the corrective actions were appropriate for a selected sample of problems involving airborne radioactivity and were appropriately documented by the licensee.

b. Findings

No findings were identified.

2RS4 Occupational Dose Assessment (71124.04)

This inspection constituted a partial sample as defined in IP 71124.04.

.1 Inspection Planning (02.01)

a. Inspection Scope

The inspectors reviewed the results of radiation protection program audits related to internal and external dosimetry (e.g., licensee's quality assurance audits, self-assessments, or other independent audits) to gain insights into overall licensee performance in the area of dose assessment and focus the inspection activities consistent with the principle of "smart sampling."

The inspectors reviewed the most recent National Voluntary Laboratory Accreditation Program accreditation report on the vendor's most recent results to determine the status of the contractor's accreditation.

A review was conducted of the licensee procedures associated with dosimetry operations, including issuance/use of external dosimetry (routine, multi-badging, extremity, neutron, etc.), assessment of internal dose (operation of whole body counter, assignment of dose based on derived air concentration-hours, urinalysis, etc.), and evaluation of and dose assessment for radiological incidents (distributed contamination, hot particles, loss of dosimetry, etc.).

The inspectors evaluated whether the licensee had established procedural requirements for determining when external and internal dosimetry is required.

b. Findings

No findings were identified.

.2 External Dosimetry (02.02)

a. Inspection Scope

The inspectors evaluated the onsite storage of dosimeters before their issuance, during use, and before processing/reading. The inspectors also reviewed the guidance provided to radiation workers with respect to care and storage of dosimeters.

The inspectors assessed whether non-National Voluntary Laboratory Accreditation Program accredited passive dosimeters (e.g., direct ion storage sight read dosimeters) were used according to licensee procedures that provide for periodic calibration, application of calibration factors, usage, reading (dose assessment) and zeroing.

The inspectors assessed the use of active dosimeters (electronic personal dosimeters) to determine if the licensee uses a "correction factor" to address the response of the electronic personal dosimeter as compared to the passive dosimeter for situations when the electronic personal dosimeter must be used to assign dose and whether the correction factor is based on sound technical principles.

The inspectors reviewed dosimetry occurrence reports or corrective action program documents for adverse trends related to electronic personal dosimeters, such as interference from electromagnetic frequency, dropping or bumping, failure to hear alarms, etc. The inspectors assessed whether the licensee had identified any trends and implemented appropriate corrective actions.

b. Findings

No findings were identified.

.3 Internal Dosimetry (02.03)

Routine Bioassay (In Vivo)

a. Inspection Scope

The inspectors reviewed procedures used to assess the dose from internally deposited nuclides using whole body counting equipment. The inspectors evaluated whether the procedures addressed methods for differentiating between internal and external contamination, the release of contaminated individuals, the route of intake, and the assignment of dose.

The inspectors reviewed the whole body count process to determine if the frequency of measurements was consistent with the biological half-life of the nuclides available for intake.

The inspectors reviewed the licensee's evaluation for use of its portal radiation monitors as a passive monitoring system to determine if instrument minimum detectable activities were adequate to determine the potential for internally deposited radionuclides sufficient to prompt additional investigation.

The inspectors selected several whole body counts and evaluated whether the counting system used had sufficient counting time/low background to ensure appropriate sensitivity for the potential radionuclides of interest. The inspectors reviewed the radionuclide library used for the count system to determine its appropriateness. The inspectors evaluated whether any anomalous count peaks/nuclides indicated in each output spectra received appropriate disposition. The inspectors reviewed the licensee's 10 CFR 61 data analyses to determine whether the nuclide libraries included appropriate gamma-emitting nuclides. The inspectors evaluated how the licensee accounts for hard-to-detect nuclides in the dose assessment.

b. Findings

No findings were identified.

Special Bioassay (In Vitro)

a. Inspection Scope

There were no internal dose assessments obtained using in vitro monitoring for the inspectors to review. The inspectors reviewed and assessed the adequacy of the licensee’s program for in vitro monitoring (i.e., urinalysis and fecal analysis) of

radionuclides (tritium, fission products, and activation products), including collection and storage of samples.

The inspectors reviewed the vendor laboratory quality assurance program and assessed whether the laboratory participated in an industry recognized cross-check program including whether out-of-tolerance results were resolved appropriately.

b. Findings

No findings were identified.

Internal Dose Assessment – Airborne Monitoring

a. Inspection Scope

The inspectors reviewed the licensee's program for airborne radioactivity assessment and dose assessment, as applicable, based on airborne monitoring and calculations of derived air concentration. The inspectors determined whether flow rates and collection times for air sampling equipment were adequate to allow lower limits of detection to be obtained. The inspectors also reviewed the adequacy of procedural guidance to assess internal dose if respiratory protection was used. The licensee had not performed dose assessments using airborne/derived air concentration monitoring since the last inspection.

b. Findings

No findings were identified.

Internal Dose Assessment – Whole Body Count Analyses

a. Inspection Scope

The inspectors reviewed several dose assessments performed by the licensee using the results of whole body count analyses. The inspectors determined whether affected personnel were properly monitored with calibrated equipment and that internal exposures were assessed consistent with the licensee's procedures.

b. Findings

No findings were identified.

.4 Special Dosimetric Situations (02.04)

Declared Pregnant Workers

a. Inspection Scope

The inspectors assessed whether the licensee informed workers, as appropriate, of the risks of radiation exposure to the embryo/fetus, the regulatory aspects of declaring a pregnancy, and the specific process to be used for (voluntarily) declaring a pregnancy.

The inspectors selected individuals who had declared pregnancy during the current assessment period and evaluated whether the licensee's radiological monitoring program (internal and external) for declared pregnant workers was technically adequate to assess the dose to the embryo/fetus. The inspectors reviewed exposure results and monitoring controls employed by the licensee with respect to the requirements of 10 CFR 20.

b. Findings

No findings were identified.

Dosimeter Placement and Assessment of Effective Dose Equivalent for External Exposures

a. Inspection Scope

The inspectors reviewed the licensee's methodology for monitoring external dose in non-uniform radiation fields or where large dose gradients exist. The inspectors evaluated the licensee's criteria for determining when alternate monitoring, such as use of multi-badging, was to be implemented.

The inspectors reviewed dose assessments performed using multi-badging to evaluate whether the assessment was performed consistently with licensee procedures and dosimetric standards.

b. Findings

No findings were identified.

Shallow Dose Equivalent

a. Inspection Scope

The inspectors reviewed shallow dose equivalent dose assessments for adequacy. The inspectors evaluated the licensee's method (e.g., VARSKIN or similar code) for calculating shallow dose equivalent from distributed skin contamination or discrete radioactive particles.

b. Findings

No findings were identified.

Neutron Dose Assessment

a. Inspection Scope

The inspectors evaluated the licensee's neutron dosimetry program, including dosimeter types and/or survey instrumentation.

The inspectors reviewed neutron exposure situations (e.g., independent spent fuel storage installation operations or at-power containment entries) and assessed whether: (a) dosimetry and/or instrumentation was appropriate for the expected neutron spectra;

(b) there was sufficient sensitivity for low dose and/or dose rate measurement; and (c) neutron dosimetry was properly calibrated. The inspectors also assessed whether interference by gamma radiation had been accounted for in the calibration and whether time and motion evaluations were representative of actual neutron exposure events, as applicable.

b. Findings

No findings were identified.

Assigning Dose of Record

a. Inspection Scope

For the special dosimetric situations reviewed in this section, the inspectors assessed how the licensee assigns dose of record for total effective dose equivalent, shallow dose equivalent, and lens dose equivalent. This included an assessment of external and internal monitoring results, supplementary information on Individual exposures (e.g., radiation incident investigation reports and skin contamination reports), and radiation surveys and/or air monitoring results when dosimetry was based on these techniques.

b. Findings

No findings were identified.

.5 Problem Identification and Resolution (02.05)

a. Inspection Scope

The inspectors assessed whether problems associated with occupational dose assessment were being identified by the licensee at an appropriate threshold and were properly addressed for resolution in the licensee's corrective action program. The inspectors assessed the appropriateness of the corrective actions for a selected sample of problems documented by the licensee involving occupational dose assessment.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

.1 Review of Submitted Quarterly Data

a. Inspection Scope

The inspectors performed a review of the data submitted by the licensee for the First Quarter 2011 Performance Indicators for any obvious inconsistencies prior to its public release in accordance with IMC 0608, "Performance Indicator Program."

This inspection was not considered to be an inspection sample as defined in IP 71151.

b. Findings

No findings were identified.

.2 Mitigating Systems Performance Index - Emergency Alternating Current (AC) Power System

a. Inspection Scope

The inspectors reviewed a sample of plant records and data against the reported Mitigating Systems Performance Index (MSPI) - Emergency AC Power System Performance Indicator. To determine the accuracy of the performance indicator data reported, performance indicator definitions and guidance contained in Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, were used. The inspectors reviewed the MSPI derivation reports, Control Room logs, Maintenance Rule database, Licensee Event Reports (LERs), and maintenance and test data from July 2010 through March 2011, to validate the accuracy of the performance indicator data reported. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25% 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 corrective action program database to determine if any problems had been identified with the performance indicator data collected or transmitted for this performance indicator.

This inspection constituted one MSPI - Emergency AC Power System Performance Indicator verification inspection sample as defined in IP 71151.

b. Findings

No findings were identified.

4OA2 Identification and Resolution of Problems (71152)

.1 Routine Review of Identification and Resolution of Problems

a. Inspection Scope

As 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 corrective action program at an appropriate threshold, that adequate attention was being given to timely corrective actions, and that adverse trends were identified and addressed. Some minor issues were entered into the licensee's corrective action program as a result of the inspectors' observations; however, they are not discussed in this report.

This inspection was not considered to be an inspection sample as defined in IP 71152.

b. Findings

No findings were identified.

.2 Annual In-Depth Review Sample

a. Inspection Scope

The inspectors selected the following action request for in-depth review:

- AR 01017464, "1B21F028A: 9861.04 LLRT [Local Leak Rate Test] on MSL [Main Steam Line] A, B, and C Test Failure."

The inspectors verified the following attributes during their review of the licensee's corrective actions for the above action requests and other related action requests:

- Complete and accurate identification of the problem in a timely manner commensurate with its safety significance and ease of discovery;
- Consideration of the extent of condition, generic implications, common cause and previous occurrences;
- Evaluation and disposition of operability/reportability issues;
- Classification and prioritization of the resolution of the problem, commensurate with safety significance;
- Identification of the root and contributing causes of the problem; and
- Identification of corrective actions, which were appropriately focused to correct the problem.

The inspectors discussed the corrective actions and associated action request evaluation with licensee personnel.

This inspection constituted one annual in-depth review sample as defined in IP 71152.

b. Findings and Observations

No findings were identified.

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

.1 (Closed) LER 05000461/2009-005-01, "Manual Scram on High Water Level Due to Reactor Recirc [Recirculation] Pump Trip," Supplement 1

On October 15, 2009, Unit 1 was manually scrammed following an unexpected trip of the 'B' reactor recirculation pump. Operators manually scrammed the reactor just before reactor vessel water level reached the Level 8 (high level) reactor scram set point. After the unit was shut down, the licensee identified that the pump motor had failed due to an internal electrical fault. The licensee reported this event in LER 05000461/2009-005-00 as a condition that resulted in the manual actuation of the reactor protection system in accordance with 10 CFR 50.73(a)(2)(iv)(A).
The performance issue related to this event was discussed in NRC Inspection Report 05000461/2010-002. The inspectors documented a finding of very low safety significance as a result of the licensee's failure to correct a non-conforming condition

with inadequate feedwater level control system response that resulted in a second reactor scram for the same cause.

The licensee submitted Supplement 1 to the original LER to revise the cause for the reactor vessel water level control issue and to update corrective actions that were completed. The inspectors determined that the information provided in LER 05000461/2009-005-01 did not change the conclusion of the previous review. LER 05000461/2009-005-01 is closed.

This inspection constituted one event followup inspection sample as defined in IP 71153.

.2 (Closed) LER 05000461/2008-001-02, "Reactor Recirc [Recirculation] Pump Trip Initiates Automatic Scram on High RPV [Reactor Pressure Vessel] Water Level," Supplement 2

On February 10, 2008, Unit 1 automatically scrammed following an unexpected trip of the 'B' reactor recirculation pump when reactor vessel water level reached the Level 8 (high level) reactor scram set point. The licensee reported this event in LER 05000461/2008-001-00 and LER 05000461/2008-001-01 as a condition that resulted in the automatic actuation of the reactor protection system in accordance with 10 CFR 50.73(a)(2)(iv)(A). The performance issues related to this event were discussed in NRC Inspection Report 05000461/2008-004. The inspectors concluded that the licensee's failure to perform adequate post-maintenance testing (i.e., feedwater level control system tuning) following the replacement of a feedwater level control system dynamic compensator card during the Cycle 10 refueling outage in February 2006 was a finding of very low safety significance. The inspectors also concluded that the licensee's failure to evaluate an unexpected and unknown cause for stray voltage in the End-of-Cycle Recirculation Pump Trip circuit discovered during post-modification testing during the Cycle 11 refueling outage in February 2008 was a finding of very low safety significance.

The licensee submitted Supplement 2 to the original LER to revise the cause for the reactor vessel water level control issue and to update corrective actions that were completed. The inspectors determined that the information provided in LER 05000461/2008-001-02 did not change the conclusion of the previous review. LER 05000461/2008-001-02 is closed.

This inspection constituted one event followup inspection sample as defined in IP 71153.

4OA5 Other Activities

.1 (Closed) NRC Temporary Instruction (TI) 2515/183, "Followup to the Fukushima Daiichi Nuclear Station Fuel Damage Event"

The inspectors assessed the activities and actions taken by the licensee to assess its readiness to respond to an event similar to the Fukushima Daiichi Nuclear Plant fuel damage event. This included: (1) an assessment of the licensee's capability to mitigate conditions that may result from beyond design basis events, with a particular emphasis on strategies related to the spent fuel pool, as required by NRC Security Order Section B.5.b issued on February 25, 2001, as committed to in Severe Accident Management Guidelines, and as required by 10 CFR 50.54(hh); (2) an assessment of

the licensee's capability to mitigate station blackout conditions, as required by 10 CFR 50.63 and station design bases; (3) an assessment of the licensee's capability to mitigate internal and external flooding events, as required by station design bases; and (4) an assessment of the thoroughness of the walkdowns and inspections of important equipment needed to mitigate fire and flooding events, which were performed by the licensee to identify any potential loss of function of this equipment during seismic events possible for the site.

Inspection Report 05000461/2011011 (ML111320336) documented detailed results of this inspection activity.

.2 (Closed) NRC TI 2515/184, "Availability and Readiness Inspection of Severe Accident Management Guidelines (SAMGs)"

On May 20, 2011, the inspectors completed a review of the licensee's Severe Accident Management Guidelines (SAMGs), implemented as a voluntary industry initiative in the 1990's, to determine (1) whether the SAMGs, were available and updated, (2) whether the licensee had procedures and processes in place to control and update its SAMGs, (3) the nature and extent of the licensee's training of personnel on the use of SAMGs, and (4) the licensee personnel's familiarity with SAMG implementation.

The results of this review were provided to the NRC task force chartered by the Executive Director for Operations to conduct a near-term evaluation of the need for agency actions following the Fukushima Daiichi fuel damage event in Japan. Plant-specific results for Clinton Power Station were provided as an Enclosure to a memorandum to the Chief, Reactor Inspection Branch, Division of Inspection and Regional Support, dated June 1, 2011, (ML111520396).

.3 (Closed) NRC TI 2515/177, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems (NRC Generic Letter 2008-01)"

a. Inspection Scope

The inspectors verified that the onsite documentation, system hardware, and licensee actions were consistent with the information provided in the licensee's response to NRC Generic Letter (GL) 2008-01, "Managing Gas Accumulation in Emergency Core Cooling (ECCS), Decay Heat Removal (DHR), and Containment Spray Systems." Specifically, the inspectors verified that the licensee has implemented or was in the process of implementing the commitments, modifications, and programmatically controlled actions described in the licensee's response to GL 2008-01. The inspection was conducted in accordance with TI 2515/177, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems (NRC Generic Letter 2008-01)," and considered the site-specific supplemental information provided by the Office of Nuclear Reactor Regulation (NRR) to the inspectors.

The documents reviewed are listed in the Attachment to this report.

b. Inspection Documentation

The selected TI areas of inspection were licensing basis, design, testing, and corrective actions. The documentation of the inspection effort and any resulting observations are below.

Licensing Basis

The inspectors reviewed selected portions of licensing basis documents to verify that they were consistent with the NRR assessment report and that they were processed by the licensee. The licensing basis verification included the verification of selected portions of TS, TS Bases, UFSAR, and Operations Requirements Manual. The inspectors also verified that applicable documents that described the plant and plant operation, such as calculations, piping and instrumentation diagrams (P&IDs), procedures, and corrective action program documents, addressed the areas of concern and were changed if needed following plant changes. The inspectors also confirmed that the frequency of selected surveillance procedures were at least as frequent as required by TSs. Finally, the inspectors confirmed that: (1) the licensee will review and evaluate the resolution of TS issues with respect to the changes contained in the Technical Specification Task Force (TSTF) traveler following NRC approval; and (2) that a license amendment request will be submitted to the NRC within 180 days following the evaluation, if necessary. The completion date for this regulatory commitment is contingent upon the approval of the TSTF.

Design

The inspectors reviewed selected design documents, performed system walkdowns, and interviewed plant personnel to verify that the design and operating characteristics were addressed by the licensee. Specifically:

- The inspectors assessed the licensee's void acceptance criteria and noted that the licensee established void volume acceptance criteria for piping locations located at system high points to be used during field verifications. The void volumes were derived based on pipe internal diameter and as-built slope, and internal height of the void.

- The inspectors selectively reviewed applicable documents, including calculations, engineering evaluations, and vendor technical manuals, with respect to gas accumulation in the residual heat removal (RHR) and high pressure core spray (HPCS) systems. Specifically, the inspectors verified that these documents addressed venting requirements, keep-full systems, and void control during system realignments.

- The inspectors conducted a walkdown of selected accessible portions of the RHR system in sufficient detail to assess the licensee's walkdowns. The inspectors also verified that the information obtained during the licensee's walkdown was consistent with the items identified during the inspector's independent walkdown. In addition, the inspectors verified that the licensee had P&IDs and isometric drawings that describe the RHR system configurations and had confirmed the accuracy of the drawings. The inspectors reviewed selected portions of isometric drawings and considered the following:

a. High point vents were identified.

b. High points that do not have vents were recognizable.

c. Other areas where gas can accumulate and potentially impact subject system operability, such as at orifices in horizontal pipes, isolated branch lines, heat exchangers, improperly slopped piping, and under closed valves, were described in the drawings or in referenced documentation.

d. Horizontal pipe centerline elevation deviations and pipe slopes in nominally horizontal lines that exceed specified criteria were identified.

e. All pipes and fittings were clearly shown.

f. The drawings were up-to-date with respect to recent hardware changes and that any discrepancies between as-built configurations and the drawings were documented and entered into the corrective action program for resolution.

- The inspectors also conducted similar walkdowns of selected inaccessible portions of the HPCS system in other inspection periods. These additional activities counted toward the completion of this TI and were documented in NRC Inspection Report 05000461/2010002.

- The inspectors verified that licensee walkdowns have been completed. In addition, the inspectors selectively verified that information obtained during the licensee's walkdowns was addressed and incorporated into procedures, the corrective actions program, and the void management program.

Testing

The inspectors reviewed selected surveillance, post-modification test, and post-maintenance test procedures and results to verify that the licensee has approved and was using procedures that were adequate to address the issue of gas accumulation and/or intrusion in the subject systems. This review included the verification of procedures used for conducting surveillances and determination of void volumes to ensure that the void criteria was satisfied and will be reasonably ensured to be satisfied until the next scheduled void surveillance. Also, the inspectors reviewed procedures used for filling and venting following conditions which may have introduced voids into the subject systems to verify that the procedures addressed testing for such voids and provided processes for their reduction or elimination. Additionally, the inspectors reviewed ultrasonic test results for locations that were determined to be susceptible to voiding based on the licensee's walkdowns and evaluations.

The inspectors also review selected portions of procedures used during the surveillance testing of subject systems in a separate inspection activity. This additional activity counted towards the completion of this TI and was documented in NRC Inspection Report 05000461/2010004.

Corrective Actions

The inspectors reviewed selected licensee assessment reports and corrective action program documents to assess the effectiveness of the licensee's corrective actions

when addressing the issues associated with GL 2008-01. The inspectors identified one instance where the licensee failed to implement follow-up void management activities when an action tracking item to resolve the issue was cancelled. Specifically, the licensee cancelled a modification that was initiated to address a void identified in RHR system piping with a horizontal centerline elevation deviation. When the modification was cancelled, the licensee did not establish a follow-up void management activity. The licensee performed a confirmatory ultrasonic examination and determined no void existed. The licensee also issued AR 01212387 to document the inspectors' concern of canceling an action without evaluating the need for a substitute action.

In addition, the inspectors verified that selected corrective actions identified in the licensee's nine-month and supplemental reports were documented. The inspectors also conducted a similar review of corrective action program documents in a separate inspection activity. This additional activity counted towards the completion of this TI and was documented in NRC Inspection Report 05000461/2010-004.

c. Findings

No findings were identified. Based on this review, the inspectors concluded that there is reasonable assurance that the licensee will complete all outstanding items and incorporate this information into the design basis and operational practices. Therefore, this TI is considered closed.

4OA6 Management Meetings

.1 Resident Inspectors' Exit Meeting

The inspectors presented the inspection results to Mr. W. Noll and other members of the licensee's staff at the conclusion of the inspection on July 13, 2011. The licensee acknowledged the findings presented. Proprietary information was examined during this inspection, but is not specifically discussed in this report.

.2 Interim Exit Meetings

Interim exit meetings were conducted for:

- The results of NRC TI 2515/184, "Availability and Readiness Inspection of Severe Accident Management Guidelines (SAMGs)," inspection with Mr. F. Kearney and other members of the licensee's staff at the conclusion of the inspection on May 20, 2011. The inspector confirmed that none of the potential report input discussed was considered proprietary.

- The results of the Occupational Dose Assessment and In-Plant Airborne Radioactivity Control and Mitigation inspection with Mr. F. Kearney and other members of the licensee's staff at the conclusion of the inspection on May 13, 2011, and subsequently with Mr. J. Stovall on June 16, 2011. The inspector confirmed that none of the potential report input discussed was considered proprietary.

- The results of the Triennial Heat Sink and NRC TI 2515/177, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems (NRC Generic Letter 2008-01)," inspection with Mr. F. Kearney and

other members of the licensee staff on May 6, 2011, and subsequently with Mr. R. Frantz on July 15, 2011. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

.3 Regulatory Performance Meeting

On April 28, 2011, the NRC held a meeting with the licensee at the Clinton Power Station to discuss the Clinton Power Station annual plant performance assessment. The assessment results were previously documented in Inspection Report 05000461/2011001.

.4 Public Meeting

On April 28, 2011, the NRC held a public open house meeting at the Clinton Elk's Lodge to engage interested members of the public on the performance of the Clinton Power Station and the role of the NRC in ensuring safe plant operations upon completion of the Clinton Power Station annual plant performance assessment in accordance with Section 09.01 of IMC 0305, "Operating Reactor Assessment Program."

4OA7 Licensee-Identified Violations

The following violation of very low significance (Green) was identified by the licensee and is a violation of NRC requirements which meets the criteria of Section 2.3.2 of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as an non-cited violation.

.1 Failure to Evaluate the Effects of Dynamic Loads on the Containment Spray Piping

Based on an issue identified at another facility, the licensee initiated AR 01197314 to verify that the normally voided section of the RHR system containment spray piping had been properly analyzed for dynamic loading during spray initiation. The licensee determined that General Electric Design Specification 22A3139, "Residual Heat Removal," specified a dynamic loading analysis, which was required by American Society of Mechanical Engineers Code, Section III, for the normally voided section of piping; however, the licensee was unable to locate the analyses or justification for not performing the analyses. The licensee's initial evaluation as documented in calculation 3C10-0175-001, "Design and Analysis of Clinton Containment Spray System," was based on a review of Electric Power Research Institute Topical Report (TR)-106438, "Water Hammer Handbook for Nuclear Plant Engineers and Operators." The evaluation concluded that a severe water hammer would not occur based on the condition that the valves required to open were slow acting. However, the licensee determined the evaluation was based on the case of a valve closing and not on the actual condition of a valve opening and a slug of water moving through the voided section of pipe. The licensee then performed an analysis of a water slug and confirmed the system remained operable. Failure to have a dynamic loading analysis for this piping as required by the design specification was considered a violation of 10 CFR 50, Appendix B, Criterion III, "Design Control." This violation was not greater than Green because the dynamic loading was verified to be within the capability of the piping design.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

K. Baker, Design Engineering Senior Manager
R. Campbell, RP Technical Specialist
T. Chalmers, Operations Director
C. Culp, Engineering
J. Cunningham, Security Manager
B. Davis, Regulatory Assurance Manager
J. Domitrovich, Work Management Director
C. Dunn, Shift Operations Superintendent
S. Fatora, Maintenance Director
R. Frantz, Regulatory Assurance
S. Gackstetter, Training Director
M. Heger, Mechanical/Structural Design Engineering Manager
N. Hightower, Radiological Engineering Manager
F. Kearney, Site Vice President
D. Kemper; Plant Engineering Senior Manager
A. Khanifar, Engineering Director
M. Kimmich, Engineering
S. Lakebrink, Mechanical Design Engineering
K. Leffel, Operations Support Manager
W. Noll, Site Vice President
J. Peterson, Regulatory Assurance
C. Rocha, Nuclear Oversight Manager
S. Soliman, Senior Chemist
J. Stovall, Radiation Protection Manager
B. Taber, Plant Manager
J. Ufert, Fire Marshall
T. Veitch, Chemistry Manager

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

05000461/2011-003-01	NCV	Deficiencies with RCIC Room Heat Up Analyses
05000461/2011-003-02	NCV	Failure to Meet Surveillance Testing Requirement for Reactor Coolant System Pressure Isolation Valves (Section 1R22.b.(1))
05000461/2011-003-03	URI	Surveillance Testing of Control Room Ventilation System (Section 1R22.b.(2))
05000461/2011-003-04	URI	NIOSH Approval of SCBAs (Section 2RS3.1)
05000461/2011-003-05	URI	Missing Respirator Spectacle Kits (Section 2RS3.4)

Closed

05000461/2011-003-01	NCV	Deficiencies with RCIC Room Heat Up Analyses
05000461/2011-003-02	NCV	Failure to Meet Surveillance Testing Requirement for Reactor Coolant System Pressure Isolation Valves (Section 1R22.b.(1))
05000461/2011-002-04	URI	Reactor Coolant System Pressure Isolation Valve Leakage Surveillance Test Procedure Questions (Section 1R22.b.(1))
05000461/2009-005-01	LER	Manual Scram on High Water Level Due to Reactor Recirc [Recirculation] Pump Trip, Supplement 1 (Section 4OA3.1)
05000461/2008-001-02	LER	Reactor Recirc [Recirculation] Pump Trip Initiates Automatic Scram on High RPV [Reactor Pressure Vessel] Water Level (Section 4OA3.2)
2515/183	TI	Followup to the Fukushima Daiichi Nuclear Station Fuel Damage Event (Section 4OA5.1)
2515/184	TI	Availability and Readiness Inspection of Severe Accident Management Guidelines (SAMGs) (Section 4OA5.2)
2515/177	TI	Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems (NRC Generic Letter 2008-01) (Section 4OA5.3)

Discussed

05000461/2009-005-00	LER	Manual Scram on High Water Level Due to Reactor Recirc [Recirculation] Pump Trip, Supplement 1 (Section 4OA3.1)
05000461/2010-002-05	FIN	Failure to Correct Inadequate FWLCS Response Resulted in High Reactor Vessel Water Level (Level 8) Scram (Section 4OA3.1)
05000461/2008-001-00	LER	Reactor Recirc [Recirculation] Pump Trip Initiates Automatic Scram on High RPV [Reactor Pressure Vessel] Water Level (Section 4OA3.2)
05000461/2008-001-01	LER	Reactor Recirc [Recirculation] Pump Trip Initiates Automatic Scram on High RPV [Reactor Pressure Vessel] Water Level (Section 4OA3.2)
05000461/2008-004-01	FIN	Failure to Perform Adequate Post-Maintenance Testing Resulted in High Reactor Vessel Water Level (Level 8) Scram (Section 4OA3.2)

05000461/2008-004-02	FIN	Failure to Evaluate an Unexpected and Unknown Cause for Stray Voltage in the End-of-Cycle Recirculation Pump Trip Circuit During Post-Modification Testing Resulted in a Reactor Recirculation Pump Trip (Section 4OA3.2)

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.

1R01 Adverse Weather Protection

- OP-AA-108-111-1001, "Severe Weather and Natural Disaster Guidelines," Revision
- OP-AA-106-101-1002, "Exelon Nuclear Issues Management,"
- CPS 4302.01, "Tornado/High Winds," Revision 19a
- AR 01204822, "Entry Into CPS 4302.01, 'Tornado/High Winds Off-Normal'"
- AR 01204927, "345 kV South Bus Voltage Low Out of Band"
- AR 01204929, "Two Storm Related Events"
- OP-AA-106-101-1002, "Exelon Nuclear Issues Management," Revision 8
- OP-AA-108-111-1001, "Severe Weather and Natural Disaster Guidelines," Revision 5
- CPS 4302.01, "Tornado/High Winds," Revision 19a
- CPS 4303.02, "Abnormal Lake Level," Revision 10
- CPS 4304.01, "Flooding," Revision 5a
- WC-AA-107, "Seasonal Readiness," Revision 9
- AC-CD-1105-0001, "Elevated Lake Temps Challenge CPS Operating Parameters," May 9, 2011
- Letter from F. Kearney to B. Hanson, Subject: Certification of 2011 Summer Readiness, May 15, 2011
- M05-1059, "P&ID Floor & Equip. Drains Screen House (DM)," Sheet 3, Revision L
- A22-1032, "Circulating Water Screen House Main Floor Plan Area-12 – El. 699'0"," Revision K
- AR 01216152, "Initiate ACMP for Summer Operation (IR 1091600)"
- AR 01210375, "Initiate ACMP for Elevated Lake Temp in Prep for Summer"
- AR 01091600, "ACMP Needed for High Lake Temperature"
- AR 01215817, "NER, NC-011-012 Seasonal Readiness/Tornado"
- AR 01200986, "345 KV 4520 B Phase Disconnect Elevated in Temperature"
- AR 01076285, "Elevated Temperature on 0SY4504C Disconnect Ball Side"
- AR 01101328, "Possible Vulnerability to a Summer Fish Loss at CPS"
- AR 01092236, "Gaps Identified During Effectiveness Review [of Industry Event Report Recommendation Implementation]"
- AR 01158006, "Weakness in Implementation of [Industry Event Report Recommendation]"
- AR 01207940, "NOS ID: Material Staged in North Parking Lot Not Secured"
- AR 01200727, "Grid Transient Causes GCB [Gas Circuit Breaker] 4510 to Cycle Open and Shut"
- AR 01183058, "345 KV Switchyard Walkdown Issues/Results From 3/3/2011"
- AR 01219519, "345 KV Switchyard Walkdown 5/23/11"
- AR 01224933, "ERAT SVC HVAC Unit #2 0VV90SB Found Not Running"
- AR 01224407, "0VV89SA: RAT SVC Building HVAC Compressor Tripped"
- AR 01224783, "Unit 2 RAT B SVC Building HVAC Unit Not Providing Cooling"
- AR 01073472, "Work Order Chiller C Amps Cycling"
- AR 01219150, "0Work Order02CE Low Oil Pressure'
- AR 01219249, "0Work Order02CA: A Work Order Chiller Trip on Low Oil Pressure"
- AR 01201962, "Main Generator Issues Requiring Attention"

1R04 Equipment Alignment

- -AR 010294475, “Procedure Enhancement”
- -CPS 9082.01, “Offsite Source Power Verification,” Revision 39b
- -E02-1AP03, “ Electrical Loading Diagram Clinton Power Station Unit 1,” Revision AA
- -CPS 3319.01, “Standby Gas Treatment (VG),” Revision 16
- -CPS 3319.01V001, “Standby Gas Treatment Valve Lineup,” Revision 8
- -CPS 3319.01V002, “Standby Gas Treatment Instrument Valve Lineup,” Revision 5a
- -CPS 3319.01E001, “Standby Gas Treatment Electrical Lineup,” Revision 10c
- -M05-1105, “P&ID Standby Gas Treatment System (VG),” Sheet 1, Revision S
- -M05-1105, “P&ID Standby Gas Treatment System (VG),” Sheet 2, Revision N
- -M05-1105, “P&ID Standby Gas Treatment System (VG),” Sheet 3, Revision F
- CPS 3402.01, “Control Room HVAC (VC),” Revision 25c
- CPS 3402.01E001, “Control Room HVAC Electrical Lineup,” Revision 10b
- CPS 3402.01V001, “Control Room HVAC Valve Lineup,” Revision 16e
- M05-1102, “Control Room HVAC (VC),” Revision U
- E02-OVC99, “Schematic Diagram, Control Room HVAC System (VC),” Revision R

1R05 Fire Protection

- CPS 1893.04M003, “Prefire Plan Legend,” Revision 1
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- RP-AA-210, “Dosimetry Issue, Usage, and Control,” Revision 20
- RP-AA-210-1001, “Dosimetry Logs and Forms,” Revision 5
- RP-AA-214, “Area TLD Surveillance,” Revision 3
- RP-AA-220 Bioassay Program, Revision 7
- RP-AA-221, “Whole Body Data Review,” Revision 1
- RP-AA-222, “Methods for Estimating Internal Exposure from In Vivo and In Vitro Bioassay Data,” Revision 3
- RP-AA-230, “Operation of the Canberra FASTSCAN Whole Body Counter,” Revision 0
- RP-AA-250, “External Dose Assessments from Contamination,” Revision 5
- Calibration of the Canberra FASTSCAN WBC System at the Clinton Power Station, 2/24/2011
- Audit SA 10-017; QAD2011001,” Joint Audit of Mirion Technologies (GDS) Inc.,” January 3, 2011
- Audit SR 2008-001, “Joint Audit of Global Dosimetry Solutions,” January 10, 2008
- FASA, “Occupational Dose Assessment & In Plant Airborne Radioactivity Control & Mitigation, Assignment 1056527-03,” February 1, 2011
- RP-AA-270, “Prenatal Radiation Exposure,” Revision 6
- AR 01215225, “Passport Expiration Date of DPW Needs Improvement,” May 12, 2011
- AR 01215180, “RP Procedure Enhancement to Clarify Attachment Use,” May 12, 2011

4OA1 Performance Indicator Verification

- AR 01113608, “Div 2 EDG Quick Start Time > 9080.02 Step 9.1.6 Criteria”
- AR 01187358, “Change 9080.26 to Eliminate an Unnecessary Engine Start”
- AR 01194749, “Division 1 Slow Start Time”
- AR 01214578, “1DG01KB: D2 DG Tripped During 9080.02”
- CPS 9000.01D001, “Control Room Surveillance Log - Mode 1, 2, 3 Data Sheet,” Revision 52e
- LS-AA-2200, “Mitigating System Performance Index Data Acquisition & Reporting,” Revision 3
- LS-AA-2001, ”Collecting and Reporting of NRC Performance Indicator Data,” Revision 14
- Nuclear Energy Institute 99-02, “Regulatory Assessment Performance Indicator Guideline,” Revision 6
- RM Document Number CL-MSPI-01, “Clinton MSPI Basis Document,” Revision 5
- MSPI Derivation Reports, Period March 2011, for Emergency AC Power System
- Nuclear Energy Institute 99-02, “Regulatory Assessment Performance Indicator Guideline,” Revision 6

4OA2 Identification and Resolution of Problems

- ANSI/ANS 56.8-2002, "Containment System Leakage Testing Requirements"
- NEI 94-01, "Industry Guideline for Implementing Performance-based Option of 10 CFR Part 50, Appendix J"
- NRC Information Notice 85-71, “Containment Integrated Leak Rate Tests”
- Regulatory Guide 1.163, "Performance-Based Containment Leak-Test Program"
- CPS 1305.01, “Primary Containment Leakage Rate Testing Program,” Revision 10c
- CPS 1305.01F001, “Type 'B' Local Leak Rate Summary Sheet,” Revision 2
- CPS 9861.04, “MSIV Local Leak Rate Test (MC-5,6,7,8),” Revision 26
- CPS 9861.04D002, “MSIV B Local Leak Rate Test Data Sheet (1MC-8),” Revision 25d
- Work Order 01128244, “MC008 LLRT Requirements (MSIV - B) and PIT 1E32-F001E,” January 20, 2010
- Operational and Technical Decision Making (OTDM) #1229710, “Through Wall Steam Leak on 1MS13AA-2”
- RCR 1021241, “Late Identification of Work Scope for 1B21F022C, Inboard Main Steam Line C Isolation Valve
- EACE 1017464, ” Investigate Failure of 'B' MSIVs”
- AR 01017464, “1B21F028A: 9861.04 LLRT on MSL A, B, and C Test Failure”
- AR 01059673, “NOS ID MSIV As-Found Results Re-Evaluate Reportability”
- AR 01224527, “NRC PI&R: As-Found LRT For Each MSIV Not Performed In C1R12”
- AR 01228126, “Heater Bay Hotter Than Expected”
- AR 01229320, “Steam Leak Identified On 1ES001B”
- AR 01229325, “1WO03SL – Water Dripping Near 1FW01AA 6A HP Heater”
- AR 01229569, “1ES001A Has Small Packing Leak”
- AR 01229710, “Through Wall Steam Leak On 1MS13AA-2”
- AR 01231642, “Need Contingent Actions For High Heater Bay Temperatures”
- AR 01232761, “Water Flow Check For Turbine Building Area Coolers”
- AR 01233539, “Replace 2 Inch Pipe 1MS13AB Downstream Of Valve 1B21CA6”
- AR 01233540, “Replace 2 Inch Pipe 1MS13AC Downstream of Valve 1B21CA5”

4OA3 Followup of Events and Notices of Enforcement Discretion

- LER 05000461/2008-001-02, "Reactor Recirculation Pump Trip Initiates Automatic Scram on High RPV Water Level," Supplement 2
- LER 05000461/2009-005-01, "Manual Scram on High Water Level Due to Reactor Recirculation Pump Trip," Supplement 1

4OA5 Other Activities

- 0000-0088-8669-R0, “BWR Owners Group Technical Report Effects of Voiding in ECCS Drywell Injection Piping,” September 2008
- 0000-0088-8669-R0, “BWR Owners’ Group Technical Report; Effects of Voiding in ECCS Drywell Injection Piping,” September 2008
- 3C10-0175-001, “Design and Analysis of Clinton Containment Spray System,” Revision 3A
- AR 00807753, “NRC GL 08-01 Inspection Results At Pipe 1RH50AB”
- AR 00812163, “NRC GL 2008-01 Inspection Results at Pipe 1RH”
- AR 01212387, “NRC GL 2008-01 Lack of Gas Management RHR Discharge Piping Void”
- AR00802940, “GL 08-01 Inspection Results at 1E12F037A,” August 1, 2008
- AR00807753, “GL 08-01 Inspection Results at 1RH50AB,” August 15, 2008
- AR00812163, “GL 08-01 Inspection Results at 1RH03AA,” August 28, 2008

- AR00814512, “GL 08-01 Inspection Results at 1RH117A,” September 5, 2008
- AR01022886, “RHR C Pump Suction Voiding,” January 28, 2010
- AR01173402, “FASA Eval Adding Time Duration to Venting Act,” February 10, 2011
- AR01195401, “GL 2008-01 Inspection Findings at Byron/Braidwood,” March 31, 2011
- AR01195408, “GL 2008-01 Inspection Findings at Byron/Braidwood,” March 31, 2011
- AR01197314, “GL 2008-01 Inspection Findings at Byron/Braidwood,” April 4, 2011
- AR01212387, “Lack of Gas Management RHR Discharge Piping Void,” May 5, 2011
- ATI-992573-07, “NRC IN 2010-11 Voiding in RHR Piping”
- CPS 3309.01, “High Pressure Core Spray (HPCS),” Revision 16a
- CPS 3312.01, “Residual Heat Removal,” Revision 38c
- CPS 3312.03, “RHR - Shutdown Cooling (SDC) and Fuel Pool Cooling and Assist (FPC&A),” Revision 6c
- CPS 9051.01, “HPCS Pump and HPCS Water Leg Pump Operability,” Revision 44a
- CPS 9051.05, “HPCS Discharge Header Filled and Flow Path Verification,” Revision 27e
- CPS 9053.01, “RHR B/RHR C Discharge Header Filled and Flow Path Verification,” Revision 28F
- EC 371529, “Generic Letter 2008-01 HPCS Evaluation,” Revision 1
- EC 371531, “GL 2008-01 System Evaluation Template, Exelon Specific, Clinton Power Station - RHR Evaluation,” Revision 1
- EC 371609, “Ultra Sonic Inspection Criteria: Division 1 ECCS: RHR A/LPCS,” Revision 1
- EC 371659, “Generic Letter 2008-01 Air Intrusion in ECCS Systems Ultrasonic Inspection Criteria Division 2 ECCS: RHR-B/RHR-C; Revision 1,”
- EC 371983, “Installation of High Point vent on Line 1RH50AB-10 “ Cancel to EC373186 and Calc IP-M-0777,” August 16, 2010
- EC 373186, “Piping Air Pocket acceptance (NRC GL 2008-01), Valve Bonnet and Known Pockets,” Revision 0
- EC-371560, “HPCS Vent Modification,” Revision 0
- EC-371660, “Generic Letter 2008-01: Air Intrusion in ECCS Systems Ultra-sonic Inspection Criteria: Division 3 ECCS: HPCS,” Revision 1
- EC-380824, “Generic Letter 2008-01 System Periodic UT Frequency Evaluation Clinton Power Station – RHR,” LPCS and HPCS; Revision 0
- ER-AA-2009, “Managing Gas Accumulation,” Revision 1
- ER-AA-335-007,” Ultrasonic Inspection for Determination of Sedimentation in Piping Systems or Components and Fluid Level Measurements,” Revision 3
- FAI/08-70, “Gas Void Pressure Pulsations Program,” Revision 0
- HP-1, High Pressure Core Spray Isometric Drawing;Revision 7U
- HP-2, High Pressure Core Spray Isometric Drawing; Revision 10L
- HP-3, High Pressure Core Spray Isometric Drawing; Revision 6A
- HP-4, High Pressure Core Spray Isometric Drawing; Revision 7E
- HP-5, High Pressure Core Spray Isometric Drawing; Revision 9N
- HP-6, High Pressure Core Spray Isometric Drawing; Revision 6R
- M05-1074, P&ID High Pressure Core Spray; Revision AH
- M05-1075-001, “P& ID Residual Heat Removal (RH),” Revision AW
- M05-1075-002, “P& ID Residual Heat Removal (RH),” Revision AM
- M05-1075-003, “P& ID Residual Heat Removal (RH),” Revision AG
- Operability Evaluation 812163-02, “Residual Heat Removal System,” January 13, 2009
- Power Point Presentation on Training for GL 2008-01
- RH-09, “System: Residual Heat Removal Isometric Drawing,” Revision 7A
- RH-11, “System: Residual Heat Removal Isometric Drawing,” Revision 5M
- RH-14, “System: Residual Heat Removal Isometric Drawing,” Revision 12M
- RH-17, “System: Residual Heat Removal Isometric Drawing,” Revision 8H

- RH-21, “System: Residual Heat Removal Isometric Drawing,” Revision 11L
- RS-08-131, “Nine-Month Response to Generic Letter 2008-01,” October 14, 2008
- RS-09-173, “Response to Request for Additional Information Regarding Generic Letter 2008-01,” December 15, 2009
- WO01359924, “UT Testing to Check for Accumulated Air – HPCS,” October 18, 2008
- WO01379900, “UT Testing to Check for Accumulated Air – HPCS,” January 17, 2011
- AR01206227, “Missed Impacts to RCIC Cooling Load Calculations,” April 22, 2011
- AR01208619, “12-Minutes Basis in Procedure – Injection Piping Fill Time,” April 27, 2011
- AR01212387, “NRC GL 2008-01 Lack of Gas Management RHR Discharge Piping Void,” May 5, 2011
- AR01205245, “SX Rooms Watertight Doors SD1-11 and SD1-12 are Found Open,” April 20, 2011
- AR01205404, “Document Update Missed in EC,” April 20, 2011
- AR01209715, “NRC IN 2010-11 Response,” April 29, 2011

LIST OF ACRONYMS USED

AC	Alternating Current
ADAMS	Agency-wide Documents and Management System
AR	Action Request
BI	Barrier Integrity
CFM	Cubic Feet Per Minute
CFR	Code of Federal Regulations
CNO	Chief Nuclear Officer
DG	Diesel Generator
DHR	Decay Heat Removal
ECCS	Emergency Core Cooling System
°F	Degrees Fahrenheit
FIN	Finding
GL	Generic Letter
GPM	Gallons Per Minute
HEPA	High Efficiency Particulate Air
HPCS	High Pressure Core Spray
HVAC	Heating Ventilation and Air Conditioning
IE	Initiating Events
IMC	Inspection Manual Chapter
IP	Inspection Procedure
ISI	Inservice Inspection
LER	Licensee Event Report
LLRT	Local Leak Rate Test
LOCA	Loss-of-Coolant-Accident
LPCS	Low Pressure Core Spray
MS	Mitigating Systems
MSL	Main Steam Line
MSPI	Mitigating Systems Performance Index
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NIOSH	National Institute for Occupational Safety and Health
NRC	U.S. Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
P&ID	Piping and Instrumentation Diagram
PARS	Publicly Available Records System
%	Percent
PIV	Pressure Isolation Valve
PMT	Post-Maintenance Test
PSIG	Pounds Per Square Inch Gauge
RCIC	Reactor Core Isolation Cooling
RCS	Reactor Coolant System
RHR	Residual Heat Removal
SAMG	Severe Accident Management Guidelines
SBO	Station Blackout
SCBA	Self Contained Breathing Apparatus
SDP	Significant Determination Process
SSC	Structures, System, and Component
SX	Shutdown Service Water
TEDE	Total Effective Dose Equivalent

TI	Temporary Instruction
TR	Topical Report
TS	Technical Specification
TSO	Transmission System Operator
TSSR	Technical Specification Surveillance Requirement
TSTF	Technical Specification Task Force
UHS	Ultimate Heat Sink
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
VC	Control Room Ventilation
VG	Standby Gas Treatment
Work Order	Work Order
WR	Work Request

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Sincerely,

/RA/

Mark A. Ring, Chief
Branch 1
Division of Reactor Projects

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