



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

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

April 29, 2011

EA 11-021

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 AND
EXERCISE OF ENFORCEMENT DISCRETION 05000461/2011-002**

Dear Mr. Pacilio:

On March 31, 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 April 15, 2011, with Mr. F. Kearney 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.

As stated in Section 4OA5 of this report, we closed an Unresolved Item and documented a violation of 10 CFR 50, Appendix B, Criterion III, "Design Control," for your failure to ensure adequate electrical separation between the safety-related Nuclear System Protection System and the non-safety related Self Test System. Although the issue constitutes a violation of NRC requirements, we have concluded that the violation resulted from matters not reasonably within Exelon Generation Company's ability to foresee and correct; and, therefore, was not a performance deficiency.

Using the NRC's Enforcement Policy, the violation met the criteria for enforcement discretion. As such, I have been authorized, after consultation with the Director, NRC Office of Enforcement and the Region III Regional Administrator, to exercise enforcement discretion in accordance with Section 3.5 of the Enforcement Policy and refrain from issuing enforcement action for the violation.

Based on the results of this inspection, three NRC-identified findings of very low safety significance were identified. Each of these findings was determined to involve a violation 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 characterization of any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement to the Regional Administrator, Region III, and the NRC Resident Inspector at 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/

Steven West, Director
Division of Reactor Projects

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

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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

Report No: 05000461/2011-002

Licensee: Exelon Generation Company, LLC

Facility: Clinton Power Station, Unit 1

Location: Clinton, IL

Dates: January 1 through March 31, 2011

Inspectors: B. Kemker, Senior Resident Inspector
D. Lords, Resident Inspector
C. Brown, Reactor Inspector
J. Cassidy, Senior Health Physicist
R. Orlikowski, Project Engineer
S. Mischke, Resident Inspector, Illinois Emergency
Management Agency

Approved by: S. West, Division Director
Division of Reactor Projects

Enclosure

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SUMMARY OF FINDINGS

IR 05000461/2011-002, 01/01/11 – 03/31/11; Clinton Power Station, Unit 1; Fire Protection, Surveillance Testing.

This report covers a three-month period of inspection by the resident inspectors and announced baseline inspections by regional inspectors. Three Green findings, each 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: Initiating Events

- Green. The inspectors identified a finding of very low safety significance with an associated non-cited violation of the Clinton Power Station Unit 1 Operating License (NPF-62, Section 2.F). The licensee failed to implement the Fire Protection Program in accordance with program requirements by failing to follow approved Fire Protection Program procedures for the control of transient combustible materials. The licensee promptly removed the transient combustible materials found by the inspectors and initiated compensatory measures.

The inspectors concluded that this finding could be reasonably viewed as a precursor to a significant event (i.e., a fire affecting more than one train of safe shutdown equipment). Specifically, the presence of transient combustible materials in a combustible free zone could reasonably result in degradation of the fire protection defense-in-depth elements in place to prevent fires from starting and mitigate the consequences of fires. In addition, based on review of Example 4k in IMC 0612, "Power Reactor Inspection Reports," Appendix E, "Examples of Minor Issues," the issue would not be considered to be of minor significance because the identified transient combustibles were found in a combustible free zone required for separation of redundant trains. The finding was of very low safety significance because the items found in the combustible free zone would not be considered transient combustibles of significance as defined in IMC 0609, Appendix F, "Fire Protection Significance Determination Process," Attachment 2, "Degradation Rating Guidance Specific to Various Fire Protection Program Elements," and, therefore, the issue was assigned a "low degradation" rating. The inspectors concluded that this finding affected the cross-cutting area of human performance. Although a pre-job briefing was not required by the licensee's procedure for the work activity, job site conditions and a discussion that the work was within a Transient Combustible Free Zone (TCFZ) was not included in the briefing. In addition, the workers' 2-Minute Drill performed at the job site did not identify that work activities were within a TCFZ. Therefore, the inspectors concluded that the licensee's work practices which support human performance were less than effective (H.4(a)). (Section 1R05.1.b.1)

- Green. The inspectors identified a finding of very low safety significance with an associated non-cited violation of Technical Specification Surveillance Requirement

(TSSR) 3.6.3.2.4. The licensee failed to verify that each required hydrogen igniter in accessible areas of the Primary Containment and Drywell develops a surface temperature of ≥ 1700 degrees Fahrenheit ($^{\circ}\text{F}$) every 24 months. 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 hydrogen igniters were operable based on the results of surveillance testing to measure voltage/current draw.

The finding was of more than minor significance because it was associated with the Human Performance attribute for the Containment and adversely affected the Barrier Integrity Cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. Specifically, the licensee did not correctly evaluate a change to perform the surveillance test with the unit at power beginning in March 2002. It was not recognized that TSSR 3.6.3.2.4 would not be met for accessible hydrogen igniters in the Drywell and 755' Elevation Steam Tunnel when performing the test with the unit at power and the licensee incorrectly believed that performance of the current/voltage surveillance test procedure for inaccessible igniters was an appropriate substitute, contrary to existing procedural guidance. The finding was a licensee performance deficiency of very low safety significance because it did not involve an actual reduction in the function of hydrogen igniters in the Primary Containment and Drywell. The inspectors concluded that because the scheduling change to perform the surveillance with the unit at power took place prior to surveillance testing beginning in March 2002, it did not necessarily reflect current licensee performance and no cross-cutting aspect was identified. (Section 1R22.b.1)

- Green. The inspectors identified a finding of very low safety significance with an associated non-cited violation of 10 CFR 50, Appendix B, Criterion XI, "Test Control." The licensee failed to establish a test program adequate to assure testing of hydrogen igniters in accessible areas of the Primary Containment and Drywell pursuant to TSSR 3.6.3.2.4. The licensee entered this violation into its corrective action program to investigate the cause and to identify appropriate corrective actions.

The finding was of more than minor significance because it was associated with the Procedure Quality attribute for the Containment and adversely affected the Barrier Integrity Cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. The finding was a licensee performance deficiency of very low safety significance because it did not involve an actual reduction in the function of hydrogen igniters in the Primary Containment and Drywell. The inspectors concluded that this finding affected the cross-cutting aspect of human performance. Specifically, adequate licensee resources involving personnel and procedures did not support successful human performance. CPS 9867.05 was not appropriate to the circumstances because it contained errors and did not provide adequate testing controls for the performance of the surveillance test (H.2(c)). (Section 1R22.b.2)

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 February 27, 2011, the licensee reduced power to about 67 percent to perform control rod sequence exchange, scram time testing, control rod settle testing, turbine-driven reactor feed pump emergency trip testing, and main turbine control/stop/intermediate valve and main steam isolation valve testing. The unit was returned to full power later the same day following testing.

On March 20, 2011, the licensee reduced power to about 84 percent to perform control rod pattern adjustments. The unit was returned to full power later the same day.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

.1 Readiness For Impending Adverse Weather Condition – Severe Winter Storm/Blizzard

a. Inspection Scope

Since severe winter weather conditions with heavy snowfall and high winds were forecast in the vicinity of Clinton Power Station for February 1, 2011, the inspectors reviewed the licensee's overall preparations/protection for the expected conditions. During the inspections, the inspectors focused on plant-specific design features and the licensee's procedure used to respond to severe weather conditions.

This inspection constituted one readiness for impending adverse weather condition inspection sample as defined in Inspection Procedure (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:

- Control Room Ventilation System Train A during planned maintenance on Control Room Ventilation System Train B;
- Division 1 Hydrogen Recombiner (Combustible Gas Control System) prior to planned maintenance on Division 2 Hydrogen Recombiner; and

- Residual Heat Removal (RHR) System Train A during planned maintenance on RHR System Trains B and C.

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.

.2 Semi-Annual Complete System Walkdown (71111.04S)

a. Inspection Scope

The inspectors performed a complete system alignment inspection of the control rod drive system to verify the functional capability of the system. This system was selected because it was considered both safety significant and risk significant in the licensee's probabilistic risk assessment. The inspectors walked down the system to review mechanical and electrical equipment lineups, electrical power availability, system pressure and temperature indications, as appropriate, component labeling, component lubrication, component and equipment cooling, hangers and supports, operability of support systems, and to ensure that ancillary equipment or debris did not interfere with equipment operation. A review of a sample of past and outstanding work orders (WOs) was performed to determine whether any deficiencies significantly affected the system function. In addition, the inspectors reviewed the corrective action program database to ensure that system equipment alignment problems and material condition issues were being identified and appropriately resolved.

This inspection constituted one complete system walkdown inspection sample 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-2j, Radwaste Pipe Tunnel - Elevation 750'6";
- Fire Zone CB-1i, Air Handling Equipment Area - Elevation 825'0";
- Fire Zones D-1, D-2, & D-3, Diesel Generator (DG) Fuel Tank Rooms – Elevation 712'0";
- Fire Zones F-1c & F-1d, Floor Drain Sump and Pump Rooms - Elevation 712'0";
- Fire Zone M-2a, Division 3 Shutdown Service Water Pump Room – Elevation 699'0"; and
- Fire Zone A-1b, Auxiliary Building (General Access Area North) – Elevation 737'0".

The inspectors verified that transient combustibles and ignition sources were appropriately controlled and assessed the material condition of fire suppression systems, manual firefighting 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 six quarterly fire protection inspection samples as defined in IP 71111.05AQ.

b. Findings

(1) Failure to Control Transient Combustible Materials in Accordance with Fire Protection Program

Introduction

The inspectors identified a finding of very low safety significance (Green) with an associated non-cited violation of the Clinton Power Station Unit 1 Operating License (NPF-62, Condition 2.F). The licensee failed to implement the Fire Protection Program in accordance with program requirements by failing to follow approved Fire Protection Program procedures for the control of transient combustible materials.

Discussion

On January 18, 2011, with Unit 1 operating in Mode 1, the inspectors identified three nylon rigging slings and a 4-wheel cart left unattended in the Auxiliary Building on the 737'0" Elevation, General Access Area North, (Fire Zone A-1b). The nylon rigging slings are combustible items and the wheeled cart contained combustible items (plastic wheels). The area in which these transient combustible items were found contained highly visible red-striped paint on the floor and markings indicating the area to be a "Combustible Free Zone," as described in the Clinton Power Station Fire Protection Evaluation Report (Updated Final Safety Analysis Report (UFSAR), Appendix E) or, alternatively, a "Transient Combustible Free Zone" (TCFZ) as described in OP-AA-201-009, "Control of Transient Combustible Material," Attachment 5, "Clinton – Station Specific Information." As stipulated in Attachment 5 of OP-AA-201-009, the placement of transient combustible materials in these areas without prior approval in the form of a Transient Combustible Permit (TCP) and Plant Barrier Impairment and additional compensatory measures is prohibited in Modes 1, 2, and 3. Neither a TCP nor a Plant Barrier Impairment was approved for these transient combustible items and no compensatory measures had been established. The procedure further stated that the TCFZs at Clinton Power Station (CPS) are provided for the purpose of separating redundant safe shutdown equipment. According to the Fire Protection Evaluation Report, redundant safe shutdown equipment of concern for the Auxiliary Building 737'0" Elevation General Access Area North includes: Divisions 1 and 2 panels and instruments, and Divisions 1 and 2 cable trays. Upon discovery, the inspectors promptly notified the licensee and compensatory measures were established until the combustible materials were removed from the TCFZ. The combustible items were determined to be Class A materials as defined in OP-AA-201-009. The combustible materials were left unattended in the TCFZ at about 9:40 a.m. on January 18th, were found by the inspectors at about 10:45 a.m., and were removed at about 11:05 a.m. the same day.

The inspectors reviewed the licensee's cause evaluation of this issue. The licensee concluded that error precursors, related to TCFZs, were not discussed during the pre-job briefing. The briefing discussed the scope of work and the safety hazards associated with the work; however, since the work activity did not involve a plant system or component, personnel were complacent in considering what else could go wrong while performing the activity at this location. The fact that the area was a TCFZ was not discussed. Additionally, the workers did not recognize the TCFZ when they arrived at the work area. Their lack of awareness of surroundings led them to not consider the requirements for materials in a TCFZ. The individuals involved were knowledgeable of the procedure requirements with respect to TCFZs; however, they became focused on the tasks at hand and lost perspective on the work location. The licensee's evaluation followed the format of a Quick Human Performance Investigation.

Refer to Section 4OA2.2 of this report for a discussion of an adverse performance trend involving the licensee's failure to follow approved Fire Protection Program procedures for the control of transient combustible materials.

Analysis

The inspectors determined that this failure to follow the procedural requirements of the Clinton Power Station Fire Protection Program was a licensee performance deficiency warranting a significance evaluation. The inspectors assessed this issue

using the Significance Determination Process (SDP). The inspectors reviewed the examples of minor issues in IMC 0612, "Power Reactor Inspection Reports," Appendix E, "Examples of Minor Issues," and found one example related to this issue. Example 4k described a situation where a licensee had not followed requirements of its Fire Protection Plan with respect to the control of transient combustible materials. In this example, the issue would be considered to be of more than minor significance if the identified transient combustibles were in a combustible free zone required for separation of redundant trains. In addition, consistent with the guidance in IMC 0612, Appendix B, "Issue Screening," the inspectors determined that this failure to follow Fire Protection Program procedural requirements could be reasonably viewed as a precursor to a significant event (i.e., a fire affecting more than one train of safe shutdown equipment). Specifically, the presence of transient combustible materials in a combustible free zone could reasonably result in degradation of the fire protection defense-in-depth elements in place to prevent fires from starting and mitigate the consequences of fires. This finding was associated with the Initiating Events Cornerstone.

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 3b, "SDP Screening Worksheet for Initiating Events, Mitigation Systems, and Barriers Cornerstones," the inspectors determined that this finding affected the fire protection defense-in-depth strategies involving fire prevention and administrative controls. Therefore, the inspectors performed a review of this finding using the guidance provided in IMC 0609, Appendix F, "Fire Protection Significance Determination Process." In Step 1.1, the inspectors determined that this issue involved the finding category of "Fire Prevention and Administrative Controls." In Step 1.2, the inspectors referenced IMC 0609, Appendix F, Attachment 2, "Degradation Rating Guidance Specific to Various Fire Protection Program Elements," and assigned a "low degradation" rating to this finding involving the licensee's combustible controls program. The inspectors' conclusion was based on the fact that the items found in the TCFZ would not be considered transient combustibles of significance. The attachment defines transient combustibles of significance as low flash point liquids (below 200 degrees Fahrenheit (°F)) and self-igniting combustibles (oily rags). The materials found were Class A combustibles (plastic and cloth). Therefore, in Step 1.3, the inspectors determined that this finding was a licensee performance deficiency of very low safety significance (Green) because the issue was assigned a "low degradation" rating.

Cross-Cutting Aspects

The inspectors concluded that the primary cause of this finding was related to the cross-cutting area of human performance. Although a pre-job briefing was not required by the licensee's procedure for the work activity, job site conditions and a discussion that the work was within a TCFZ were not included in the briefing. In addition, the workers' 2-Minute Drill performed at the job site did not identify that work activities were within a TCFZ. Therefore, the inspectors concluded that the licensee's work practices which support human performance (e.g., pre-job briefing and 2-Minute Drill) were less than effective (H.4(a)).

Enforcement

The Clinton Power Station Unit 1 Operating License (NPF-62), Condition 2.F requires, in part, that the licensee implement and maintain in effect all provisions of the approved Fire Protection Program as described in the Final Safety Analysis Report as amended, and as approved in the Safety Evaluation Report (NUREG-0853), dated February 1982, and Supplement Numbers 1 through 8.

The Clinton Power Station UFSAR, Appendix E, "Fire Protection Evaluation Report," Section 4.0, "Compliance with Branch Technical Position (BTP) APCS 9.5-1, Appendix A, Plants Under Construction and Operating Plants," contains the overall program requirements of the licensee's Fire Protection Program. Paragraph C.2, "Instructions, Procedures, and Drawings" states, in part, that administrative controls that govern the Fire Protection Program should be prescribed by documented instructions, procedures, or drawings and should be accomplished in accordance with these documents. OP-AA-201-009, "Control of Transient Combustible Material," Revision 11, prescribes the licensee's administrative controls governing the control of transient combustible materials at Clinton Power Station. OP-AA-201-009, Attachment 5, "Clinton Station Specific Information," Step 1 requires, in part, that authorization be obtained from the Fire Marshall or designee in the form of a TCP prior to staging or storing exposed Class A combustibles or any Class B combustible material in a TCFZ when the plant is in Mode 1, 2, or 3.

Contrary to the above, the licensee failed to follow OP-AA-201-009, Attachment 5, Step 1, by not having an authorized TCP for unattended Class A combustible items (three nylon rigging slings and a 4-wheel cart containing plastic wheels) that were found by the inspectors within the TCFZ in the Auxiliary Building 737'0" Elevation, General Access Area North, on January 18, 2011. Because of the very low safety significance, this violation is being treated as a non-cited violation consistent with Section 2.3.2 of the NRC Enforcement Policy (**NCV 05000461/2011002-01, Failure to Control Transient Combustible Materials in Accordance with Fire Protection Program**). The licensee entered this violation into its corrective action program as Action Request (AR) 1163754.

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 shutdown 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:

- Reactor Core Isolation Cooling (RCIC) Pump Room; and
- High Pressure Core Spray (HPCS) Pump Room.

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

b. Findings

No findings were identified.

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 March 9, 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):

- Critical Equipment Preventive Maintenance Deferrals;
- Self Test System (STS); and
- Reactor Water Cleanup (RWCU) Pump B.

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).

The inspectors used the guidance contained in Operating Experience Smart Sample (OpESS) FY2010-01, "Recent Inspection Experience for Components Installed Beyond Vendor Recommended Service Life" during this inspection to review a sample of deferred preventive maintenance activities.

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 three maintenance effectiveness inspection samples 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 and testing during the week of January 24-28 on Control Room Ventilation System Train A, RHR System Train A, Low Pressure Core Spray (LPCS) System, and Station Battery 1E;
- Planned maintenance during the week of February 28 - March 4 on Division 1 DG and Standby Gas Treatment System Train A;
- Planned maintenance during the week of February 21-25 on Division 4 Battery Charger and Two Control Rod Drive Hydraulic Control Units;
- Emergent maintenance during the week of March 28 - April 1 on Division 1 DG following a fast start test failure; and
- Emergent maintenance during the week of March 14-18 on Division 2 DG speed sensing relay and Main Condenser tube leak actions.

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 five maintenance risk assessment inspection samples as defined in IP 71111.13.

b. Findings

No findings were identified.

1R15 Operability Evaluations (71111.15)

.1 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following issues:

- AR 01171599, "9054.02 RCIC Valve Operability Not Performed As Scheduled";
- AR 01164658, "Potential Missed Surveillance Hydrogen Igniters SR [Surveillance Requirement] 3.6.3.2.4";
- AR 01166886, "Issue for Trending Hydramotor Weeping Oil in Control Department";
- AR 01166610, "FASA [Focus Area Self Assessment] Gas – New Calc For Air Pockets Is Not Prepared"; and
- AR 01172335, "Design Basis Issue for Spurious HPCS Operation."

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.

.2 Operability Evaluations Associated with Temporary Instruction (TI) 2515/177, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems"

a. Inspection Scope

The inspectors reviewed the following issues associated with the scope of GL 2008-01, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems":

- EC 373186, "Piping Air Pocket Acceptance, Valve Bonnets and Known Pockets," Revision 0.

The inspectors verified that the licensee acceptably identified the gas intrusion mechanisms that apply to the licensee's plant. If the licensee's evaluation was incomplete, the inspectors verified that corrective actions were placed into the corrective action program (TI 2515/177, Section 04.02.e).

This inspection effort counts towards the completion of TI 2515/177, which will be closed in a later inspection report.

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 377772, Rev. 1, "Jumper Out High Compressor Oil Temperature Trip on 1VP04CB."

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 equipment.

The inspectors also reviewed a sample of action requests pertaining to temporary modifications to verify that problems were entered into the licensee's corrective action program with the appropriate significance characterization and that corrective actions were appropriate.

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:

- WOs 01097866-02 & 01097867-02, "Control Room Ventilation 'A' Hydramotor Post-Maintenance Tests";
- WO 1262577-01, "Clean and Inspect Division IV 125 VDC [Volts Direct Current] Battery Charger 1DDC";
- WOs 00775161 & 01375865, "Refurbish Rod Drive Hydraulic Accumulators 1C11D001DD & 1C11D001BV";
- WO 01283986-05, "Place Plant Chilled Water 'C' Chiller in Service";
- WO 01266387-02, "2SA01C Return to Service, Verify Function, No Leaks";
- WO 01175527-03, "Replace and Calibrate Capacity Controller 1TCVP013"; and
- WO 01244250 05, "Swap Breaker for Drywell Chiller 1A 1VPO4CA."

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 post-maintenance 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 the 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)

.1 Surveillance Testing

a. Inspection Scope

The inspectors reviewed the test results for 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 9052.01, "LPCS/RHR 'A' Pumps & LPCS/RHR 'A' Water Leg Pump Operability"; (Inservice Test)
- CPS 9867.05, "Hydrogen Igniter Temperature Test"; (Routine Test)
- CPS 9080.12, "Diesel Generator Fuel Oil Transfer Pump Operability"; (Inservice Test)
- CPS 9080.01, "Diesel Generator 1A Operability – Manual and Quick Start Operability," and CPS 9080.24, "DG 1A Test Mode Override, Load Reject Operability, and Idle Speed Override"; (Routine Test) and
- CPS 9843.01, "ISI [Inservice Inspection] Category 'A' Valve Leak Rate Test." (Reactor Coolant System Leakrate)

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 testing methodology and documentation to verify that equipment performance was consistent with safety analysis and design basis assumptions, and that testing acceptance criterion 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 two inservice tests, one reactor coolant system leakrate test, and two routine surveillance tests, for a total of five surveillance testing inspection samples as defined in IP 71111.22.

b. Findings

Failure to Meet Surveillance Testing Requirement for Hydrogen Igniters in Accessible Areas of the Primary Containment and Drywell

Introduction

The inspectors identified a finding of very low safety significance (Green) with an associated non-cited violation of Technical Specification Surveillance Requirement (TSSR) 3.6.3.2.4. The licensee failed to verify that each required hydrogen igniter in

accessible areas of the Primary Containment and Drywell develops a surface temperature of ≥ 1700 degrees Fahrenheit ($^{\circ}\text{F}$) every 24 months.

Discussion

The inspectors observed and reviewed the licensee's performance of surveillance testing that was accomplished in accordance with procedure CPS 9867.05, "Hydrogen Igniter Temperature Test," Revision 24. The inspectors observed testing of the Division 2 hydrogen igniters on January 10, 2011, and also reviewed the results of the Division 1 hydrogen igniter testing performed on December 27, 2010. This surveillance test procedure was performed to satisfy TSSR 3.6.3.2.4, which requires the licensee to verify that each required hydrogen igniter in accessible areas of the Primary Containment and Drywell develops a surface temperature of $\geq 1700^{\circ}\text{F}$ every 24 months. As described in Section 6.2.5.2.1 of the UFSAR, the safety function of the hydrogen ignition system is to burn hydrogen at low concentrations, thereby maintaining the concentration of hydrogen below that, if ignited, could lead to containment over-pressurization failure in the unlikely occurrence of a degraded core event that results in the generation of excessive quantities of hydrogen from a large metal-water reaction in the reactor pressure vessel.

There is a distinction made in the hydrogen ignition system TSSRs between "accessible areas" and "inaccessible areas." According to the Bases for TSSRs 3.6.3.2.3 and 3.6.3.2.4, functional testing the hydrogen igniters is performed every 24 months to verify system operability. The current draw to develop a surface temperature of $\geq 1700^{\circ}\text{F}$ is verified by TSSR 3.6.3.2.3 for igniters in inaccessible areas of the plant (e.g., in high radiation areas), while the surface temperature of each accessible igniter is measured to be $\geq 1700^{\circ}\text{F}$ by TSSR 3.6.3.2.4 to demonstrate that a temperature sufficient for ignition is achieved. The Bases also states, in part, that: "The 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power." The above wording in the Clinton Power Station TS Bases for TSSRs 3.6.3.2.3 and 3.6.3.2.4 is consistent with the wording in NUREG-1434, "Standard Technical Specifications - General Electric Plants, BWR/6," Revision 1.

The inspectors noted that CPS 9867.05 clearly defined which hydrogen igniters were "accessible igniters" subject to TSSR 3.6.3.2.4 testing and which hydrogen igniters were "inaccessible igniters" subject to TSSR 3.6.3.2.3 testing in Appendices A and B of the procedure, respectively. Hydrogen igniters in the Drywell and 755' Elevation Steam Tunnel that would not be accessible with the unit at power due to high dose rates were listed in Appendix A as accessible igniters. This was appropriate because the 24-month surveillance frequency would support testing these igniters during an outage when dose rates in these areas would be much lower. The only hydrogen igniters listed in Appendix B as inaccessible igniters were those located in the Reactor Water Cleanup System Equipment Rooms. This was appropriate because dose rates in these rooms would be very high irrespective of unit power level. Step 2.1.3 stated: "For igniters in the heat exchanger, filter demineralizer, backwash and holding pump rooms for RWCU, the igniter surface temperature is verified by measurement of the feed current/voltage. The most recent performance of CPS No. 9367.04, 'Hydrogen Igniter Current/Voltage Test,' is reviewed to ensure that the combination measured is sufficient to assure at least 1700°F to satisfy TSSR 3.6.3.2.3. These igniters are identified in Appendix B."

During review of CPS 9867.05, the inspectors developed several questions regarding the performance of surveillance testing for the hydrogen igniters.

1. The inspectors noted that testing was performed on January 10th with Unit 1 operating at power rather than during an outage. This appeared to conflict with the statement in the Bases for TSSR 3.6.3.2.3 and 3.6.3.2.4 that referred to “the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power.” The inspectors brought this apparent conflict to the attention of the Shift Manager prior to the test. The Shift Manager evaluated the question raised by the inspectors and concluded that performance of the test with the unit at power was acceptable and authorized it to be done. The inspectors did not understand the origin of the statement in the TS Bases and did not identify a safety concern with performing the test with the unit at power. However, the inspectors recognized that not all hydrogen igniters accessible during an outage would be accessible with the unit at power. Specifically, hydrogen igniters in the Drywell are only accessible during an outage due to very high dose rates in the Drywell with the unit at power. The licensee wrote AR 01160746 requesting engineering and licensing to evaluate whether the testing needed to be performed only during an outage as stated in the TS Bases or whether a change to the TS Bases would be appropriate. This question was also captured in AR 01163043.
2. The inspectors noted that hydrogen igniters in the Drywell and 755’ Elevation Steam Tunnel were not verified during the performance of CPS 9867.05 on December 27th and January 10th to satisfy TSSR 3.6.3.2.4. The inspectors requested the licensee to provide documentation from the previous outage period that would demonstrate acceptable performance of TSSR 3.6.3.2.4 for these hydrogen igniters. This question was captured in AR 01163043. In response to the inspectors’ question, the licensee discovered that surveillance testing to satisfy TSSR 3.6.3.2.4 for hydrogen igniters in the Drywell and 755’ Elevation Steam Tunnel had not been performed since March 19, 2002. The licensee wrote AR 01164658 for this issue and 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 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 hydrogen igniters were operable based on the results of surveillance testing to measure current/voltage draw. The inspectors reviewed the operability evaluation and concurred with the licensee’s conclusion. The licensee subsequently entered the 755’ Elevation Steam Tunnel and performed the CPS 9867.05 visual verification satisfactorily for two of the hydrogen igniters.
3. The inspectors reviewed the completed test package for CPS 9867.05 performed on January 10th and discovered that the licensee had incorrectly concluded that the surveillance test was completed satisfactorily. On the CPS 9867.05 Data Sheet 1, the licensee wrote a note in the comments field for the hydrogen igniters in the Drywell and 755’ Elevation Steam Tunnel that were not verified, which read: “Note 1 - These igniters are not accessible at 100% power. Verified acceptance criteria of CPS 9367.04, WO 1370262-01 completed on January 3, 2011.” The inspectors found a similar annotation in the completed test package for

CPS 9867.05 performed on December 27th. However, verification by measurement of the feed current/voltage as stated in Step 2.1.3 of CPS 9867.05 was only allowed to satisfy TSSR 3.6.3.2.3 for igniters in inaccessible areas. It would not satisfy TSSR 3.6.3.2.4 for igniters in accessible areas. The inspectors reviewed the acceptance criteria specified in CPS 9867.05, both in the body of the procedure as well as on the Data Sheet 1. While the acceptance criteria in Steps 9.1.1 and 9.1.2 of the procedure clearly stated the appropriate criteria for both accessible and inaccessible hydrogen igniters, the acceptance criteria in Step 9.1 of the Data Sheet 1 was incorrect because it allowed either visual verification by an orange glow or verification of sufficient current and voltage to satisfy the surveillance for any igniter.

4. The inspectors noted that in addition to the Drywell and 755' Elevation Steam Tunnel hydrogen igniters, there were three other accessible igniters not viewed directly on January 10th to verify the igniters glowed with an orange color. On the CPS 9867.05 Data Sheet 1, the licensee provided a note in the comments field for these hydrogen igniters stating: "1HG06EH & 1HG11EL could not be seen directly due to location behind rad [radiation protection] rope but the orange glow reflection could be seen off adjacent equipment & 1HG09EP could not be located. All three (3) were verified acceptable reviewing results in WO 1370262-01 (CPS 9367.04 Surveillance)." The licensee wrote AR 01162250 to identify the three igniters that were not initially verified and incorrectly concluded in the AR and in the completed test package that all three igniters were verified as acceptable per CPS 9867.05, Paragraph 2.1.3 by reviewing the acceptable results obtained from the previous CPS 9367.04 surveillance. The inspectors discussed this conclusion with the licensee and determined that, as with the Drywell and 755' Elevation Steam Tunnel hydrogen igniters, verification by measurement of the feed current/voltage as stated in Step 2.1.3 of CPS 9867.05 was only allowed to satisfy TSSR 3.6.3.2.3 for igniters in inaccessible areas. It did not satisfy TSSR 3.6.3.2.4 for these three hydrogen igniters in an accessible area. The licensee subsequently performed the CPS 9867.05 visual verification satisfactorily for these three igniters.

The inspectors thoroughly reviewed the licensee apparent cause evaluation for the missed surveillance and concluded that the licensee had not neglected any likely factors. The licensee identified two apparent causes and two contributing causes:

1. CPS 9867.05 was not correctly followed beginning in March 2002. The surveillance test was performed with the unit at power for the first time even though some of the hydrogen igniters on the Appendix A accessible igniter list were not accessible with the unit at power. The Data Sheet 1 was incorrectly annotated that the Drywell and 755' Elevation Steam Tunnel hydrogen igniters were inaccessible, but tested satisfactorily because they passed the current/voltage test. (apparent cause)
2. Refueling outage hydrogen igniter testing for igniters that are not accessible with the unit at power was incorrectly scheduled to be performed with the unit at power. Prior to March 2002, CPS 9867.05 was scheduled and performed during a refueling outage. The licensee rescheduled the testing to be performed with the unit at power, but failed to correctly address the need for testing the Drywell and 755' Elevation Steam Tunnel hydrogen igniters during an outage period. (apparent cause)

3. From 2003 through 2011, accessible hydrogen igniters in the Drywell and 755' Elevation Steam Tunnel were incorrectly annotated in completed test procedures as inaccessible based on previous experience. Test performers repeatedly followed the incorrect example set in March 2002 by simply annotating that these hydrogen igniters were inaccessible but tested satisfactorily because they passed the CPS 9367.04 current/voltage test. The completed surveillance test packages were reviewed and approved by supervisors 11 times since March 2002 and the annotation error was not identified. Test performers believed that because the procedure allowed performance of the test in all modes of plant operation and because of past practice, it would be acceptable to use the current/voltage results for the untested Drywell and 755' Elevation Steam Tunnel hydrogen igniters. They did not believe the list of accessible igniters in Appendix A of CPS 9867.05 to be a limitation to performing the surveillance test. (contributing cause)
4. Pre-job briefings for the performance of CPS 9867.05 on January 10, 2011, and December 27, 2010, were inadequate because procedure steps and acceptance criteria were not discussed during the briefings. Participants in the briefings stated that the focus of the briefings was industrial safety and that the procedure was not reviewed. (contributing cause)

Corrective actions identified by the licensee for the above causes included changes to CPS 9867.05 to address procedure deficiencies and appropriate scheduling changes to account for the performance of hydrogen igniter testing both during an outage and with the unit at power. The inspectors concluded that the corrective actions would be appropriate.

Analysis

The inspectors determined that the licensee's failure to satisfy the surveillance testing requirement to verify accessible hydrogen igniters in the Drywell and 755' Elevation Steam Tunnel developed a surface temperature of $\geq 1700^{\circ}\text{F}$ every 24 months 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 was associated with the Human Performance attribute for the Containment and adversely affected the Barrier Integrity Cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. Specifically, the licensee did not correctly evaluate a change to perform the surveillance test with the unit at power beginning in March 2002. It was not recognized that TSSR 3.6.3.2.4 would not be met for accessible hydrogen igniters in the Drywell and 755' Elevation Steam Tunnel when performing the test with the unit at power and the licensee incorrectly believed that performance of the current/voltage surveillance test procedure for inaccessible igniters was an appropriate substitute, contrary to existing procedural guidance. 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 this finding was a licensee performance deficiency of very low safety significance (Green) because the

finding did not involve an actual reduction in the function of hydrogen igniters in the Primary Containment and Drywell.

Cross-Cutting Aspects

The inspectors concluded that because the scheduling change to perform the surveillance with the unit at power took place prior to surveillance testing beginning in March 2002, it did not necessarily reflect current licensee performance and no cross-cutting aspect was identified.

Enforcement

TSSR 3.6.3.2.4 requires the licensee to verify each required hydrogen igniter in accessible areas of the Primary Containment and Drywell develops a surface temperature of $\geq 1700^{\circ}\text{F}$ every 24 months.

Contrary to the above, following satisfactory completion of surveillance testing to satisfy TSSR 3.6.3.2.4 on October 16, 2000, the licensee discontinued performing the testing during outage periods and no longer verified each required hydrogen igniter in accessible areas develops a surface temperature of $\geq 1700^{\circ}\text{F}$ every 24 months. Specifically, during subsequent testing as of March 19, 2002, with Unit 1 not in an outage, the licensee no longer verified that 11 accessible hydrogen igniters in the Drywell and two accessible hydrogen igniters in the 755' Elevation Steam Tunnel developed a surface temperature of $\geq 1700^{\circ}\text{F}$ every 24 months as required by TSSR 3.6.3.2.4. Because of the very low safety significance, this violation is being treated as a non-cited violation consistent with Section 2.3.2 of the NRC Enforcement Policy (**NCV 05000461/2011002-02, Failure to Meet Surveillance Testing Requirement for Hydrogen Igniters in Accessible Areas of the Primary Containment and Drywell**). The licensee entered this violation into its corrective action program as AR 01164658.

- (1) Inadequate Testing Controls to Perform Surveillance Testing of Hydrogen Igniters in the Primary Containment and Drywell

Introduction

The inspectors identified a finding of very low safety significance (Green) with an associated non-cited violation of 10 CFR 50, Appendix B, Criterion XI, "Test Control." The licensee failed to establish a test program adequate to assure testing of hydrogen igniters in accessible areas of the Primary Containment and Drywell pursuant to TSSR 3.6.3.2.4.

Discussion

The inspectors observed and reviewed the licensee's performance of surveillance testing that was accomplished in accordance with procedure CPS 9867.05, "Hydrogen Igniter Temperature Test," Revision 24. The inspectors observed testing of the Division 2 hydrogen igniters on January 10, 2011, and also reviewed the results of the Division 1 hydrogen igniter testing performed on December 27, 2010. This surveillance test procedure was performed to satisfy TSSR 3.6.3.2.4, which requires the licensee to verify that each required hydrogen igniter in accessible

areas of the Primary Containment and Drywell develops a surface temperature of $\geq 1700^{\circ}\text{F}$ every 24 months.

The inspectors noted that the Bases for TSSR 3.6.3.2.4 stated, in part, that “the surface temperature of each accessible igniter is measured to be $\geq 1700^{\circ}\text{F}$ to demonstrate that a temperature sufficient for ignition is achieved.” This wording in the CPS TS Bases for TSSR 3.6.3.2.4 is consistent with the wording in NUREG-1434, “Standard Technical Specifications - General Electric Plants, BWR/6,” Revision 1. Rather than taking a direct measurement of each igniter’s temperature to satisfy the surveillance requirement, the licensee performed a visual comparison as described in Step 8.2 of the procedure by simply observing that “the igniter glows with an orange color.” This comparison was based upon a vendor’s laboratory test report that concluded the igniters will glow orange with temperature $\geq 2100^{\circ}\text{F}$. The inspectors reviewed the test report and discussed its results with the licensee. The inspectors had no basis to question the results of the report as it would appear to be a valid “go/no-go” indication of igniter temperature $\geq 1700^{\circ}\text{F}$ when performed under suitable environmental conditions comparable to the laboratory testing.

Based on observation of testing for the Division 2 hydrogen igniters on January 10th, and review of CPS 9867.05, the inspectors identified several problems with inadequate testing controls in the licensee’s procedure, incorrect acceptance criteria, and how the visual comparison was actually performed in the field. These included:

1. Test performers did not have the color standard (i.e., color photographs from the laboratory test report) with them in the field for comparison to verify that the igniters glowed with an orange color. A prerequisite in the test procedure required the test performers to familiarize themselves with the color photographs beforehand, but the procedure did not require them to take copies of the photos into the field for direct comparison.
2. While a prerequisite in the test procedure stipulated that the test performers shall be capable of discerning the color difference between the color photographs, no controls were in place to assure that the test performers were actually able to distinguish the color differences (i.e., no verification by independent examination) and no quality records existed for the test performers’ ability to distinguish colors.
3. No objective quality evidence was acquired during the surveillance test (e.g., color photographs of the hydrogen igniters, recording of corresponding temperatures, etc.) and maintained with the completed test records to allow a later independent evaluation to assure that test requirements were satisfied.
4. There was no minimum viewing distance specified in the test procedure and no limitation was placed on viewing the igniters with or without magnification aids (e.g., binoculars or telescoping lens). The igniters were often viewed from extended distances (up to 75 feet), which could affect the test performers’ ability to see the igniters and discern the orange glow.
5. There were no controls established for area lighting. The testing was performed in various locations throughout the Primary Containment with varying levels of area lighting that could affect the test performers’ ability to discern the orange

glow, especially at extended distances. Reflection of area lighting from metal structures also could affect the test performers' ability to discern the orange glow.

6. Direct line-of-sight view of many igniters was not possible due to cableways, piping, supports, etc. in the overhead, or deck grating when viewed from above, which also could affect the test performers' ability to discern the orange glow. The test performers occasionally used small hand-held mirrors to view igniters under deck gratings rather than remove gratings for a more direct view.
7. Step 5.3 of the procedure allowed testing to be performed in all modes of plant operation. While this prerequisite would be appropriate for the hydrogen igniters in the Primary Containment, it was not appropriate for igniters in the Drywell.
8. While the acceptance criteria in Steps 9.1.1 and 9.1.2 of the procedure clearly stated the appropriate criteria for both accessible and inaccessible hydrogen igniters, the acceptance criteria in Step 9.1 of the Data Sheet 1 was incorrect because it allowed either visual verification by an orange glow or verification of sufficient current and voltage to satisfy the surveillance for any igniter. Only the Data Sheet 1 was reviewed and retained as a quality record.

The inspectors discussed these test control problems with the licensee. 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.

Analysis

The inspectors determined that the licensee's failure to implement appropriate testing controls in procedure CPS 9867.05 to perform surveillance testing of accessible hydrogen igniters in the Primary Containment and Drywell to satisfy TSSR 3.6.3.2.4 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 was associated with the Procedure Quality attribute for the Containment and adversely affected the Barrier Integrity Cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. 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, MS, and BI Cornerstones," the inspectors determined that this finding was a licensee performance deficiency of very low safety significance (Green) because the finding did not involve an actual reduction in the function of hydrogen igniters in the Primary Containment and Drywell.

Cross-Cutting Aspects

The inspectors concluded that this finding affected the cross-cutting aspect of human performance. Specifically, adequate licensee resources involving personnel and procedures did not support successful human performance. CPS 9867.05 was not

appropriate to the circumstances because it contained errors and did not provide adequate testing controls for the performance of the surveillance test (H.2(c)).

Enforcement

Title 10 CFR 50, Appendix B, Criterion XI, "Test Control," requires, in part, that a test program shall be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents. Test procedures shall include provisions for assuring that all prerequisites for the given test have been met and that the test is performed under suitable environmental conditions. Test results shall be documented and evaluated to assure that test requirements have been satisfied.

Contrary to the above:

The licensee failed to establish a test program adequate to assure testing of hydrogen igniters in accessible areas of the Primary Containment and Drywell pursuant to TSSR 3.6.3.2.4. Specifically, the inspectors identified the following deficiencies with CPS 9867.05, "Hydrogen Igniter Temperature Test," Revision 24, performed on December 27, 2010, and January 10, 2011:

1. A prerequisite in Step 5.3 of the procedure allowed hydrogen igniter testing to be performed in all modes of plant operation, which was not appropriate for testing igniters in the Drywell.
2. The acceptance criteria in Step 9.1 of the Data Sheet 1 was incorrect because it allowed either visual verification by an orange glow or verification of sufficient current and voltage to satisfy the surveillance for any igniter.
3. The procedure did not incorporate adequate controls for performing the surveillance testing. For example:
 - a. There were no controls to assure that an appropriate color standard was used in the field for direct comparison,
 - b. There were no controls to assure that the test performers were actually able to distinguish color differences,
 - c. There was no minimum viewing distance specified in the test procedure and no limitation placed on viewing the igniters with or without magnification aids,
 - d. There were no controls established for area lighting and no limitations defined regarding direct line-of-sight viewing of igniters, and
 - e. There was inadequate objective quality evidence acquired during the surveillance test and maintained with the completed test records to allow a later independent evaluation to assure that test requirements were satisfied.

Because of the very low safety significance, this violation is being treated as a non-cited violation consistent with Section 2.3.2 of the NRC Enforcement Policy

(NCV 05000461/2011002-03, Inadequate Testing Controls to Perform Surveillance Testing of Hydrogen Igniters in the Primary Containment and Drywell).

The licensee entered this violation into its corrective action program as AR 01191200.

(2) RCS Pressure Isolation Valve (PIV) Leakage Surveillance Test

Introduction

The inspectors identified that the licensee's surveillance test procedure for demonstrating operability of RCS PIVs may not correctly incorporate the required test pressure limits of TSSR 3.4.6.1. This issue is considered to be an Unresolved Item pending additional review by the inspectors to determine whether the surveillance test procedure was adequate to satisfy the surveillance testing requirement.

Discussion

The inspectors reviewed the licensee's performance of surveillance testing that was accomplished in accordance with CPS 9843.01, "ISI 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 gpm per nominal inch of valve size up to a maximum of 5 gpm, at an RCS pressure ≥ 1000 pounds-per-square-inch gage (psig) and ≤ 1025 psig. 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 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. This issue is considered to be an Unresolved Item (**URI 05000461/2011002-04, Reactor Coolant System Pressure Isolation Valve Leakage Surveillance Test Procedure Questions**) 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 AR 00282084 to address the inspectors' questions.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

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

This inspection constituted a partial sample as defined in IP 71124.02.

.1 Inspection Planning (02.01)

a. Inspection Scope

The inspectors reviewed pertinent information regarding plant collective exposure history, current exposure trends, and ongoing or planned activities in order to assess current performance and exposure challenges. The inspectors reviewed the plant's three year rolling average collective exposure.

The inspectors reviewed the site-specific trends in collective exposures (using NUREG-0713, "Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities," and plant historical data) and source term (average contact dose rate with reactor coolant piping) measurements (using Electric Power Research Institute TR-108737, "BWR Iron Control Monitoring Interim Report," issued December 1998, and/or plant historical data, when available).

The inspectors reviewed site-specific procedures associated with maintaining occupational exposures ALARA, which included a review of processes used to estimate and track exposures from specific work activities.

b. Findings

No findings were identified.

.2 Radiological Work Planning (02.02)

a. Inspection Scope

The inspectors selected the following work activities of the highest exposure significance.

- RWP 10010088; C1R12-Drywell-Temporary Shielding Activities;
- RWP 10010090; C1R12-Drywell-RP Rover Tours/Minor Job Coverage;
- RWP 10010098; C1R12 SRV Change Outs;
- RWP 10010099; C1R12 – Drywell Snubber Activities;
- RWP 10010101; RT Pipe Replacement; and
- RWP10010149; C1R12-Refuel Floor- Rx Disassembly and Reassembly.

The inspectors reviewed the ALARA work activity evaluations, exposure estimates, and exposure mitigation requirements. The inspectors determined whether the licensee reasonably grouped the radiological work into work activities, based on historical precedence, industry norms, and/or special circumstances.

The inspectors assessed whether the licensee’s planning identified appropriate dose mitigation features; considered alternate mitigation features; and defined reasonable dose goals. The inspectors evaluated whether the licensee’s ALARA assessment had taken into account decreased worker efficiency from use of respiratory protective devices and/or heat stress mitigation equipment (e.g., ice vests). The inspectors determined whether the licensee’s work planning considered the use of remote technologies (e.g., teledosimetry, remote visual monitoring, and robotics) as a means to reduce dose and the use of dose reduction insights from industry operating experience and plant-specific lessons learned. The inspectors assessed the integration of ALARA requirements into work procedure and radiation work permit documents.

The inspectors compared the results achieved (dose rate reductions, person-rem used) with the intended dose established in the licensee’s ALARA planning for these work activities. The inspectors compared the person-hour estimates provided by maintenance planning and other groups to the radiation protection group with the actual work activity time requirements, and evaluated the accuracy of these time estimates. The inspectors assessed the reasons (e.g., failure to adequately plan the activity, failure to provide sufficient work controls) for any inconsistencies between intended and actual work activity doses.

The inspectors determined whether post-job reviews were conducted and if identified problems were entered into the licensee’s corrective action program.

b. Findings

No findings were identified.

.3 Verification of Dose Estimates and Exposure Tracking Systems (02.03)

a. Inspection Scope

The inspectors reviewed the assumptions and basis (including dose rate and man-hour estimates) for the current annual collective exposure estimate for reasonable accuracy for select ALARA work packages. The inspectors reviewed applicable procedures to determine the methodology for estimating exposures from specific work activities and the intended dose outcome.

The inspectors evaluated whether the licensee had established measures to track, trend, and, if necessary, to reduce occupational doses for ongoing work activities.

The inspectors assessed whether trigger points or criteria were established to prompt additional reviews and/or additional ALARA planning and controls.

b. Findings

No findings were identified.

.4 Problem Identification and Resolution (02.06)

a. Inspection Scope

The inspectors evaluated whether problems associated with ALARA planning and controls are being identified by the licensee at an appropriate threshold and were properly addressed for resolution in the licensee's corrective action program.

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 Fourth Quarter 2010 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 Unplanned Scrams per 7000 Critical Hours

a. Inspection Scope

The inspectors verified the Unplanned Scrams per 7000 Critical Hours Performance Indicator for Unit 1. The inspectors reviewed each Licensee Event Report (LER) from January 1, 2010, through December 31, 2010, determined the number of scrams that occurred, and verified the licensee's calculation of critical hours. 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 indicator and none were identified. The inspectors noted that there were no unplanned scrams in 2010.

This inspection constituted one performance indicator verification inspection sample as defined in IP 71151.

b. Findings

No findings were identified.

.3 Unplanned Scrams with Complications

a. Inspection Scope

The inspectors verified the Unplanned Scrams with Complications Performance Indicator for Unit 1. The inspectors reviewed each LER from January 1, 2010, through December 31, 2010, determined the number of scrams that occurred, and evaluated each of the scrams against the performance indicator definition. 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 indicator and none were identified. The inspectors noted that there were no unplanned scrams in 2010.

This inspection constituted one performance indicator verification inspection sample as defined in IP 71151.

b. Findings

No findings were identified.

.4 Unplanned Transients per 7000 Critical Hours

a. Inspection Scope

The inspectors verified the Unplanned Transients per 7000 Critical Hours Performance Indicator for Unit 1. The inspectors reviewed power history data from January 1, 2010, through December 31, 2010, determined the number of power changes greater than 20 percent full power that occurred, evaluated each of the power changes against the performance indicator definition, and verified the licensee's calculation of critical hours. 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 indicator. The inspectors noted that there were no unplanned transients in 2010.

This inspection constituted one performance indicator verification inspection sample as defined in IP 71151.

b. Findings

No findings were identified.

.5 Safety System Functional Failures

a. Inspection Scope

The inspectors verified the Safety System Functional Failures Performance Indicator for Unit 1. The inspectors reviewed each LER from January 1, 2010, through December 31, 2010, determined the number of safety system functional failures that

occurred, evaluated each LER against the performance indicator definition, and verified the number of safety system functional failures reported. 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 indicator.

This inspection constituted one performance indicator verification inspection sample as defined in IP 71151.

b. Findings

In September 2009, the inspectors identified that floor drains in the RHR 'A' Pump Room and the Radwaste Pipe Tunnel were interconnected, which resulted in the plant being in an unanalyzed condition that could have prevented fulfillment of the safety function of the emergency core cooling system (ECCS). The inspectors opened URI 05000461/2009004-01 to review the licensee's evaluation of the condition.

In its evaluation of the unanalyzed condition, the licensee concluded that it was not reportable to the NRC under the requirement of 10 CFR 50.73(a)(2)(v) as a condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident and, therefore, did not count it as an occurrence under the performance indicator. In NRC Inspection Report 05000461/2010003, the inspectors reviewed the licensee's evaluation and determined that the unanalyzed condition met the 10 CFR 50.73(a)(2)(v)(D) reporting criterion and documented a Severity Level IV Non-Cited Violation of 10 CFR 50.73(a)(1), "Licensee Event Report System," because the licensee had failed to submit a required LER within 60 days after discovery of the condition. Therefore, the licensee should also have counted the event as an occurrence under the Safety System Functional Failure Performance Indicator. As documented in NRC Inspection Report 05000461/2010003, the inspectors concluded that the licensee's failure to report this occurrence under the Safety System Functional Failure Performance Indicator constituted a Violation of 10 CFR 50.9, "Completeness and Accuracy of Information," of minor significance. The licensee entered this violation into its corrective action program as AR 01080117 and subsequently submitted LER 05000461/2010-001-01, "Unanalyzed Leakage Pathway Affecting Residual Heat Removal 'A' Pump Room Flooding Analysis," Supplement 1 on January 26, 2011. This LER was reviewed and closed in Section 4OA3.1 of this inspection report. Based on the Nuclear Energy Institute (NEI) 99-02 guidance, this occurrence should be counted starting in the First Quarter of 2011.

On January 28, 2008, a local leak rate test (LLRT) performed on feedwater primary containment isolation check valve 1B21F032A failed the acceptance criterion in TSSR 3.6.1.3.11. The licensee performed maintenance on the valve and retested it satisfactorily. During the root cause evaluation of an LLRT failure for the opposite train feedwater primary containment isolation check valve (1B21F032B) during the Cycle 12 refueling outage in January 2010, the licensee recognized that an LER was never submitted to report the 1B21F032A test failure two years before. As discussed in NRC Inspection Report 05000461/2010003, the licensee subsequently submitted LER 05000461/2008-003-00, "Excessive Leakage Through Feedwater Isolation Valve 1B21F032A," on May 17, 2010, to report the 1B21F032A test failure as a condition that could have prevented the fulfillment of the safety function of structures or systems

needed to control the release of radioactive material and mitigate the consequences of an accident in accordance with 10 CFR 50.73(a)(2)(v).

The licensee counted the 1B21F032B test failure from January 2010 as an occurrence under the Safety System Functional Failure Performance Indicator; however, it did not count the 1B21F032A test failure from January 2008. The licensee reasoned that only the 1B21F032B test failure should be counted because the failure to report the 1B21F032A test failure from two years before was identified during the root cause evaluation for the 1B21F032B test failure and the 1B21F032A test failure should be excluded as an “additional failure” as described in the NEI 99-02 guidance.

The inspectors challenged this reasoning because the 1B21F032A test failure was not a new problem found during the evaluation of the more recent 1B21F032B test failure. It had already been found by the licensee during the previous refueling outage and should have been reported (and counted as an occurrence under the performance indicator) at the time, but the licensee failed to submit the required LER. The original problem (i.e., inadequate preventive maintenance on the feedwater primary containment isolation check valves) was not recognized and resolved during the licensee’s evaluation of the 1B21F032A test failure two years before the more recent 1B21F032B test failure. Following the inspectors’ discussion of this reporting discrepancy with the Office of Nuclear Reactor Regulation and additional review, the licensee subsequently reported this additional occurrence to revise the Second Quarter 2010 performance indicator data during the Fourth Quarter of 2010.

The inspectors noted that had the licensee correctly reported the two occurrences discussed above, the performance indicator would have been at the Green-to-White threshold of six occurrences in the Second Quarter of 2010. Since the threshold was not exceeded, the inspectors concluded that the licensee’s failure to report the additional occurrence for the 1B21F032A test failure under the Safety System Functional Failure Performance Indicator constituted a Violation of 10 CFR 50.9, “Completeness and Accuracy of Information,” of minor significance and is not subject to enforcement action in accordance with the NRC’s Enforcement Policy. The licensee entered this violation into its corrective action program as AR 01113909.

40A2 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 Semi-Annual Trend Review

a. Inspection Scope

The inspectors reviewed repetitive or closely related issues documented in the licensee's corrective action program to look for trends not previously identified. The inspectors also reviewed action requests regarding licensee identified potential trends to verify that corrective actions were effective in addressing the trends and implemented in a timely manner commensurate with the significance.

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

b. Assessment and Observations

(1) Overall Effectiveness of Trending Program

The inspectors determined that the licensee's trending program was generally effective at identifying, monitoring, and correcting adverse performance trends. The inspectors reviewed several common cause evaluations performed by the licensee to evaluate potential adverse performance trends. In general, these common cause evaluations were performed well and identified appropriate corrective actions to address adverse trends that were identified. The inspectors did not identify any adverse trends that were not already identified by the licensee and entered into its corrective action program.

(2) Adverse Trend in Controls for Transient Combustible Materials in Accordance with the Licensee's Fire Protection Program

The inspectors have documented findings during the fourth quarter of 2007, first and fourth quarters of 2008, first and fourth quarters of 2010, and first quarter of 2011 involving the licensee's failure to follow approved Fire Protection Program procedures for the control of transient combustible materials. Those findings were attributed to poor worker behaviors with storing or staging work materials in TCFZs while work was ongoing and inadequate walkdowns of the plant's TCFZs following previously identified issues.

The licensee recently performed a common cause evaluation, AR 01165189-02, to review multiple inspector-identified and licensee-identified combustible materials issues during the past several years. In the evaluation, the licensee reviewed 12 different corrective action program products, which described failures to meet Fire Protection Program procedure requirements for the control of combustible materials in the plant. Because there have been repetitive findings indicative of an adverse performance trend, the licensee's focus in the evaluation was to assess the effectiveness of its corrective action program in addressing the issues and to identify a common cause for the issues. In the evaluation, the licensee concluded that there were two common causes:

(1) The licensee was not using the appropriate level of investigation for transient combustible materials issues, and (2) Plant personnel failed to follow the licensee's procedure for control of transient combustible materials in the plant (i.e., personal accountability). The licensee identified several corrective actions including: (1) evaluation of future transient combustible material control issues using apparent cause evaluations, (2) increased plant walkdowns of plant TCFZs by the Fire Marshall with department level champions, and (3) computer-based training for plant staff to

reinforce the requirements for the control of transient combustible materials. Sufficient time has not elapsed for the inspectors to evaluate the effectiveness of these particular corrective actions.

Because there are current corrective actions being implemented and performance issues have been adequately addressed individually to date, this adverse trend in controls of transient combustible materials is considered to be an observation at this time.

.3 Annual In-Depth Review Sample

a. Inspection Scope

The inspectors selected the following issues for in-depth review:

- URI 05000461/2010004-01, "Apparent Interaction Between Non-Safety Related and Safety-Related Portions of the NSPS [Nuclear System Protection System] Causing Spurious Component Actuations";
- AR 01159553, "Up Trend Auxiliary Building Steam Tunnel Area Cooler Temperature Difference."

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 evaluations with licensee personnel.

This inspection constituted two annual in-depth review samples as defined in IP 71152.

b. Findings and Observations

No findings were identified. URI 05000461/2010004-01 is further discussed and closed in Section 4OA5.2 of this inspection report.

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

.1 (Closed) LER 05000461/2010-001-01, "Unanalyzed Leakage Pathway Affecting Residual Heat Removal 'A' Pump Room Flooding Analysis," Supplement 1

During review of plant drawings for floor drain system piping in the ECCS and RCIC Pump Rooms on the 707'0" elevation of the Auxiliary Building in early October 2009,

the inspectors identified that floor drains in the RHR A Pump Room appeared to be connected via permanent 4-inch pipe embedded in the floor to floor drains in the Radwaste Pipe Tunnel. The inspectors noted that each of the separate pump rooms was supposedly designed to be isolated from other areas of the plant and not susceptible to flooding from sources external to the pump rooms.

In its evaluation of the unanalyzed condition, the licensee concluded that the condition was not reportable to the NRC under the requirements of 10 CFR 50.73(a)(2)(ii)(B) as a condition that resulted in the nuclear power plant being in an unanalyzed condition that significantly degraded plant safety, and 10 CFR 50.73(a)(2)(v)(D) as a condition that could have prevented the fulfillment of the safety function of structures or systems needed to mitigate the consequences of an accident. The inspectors questioned this conclusion. The licensee subsequently submitted LER 05000461/2010-001-00, "Unanalyzed Leakage Pathway Affecting Residual Heat Removal 'A' Pump Room Flooding Analysis," as a "voluntary" LER.

The inspectors documented their review of LER 05000461/2010-001-00 in NRC Inspection Report 05000461/2010-003 and did not concur with the licensee's conclusion that the reporting criteria were not met. The inspectors concluded that the unanalyzed condition met the 10 CFR 50.73(a)(2)(ii)(B) and 50.73(a)(2)(v)(D) reporting criteria and documented a Severity Level IV Non-Cited Violation of 10 CFR 50.73(a)(1), "Licensee Event Report System," because the licensee failed to submit a required LER within 60 days after discovery of a condition that met the above reporting criteria. The licensee disputed the violation in a letter to the NRC dated September 1, 2010. The NRC staff thoroughly reviewed the licensee's basis for dispute and responded to the licensee in a letter on November 29, 2010, upholding the violation; however, the staff focused on the ECCS safe shutdown function in response to moderate energy line breaks concurrent with loss of offsite power, safe shutdown earthquake, and a single active failure rather than the use of the ECCS systems to mitigate the consequences of an accident. In other words, the NRC staff specified reporting the event under 10 CFR 50.73(a)(2)(v)(A).

The licensee submitted Supplement 1 to the original LER to revise the reporting requirements to include the 10 CFR 50.73(a)(2)(ii)(B) and 50.73(a)(2)(v)(A) reporting criteria and to revise the safety consequences discussion.

The inspectors determined that the information provided in LER 05000461/2010-001-01 did not raise any new issues or change the conclusions of the previous review. Licensee Event Report 05000461/2010-001-01 is closed.

This inspection constituted one event follow-up inspection sample as defined in IP 71153.

.2 (Closed) LER 05000461/2010-003-00, "Unexpected Component Actuations Due to Self Test System Design Deficiencies"

(Closed) LER 05000461/2010-003-01, "Unexpected Component Actuations Due to Self Test System Design Deficiencies," Supplement 1

On May 5, 2010, the licensee notified the NRC that the Division 2 drywell ventilation and drywell cooling primary containment isolation valves had closed without a valid actuation condition present for isolation Groups 11 and 17. The event occurred on

March 15, 2010, during full power operations. Event Notification (EN) 45901 was made by telephone in accordance with 10 CFR 50.73(a)(1) within the 60-day reporting requirement.

From August 24 through 26, 2010, the licensee experienced additional spurious valve actuations in its RWCU, RCIC, and low pressure coolant injection (LPCI) systems. On December 3, 2010, the licensee submitted LER 2010-003-00 as a revision to EN 45901. In this LER, the licensee stated that during its investigation of the additional spurious valve actuations in August 2010, which were similar to those that occurred on March 15th, it was determined that the March 15th event was most likely due to a combination of degraded power supply voltage with a design problem in the load driver circuit, which allowed spurious signals to pass through to safety-related components. This was a different cause than what was reported in EN 45901. In addition, this LER also discussed the events that occurred in August, which enabled the licensee to determine a more likely cause for the spurious valve actuations in March. The March 2010 and August 2010 events are discussed further in Section 40A5.2 of this inspection report.

On January 6, 2011, the licensee identified in AR 01159395 that the LER contained an error. The LER read that "The 1E12F042A automatically opens if reactor pressure is greater than 472 psig with a LPCI initiation signal present." The LER should have stated that "The 1E12F042A automatically opens if reactor pressure is less than 472 psig with a LPCI initiation signal present." Subsequently, the licensee made this correction in LER 2010-003-01 on February 21, 2011.

The inspectors reviewed both revisions of the LER and concluded that it was appropriate that the information provided in EN 45901 be revised based upon new information which was gained after the self-revealing events in August 2010.

Licensee Event Report (LER) 05000461/2010-003-00 and LER 05000461/2010-003-01 are closed.

This inspection constituted two event follow-up inspection samples as defined in IP 71153.

.3 (Closed) LER 05000461/2010-004-00, "Operations with the Potential for Draining the Reactor Vessel (OPDRV) Requirements Not Met During Control Rod Drive Mechanism Replacements"

During review of the 10 CFR 50.59 evaluation performed by the licensee for CPS 3711.01, "CPS Operations with the Potential to Drain the Reactor Vessel (OPDRV)," Revision 0, the inspectors identified that the procedure, in effect, constituted a change to the TS which required prior approval of the NRC.

The inspectors documented their review of the new procedure in NRC Inspection Report 05000461/2010-003 and issued a Severity Level IV Non-Cited Violation of 10 CFR 50.59, "Changes, Tests, and Experiments," because the licensee failed to recognize that implementing this new procedure, in effect, constituted a change to the TS incorporated into its licensing basis, which would, therefore, require a license amendment pursuant to 10 CFR 50.59(c)(1)(i) and 10 CFR 50.90. The licensee disputed the violation in a letter to the NRC dated September 1, 2010. The NRC staff thoroughly reviewed the licensee's basis for dispute and responded to the licensee in a

letter on November 29, 2010, upholding the violation. As corrective actions to the violation, the licensee suspended the use of CPS 3711.01, revised the 10 CFR 50.59 evaluation, and presented the details of the event during licensee 10 CFR 50.59 requalification classes and to other applicable personnel who do not have 10 CFR 50.59 qualifications.

Based on the NRC letter dated November 29, 2010, the licensee concluded that control rod drive mechanism replacement activities on January 17 and 18, 2010, were performed without meeting several TS requirements because CPS 3711.01 was in use during that time. The licensee submitted LER 05000461/2010-001-00 to report this as a condition prohibited by TSs in accordance with 10 CFR 50.73(a)(2)(i)(B).

The inspectors determined that the information provided in LER 05000461/2010-004-00 did not raise any new issues or change the conclusions of the previous review. Because the TS violations described in the LER were due to the previously documented performance issue, no additional findings of significance were identified. LER 05000461/2010-004-00 is closed.

This inspection constituted one event follow-up inspection sample as defined in IP 71153.

4OA5 Other Activities

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

As documented in Section 1R15.2, the inspectors confirmed the acceptability of the described licensee's actions. This inspection effort counts towards the completion of TI 2515/177, which will be closed in a later inspection report.

(Closed) URI 05000461/2010004-01, "Apparent Interaction Between Non-Safety Related and Safety-Related Portions of the NSPS Causing Spurious Component Actuations"

Introduction

A violation of 10 CFR 50, Appendix B, Criterion III, "Design Control," was self-revealed by multiple spurious component actuations due to interaction between non-safety related and safety-related portions of the NSPS. Although the issue constituted a violation of NRC requirements, the NRC has concluded that the violation resulted from matters not reasonably within the licensee's ability to foresee and correct; and, therefore, was not a performance deficiency and not a finding. Using the NRC's Enforcement Policy, the violation met the criteria for enforcement discretion and will not be cited.

Discussion

The inspectors initiated URI 05000461/2010004-01 during the third quarter of 2010 to evaluate a potential design control issue involving an apparent interaction between non-safety related and safety-related portions of the NSPS that had caused several spurious component actuations. This latent design issue was only revealed by a degraded Division 1 Self Test System (STS) power supply that caused spurious valve actuations. The inspectors discussed this issue and documented a finding of very low safety significance (Green) for the licensee's failure to perform appropriate preventive

maintenance to replace the degraded Division 1 STS power supply in NRC Inspection Report 05000461/2010005.

On August 24, 2010, the RWCU system return line outboard primary containment isolation valve unexpectedly closed, isolating the RWCU system. Several other unintended valve repositioning events occurred from August 25 through August 26, 2010. During this time the RCIC minimum flow valve cycled open and closed on four separate occasions and the 'A' Train LPCI valve opened automatically without a valid signal present.

The non-safety related STS is an automatic, on-line self test system that injects short duration pulses into the NSPS logic to verify proper response of the logic to various input combinations. Test pulses are purposely of short duration and limited repetition rate so that they do not cause mechanical movement downstream in the circuit. Each of the four divisional NSPS cabinets in the Control Room contains a microprocessor based self test controller that compares input test signals with expected output results. Discrepancies are annunciated. These sets of test signals comprehensively test all essential circuits and wiring within and between the NSPS cabinets, such that STS is able to determine the exact location of any failures in the safety-related hardware. The STS was designed to prevent propagation of any failure to the safety-related functions of the NSPS. According to Section 7.2.1.1.4.8 of the UFSAR, STS is classified as "safety associated." The UFSAR also states, in part, the STS is designed to meet the separation requirements of Regulatory Guide 1.75 and interfaces are supposedly by means of high impedance isolation devices to ensure "that failures in the STS will not propagate to the safety equipment."

In March 2010, CPS had a drywell cooling containment isolation event (EN 45901). Like the event in March 2010, the licensee initially thought that the spurious RWCU valve actuations in August 2010 were due to a bad NSPS load driver circuit card. The only spare card available was the exact same load driver card that had apparently failed in March 2010 and was refurbished by the vendor. However, neither the vendor's testing nor the licensee's on-site testing found anything wrong with that circuit card. The licensee replaced the load driver card suspected of causing the RWCU system isolation with the spare card. The licensee tested the removed card and again there was nothing found wrong with the card. The licensee then suspected that something else was the cause of the problem. The licensee subsequently found that the 5 VDC power supply for the Division 1 STS had an output of about 3.1 VDC and the ripple and noise were also excessive at about 1.4 Volts Alternating Current (VAC) (2,000% the acceptable maximum value). After some additional spurious valve movements (i.e., the RCIC system recirculation valve and LPCI system injection valve), the licensee powered down the Division 1 STS 5 VDC power supply and installed a temporary modification to parallel a new 5 VDC power supply to see if conditions improved. There have been no additional spurious valve actuations since then. Temporary modifications were subsequently installed on Divisions 2, 3 and 4 of the STS.

The licensee's Equipment Apparent Cause Evaluation (EACE #1105478) for the August 2010 unexpected valve operations concluded that STS has two design deficiencies that do not allow the STS to meet its design function, which is that no fault in the STS will degrade the operation of safety-related equipment. The licensee described these two design deficiencies as: (1) no low voltage protection for the STS 5 VDC power supply to prevent a failure mode that resulted in the generation of electronic

noise, and (2) improper coordination timing between the STS coupling capacitor and pulse stretcher circuits on the load driver cards, which allowed the electronic noise to cause unwanted valve operations. The inspectors thoroughly examined the licensee's apparent cause evaluation and supporting documents and concluded that the licensee had not neglected any significant issues. In addition, the corrective actions taken by the licensee in response to the documented causes also appeared to be appropriate. The licensee concluded that the cause of the valve repositioning events was due to the combination of low power supply voltage and lack of coordination between the coupling capacitor and pulse stretcher portions of the circuit, which allowed spurious signals to pass through to safety-related components.

Analysis

In accordance with IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening," the inspectors determined that this issue did not meet the definition of a performance deficiency since it was not reasonably within the licensee's ability to foresee and correct. However, this issue was a violation of regulatory requirements and warranted an evaluation using the traditional enforcement process in accordance with the NRC Enforcement Policy. The inspectors reviewed the examples of minor issues in IMC 0612, Appendix E, "Examples of Minor Issues," and found no examples related to this violation. The inspectors determined that this violation was of more than minor significance because it could potentially lead to a more significant safety concern if left uncorrected. Specifically, spurious safety system component actuations could upset plant stability and challenge the capability of these systems that respond to initiating events to prevent undesirable consequences. Since this violation was determined to be of more than minor significance, but did not include a performance deficiency, IMC 0612, Appendix B, defers to the Enforcement Policy for disposition including the use of Enforcement Discretion, if warranted.

The NRC staff used Sections 3.2 and 3.5 of the Enforcement Policy and Section 5 of the Enforcement Manual to determine if enforcement discretion was appropriate. Although the design errors were not discovered as a result of a voluntary initiative, the NRC determined that the issue was related to the original design and that the design flaws were of a subtle nature that only became apparent when combined with a degraded power supply. The NRC also determined that the issue was corrected within a reasonable time period and that it was an issue that was unlikely to be identified during routine surveillances or routine quality assurance activities, as it required the interaction of two separate original design deficiencies and an age-related power supply degradation. Finally, while the formal significance determination process was not entered for this issue because no performance deficiency was identified, the inspectors utilized SDP tools and determined that the risk did not likely have either a substantial or high safety significance. Therefore, the NRC determined that the issue warranted enforcement discretion.

Cross-Cutting Aspects

The inspectors concluded that because there was no performance deficiency associated with this violation, no cross-cutting aspect was assigned to it.

Enforcement

CPS UFSAR Section 7.2.1.1.4.8 states, in part, that the STS was designed to meet the separation requirements of Regulatory Guide 1.75 and interfaces are by means of high impedance isolation devices to ensure that failures in the STS will not propagate to the safety equipment. The UFSAR specifically noted that any STS failure would not degrade the NSPS function since STS was isolated from NSPS, eliminating failure propagation.

From initial licensing in 1987 and prior to August 26, 2010, the licensee failed to ensure that the safety-related portion of the NSPS was isolated from the non-safety related STS as specified in its design basis. As a result, safety-related components (i.e., primary containment isolation valves) repositioned independent of operator action or a valid signal on March 15, 2010, and during August 24 through 26, 2010. The failure to ensure that the design basis was correctly translated into the design specifications for the STS is a Violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control."

The NRC determined that this violation resulted from matters not reasonably within the licensee's control; that is, the failure to meet the requirements could not be readily identified and, therefore, addressed. Therefore, in accordance with the Enforcement Policy, and after consultation with the Director of the Office of Enforcement and the Region III Regional Administrator, the NRC has decided to exercise enforcement discretion in accordance with Section 3.5 of the NRC Enforcement Policy and to refrain from issuing enforcement action for the violation. In accordance with the NRC's Reactor Oversight Process, this condition will not be considered in the assessment process or the NRC's Action Matrix.

Minor Violation of Technical Specification 5.4 Procedures

During the exit meeting with the licensee on April 15, 2011, the inspectors discussed a minor violation of TS 5.4.1.a, "Procedures." Following the exit meeting, the inspectors provided a written description of the violation to the licensee. Although this issue should be corrected, it constitutes a violation of minor significance that is not subject to enforcement action in accordance with Section 2.3.1 of the NRC's Enforcement Policy and it was not originally intended to be included in this inspection report.

Minor violations are not routinely documented in inspection reports; however, a few exceptions to this practice are discussed in the NRC Enforcement Manual and Enforcement Policy. While this violation did not fit one of the exceptions for documenting it in an inspection report the written description provided to the licensee has been included in the supplemental information attachment at the end of this inspection report.

4OA6 Management Meetings

.1 Resident Inspectors' Exit Meeting

The inspectors presented the inspection results to Mr. F. Kearney and other members of the licensee's staff at the conclusion of the inspection on April 15, 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 the Radiological Hazard Assessment and Exposure Control, ALARA Inspection with Mr. F. Kearney and other members of the licensee's staff on February 24, 2011. The inspector confirmed that none of the potential report input discussed was considered proprietary.

40A7 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 a non-cited violation.

- Technical Specification 5.4.1.a for failure to implement procedures required to conduct timely reviews of job progress and implement actions necessary to reduce workers' exposure. Specifically, work in progress reviews for jobs greater than 5 rem were not completed as directed by licensee procedure RP-AA-401, "Operational ALARA Planning and Controls;" and, therefore, did not implement additional actions necessary to reduce workers' exposure. The issue was entered in the licensee's corrective action program as AR 01056002.

The finding is more than minor because it impacted the Program and Process attribute of the Occupational Radiation Safety Cornerstone and affected the cornerstone objective of ensuring adequate protection of worker health and safety from exposure to radiation, in that a full evaluation into the cause for additional exposure was not performed nor were exposure mitigation efforts prescribed. Therefore, additional exposure was received by the plant staff. The inspector determined that this finding did not involve: (1) an ALARA finding; (2) an overexposure; (3) a substantial potential for overexposure; or (4) an impaired ability to assess doses. Consequently, the inspector concluded that the SDP assessment for this finding was of very low safety significance.

ATTACHMENTS:

1. SUPPLEMENTAL INFORMATION
2. MINOR VIOLATION OF TECHNICAL SPECIFICATIONS 5.4.1a PROCEDURES

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

K. Baker, Design Engineering Senior Manager
R. Campbell, RP Technical Specialist
T. Chalmers, Operations Director
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
M. Kanavos, Plant Manager
F. Kearney, Site Vice President
D. Kemper, Plant Engineering Senior Manager
A. Khanifar, Engineering Director
S. Lakebrink, Mechanical Design Engineering
K. Leffel, Operations Support Manager
J. Peterson, Regulatory Assurance
S. Soliman, Senior Chemist
J. Stovall, Radiation Protection Manager
J. Ufert, Fire Marshall
C. VanDenburgh, Nuclear Oversight Manager

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

05000461/2011002-01	NCV	Failure to Control Transient Combustible Materials in Accordance with Fire Protection Program (Section 1R05.b.1)
05000461/2011002-02	NCV	Failure to Meet Surveillance Testing Requirement for Hydrogen Igniters in Accessible Areas of the Primary Containment and Drywell (Section 1R22.b.1)
05000461/2011002-03	NCV	Inadequate Testing Controls to Perform Surveillance Testing of Hydrogen Igniters in the Primary Containment and Drywell (Section 1R22.b.2)
05000461/2011002-04	URI	Reactor Coolant System Pressure Isolation Valve Leakage Surveillance Test Procedure Questions (Section 1R22.b.3)

Closed

05000461/2011002-01	NCV	Failure to Control Transient Combustible Materials in Accordance with Fire Protection Program (Section 1R05.b.1)
05000461/2011002-02	NCV	Failure to Meet Surveillance Testing Requirement for Hydrogen Igniters in Accessible Areas of the Primary Containment and Drywell (Section 1R22.b.1)
05000461/2011002-03	NCV	Inadequate Testing Controls to Perform Surveillance Testing of Hydrogen Igniters in the Primary Containment and Drywell (Section 1R22.b.2)
05000461/2010-001-01	LER	Unanalyzed Leakage Pathway Affecting Residual Heat Removal A Pump Room Flooding Analysis, Supplement 1 (Section 4OA3.1)
05000461/2010-003-00	LER	Unexpected Component Actuations Due to Self Test System Design Deficiencies (Section 4OA3.2)
05000461/2010-003-01	LER	Unexpected Component Actuations Due to Self Test System Design Deficiencies, Supplement 1 (Section 4OA3.2)
05000461/2010-004-00	LER	Operations with the Potential for Draining the Reactor Vessel (OPDRV) Requirements Not Met During Control Rod Drive Mechanism Replacements (Section 4OA3.3)
05000461/2010004-01	URI	Apparent Interaction Between Non-Safety Related and Safety-Related Portions of the NSPS Causing Spurious Component Actuations (Section 4OA5.2)

Discussed

05000461/2009-004-01	URI	Interconnecting Floor Drains Between the Residual Heat Removal 'A' Pump Room and Radwaste Pipe Tunnel (Section 4OA1.5)
05000461/2010-003-01	NCV	Failure to Satisfy 10 CFR 50.72 and 50.73 Reporting Requirements (Sections 4OA1.5 and 4OA3.1)
05000461/2010-001-01	LER	Unanalyzed Leakage Pathway Affecting Residual Heat Removal A Pump Room Flooding Analysis, Supplement 1 (Section 4OA1.5)
05000461/2008-003-00	LER	Excessive Leakage Through Feedwater Isolation Valve 1B21F032A (Section 4OA1.5)
05000461/2010004-01	URI	Apparent Interaction Between Non-Safety Related and Safety-Related Portions of the NSPS Causing Spurious Component Actuations (Section 4OA2.3)
05000461/2010-001-00	LER	Unanalyzed Leakage Pathway Affecting Residual Heat Removal A Pump Room Flooding Analysis (Section 4OA3.1)
05000461/2010003-02	NCV	Failure to Perform an Adequate 10 CFR 50.59 Evaluation for CPS Procedure 3711.01 (Section 4OA3.3)
TI 2515/177	TI	Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems (Section 4OA5.1)
05000461/2010005-02	FIN	Failure to Perform Preventative Maintenance of Division 1 Self Test System (STS) Power Supply Results in Spurious Repositioning of Safety-Related Valves (Section 4OA5.2)

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 (71111.01)

- OP-AA-106-101-1002, "Exelon Nuclear Issues Management," Revision 8
- OP-AA-108-111-1001, "Severe Weather and Natural Disaster Guidelines," Revision 5
- AR 01169843, "Annunciator 5006-3K A RPS Solenoid Inverter Trouble Received"
- AR 01169937, "Received 5006-3L for RPS Inverter A Trouble"
- CPS 4302.01, "Tornado/High Winds," Revision 19a
- AR 01171454, "Improvement In Site Response to Severe Winter Weather"

1R04 Equipment Alignment (71111.04)

- CPS 3402.01, "Control Room HVAC (VC)," Revision 25b
- CPS 3402.01P001, "Control Room HVAC (VC) Train Shifting," Revision 3c
- CPS 3402.01V001, "Control Room HVAC Valve Lineup," Revision 16e
- CPS 3402.01V002, "Control Room HVAC Instrument Valve Lineup," Revision 6
- CPS 3402.01E001, "Control Room HVAC Electrical Lineup," Revision 10b
- M05-1102, "P&ID Control Room HVAC (VC)," Sheet 1, Revision U
- M05-1102, "P&ID Control Room HVAC (VC)," Sheet 2, Revision J
- M05-1102, "P&ID Control Room HVAC Chilled Water System (VC)," Sheet 5, Revision W
- CPS 3316.01V001, "Containment Combustible Gas Control Valve Lineup," Revision 6
- CPS 3316.01, "Containment Combustible Gas control (HG)," Revision 13a
- CPS 3316.01V002, "Containment Combustible Gas Control Instrument Valve Lineup," Revision 5
- CPS 3316.01E001, "Containment Combustible Gas Control Electrical Lineup," Revision 11a
- CPS 3316.01E002, "Containment Combustible Gas Control 120 VAC Electrical Lineup," Revision 7b
- M05-1063, "P&ID Combustible Gas Control System (HG)," Revision N
- CPS 3312.01V001, "Residual Heat Removal Valve Lineup," Revision 17a
- CPS 3312.01V002, "Residual Heat Removal Instrument Valve Lineup," Revision 9a
- M05-1075, "Residual Heat Removal (RH)," Sheet 1
- M05-1075, "Residual Heat Removal (RH)," Sheet 4

1R05 Fire Protection (71111.05)

- Clinton Power Station Updated Final Safety Analysis Report, Appendix E, "Fire Protection Evaluation Report – Clinton Power Station Unit 1," Revision 11
- Clinton Power Station Updated Final Safety Analysis Report, Appendix F, "Fire Protection Safe Shutdown Analysis – Clinton Power Station Unit 1," Revision 11
- OP-AA-201-009, "Control of Transient Combustible Material," Revision 11
- OP-CL-201-009, "Control of Transient Combustible Material," Revision 1
- CPS 1893.04M500, "712 Diesel Generator: Div 3 Diesel Fuel Tank Room Prefire Plan," Revision 5

- CPS 1893.04M501, "712 Diesel Generator: Div 1 Diesel Fuel Tank Room Prefire Plan," Revision 5
- CPS 1893.04M502, "712 Diesel Generator: Div 2 Diesel Fuel Tank Room Prefire Plan," Revision 6
- CPS 1893.04M370, "825 Control: Control Room HVAC [Heating, Ventilation and Air Conditioning] Prefire Plan," Revision 7
- Quick Human Performance Investigation AR 01163754, "Combustible Materials Left in TCFZ [Transient Combustible Free Zone]"
- AR 01167485, "NRC Questions Regarding 719/712 DG [Diesel Generator] Rooms"
- AR 01163754, "Combustible Materials Left in TCFZ"
- AR 01158901, "Questions Raised by NRC Regarding Fire Protection"
- AR 01190230, "NRC Walkdown Discrepancy List From 750' Auxiliary Building RT [Reactor Water Cleanup] Mezzanine"
- AR 01194205, "Minor Combustibles Remain in Overhead in TCFZ"
- CPS 1893.04M400, "712 Fuel: Basement Prefire Plan," Revision 5

1R06 Flood Protection Measures (71111.06)

- CPS 4304.01, "Flooding," Revision 5a
- CPS Individual Plant Examination (IPE), Section 3.3.8, "Internal Flood Analysis," September 1992
- CPS 3219.01, "CT [Containment], AB [Auxiliary Building], FB [Fuel Building] Floor Drain (RF)," Revision 8
- CPS-PSA-012, "Clinton PRA 2003 Update Internal Flooding Update: Integration of the Internal Flooding Analysis into the Single-Top Model," Revision 0
- CPS 4411.03, "Injection/Flooding Sources," Revision 7
- CC-AA-309-1001, "Suppression Pool Equalization Levels," Revision 5
- CPS 4001.01, "Reactor Coolant Leakage," Revision 11
- Clinton Power Station Updated Safety Analysis Report, Revision 13
- NRC Information Notice 2009-006, "Construction-Related Experiences with Flood Protection Features," July 21, 2009
- Calculation 3C10-0485-001, "Internal Flooding Analysis," Revision 8, Volume B
- SL-4576, "Internal Flooding – Safe Shutdown Analysis and INPO SOER No. 85-5 Comparison Evaluation Report" (Sargent & Lundy), January 31, 1990

1R12 Maintenance Effectiveness (71111.12)

- MA-AA-716-210, "Performance Centered Maintenance (PCM) Process," Revision 10
- Clinton Power Station Updated Safety Analysis Report, Revision 13
- Equipment Apparent Cause Evaluation (AR 01123942), "RT [Reactor Water Cleanup] Pump 'B' Has a Solid Stream Mechanical Seal Leak," Revision 0
- Equipment Apparent Cause Evaluation (AR 01116894), "Failure of Reactor Water Cleanup Pump Time Delay Relays (1G33AK03B, 1G33AK05)," Revision 0
- Equipment Apparent Cause Evaluation (AR 00763123), "Feedwater Level Control and RPV [Reactor Pressure Vessel] Water Level Oscillations While Placing the 'B' TDRFP [Turbine Driven Reactor Feedwater Pump] on the Master Level Controller," Revision 0
- Equipment Apparent Cause Evaluation (AR 00951748), "MCR [Main Control Room] Alarmed on SA [Station Air] Header Pressure Drop Due to a Failed Air Dryer Purge Check Valve," Revision 0

- Equipment Apparent Cause Evaluation (AR 00948468), "1E12-F064A RHR 'A' Minimum Flow Valve Failed to Stroke Shut Resulting in Unplanned Entry Into 7-Day Shutdown LCO [Limiting Condition for Operation]," Revision 0
- Equipment Apparent Cause Evaluation (AR 00989074), "1E51F077 Failed to Stroke Fully Close During 9052.02," Revision 0
- Equipment Apparent Cause Evaluation (AR 01016173), "1B33F067B Failed to Perform As Designed Entering C1R12," Revision 0
- WO 01229550, "Contingent Work Order to Replace Seal RT Pump B," August 28, 2010
- WO 01366464, "RT Pump B Casing Probe / Wire Temperature Indication Suspect," October 15, 2010
- AR 01116894, "Need EACE [Equipment Apparent Cause Evaluation] for RWCU [Reactor Water Cleanup] Pump Relays"
- AR 01108063, "1G33AK04B: Extent of Condition Review of RWCU Pump Relays"
- AR 01105965, "1G33AS03B: RWCU 'B' Pump Time Delay Relay Does Not Pickup"
- AR 01134724, "Relay Failures Need Review"
- AR 00763123, "RPV Level Oscillations During FW [Feedwater] Evolution"
- AR 00780754, "Extent of Condition Review – Deferred PMS [Performance Monitoring System]"
- AR 00983794, "1B21F066D Failed to Shut When Attempted From MCR"
- AR 00932653, "1B21F067A Failed to Open"
- AR 01015235, "1E21F006 (LPCS [Low Pressure Core Spray] Check Valve) Failed to Seat – Test Failure"
- AR 00911019, "1B33K634A2: Deferral of RR [Reactor Recirculation] Power Supply Replacement"
- AR 00881739, "Deferral of Degraded Power Supply Replacement"
- AR 00884486, "Deferral of Degraded Power Supply Replacement – 2"
- AR 00879852, "1PA06J EHC [Electro-Hydraulic Control] Power Supply PM [Preventive Maintenance] Deferral Rejection – C1R12 Impact"
- AR 00945484, "Service Request #00063533 Rejected for Deferral to C1R13"
- AR 00947244, "Rejected Deferral 1VP10Y & 1VP12Y Service Request 63595"
- AR 00880093, "Reject – SR [Service Request] 61251 to Defer Electrical Testing of ERAT [Emergency Reserve Auxiliary Transformer] LTC [Load Tap Changer]"
- AR 00881728, "Deferral of Power Supply Replacement"
- AR 00966870, "1ES006A: C1R12 PM Deferrals Not Technically Justified"
- AR 01048261, "Deferral Service Request Submitted on PMRQ [Q] 175947-01"
- AR 01002435, "1TICVD001: Temperature Indicator Out of Expected Range"
- AR 01050525, "Deferral Requested for 1TICVD002 Due to Parts Availability"
- AR 01065347, "Critical Equipment (1TICVD002) PM Being Deferred"
- AR 01065269, "Critical Equipment PM's Being Deferred"
- AR 01141577, "Love Controller Replacement – Critical Equipment Deferrals"
- AR 01025236, "1G33-F101 Failed to Shut"
- AR 01108595, "1HG009A: CGCS [Combustible Gas Control System] Compressor 1A Suction Valve Failed to Close"
- AR 01006218, "'A' Mixing Compressor Suction Valve 1HG009A Failed to Open"
- AR 01015102, "1VQ002: Valve Failed to Reposition"
- AR 00952997, "1VO02CA (Off Gas Compressor 2A) Breaker Failed Shut"
- AR 01018047, "1AP05EG Breaker Failed to Close"
- AR 01027314, "1AP08EJ Failed to Close During 4160 V [Volt] Bus 1B Source Shifting"
- AR 01070446, "1AP49E7E: MCC [Motor Control Center] Breaker Failed to Open On Demand"
- AR 00983141, "1RR02EA: RR [Reactor Recirculation] 'B' Pump Breaker 4B Failed to Close"

- AR 00945310, "Rx [Reactor] Recirculation HPU [Hydraulic Power Unit] 1B Subloop Motor Breaker Failed to Close"
- AR 01070260, "1AP48E9E Breaker Failed to Open"
- AR 01015261, "1AP06EK Failed to Close During Shifting Evolution"
- AR 01023932, "Refurbished K-Line Breaker Failed to Open 1AP20E5B VO [Off Gas Vault Heating, Ventilation & Air Conditioning] Compressor 1CA"
- AR 01071835, "Evaluate Activity for Deferral Due to Estimated Dose"
- AR 01103546, "NOS [Nuclear Oversight] Identified Predefine Deferral Not Properly Justified"
- AR 01010101, "C1R12 FAC [Flow Accelerated Corrosion] Inspections Deferred to After Outage"
- AR 00982022, "Rejected SR 64626 Defer ERAT Doble-Hi Pot Bus"
- AR 00917270, "Reject SR 62279 to Defer Cleaning 1VP04CA Condenser"
- AR 00947237, "Rejected Deferral 1VP010A Service Request 63594"
- AR 00947229, "Rejected Deferral 1VP12Y Service Request 63603"
- AR 00861295, "Service Request Used to Defer TS SR 3.8.3.6 (FOST [Fuel Oil Storage Tank] Cleaning)"
- AR 00951748, "Received MCR Annunciator 5009-3H PPC [Plant Process Computer] Alarm Display Due to SA Header"
- AR 00953073, "0SA657 Check Valve Failure"
- AR 00989074, "1E51-F077 Failed to Stroke Fully Closed During 9054.02"
- AR 00896658, "1E51F077 Valve Did Not Indicate Properly During RCIC Surveillance"
- AR 00948773, "1E51-F077 Tripped Thermal Overloads When Cycled"
- AR 01015786, "1B33F067B Failed to Fully Stroke Closed"
- AR 01016173, "1B33F067B Discovered Cracked Limitorque Housing"
- AR 00889247, "'A' Mixing Compressor Suction Valve 1HG009A Failed to Open"
- AR 00948468, "1E12F064A RHR 'A' Minimum Flow F064A Failed to Stroke Open"
- AR 01123942, "1G33C001B RT Pump 'B' Has a Solid Stream Leak"
- Regulatory Guide 1.160, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Revision 2 March 1997
- NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Revision 2
- ER-AA-310, "Implementation of Maintenance Rule," Revision 8
- ER-AA-310-1001, "Maintenance Rule Scoping," Revision 4
- ER-AA-310-1005, "Maintenance Rule – Dispositioning Between A(1) and A(2)," Revision 5
- AR 00944238, "Maintenance Rule Performance Criteria Exceeded for SP System"
- AR 00968545, "Maintenance Rule A(1) Determination Requires Revision"
- AR 01141088, "Maintenance Rule A(1) Determinations"
- AR 01177840, "Maintenance Rule Compliance (1 of 2)"

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

- ER-AA-600, "Risk Management," Revision 6
- ER-AA-600-1012, "Risk Management Documentation," Revision 9
- ER-AA-600-1042, "On-Line Risk Management," Revision 7
- WC-AA-101, "On-Line Work Control Process," Revision 18
- WC-AA-104, "Integrated Risk Management," Revision 18
- Clinton Power Station Technical Specifications
- URE (Update Requirements Evaluation) CL2007-015, "Division 3 DG to Division 1 or 2 Cross Connect Operator Actions Optimistic," November 3, 2010
- AR 01176983, "Division 1 DG SOW [System Outage Window] Removed from Schedule Due to Risk"

- AR 01173770, "Inadequate Risk Perception Displayed by Crew D Supervision"
- AR 01124281, "ERAT [Emergency Reserve Auxiliary Transformer] SOW – Protected Systems"
- AR 01121636, "Work Week 1043 Risk Delta Between Paragon and EC 354296 Revision 0"
- AR 01038331, "Station Effectiveness and Communication on Emergent Issue"
- AR 00966171, "Engineering Evaluation of Unit Output Breakers Needed"
- AR 00944122, "Instrument Air Filter Replacement Poses Risk to Plant"
- AR 00681038, "Problems Discovered With 4303.01P023 During Walkdown"
- AR 01082680, "Procedure Cancelled Due to CDBI [Component Design Basis Inspection] Review"
- AR 01097828, "Restoration of Division 3 DG Cross-Tie Procedure Provides Risk Reduction"
- AR 01033110, "1DG01KC Unavailability Due to Loop 1VD009 System Test"
- AR 01196188, "NRC Questions Regarding 9080.24"
- AR 01194749, "Division 1 DG Slow Start Time"
- AR 01194803, "Transient Test Servers Full – Impact DG Surveillance"

1R15 Operability Evaluations (71111.15)

- Clinton Power Station Technical Specifications
- Clinton Power Station Updated Final Safety Analysis Report, Revision 13
- NRC Regulatory Issue Summary 2005-20, "Revision to NRC Inspection Manual Part 9900 Technical Guidance, 'Operability Determinations & Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety,'" Revision 1
- AR 01164658, "Potential Missed Surveillance Hydrogen Igniters SR 3.6.3.2.4"
- EC 382927, "Accessible Hydrogen Igniters Not Visually Verified Per SR 3.6.3.2.4," Revision 0
- CL-SURV-09, "Risk Analysis for Missed Surveillance Accessible Hydrogen Igniters in the Drywell Not Tested Using Observation of Temperature," Revision 0
- Safety Evaluation Screening for Change to CPS 9867.05, "Hydrogen Igniter Temperature Test," Revision 23, December 6, 1995
- ER-AA-2009, "Managing Gas Accumulation," Revision 1
- MA-CL-725-5611, "Hydramotor Actuator – Model AH91 and NH91 Preventive Maintenance," Revision 6
- MA-CL-725-5611, "Hydramotor Actuator – Model AH95 and NH95 Preventive Maintenance," Revision 6
- Prompt Investigation #1171228, "9054.02 RCIC Valve Operability Not Performed as Scheduled"
- EC 371609, "Generic Letter 2008-01: Air Intrusion in ECCS Systems: RHR-A/LPCS," Revision 1
- EC 371659, "Generic Letter 2008-01: Air Intrusion in ECCS Systems: RHR-B/RHR-C," Revision 1
- EC 371660, "Generic Letter 2008-01: Air Intrusion in ECCS Systems: HPCS," Revision 1
- EC 373186, "Piping Air Pocket Acceptance (NRC GL 2008-01), Valve Bonnets and Known Pockets," Revision 0
- AR 00802940, "NRC GL 08-01 Inspection Results at 1E12F037A"
- AR 00807753, "NRC GL 08-01 Inspection Results at Pipe 1RH50AB"
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- AR 01166610, "FASA Gas – New Calc For Air Pockets Is Not Prepared"
- AR 01166687, "Hydramotor 0VC08YA Redundant Dump Valve Needs Replaced"
- AR 01166886, "Issue For Trending Hydramotor Weeping Oil in Control Department"
- AR 01166996, "0VC04YA: Gaps in Damper Blades"

- AR 01171228, "Annunciator 5063-7E, RCIC Water Leg Pump Discharge Pressure"
- AR 01171599, "9054.02 RCIC Valve Operability Not Performed as Scheduled"
- CPS 9054.01C001, "RCIC Water Leg Pump (1E51-C003) Operability Test 1E51-F040 Closure Test and 1SX037 Stroke Timing," Revision 6b
- CPS 9054.01C002, "RCIC (1E51-C001) High Pressure Operability Checks," Revision 3a
- CPS 9054.01D002, "RCIC (1E51-C001) High Pressure Operability Checks Checklist," Revision 23e
- CPS 9054.06, "RCIC Discharge Header Filled and Flow Path Verification, and Flow Controller Checks," Revision 26a
- Work Order 01208746-01, "Perform Hydramotor 0FZVC003B/Damper 0VC24YA PM," November 2, 2010
- Work Order 01258432-01, "Inspect Damper Seal," January 25, 2011
- Work Order 01385103-01, "9054.01A20 RCIC Pump Operability (High Pressure Test & Valve Operability)," February 4, 2011
- M05-1079, "Reactor Core Isolation Cooling (RCIC)(RI)," Sheet 2

1R18 Plant Modifications (71111.18)

- CC-AA-112, "Temporary Configuration Changes," Revision 15
- EC 376508, "Provide Alternate Detail As An 'As-Built' for Encasing Bearing Temperature RTD for VP Condensers," Revision 0
- EC 377772, "Jumper Out High Compressor Oil Temperature Trip on 1VP04CB," Revision 1
- TCCP Extended Installation Justification, EC 377772, approved January 27, 2010
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- AR 00886616, "1VP04CB: Loss of Drywell Cooling, 'B' VP Chiller Tripped"
- AR 00942892, "VP Chiller B Tripped on High Oil Temperature"
- AR 00943851, "NOS ID No Corrective Actions for 1VP04CB"
- AR 01164677, "1WS066A Full Open Appears Mechanically Bound"
- AR 01168032, "1VP04CA Oil Temperature Low Out of Specification"
- AR 01168364, "NRC Questions, VP-B Chiller Work and 1VQ002 Action Statement"
- Work Order 01171878, "Clean Heat Exchanger, Hydrolance 1VP04CB," January 13, 2011
- M10-9084, "Off-Gas System (OG)," Sheet 4, Revision C

1R19 Post-Maintenance Testing (71111.19)

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- WO 01375856, "Refurbish Rod Drive Hydraulic Accumulator 1C11D001BV"
- WO 01175527, "Replace and Calibrate Capacity Controller 1TCVP013"
- WO 01244250, "Swap Breaker for Drywell Chiller 1A 1VPO4CA"
- MA-CL-725-5601, "Hydramotor Actuator – Model AH91 and NH91 Preventive Maintenance," Revision 6
- CPS 3214.01, "Plant Air (IA & SA)," Revision 25

- 3503.01C006, "Class 1E Swing Battery Charger 1DC11E Feed to Safety-Related DC Bus Checklist," Revision 4f
- CPS 9382.11, "Division IV 125VDC Charger Load Test," Revision 29
- MA-AA-721-1001, "Station Batter Testing Strategies," Revision 1
- Technical Bulletin TB-143001-01, "PCP Edge Card Connector and Terminals," Revision 1
- Work Order 00927147-04, "OPS PMT Place 1AP06EE/0WO02CC In Service," February 23, 2011
- Work Order 01097866-01, "Stroke Hydramotor 0VC16YA to Identify Deficiencies," November 4, 2010
- Work Order 01097866-02, "Stroke Hydramotor 0VC16YA for Post-Maintenance Test IAW MA-CL-725-5601," November 4, 2010
- Work Order 01097867-01, "Stroke Hydramotor 0VC18YA to Identify Deficiencies," November 4, 2010
- Work Order 01097867-02, "Stroke Hydramotor 0VC18YA for Post-Maintenance Test IAW MA-CL-725-5601," November 4, 2010
- Work Order 01258432-02, "Stroke and Adjust as Needed Hydramotor 0FZ-VC024 for Control Room Supply Air 'A' Damper 0VC04YA,"
- Work Order 01266387, "Clean, Replace Filters/Lube Coupling/Inspect Check Valve," March 1, 2011
- Work Order 01266387-02, "OPS PMT 2SA01C Return to Service, Verify Function, No Leaks," March 4, 2011
- Work Order 01337477-04, "OPS PMT Place 1AP06EE/0WO02CC In Service," February 22, 2011
- Work Order 01262577-01, "Perform Clean and Inspect Battery Charger 1D (1DC08E). Record CB1 Shunt Coil Resistance (CR 1-97-10-157)
- Work Order 01262836-01, "9382.11D22 Ver #125V DC Charger Load Test (Div IV)
- Work Order 01262836-02, "Ops Line Up to Swing Charger per 3503.01C006
- Work Order 01262836-03, "Ops Restore from Swing Charger per 3503.01C006
- AR 01099159, "1HG009B at 3626 Strokes Triggers Actuator Refurbishment"
- AR 01177165, "0WO02CC Still Surging After Tube Cleaning"
- AR 01186485, "0WO02CC Chiller Cycling Concern"
- AR 01179126, "NRC Question about Battery Charger Preconditioning"

1R22 Surveillance Testing (71111.22)

- Clinton Power Station Technical Specifications
- Clinton Power Station Updated Final Safety Analysis Report, Revision 13
- CPS 9867.05, "Hydrogen Igniter Temperature Test," Revision 24
- CPS 9367.04, "Hydrogen Igniter Current/Voltage Test," Revision 27
- CPS 9867.05D001, "Hydrogen Igniter Temperature Test Data Sheet," Revision 4
- CPS 9052.01, "LPCS/RHR A Pumps & LPCS/RHR A Water Leg Pump Operability," Revision 45b
- CPS 9052.01D001, "LPCS/RHR A Pumps & LPCS/RHR A Water Leg Pump Operability Data Sheet," Revision 43c
- CPS 9843.01, "ISI [Inservice Inspection] Category 'A' Valve Leak Rate Test," Revision 35
- CPS 9080.01, "Diesel Generator 1A Operability – Manual and Quick Start Operability," Revision 52e
- CPS 9080.24, "DG 1A Test Mode Override, Load Reject Operability, and Idle Speed Override," Revision 3a;
- CPS 9080.12, "Diesel Generator Fuel Oil Transfer Pump Operability," Revision 34a
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- CPS 9080.12D001, "Diesel Generator Fuel Oil Transfer Pump Operability Data Sheet," Revision 31
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- Calculation 1LLP14, "Pump Differential Pressure and Flow Measurement Criteria for LPCS Pump 1E21-C001 Surveillance Test and Inservice Test," Revision 0
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- WO 1151910-01, "9367.04B20 H2 Igniter Current Test (Division II)," January 9, 2009
- WO 1144785-01, "MC010-1 LLRT [Local Leak Rate Test] FW [Feedwater] B Line 9861.05D014," January 19, 2010
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- WO 1144802-01, "9843.01V003 Category A Valve Leak Rate Test (1E21-F006) LPCS Injection," January 13, 2010
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- WO 1144812-01, "9843.01V006 Category A Valve Leak Rate Test (1E12-F009) RHR Shutdown Cooling Suction," January 17, 2010
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- AR 01163043, "NRC Senior Resident's Questions of H2 Igniter Test"
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- AR 01164847, "NOS ID Incomplete Documentation of Prompt Operability Basis"
- AR 01164658, "Potential Missed Surveillance Hydrogen Igniters SR 3.6.3.2.4"
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- AR 01157861, "1HG09EG: Incorrectly Identified as a Division 1 Hydrogen Igniter"
- AR 01167888, "Equivalency Engineering Change for H2 Igniter Did Not Identify Calc Impact"
- AR 01167864, "Technical Specification Bases B3.6.3.2 Error"
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- AR 01169655, "Discrepancies Between Design Calc 1LLP14 and 9052.01"
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- AR 01198669, "Senior Resident NRC Inspector Noted Deficiencies in C1R12 Leak Rate Testing"
- AR 01190283, "Enhancement to 9080.12 Diesel Fuel Oil Transfer Pump Test"
- AR 00282084, "Discrepancy Between TSSR 3.4.6 and CPS 9843.01"

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- Occupational As-Low-As-Is-Reasonably-Achievable (ALARA) Planning and Controls NRC IP 71124.02, October 29, 2010
- RP-AA-1006, "Outage Exposure Estimating and Tracking," Revision 3
- RP-AA-401, "Operational ALARA Planning and Controls," Revision 12
- RP-AA-400, "ALARA Program," Revision 7
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- AR 01043469, "ALARA C1R12 Post Job Review Actions," March 14, 2010
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- AR 01020244, "Reforecast of C1R12 Exposure Goal and Stretch Goal," January 22, 2010
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- AR 01017453, "Drywell Dose Rates Higher Than Anticipated – RT Project," January 16, 2010
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- RWP and Associated ALARA Documents, "RWP 10010099, C1R12 – Drywell Snubber Activities"
- RWP and Associated ALARA Documents, "RWP 10010101, RT Pipe Replacement"
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4OA1 Performance Indicator Verification (71151)

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- AR 00976295, "ECCS Room Floor Drain Piping Connected to RW Pipe Tunnel"
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- LER 05000461/2008-003-00, "Excessive Leakage Through Feedwater Isolation Valve 1B21F032A," May 17, 2010

4OA2 Identification and Resolution of Problems (71152)

- Common Cause Evaluation, AR 01165189, "Perform Common Cause Analysis on TCFZ Issues," February 15, 2011
- Common Cause Evaluation, AR 01159858, "Reactivity Management Performance," February 1, 2011
- Common Cause Evaluation, AR 01125966, "Clinton Training Department Performance," November 17, 2010
- Common Cause Evaluation, AR 01112594, "Latent Organizational Weaknesses," October 8, 2010
- Common Cause Evaluation, AR 01120870, "Common Cause Analysis on Maintenance Planning Issue Reports," October 26, 2010
- Common Cause Evaluation, "Common Cause Analysis on Equipment Issues," December 13, 2010
- Common Cause Evaluation, AR 01166686, "Operations Work Process and Operational Risk Assessment," February 25, 2011

- Common Cause Evaluation, AR 01157109, "Radiation Protection Technician Human Performance," January 24, 2011
- Common Cause Evaluation, AR 01164564, "Analysis of Rework Items Determined in 2010," February 14, 2011
- Common Cause Evaluation, AR 01167605, "Training Potential Trend Identified During Quarterly Corrective Action Program Trend Coding & Analysis Review," February 23, 2011
- Common Cause Evaluation, AR 01116651, "ERAT [Emergency Reserve Auxiliary Transformer] and RAT [Reserve Auxiliary Transformer] SVC [Static VAR Compensator] Building HVAC [Heating, Ventilation, and Air Conditioning] Unit Reliability," November 5, 2010
- Fourth Quarter Corrective Action Program Trend Coding & Analysis Report, January 28, 2011
- OP-AA-103-102, "Watch-Standing Practices," Revision 8
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- Equipment Apparent Cause Evaluation (AR 01105478), "Degradation of the Division 1 Self Test System Caused Unwanted Valve Operations"
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- AR 01002139, "GE Can Not Supply Power Supply Required For C1R12"
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- AR 01105962, "NSPS STS Equipment Classification On E03S and Parts Lists"
- AR 01106214, "Received MCR Annunciator 5063-1D RCIC Pump Suction Pressure High"
- AR 01106516, "1E12F042A: Discovered LPCI A Injection Valve Open"
- AR 01108706, "Division 1 Self Test System Failure Assessment – ECC"
- AR 01108708, "Division 1 Self Test System Failure Assessment – ECC"
- AR 01108749, "Determine Operating Options of Self Test System"
- AR 01110657, "1C71AK615B: Division 2 Self Test Observations"
- AR 01111519, "TCC Enhancement for Division 1 STS Temporary Power"
- AR 01112804, "DC Current < 3.5 Amps"
- AR 01116521, "Condition Report Written to Comply with ORM 2.2.14 Actions"
- AR 01129432, "Division 4 STS Failure"
- AR 01134062, "NRC URI 2010004-01: Spurious Actuations Caused By Self Test"
- AR 01135256, "9030.05 Failures On Division 1 and 2 Self Test"
- AR 01138765, "Self Test (STS) Will Not Reset"
- AR 01140299, "Self Test (STS) Will Not Reset"
- AR 01140553, "NOS ID Wiring Separation Criteria Not Maintained"
- AR 01142022, "Unable to Perform 9030.05 STS Manual Testing"
- AR 01143531, "MCR Team Questions Non-Divisional Power Crossing Over Divisional Panels"
- AR 01150240, "Restoration of NSPS STS to Automatic"
- AR 01157605, "Recommend STS Power Monitor Circuit Operation Be Restored"
- AR 01159553, "Up Trend Auxiliary Building Steam Tunnel Area Cooler Temperature Difference"
- AR 01160930, "Elevated Run Times on RCIC Floor Drain Sump"
- AR 01165959, "Unable To Complete 9030.01C025 Due To Communication Failure with STS"
- AR 01166414, "RCIC Floor Drain Sump Increased In-Leakage"
- AR 01167533, "Potential Emerging Steam Leak in Auxiliary Building Steam Tunnel (ABST)"
- AR 01168193, "Water Leaking in ABST"
- AR 01169634, "NOS ID ABST Adverse Condition Monitoring Plan (ACMP) Not Approved in a Timely Fashion"
- AR 01170593, "Unexpected Alarm 5064-7C ECCS Floor Drain Sump Hi Leak Rate"

- AR 01175105, "Leakage Observed From ABST Cooler"
- AR 01176032, "Steam Leak Found on 1B21F019"
- AR 01176157, "1B21F019 Thermals Tripped"
- AR 01176409, "NOS ID NSPS Card Replacement Action Plan In Jeopardy"
- M05-1002, "Main Steam (MS)," Sheet 2, Revision T

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

- LER 05000461/2010-001-01, "Unanalyzed Leakage Pathway Affecting Residual Heat Removal 'A' Pump Room Flooding Analysis," Supplement 1, January 26, 2011
- LER 05000461/2010-001-01, "Unanalyzed Leakage Pathway Affecting Residual Heat Removal 'A' Pump Room Flooding Analysis," March 25, 2010
- Letter from F. Kearney, Exelon Generation Company, LLC, to U.S. NRC, "Response to NRC Integrated Inspection Report 05000461/2010-003," September 1, 2010
- Letter EA-10-185 from C. Pederson, U.S. NRC, to M. Pacilio, Exelon Generation Company, LLC, "Response to Disputed Non-Cited Violation – Clinton Power Station NRC Inspection Report 05000461/2010-003," November 29, 2010
- General Electric Document Number 22A4C52, "Nuclear System Protection System," Revision 2, October 19, 1981
- Licensee Event Notification 45901, "Division 2 Drywell Ventilation and Drywell Cooling Primary Containment Isolation Valves Closed," May 5, 2010
- LER 2010-003-00, "Unexpected Component Actuations Due To Self Test System Design Deficiencies," February 21, 2011
- LER 2010-003-01, "Unexpected Component Actuations Due To Self Test System Design Deficiencies," February 21, 2011
- LER 2010-004-00, "OPDRV Requirements Not Met During Control Rod Drive Mechanism Replacements," January 25, 2011
- AR 01119997, "NOS ID Re-Evaluate STS NSPS Reportability"
- AR 01123984, "Self Test System (STS) Voluntary LER"
- AR 01134710, "Design Deficiencies Identified During STS EACE Investigation"
- AR 01149660, "NOS ID Self Test System NIRB Questions"
- AR 01154358, "Evaluate Potential Use of CPS 3711.01 for Reportability"
- AR 01159395, "Error in LER 2010-003"
- AR 01176652, "NRC Question Regarding Response to NOS NSPS STS"
- AR 01192363, "CPS 9433.36 Needs Revised After Time Response of 1B21N073D"

LIST OF ACRONYMS USED

AB	Auxiliary Building
ABST	Auxiliary Building Steam Tunnel
ACMA	Adverse Condition Monitoring Plan
ADAMS	Agencywide Documents and Management System
ALARA	As-Low-As-Is-Reasonably-Achievable
AR	Action Request
BI	Barrier Integrity
BTP	Branch Technical Program
CDBI	Component Design Basis Inspection
CNO	Chief Nuclear Officer
CPS	Clinton Power Station
CT	Containment
DG	Diesel Generator
EACE	Equipment Apparent Cause Evaluation
ECCS	Emergency Core Cooling System
EN	Event Notification
ERAT	Emergency Reserve Auxiliary Transformer
°F	Degrees Fahrenheit
FAQ	Frequently Asked Questions
FASA	Focus Area Self Assessment
FB	Fuel Building
FOST	Fuel Oil Storage Tank
FW	Feed Water
GPM	Gallons Per Minute
HG	Containment Combustible Gas Control
HPCS	High Pressure Core Spray
HPU	Hydraulic Power Unit
HVAC	Heating, Ventilation, and Air Conditioning
IE	Initiating Events
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IPE	Individual Plant Examination
ISI	Inservice Inspection
LCO	Limiting Condition for Operation
LER	Licensee Event Report
LPCI	Low Pressure Coolant Injection
LPCS	Low Pressure Core Spray
LLRT	Local Leak Rate Test
LTC	Load Tap Changer
MCR	Main Control Room
MCC	Motor Control Center
MS	Mitigating Systems
MS	Main Steam
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
NSPS	Nuclear System Protection System
OG	Off-Gas System
OPDRV	Operations with the Potential for Draining the Reactor Vessel

OpESS	Operating Experience Smart Sample
PARS	Publicly Available Records System
PCM	Performance Centered Maintenance
PI	Performance Indicator
PIV	Pressure Isolation Valve
PMS	Performance Monitoring System
PPC	Plant Process Computer
PSIG	Pounds-Per-Square Inch Guage
RAT	Reserve Auxiliary Transformer
RCIC	Reactor Core Isolation Cooling
RF	Floor Drain
RHR	Residual Heat Removal
RR	Reactor Recirculation
RT	Reactor Water Cleanup
RWCU	Reactor Water Cleanup
SA	Station Air
SDP	Significance Determination Process
SOW	System Outage Window
SSCs	Structures, Systems, and Components
STS	Self Test System
SVC	Static Var Compensator
TCFZ	Transient Combustible Free Zone
TCP	Transient Combustible Permit
TDRFP	Turbine Driven Reactor Feedwater Pump
TI	Temporary Instruction
TS	Technical Specification
TSSR	Technical Specification Surveillance Requirement
UFSAR	Updated Final Safety Analysis Report
URE	Updated Requirement Evaluation
VAC	Volts Alternating Current
VC	Control Room HVAC
VDC	Volts Direct Current
WO	Work Order

MINOR VIOLATION OF TECHNICAL SPECIFICATION 5.4.1.a PROCEDURES

On August 27, 2010, a self-revealed violation of TS 5.4.1.a, "Procedures," occurred. On August 26, 2010, at 11:44 a.m., the Low Pressure Coolant Injection (LPCI) Valve 1E12F042A automatically opened as was shown on Control Room computer data point RH-BC837. The valve had repositioned due to a spurious signal created by the Self Test System. This fact was not observed by Control Room personnel until August 27, 2010, at 2:51 a.m. during routine performance of operator checklist OP-CL-112-101-1001, "Safety System Status Report."

LPCI valve 1E12F042A is a safety-related valve, which fulfills safety functions in both the open and closed positions. The valve must open to provide a flow path from the discharge of the RHR pump to the reactor vessel and the valve must also close to provide primary containment isolation and to isolate lower pressure RHR piping from the reactor coolant system. This valve repositioned from the closed to the open position despite not satisfying reactor pressure permissive logic.

Clinton Power Station Technical Specification 5.4.1.a requires that, in part, written procedures shall be established, implemented, and maintained covering the applicable procedures in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Regulatory Guide 1.33, Appendix A.1, requires procedures for the authorities and responsibilities for safe operation and for shift and relief turnover. Exelon procedure OP-AA-103-102, "Watch-Standing Practices," Step 4.2.5, states that Control Room personnel shall remain alert and attentive to control board indications and alarms. This procedure step also states that in order to establish consistently high levels of awareness and performance, Unit Reactor Operators are to perform an hourly walk-down of the unit panels and the Unit Supervisor is to perform a panel walk-down at least every four hours. Exelon procedure OP-AA-112-101, "Shift Turnover and Relief," requires that both the on-coming Shift Manager and Unit Supervisor visually inspect the control boards. In addition, this procedure requires on-coming Reactor Operators to tour the main control boards with the off-going Reactor Operators and discuss the status of safety-related systems and safety train alignments. Contrary to these requirements, for a period of 15 hours and two shift turnovers, operations personnel failed to recognize that safety-related valve 1E12F042A had spuriously realigned to an incorrect position.

Inspectors concluded that this issue screens as "minor" using IMC 0612, Appendix E, Example 2.g, because the failure to implement licensee administrative procedures caused no actual safety consequences. With valve 1E12F042A open and the reactor at normal operating pressure, the low pressure portions of the RHR piping were being protected by a check valve. A review of computer data points revealed that at no time did the low pressure RHR piping exceed its design pressure for the time period in question.

Inspectors have observed that the corrective actions taken by operations personnel following this incident have been generally appropriate and have noted that no similar violation has occurred since that time.

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 characterization of any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement to the Regional Administrator, Region III, and the NRC Resident Inspector at 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/

Steven West, Director
 Division of Reactor Projects

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*OE and NRR review completed via e-mail from C. Hott (OE) on April 12, 2011, and from M. Ashley (NRR) on April 12, 2011.

Letter to M. Pacilio from S. West dated April 29, 2011

SUBJECT: CLINTON POWER STATION NRC INTEGRATED INSPECTION REPORT AND
EXERCISE OF ENFORCEMENT DISCRETION 05000461/2011-002

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