UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
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October 24, 2016

Mr. Bryan C. Hanson
Senior VP, Exelon Generation Company
LLC President and CNO, Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3—NRC INTEGRATED INSPECTION REPORT 05000237/2016003 AND 05000249/2016003

Dear Mr. Hanson:

On September 30, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Dresden Nuclear Power Station, Units 2 and 3. On October 12, 2016, the NRC inspectors discussed the results of this inspection with Mr. P. Karaba and other members of your staff. The enclosed report represents the results of this inspection.

Based on the results of this inspection, the NRC has identified one issue that was evaluated under the risk significance determination process as having very low safety significance (green). The NRC has also determined that a violation is associated with this issue. Because the licensee initiated condition reports to address this issue, this violation is being treated as a Non-Cited Violation (NCV), consistent with Section 2.3.2 of the Enforcement Policy. The NCV is described in the subject inspection report. Further, the inspectors documented a licensee-identified violation which was determined to be of very low safety significance in this report. The NRC is treating this violation as an NCV consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violation(s) or significance of the(se) NCV(s), 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: (1) the Regional Administrator, Region III; (2) the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555–0001; and (3) the NRC Resident Inspector at the Dresden Nuclear Power Station.

In addition, if you disagree with the cross-cutting aspect assignment to 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 the Dresden Nuclear Power Station.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390, “Public Inspections, Exemptions, Requests for Withholding,” 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’s Public Document Room or from the Publicly Available Records System (PARS) component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Jamnes Cameron, Chief
Branch 4
Division of Reactor Projects

Docket Nos. 50–237; 50–249
License Nos. DPR–19; DPR–25

Enclosure:
IR 05000237/2016003; 05000249/2016003

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos:	50–237; 50–249
License Nos:	DPR–19; DPR–25
Report No:	05000237/2016003; 05000249/2016003
Licensee:	Exelon Generation Company, LLC
Facility:	Dresden Nuclear Power Station, Units 2 and 3
Location:	Morris, IL
Dates:	July 1 through September 30, 2016
Inspectors:	G. Roach, Senior Resident Inspector R. Elliott, Resident Inspector C. Phillips, Project Engineer J. Rutkowski, Project Engineer
Approved by:	J. Cameron, Chief Projects Branch 4 Division of Reactor Projects

Enclosure

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SUMMARY

Inspection Report 05000237/2016003, 05000249/2016003; 07/01/2016 – 09/30/2016; Dresden Nuclear Power Station, Units 2 & 3; Follow-Up of Events and Notices of Enforcement Discretion.

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. One Green finding was identified by the inspectors. The finding involved a Non-Cited Violation (NCV) of the U.S. Nuclear Regulatory Commission (NRC) requirements. The significance of inspection findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," dated April 29, 2015. Cross-cutting aspects are determined using IMC 0310, "Aspects Within the Cross-Cutting Areas," dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated February 4, 2015. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG–1649, "Reactor Oversight Process," dated July 2016.

Cornerstone: Mitigating Systems

Green. A finding of very low safety significance and associated NCV of TS 5.4.1.a, "Procedures," was self-revealed for the licensee's failure to maintain maintenance procedures appropriate for the circumstances that could affect performance of safety related equipment. Specifically, procedures MA–AA–716–010, "Maintenance Planning," Revision 20 and DAP 15–18, "Work Order Supplemental Information and Lessons Learned," Revision 17 did not ensure that scope revisions in support of corrective maintenance activities performed on high pressure coolant injection (HPCI) piping in 2013 were properly reviewed and evaluated for technical adequacy directly resulting in a through-wall steam leak on the Unit 2 HPCI inlet drain pot drain piping and safety system inoperability in May 2016. Immediate corrective actions included the replacement of the failed piping section, a determination of the extent of condition of susceptible piping to include the scheduling of a replacement work window, and changes to the maintenance planning procedures requiring engineering scope determination and oversight of scope changes for safety related corrective maintenance.

The performance deficiency was determined to be more than minor, and thus a finding, in accordance with IMC 0612, Appendix B, "Issue Screening," dated September 7, 2012, because it was associated with the Mitigating Systems Cornerstone Attribute of Procedure Quality and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e. core damage). Specifically, the failure to ensure work planning procedures controlled the process of major revisions to corrective maintenance activities ensuring adequate engineering reviewing and assessment resulted in continued degradation and ultimate failure of the Unit 2 HPCI inlet drain pot drain piping. The inspectors applied IMC 0609, Attachment 4, "Initial Characterization of Findings," issued June 19, 2012, to this finding. The inspectors answered "No" to all questions within Table 3, "Significance Determination Process Appendix Router," and transitioned to IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," June 19, 2012. The inspectors answered "No" to all questions in Exhibit 2, "Mitigating Systems Screening Questions." Therefore, the finding was screened as very low safety significance (Green). This finding has a cross-cutting aspect in the area of Problem Identification and Resolution, Evaluation, because the

licensee failed to thoroughly evaluate corrective maintenance scope changes to ensure that resolutions address causes and extent of conditions commensurate with their safety significance. Specifically, the licensee incorrectly removed scope without engineering evaluation for adequacy from the Unit 2 HPCI inlet drain pot drain line corrective maintenance following a through wall leak in 2012. Piping that was identified as part of the extent of condition of the failure in 2012, was removed from the scope of corrective maintenance activities due to maintenance personnel short falls. This specific piping failed in May of 2016 resulting in the loss of the HPCI system safety function. [P.2] (Section 4OA3)

Licensee-Identified Findings

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

REPORT DETAILS

Summary of Plant Status

Unit 2

Unit 2 began the inspection period near full power. On August 22, output was reduced to 340 MWe (~40 percent reactor power) to perform troubleshooting and testing on the 2–4402–D Circulating Water flow reversal valve; the unit returned to near full power the next day. The unit operated at or near full power for the remainder of the inspection period.

Unit 3

Unit 3 began the inspection period near full power. On August 11, unit coast down to refueling outage D3R24 commenced. The unit operated at reduced power due to coast down for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

.1 External Flooding

a. Inspection Scope

The inspectors evaluated the design, material condition, and procedures for coping with the design basis probable maximum flood. The evaluation included a review to check for deviations from the descriptions provided in the Updated Final Safety Analysis Report (UFSAR) for features intended to mitigate the potential for flooding from external factors. As part of this evaluation, the inspectors checked for obstructions that could prevent draining, checked that the roofs did not contain obvious loose items that could clog drains in the event of heavy precipitation, and determined that barriers required to mitigate the flood were in place and operable. Additionally, the inspectors performed a walkdown of the protected area to identify any modification to the site which would inhibit site drainage during a probable maximum precipitation event or allow water ingress past a barrier. The inspectors also reviewed the abnormal operating procedure (AOP) for mitigating the design basis flood to ensure it could be implemented as written. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one external flooding sample as defined in IP 71111.01–05.

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04Q and S)

.1 Quarterly Partial System Walkdowns

a. Inspection Scope

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

- 2A core spray (CS) with 2B CS out-of-service (OOS);
- 2A fuel pool cooling (FPC) with 2B OOS; and
- control room emergency ventilation following a work window.

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

These activities constituted three partial system walkdown samples as defined in IP 71111.04–05.

b. Findings

No findings were identified.

.2 Semi-Annual Complete System Walkdown

a. Inspection Scope

From August 8–26, 2016, the inspectors performed a complete system alignment inspection of the Unit 2 isolation condenser system to verify its functional capability. This system was selected because it was considered both important to safety 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 CAP database to ensure that system equipment alignment problems were being identified and appropriately resolved. Documents reviewed are listed in the Attachment to this report.

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

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05)

.1 Routine Resident Inspector Tours (71111.05Q)

a. Inspection Scope

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

- Fire Zone 7.0.A.2, 125 VDC battery room and Fire Zone 7.0.A.3, 250 VDC battery room, elevation 549';
- Fire Zone 7.0.A.1, DC [direct current] panel room, elevation 549';
- Fire Zone 1.1.2.5.A, Unit 2 isolation condenser area, elevation 589';
- Fire Zone 11.1.3, Unit 3 HPCI pump room, elevation 476'; and
- Fire Zone 11.1.2, Unit 3 LPCI pump room, Division I, elevation 476'.

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

These activities constituted five quarterly fire protection inspection samples as defined in IP 71111.05–05.

b. Findings

No findings were identified.

1R06 Flooding (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. The specific documents reviewed are listed in the Attachment to this report. 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 circulating 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 Unit 3 flood penetrations and seals in the following listed 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:

- the emergency core cooling system (ECCS) corner rooms;
- Unit 3 containment cooling service water pump vault; and
- Unit 3 condensate pump area.

Documents reviewed during this inspection are listed in the Attachment to this report. This inspection constituted one internal flooding sample as defined in IP 71111.06–05.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11)

.1 Resident Inspector Quarterly Review of Licensed Operator Requalification (71111.11Q)

a. Inspection Scope

On July 18, 2016, the inspectors observed a crew of licensed operators in the plant's simulator during licensed operator requalification training. The inspectors verified that operator performance was adequate, evaluators were identifying and documenting crew performance problems, and that training was being conducted in accordance with licensee procedures. The inspectors evaluated the following areas:

- licensed operator performance;
- crew's clarity and formality of communications;
- ability to take timely actions in the conservative direction;
- prioritization, interpretation, and verification of annunciator alarms;

- correct use and implementation of abnormal and emergency procedures;
- control board manipulations;
- oversight and direction from supervisors; and
- ability to identify and implement appropriate TS actions and Emergency Plan actions and notifications.

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

This inspection constituted one quarterly licensed operator requalification program simulator sample as defined in IP 71111.11–05

b. Findings

No findings were identified.

.2 Resident Inspector Quarterly Observation During Periods of Heightened Activity or Risk (71111.11Q)

a. Inspection Scope

On August 26, 2016, the inspectors observed main control room operators during a Unit 2 circulating water flow reversal with a potentially degraded 2–4402D valve actuator. A failure of the 2–4404D valve to operate would have resulted in a degraded main condenser vacuum and a potential reactor scram. This was an activity that required heightened awareness or was related to increased risk. The inspectors evaluated the following areas:

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

The performance in these areas was compared to pre-established operator action expectations, procedural compliance and task completion requirements. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one quarterly licensed operator heightened activity/risk sample as defined in IP 71111.11–05.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12)

.1 Routine Quarterly Evaluations

a. Inspection Scope

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

- Unit 2 isolation condenser; and
- Unit 2 and Unit 3 control rod drive.

The inspectors reviewed events such as where ineffective equipment maintenance had resulted in valid or invalid automatic actuations of engineered safeguards systems and independently verified the licensee's actions to address system performance or condition problems in terms of the following:

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

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

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

b. Findings

No findings were identified.

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

.1 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

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

- heavy lift and mounting of hardened vent structure on Unit 2/3 reactor building; and
- Unit 2 in YELLOW risk condition with HPCI unavailable.

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

Documents reviewed during this inspection are listed in the Attachment to this report. These maintenance risk assessments and emergent work control activities constituted two samples as defined in IP 71111.13–05.

b. Findings

No findings were identified.

1R15 Operability Determinations and Functional Assessments (71111.15)

.1 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following issues:

- expanding HPCI operability limits for torus suction temperatures up to 165F;
- Emergency Diesel Generator (EDG) fuel and lubricating oil pump coupling connections not properly torqued;
- Motor Operated Valve (MOV) 3–2301–14 seat leak-by to Unit 3 torus requires manual torque to arrest leakage from the condensate storage tanks; and
- 10 CFR Part 21: Defect in solenoid operated valves supplied by Target Rock.

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

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

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19)

.1 Post-Maintenance Testing

a. Inspection Scope

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

- WO 01934807, Unit 3 HPCI following auxiliary oil pump (AOP) replacement;
- WO 01938475, reactor building vent and fuel pool radiation monitor following replacement of failed power supply;
- WO 01762656, 2B CS following a preventative maintenance work window;
- WO 01820265, pressure control valve (PCV) 2–8520 in Unit 2 drywell nitrogen inerting system following corrective maintenance; and
- WO 01374627, control room envelope ventilation (CREVS) following work window.

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

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

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22)

.1 Surveillance Testing

a. Inspection Scope

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

- WO 01910377, Unit 3 HPCI Inservice Test (IST);
- WO 01926055, Unit 3 EDG cooling water pump (IST);
- WO 01918171, Unit 3 CS pump minimum flow valve differential pressure instrument calibration, and WO 01918170–01, CS pump minimum flow valve analog trip unit functional test and calibration (routine);
- WO 98084362, Unit 2 scram discharge volume high level channel functional test (routine);
- WO 01919691–01, 3B standby liquid control pump operability run (routine);
- WO 01016610, System Particulate Iodine Noble Gas (SPING) effluent monitor quarterly functional test (routine); and
- WO 01929897, Dresden 2/3 Monthly TS Unit Diesel Generator Operability (routine).

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

- did preconditioning occur;
- the effects of the testing were adequately addressed by control room personnel or engineers prior to the commencement of the testing;
- acceptance criteria were clearly stated, demonstrated operational readiness, and were consistent with the system design basis;
- plant equipment calibration was correct, accurate, and properly documented;
- as-left setpoints were within required ranges; and the calibration frequency was in accordance with TSs, the UFSAR, procedures, and applicable commitments;
- measuring and test equipment calibration was current;
- test equipment was used within the required range and accuracy; applicable prerequisites described in the test procedures were satisfied;
- test frequencies met TS requirements to demonstrate operability and reliability; tests were performed in accordance with the test procedures and other applicable procedures; jumpers and lifted leads were controlled and restored where used;
- test data and results were accurate, complete, within limits, and valid;
- test equipment was removed after testing;
- where applicable for inservice testing activities, testing was performed in accordance with the applicable version of Section XI, American Society of Mechanical Engineers code, and reference values were consistent with the system design basis;

- where applicable, test results not meeting acceptance criteria were addressed with an adequate operability evaluation or the system or component was declared inoperable;
- where applicable for safety-related instrument control surveillance tests, reference setting data were accurately incorporated in the test procedure;
- where applicable, actual conditions encountering high resistance electrical contacts were such that the intended safety function could still be accomplished;
- prior procedure changes had not provided an opportunity to identify problems encountered during the performance of the surveillance or calibration test;
- equipment was returned to a position or status required to support the performance of its safety functions; and
- all problems identified during the testing were appropriately documented and dispositioned in the CAP.

Documents reviewed are listed in the Attachment to this report.

This inspection constituted five routine surveillance testing samples, and two in-service test samples as defined in IP 71111.22, Sections–02 and–05.

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06)

.1 Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors observed an emergency preparedness drill for the site's Emergency Response Organization (ERO) on September 21, 2016, from the Technical Support Center. This evolution was planned to be evaluated and included in performance indicator data regarding drill and exercise performance. The inspectors observed event classification and notification activities performed by the ERO. The inspectors also attended the post-evolution critique for the scenario. The focus of the inspectors' activities was to note any weaknesses and deficiencies in the ERO's performance and ensure that the licensee evaluators noted the same issues and entered them into the corrective action program. As part of the inspection, the inspectors reviewed the scenario package and other documents listed in the Attachment to this report.

This inspection of the licensee's emergency preparedness drill constituted one sample as defined in IP 71114.06–06.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

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

4OA1 Performance Indicator Verification (71151)

.1 Mitigating Systems Performance Index—Heat Removal System

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index (MSPI)- Heat Removal System (MS08) performance indicator for Dresden Nuclear Power Station, Units 2 and 3, for the period from the second quarter of 2015 through the second quarter of 2016. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the NEI Document 99–02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 31, 2013, were used. The inspectors reviewed the licensee's operator narrative logs, MSPI derivation reports, issue reports, event reports and NRC Integrated Inspection Reports for the period of April 1, 2015, through June 30, 2016, to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two MSPI heat removal system samples as defined in IP 71151–05.

b. Findings

No findings were identified.

.2 Mitigating Systems Performance Index—Residual Heat Removal System

a. Inspection Scope

The inspectors sampled licensee submittals for the MSPI - Residual Heat Removal System (MS09) performance indicator for Dresden Nuclear Power Station, Units 2 and 3, for the period from the second quarter of 2015 through the second quarter of 2016. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the NEI Document 99–02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 31, 2013, were used. The inspectors reviewed the licensee's operator narrative logs, MSPI derivation reports, issue reports, event reports and NRC Integrated Inspection Reports for the period of April 1, 2015, through June 30, 2016, to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that

the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two MSPI residual heat removal system samples as defined in IP 71151–05.

b. Findings

No findings were identified.

.3 Mitigating Systems Performance Index—Cooling Water Systems

a. Inspection Scope

The inspectors sampled licensee submittals for the MSPI- Cooling Water Systems (MS10) performance indicator for Dresden Nuclear Power Station, Units 2 and 3, for the period from the second quarter of 2015 through the second quarter of 2016. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the NEI Document 99–02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 31, 2013, were used. The inspectors reviewed the licensee's operator narrative logs, MSPI derivation reports, issue reports, event reports and NRC Integrated Inspection Reports for the period of April 1, 2015, through June 30, 2016, to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two MSPI cooling water system samples as defined in IP 71151–05.

b. Findings

No findings were identified.

4OA2 Identification and Resolution of Problems (71152)

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

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 they were being entered into the licensee's corrective action program at an appropriate threshold, adequate attention was being given to timely corrective actions, and 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 not discussed in this report.

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

b. Findings

No findings were identified.

.2 Follow-Up Sample for In-Depth Review: Review of the Licensee's Effectiveness Review for Corrective Actions to Prevent Recurrence Associated with Root Cause Report 1513452, "NRC: Preliminary White Finding – Flood Mitigation Procedure" Action Items 41 and 42

a. Inspection Scope

The inspectors performed a review of the licensee's CAP and associated documents, specifically Issue Report (IR) 1513452, "NRC: Preliminary White Finding – Flood Mitigation Procedure" action items 41 and 42 which included the development of an effectiveness review of six corrective actions and corrective actions to prevent recurrence (CAPR) to address the licensee's determined root cause of a historical minimum compliance culture regarding an environmentally driven flooding event and a presentation for challenge and acceptance of the effectiveness review by site senior management at the Management Review Committee (MRC). The inspectors interviewed personnel, performed walkdowns of equipment maintained by the licensee to respond to an environmentally driven flooding event, and verified the completion of and independently assessed the adequacy of the corrective actions taken in response to the NRC identified White Finding and Notice of Violation documented in Enforcement Action, EA–13–079 (Adams Accession Number ML13213A073).

The inspectors' review and evaluation was focused on the adequacy of the licensee's determination that the corrective actions and CAPR implemented as a result of the licensee's root cause determination that a historical minimum compliance culture regarding an environmentally driven flood existed prior to the NRC's identification of an inadequate flood response procedure in 2013. In support of this effort the inspectors reviewed the licensee's corrective actions and CAPR to ensure they: were complete, accurate, and timely and that they are firmly incorporated into the licensee's continuous education and new employee training programs; ensured the licensee considered extent of condition and extent of cause; provided appropriate classification and prioritization; provided identification of root and contributing causes; were appropriately focused; included actions taken which resulted in the correction of the identified problem; identified negative trends; ensured operating experience was adequately evaluated for applicability; and communicated applicable lessons learned to appropriate organizations.

This review constituted a single follow-up inspection sample for in-depth review as defined in IP 71152–05.

b. Background

In August 2012, the licensee performed a reasonable simulation of its external flooding strategy for coping with a probable maximum flood (PMF) event. The inspectors subsequently noted that the flood strategy did not contain steps accounting for losses in

reactor vessel inventory. Under normal plant conditions there are both unidentified and identified leakage paths from the reactor coolant system. During the PMF event, systems which would provide normal and emergency make up capacity to the reactors would be inundated by the flood waters and would not be available.

The NRC questioned the licensee regarding this concern in a 30 day response letter to the licensee on November 1, 2012, (Adams Accession Number ML12306A393). In response to this concern, the licensee developed procedure TSG–3, Attachment T, effective November 21, 2012, proceduralizing the use of the fire protection header which would be pressurized and supplied by a diesel driven flood pump to supply through mechanical adapters, which are labeled and stored above projected PMF flood levels, the reactor by connecting to test connections in the standby liquid control (SBLC) system. The licensee also revised DOA 0010–04, "Floods," directing operators to shut reactor recirculation loop isolation valves to reduce potential reactor leakage sources to those governed by the unidentified leakage Technical Specification.

The licensee determined that with reactor unidentified leakage at 5 gpm, the maximum permitted by TS, it would take approximately 130 hours to reach a reactor water level at the top of active fuel (TAF) (–143 inches of water for Dresden). The Dresden PMF hydrograph indicates that flood waters would exist at site grade for approximately 57 hours. In addition, after the flood waters recede, mechanical level instruments for the entire fuel zone would once again be available to the operators.

The inspectors challenged the licensee's leakage assertion in that TS permit a total leakage rate of up to 25 gpm which would significantly reduce the amount of time until TAF is reached under the worst case permitted leakage conditions in the reactor coolant system. The inspectors based this concern on the fact that the licensee did not originally employ the strategy for isolating reactor recirculation loops which would make them susceptible to losses due to both unidentified and identified pathways. During the site flood event operators would be limited in their ability to monitor reactor water level as the mechanical level indicator called out by licensee procedures has an indication band between +60 inches and – 60 inches of water. As a result, operators would have to provide make up to the reactor vessel much sooner than 130 hours in order for level in the reactor to not become indeterminate or possibly reach TAF during the 57 hours the flood waters inundate the site. This performance deficiency was documented as an NRC identified White Finding and Notice of Violation in Enforcement Action, EA–13–079 (Adams Accession Number ML13213A073).

c. Observations

As discussed in the "Inspection Scope" section above, the inspectors' review was focused on the licensee's determination that corrective actions and CAPR had been effective at addressing a historic minimum compliance culture with regards to environmentally driven flood events.

The inspectors observed the licensee's staff presentation with a determination of corrective action effectiveness to the MRC on August 11, 2016. The inspectors determined that the MRC was adequately challenging of the presentation and the basis for its assessment of the corrective actions for present and future licensee staff with regards to environmentally driven flooding events.

The inspectors noted the licensee's determination of corrective action and CAPR effectiveness was referenced by the site's successful completion of audits from outside agencies and organizations including NRC and the Institute for Nuclear Power Operations (INPO) concerning implementation of actions and strategies to external events as a result of the nuclear accident at the Fukushima Daiichi Nuclear Power Station. In addition, the effectiveness review noted the licensee's implementation of a hardened design for deficient electromatic relief valve actuators on Units two and three, proactive contingency modification and procedure development in for main steam isolation valves due to limit switch failures during surveillance testing, and the development of the "All in Work Windows" which integrate operations, engineering, and maintenance in the preparation of a scheduled work window on safety-related equipment to ensure that deficiencies are prioritized and repaired prior to system and component restoration.

The inspectors evaluated corrective action effectiveness through walkdowns of flood response equipment to ensure their state of maintenance and readiness was appropriate, and reviewed flooding procedures to ensure they were accurate and adequate for the plants current licensing basis. The inspectors noted that the licensee is presently in the process of using the 10 CFR 50.59 process for modifying the licensing basis for external flooding response from a site in which procedures allow the reactor building to be inundated with flood waters to one in which barriers are installed in an attempt to maintain the reactor building free of flood water. The inspectors will review this modification in a future inspection report.

d. Findings

No findings were identified.

.3 Follow-Up Sample for In-Depth Review: Review of Root Cause Report RCR 2686163, "Unit 3 HPCI Auxiliary Oil Pump AOP on Fire"

a. Inspection Scope

The licensee performed RCR 2686163 following a fire in the motor associated with the Unit 3 HPCI auxiliary oil pump (AOP). The inspectors reviewed the causal document to ensure the event was adequately documented in the CAP; a timely assessment of operability and reportability was made by the licensee at the time of the event; root causes and contributing causes of risk significant performance issues were understood; the extent of condition and extent of cause of risk significant issues were identified; operating experience was adequately evaluated for applicability; and licensee corrective actions to risk significant performance issues were or will be sufficient to address the root causes and contributing causes, and to prevent recurrence.

This review constituted a single follow-up inspection sample for in-depth review as defined in IP 71152–05.

Background

On June 27, 2016 during the performance of DOS 2300–03, "HPCI System Operability and Quarterly IST Verification Test" the Unit 3 HPCI AOP motor failed and caught on fire. The root cause of the fire as documented in root cause report (RCR) 2686163, "HPCI AOP Motor Failure" was that licensee personnel did not recognize or control

critical parameters when installing a DC shunt wound motor. Specifically, the licensee did not adjust the external variable shunt resistors while monitoring critical motor parameters such armature current, field current, and pump speed when installing a new pump motor. In this instance, the variable shunt resistors were set to a maximum value (>66Ω) in March of 2015 when the Unit 3 AOP motor was most recently replaced. Setting the shunt resistors to maximum resulted in a field current that was too low for motor operation therefore drawing excessive armature current degrading the motor's windings ending in an electrical stall of the motor and premature failure.

Observations

The inspectors determined that the overall root cause report adequately identified the root and contributing causes to the event; evaluated the extent of condition and extent of cause; evaluated the applicability of operating experience; and that the licensee's corrective actions were or will be adequate to address the root and contributing causes and where appropriate prevent recurrence.

The inspectors interviewed licensee staff, performed equipment walkdowns, and reviewed numerous historical records including engineering evaluations, drawings, procedures, work orders, corrective action documents, and correspondence between the licensee and the motor vendor in support of their review of RCR 2686163. Through this review, the inspectors identified that the licensee did not assess a HPCI AOP motor failure in August 1992 affecting Unit 2. This failure was significant, because it affected an identical motor to that which failed in the Unit 3 HPCI AOP in June 2016. In addition, this failure occurred on a motor which had just been installed in June 1992 with its shunt resistors set to 66Ω (maximum setting). In addition, the licensee's RCR did not assess a 2004 event also affecting the Unit 2 HPCI AOP where upon start high current was drawn and numerous alarms were received as the 250VDC bus was briefly degraded during the start. The inspectors reported these additional events to the licensee for their assessment. The inspectors assessed that the lack of inclusion of these significant events did not result in a failure to identify adequate root and contributing causes and that inclusion of these events would not have changed the licensee's corrective actions or their effectiveness. The inspectors will be reviewing the licensee's actions surrounding the failure of the Unit 3 HPCI AOP from a technical adequacy standpoint in IR 05000249/2016010.

b. Findings

No findings were identified.

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

.1 (Closed) Licensee Event Report 05000237/2016-002-00, "Unit 2 HPCI Inlet Steam Drain Pot Piping Leak Resulting in HPCI Inoperability"

a. Inspection Scope

The inspectors reviewed the licensee's response to and assessment of a through-wall leak which developed on the Unit 2 HPCI inlet drain pot drain piping. Specifically, on May 16, 2016, while in standby operation, a through-wall steam leak was observed coming from the Unit 2 HPCI 1 inch diameter inlet drain pot drain piping upstream of the

main condenser return isolation valve 2–2301–29. The leak was identified to be from 2–2323–1", which is American Society of Mechanical Engineers (ASME) Code Class 2 piping. Due to the piping being ASME Code Class 2, it was required to be isolated in accordance with Technical Requirements Manual 3.4.a, Structural Integrity. Isolating this piping resulted in the Unit 2 HPCI system becoming inoperable. Follow-up investigation and testing of the failed component indicated a failure mechanism of liquid droplet impingement. The piping that failed was believed to have been replaced in 2013 with stainless steel, a material resistant to liquid drop impingement, but was actually not replaced due to a work package revision/scope removal change prior to execution.

The licensee reported this event in accordance with 10 CFR 50.73(a)(2)(v)(D), any event or 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. Documents reviewed are listed in the Attachment to this report. This licensee event report (LER) is closed.

This event follow up review constituted one sample as defined in IP 71153–05.

b. Findings

Introduction: A finding of very low safety significance (Green) and associated NCV of TS 5.4.1.a, "Procedures," was self-revealed for the licensee's failure to maintain maintenance procedures appropriate for the circumstances that could affect performance of safety related equipment. Specifically, procedures MA–AA–716–010, "Maintenance Planning," Revision 20 and DAP 15–18, "Work Order Supplemental Information and Lessons Learned," Revision 17 did not ensure that scope revisions in support of corrective maintenance activities performed on HPCI piping in 2013 were properly reviewed and evaluated for technical adequacy directly resulting in a through-wall steam leak on the Unit 2 HPCI inlet drain pot drain piping and safety system inoperability in May 2016.

Description: On May 16, 2016, while in standby operation, a through-wall steam leak was observed coming from the Unit 2 HPCI 1 inch diameter inlet drain pot drain piping upstream of the main condenser return isolation valve 2–2301–29. The leak was identified to be from 2–2323–1", which is ASME Code Class 2 piping. Due to the piping being ASME Code Class 2, it was required to be isolated in accordance with Technical Requirements Manual 3.4.a Structural Integrity. Isolating this piping resulted in the Unit 2 HPCI system becoming inoperable. Follow-up investigation and testing of the failed component indicated a failure mechanism of liquid droplet impingement. The piping that failed was believed to have been replaced in 2013 with stainless steel, a material resistant to liquid drop impingement, but was not replaced due to a work package revision/scope removal change prior to execution.

In March of 1997 and April of 1998, sections of the Unit 3 and Unit 2–2323–1" inlet drain pot drain carbon steel piping were replaced with chrome-moly steel in order to address the original piping's degradation and susceptibility to flow accelerated corrosion (FAC). Stainless steel was originally considered for these modifications but was rejected due to cost concerns. Additional sections of piping were replaced with chrome-moly steel in 2003 and again in March 2007 following another FAC induced failure on Unit 3.

In July 2007, Unit 2 experienced a steam leak immediately upstream of the 2–2301–29 condenser isolation valve this time from a chrome-moly elbow. The licensee's

equipment apparent cause (EACE) 654273 determined the cause to be internal liquid impingement corrosion. The affected elbow and two additional degraded elbows in Unit 3 piping identified during extent of condition/cause determinations were replaced with stainless steel components which is considered resistant to both FAC and liquid impingement corrosion. Additional steam leaks occurred in August 2011 (Unit 2), May 2012 (Unit 2), and June 2012 (Unit 3) and were attributed to liquid impingement corrosion affecting a remaining carbon steel valve body and chrome-moly piping elbows. The license performed EACE 1392823 in September 2012 and determined that the extent of condition from EACE 654273 was not adequate in that it only considered elbows at the end of long stretches of piping and not shorter stretches susceptible to liquid impingement corrosion. Corrective actions derived from the EACE included non-destructive examination of Unit 2 and 3 piping for signs of degradation. Components along the length of the drain pipes in both the reactor building and turbine building were identified and WOs 1571975–01 and 1571975–13 were created to replace these components. On February 12, 2013, WO 1571975–01 was modified and scope was removed (piping immediately upstream of 2–2301–29) due to limited welder resources. As the scope of this WO was not derived from an Engineering Change Request, work planning procedures MA–AA–716–010, "Maintenance Planning," Revision 20 and DAP 15–18, "Work Order Supplemental Information and Lessons Learned," Revision 17 did not require engineering to be formally made aware that this scope reduction had taken place through the major revision process. Both design and plant engineering assumed that the replacements were performed in March of 2013 when the remaining susceptible piping in the Unit 2 turbine building was replaced. Unit 2 reactor building susceptible piping was replaced in November of 2013.

The HPCI drain system is designed to remove condensation in the steam turbine supply line 2(3)–2305–10" upstream of the turbine steam supply valve 2(3)–2301–3. The drain path directs flow from the HPCI drain pot to the main condenser during standby operations. The condensate in the drain system is in the form of two-phase flow (liquid and vapor) at an elevated temperature. As the line approaches the main condenser which is under vacuum conditions, it accelerates causing velocity and impact angle to become more severe on the piping.

Analysis: The inspectors determined that failing to establish maintenance planning procedures appropriate to the circumstances represented a performance deficiency. Specifically, the licensee performed a major revision to remove scope from a corrective maintenance work order without engineering reviewing and assessment as maintenance planning procedures did not require engineering to establish the boundaries of the original corrective maintenance package, and as a result they were not consulted when changes to the scope of the corrective maintenance were made by maintenance staff due to manpower limitations. The removal of scope to a corrective maintenance work order to replace HPCI drain line components identified as susceptible to failure following performance of corrective actions associated with EACE 1392823 was reasonably within the licensee's ability to foresee and correct and should have been prevented.

The performance deficiency was determined to be more than minor, and thus a finding, in accordance with IMC 0612, Appendix B, "Issue Screening," dated September 7, 2012, because it was associated with the Mitigating Systems Cornerstone Attribute of Procedure Quality and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e. core damage). Specifically, the failure to ensure

work planning procedures controlled the process of major revisions to corrective maintenance activities ensuring adequate engineering reviewing and assessment resulted in continued degradation and ultimate failure of the Unit 2 HPCI inlet drain pot drain piping.

The inspectors applied IMC 0609, Attachment 4, "Initial Characterization of Findings," issued June 19, 2012, to this finding. The inspectors answered "No" to all questions within Table 3, "Significance Determination Process Appendix Router," and transitioned to IMC 0609, Appendix A, "The Significance Determination Process for Findings At- Power," June 19, 2012. The inspectors answered "No" to all questions in Exhibit 2, "Mitigating Systems Screening Questions." Therefore, the finding was screened as very low safety significance (Green).

This finding has a cross-cutting aspect in the area of Problem Identification and Resolution, Evaluation, because the licensee failed to thoroughly evaluate corrective maintenance scope changes to ensure that resolutions address causes and extent of conditions commensurate with their safety significance. Specifically, the licensee incorrectly removed scope without engineering evaluation for adequacy from the Unit 2 HPCI inlet drain pot drain line corrective maintenance following a through wall leak in 2012. Piping that was identified as part of the extent of condition of the failure in 2012, was removed from the scope of corrective maintenance activities due to maintenance personnel short falls. This specific piping failed in May of 2016, resulting in the loss of the HPCI system safety function. [P.2]

Enforcement: Technical Specification 5.4.1.a requires in part, that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February, 1978. Regulatory Guide 1.33, Revision 2, Appendix A, February, 1978, Section 9.a covers, in part, maintenance that can affect the performance of safety-related equipment should be properly pre-planned and performed in accordance with written procedures, documented instructions, or drawings appropriate for the circumstances.

Contrary to the above, between February 12, 2013, and present, the licensee failed to establish maintenance planning procedures appropriate to the circumstances that could affect the performance of safety related equipment. Specifically, procedures MA–AA–716–010, "Maintenance Planning," Revision 20 and DAP 15–18, "Work Order Supplemental Information and Lessons Learned," Revision 17 did not ensure that scope revisions in support of corrective maintenance activities performed on HPCI piping in 2013 were properly reviewed and evaluated for technical adequacy directly resulting in a through-wall steam leak on the Unit 2 HPCI inlet drain pot drain piping and safety system inoperability in May 2016.

The licensee performed RCR 2695353 to review the May 2016 failure of the Unit 2 HPCI inlet drain pot piping and determined corrective actions to address the root cause of maintenance procedures provided less than adequate guidance to protect work scope of a corrective work order. Corrective actions included replacement of failed components and establishment of a new work order to replace additional susceptible components in the Unit 2 HPCI inlet drain line; verification of previous component replacements on the Unit 3 HPCI inlet drain line; revisions to procedures MA–AA–716–010 and DAP 15–18 requiring an Engineering Change Request to design engineering to establish the scope boundaries for all corrective maintenance activities possessing a Plant Health

Committee commitment code, and guidance for the removal of scope within a corrective maintenance activity requiring approval from the appropriate owners of the work order. Because this violation was of very low safety significance and because the issue was entered into the licensee's CAP as IR 2695353, consistent with Section 2.3.2 of the Enforcement Policy it is being treated as a NCV. **(NCV 05000237/2016003–01, Failure to Assess Scope Changes to Corrective Maintenance Activities Affecting Safety-Related SSC)**.

4OA6 Management Meetings

.1 Exit Meeting Summary

On October 12, 2016, the inspectors presented the inspection results to Mr. P. Karaba, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary. Proprietary material received during the inspection was returned to the licensee.

4OA7 Licensee-Identified Violations

The following violation of very low significance (Green) was identified by the licensee and is a violation of NRC requirements which meets the criteria of the NRC Enforcement Policy for being dispositioned as an NCV.

Appendix R, Section III.G.3 requires, in part, that an alternative dedicated shutdown capability and its associated circuits, independent of cables, systems, or components in the area, room, or zone under consideration should be provided where the protection of systems whose function is required for hot shutdown does not satisfy the requirement of paragraph G.2 of this section.

Compliance with 10 CFR Part 50, Appendix R, Section III.L is considered necessary to satisfy the requirements of 10 CFR Part 50, Appendix R, Section III.G. Section III.L of 10 CFR Part 50, Appendix R, requires implementation of an alternative dedicated shutdown capability as required by Section III.G.3 of 10 CFR Part 50, Appendix R. Section III.L.3 of 10 CFR Part 50, Appendix R, states, in part, that alternative shutdown capability shall be independent of the specific fire area and that procedures shall be in effect to implement this capability.

Contrary to the above, from October 15, 2003, until present, the licensee failed to maintain in effect all provisions of 10 CFR Part 50, Appendix R, Section III.G.3 and Section III.L. Specifically, the licensee failed to ensure that systems that were required for alternative shutdown capability were not free of fire effects, therefore, were not independent of the specific fire area. The licensee credits the HPCI system as the alternative to the isolation condenser for hot shutdown. Licensee procedures DSSP 0100–C, "Hot Shutdown Procedure – Path C" Revision 27 and DSSP 0100–D, "Hot Shutdown Procedure – Path D" Revision 26, inappropriately direct operators to lift leads and install electrical jumpers in order to defeat HPCI suction transfer from the condensate storage tank (CST) to the torus on low CST level or high torus level. Installation of jumpers and lifting leads is considered a repair and is not permissible for systems required to achieve safe hot shutdown.

In accordance with Inspection Manual Chapter (IMC) 0609, “Significance Determination Process (SDP),” Attachment 0609.04, “Initial Characterization of Findings,” Table 2 the inspectors determined the finding affected the Mitigating Systems cornerstone. The finding degraded fire protection defense-in-depth strategies, and the inspectors determined, using Table 3, that it could be evaluated using Appendix F, “Fire Protection SDP.” The inspectors determined that the finding impacted the ability to achieve safe shutdown and, assigned the finding to the category of 1.4.5 Post-fire Safe Shutdown using Table 1 in IMC 0609, Appendix F, Attachment 1, “Part 1: Fire Protection SDP Phase 1 Worksheet,” dated September 20, 2013. The inspectors answered “no” to Question 1.4.5–B, “Does the fire finding affect the ability to reach and maintain a stable plant condition within the first 24 hours of a fire event?” in Task 1.4.5 of IMC 0609, Appendix F. The repair actions already in place in procedures DSSP 0100–C and DSSP 0100–D, while not allowed by Appendix R, were determined to be a viable compensatory measure that would allow the plant to reach and maintain a stable hot shutdown condition. Therefore, the inspectors determined that the finding screened as having very low safety significance (Green). This issue was entered into the licensee’s CAP as IR 2651479.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

P. Karaba, Site Vice President
J. Washko, Station Plant Manager
L. Antos, Manager Site Security
C. Bachman, Plant Engineering
M. Budelier, Senior Engineering Manager
J. Condreay, Operations Training Instructor
T. Dean, Director, Site Training
T. Ditchfield, Shift Operations Superintendent
D. Doggett, Emergency Preparedness Manager
B. Franzen, Regulatory Assurance Manager
F. Gogliotti, Director, Site Engineering
R. Johnson, Chemistry
D. Ketchledge, Engineering
G. Morrow, Operations Director
S. Matzke, Corrective Action Program Coordinator
A. McMartin, Manager Site Chemistry, Environment & Radwaste
M. Overstreet, Radiation Protection Manager
J. Quinn, Director, Site Maintenance
R. Sisk, Buried Pipe Program Owner
D. Thomas, Training Manager
D. Walker, Regulatory Assurance – NRC Coordinator

U.S. Nuclear Regulatory Commission

J. Cameron, Chief, Division of Reactor Projects, Branch 4

IEMA

M. Porfirio, Resident Inspector, Illinois Emergency Management Agency

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

05000237/2016003–01	NCV	Failure to Assess Scope Changes to Corrective Maintenance Activities Affecting Safety-Related Structures, Systems, and Components (SSC)

Closed

05000237/2016003–01	NCV	Failure to Assess Scope Changes to Corrective Maintenance Activities Affecting Safety-Related SSC
05000237/2016–002–00	LER	Unit 2 HPCI Inlet Steam Drain Pot Piping Leak Resulting in HPCI Inoperability

LIST OF DOCUMENTS REVIEWED

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

1R01 Adverse Weather Protection

- WO 01588908-01, "D3 RFL COM Flood Seals Unit 2/3 EDG Area: Outside Walls"
- IR 2700948, "NRC Resident Inspector Concerns/Questions"
- IR 2699082, "Discharge Canal Water Level Failed"
- IR 2670922, "Flex Building Charlie Equipment"
- IR 2614834, "Enhancements Identified to Localized and Global Flooding"
- IR 2543877, "Flooding Overall Strategy Revision"
- IR 2703969, "Entered DOA 0010-04"
- IR 2705443, "NRC Identifies Issues with Response to IR 2699082"
- EC-Eval 393261, "Evaluation of Water Flow Paths Under Aquadam During PMF," Revision 000
- Work Planning Instruction for EC 391644, "Reactor and Diesel Building Flood Barriers," Revision 4
- Design Consideration Summary (DCS) for EC 391644, "Reactor and Diesel Building Flood Barriers," Revision 005
- DOA 0010-04, "Floods," Revision 45
- DOA 0010-S1, "Key Phone Numbers for DOA 0010 Block Procedures," Revision 15
- FSG-34, "Ford F-750 Flex Truck and Mounted Accessories," Revision 00
- FSG-60, "Flex Flood Pump Deployment/Operation," Revision 00
- FSG-62, "Flex Generator Deployment During a Flood," Revision 00
- MA-DR-MM-6-00101, "Maintenance Activities for Site Flooding," Revision 03
- 50.59 Screening No. 2015-380, "External Flood Mitigation Strategy," Revision 000
- OP-AA-108-111-1001, "Severe Weather and Natural Disaster Guidelines," Revision 15
- ER-AA-450, "Structures Monitoring," Revision 5
- 50.59 Screening No. 2013-0024, EC 391644, UFSAR Change # 13-001, "Reactor and Diesel Building Flood Barriers," Revision 0052
- IR 2718499, "Documentation of NRC Requested Tour of Flood Barriers"
- Drawing: B-500, Building Excavation Plan & Sections, Revision H

1R04 Equipment Alignment

- IR 2642031, "High Packing Loads MOV 2-1402-24B"
- DOP 1400-M1, "Unit 2 Core Spray System," Revision 24
- DOP 1400-E1, "Unit 2 Core Spray System Electrical Checklist," Revision 04
- Drawing: 20901-001, Core Spray System, Revision 2
- Drawing: 20901-005, Core Spray Logic, Revision 1
- Drawing: 209LN001-003, Core Spray Sparger, Revision 00
- Drawing: 209LN001-004, Core Spray Logic, Revision 00
- Drawing: 209LN001-009, Core Spray System Alarms Panel 902-3"A", Revision 00
- Drawing: M-27, Diagram of Core Spray Piping, Revision AAN
- IR 2509889, "2-1904-24 U2 FPF[fuel pool filter] Outlet AOV[air operated valve] Not Operating Properly"

- IR 2518409, “Fuel Pool Cooling Pump Drawing Issues”
- IR 2539684, “PS Fuel Pool Cooling Pump Suction Failed”
- IR 2544369, “Unit 2 Fuel Pool Adverse Silica Results”
- IR 2546052, “SFP LI Mod and Fuel Measurement Equipment Location Conflict”
- IR 2570576, “Pressure Gauge 2-1941-25A Not Indicating Correct Pressure”
- IR 2583109, “U2 FPC Filter FCV[flow cont valve] AOV Not Responding”
- IR 2628349, “IEMA Question About U2 Fuel Pool Liner Leak Sight Glasses”
- IR 2647611, “D2 Fuel Pool Cooling Flow Indicator Out of Tolerance for CAL”
- IR 2647612, “2-1951-C Unable to Calibrate”
- IR 2666015, “U2 Fuel Pool and Skimmer Surge Tank Levels Found High”
- IR 2673816, “Unexpected Alarm: Fuel Pool Trouble”
- IR 2676677, “2B Spent Fuel Pool Lvl Indicator Not Functioning as Expected”
- IR 2694505, “NRC SRI for WEC Supervisor”
- Fuel Pool Cooling Electrical Checklist
- DOP 1900-M1, “Unit 2 Fuel Pool Cooling System Checklist,” Revision 15
- 50.59 Review for EC 356610 & EC 356611, “Modify Fuel Pool Cooling Pump Logic (Add Low Suction Pressure Trip Bypass to the Start Circuit),” Revision 000 & 000
- Work Planning Instructions for EC 356610, “Modify Fuel Pool Cooling (FPC) Pump Logic,” Revision 000
- Design Considerations Summary for EC 356610, “Modify Fuel Pool Cooling (FPC) Pump Logic,” Revision 000
- Drawing: M-31, Diagram of Fuel Pool Cooling Piping, Revision BQ
- IR 2706381, “NRC Identified Issues Dealing With the Isolation Condenser”
- IR 2705590, “NRC Identified Issue During Walkdowns”
- IR 2690308, “NRC/IEMA Walkdown Questions and Concerns”
- IR 2631810, “IEMA Question About 2-1301-16 Valve Packing Leak”
- IR 2577353, “2-1301-16 Valve Has a Packing Leak”
- IR 2501100, “Steam Leak on 2-1301-16 Manual Valve”
- IR 0483919, “Hoffman Junction Box Flooded in ISO Cond. B Pump Rm Basement”
- DOP 1300-01, “Standby Operation of the Isolation Condenser System,” Revision 54
- DOP 1300-M1/E1, “Unit 2 Isolation Condenser System Checklist,” Revision 21
- Drawing: M-4203, Flow Diagram Isolation Condenser Make Up System, Revision G
- Drawing M-28, Diagram of Isolation Condenser Piping, Revision LR
- IR 2716703, “’B’ CREVS Following Maintenance”
- IR 2713262, “MCR Temperature Fluctuations”
- IR 2680419, “NRC Question Regarding CR HVAC ‘A’ Train”
- IR 2679355, “2/3 A CR HVAC A HX Tube Cleaning Enhancement”
- IR 2642618, “Control Room Hot Water Pump Tripped”
- IR 2636649, “2/3 CR HVAC Hot Wtr Pump Suction Gauge Broke”
- WO 01949974, “D2/3 1M TS/COM Cont Room Train B HVAC Filtration Unit”
- WO 01936910, “D2/3 Qtr TS/Com Valve Timing (IST)”
- WO 01703022, “D2 2RFL COM Isolation Condenser Internal Grating/Support Visual Inspection”
- WO 01710134, “D2 RFL COM Isolation Condenser Tube Bundle Integrated Inspection During Vessel Hydro”
- DMP 1300-01, “Installation and Removal of Isolation Condenser Exhaust Vent Pipe Cover/Hatch,” Revision 8
- DOP 5750-05, “Control Room Ventilation and Air Conditioning System,” Revision 67
- DOP 5750-M4/E4, “Unit 2/3 Control Room Heating, Ventilation, and Air Conditioning Systems Checklist,” Revision 02
- DOP 5750-M9, “Unit 2/3 Control Room Ventilation Manual Damper Checklist,” Revision 02

- DOS 1600-04, “Unit 2/3 Quarterly Valve Timing (W-5),” Revision 27
- DOS 5750-04, “Control Room Train B HVAC and Air Filtration Unit Surveillance,” Revision 51
- Drawing: 28803-001, Control Room HVAC, Revision 01
- Drawing: 28803-002, “Train “B” HVAC Equipment Room, Revision 02
- Drawing: 28803-003, Train “A” Equipment Area, Revision 01
- Drawing: 28803-004, RCU SW/CCSW Valves, Revision 01
- Drawing: 28803-007, Control Room HVAC Overview, Revision 00
- Drawing: M-273, Diagram of Control Room and Office Air Conditioning, Revision Z

1R05 Fire Protection

- Dresden Pre-Fire Plan for FZ 11.1.3
- Dresden Pre-Fire Plan for FZ 7.0.A.2 and FZ 7.0.A.3
- Dresden Pre-Fire Plan for FZ 1.1.2.5.A
- Dresden Pre-Fire Plan for FZ 11.1.2
- Fire Load Calculation No. DRES 97-0105, Revision 10
- DFPS 4114-02, “Unit 2 Fire System Inspection,” Revision 29
- Dresden Fire Hazard Analysis, Section 4.8.1, “Turbine Building-Station Battery Rooms Elevation 549 Feet 0 Inch (Fire Zone 7.0.A),” Amendment 13
- Dresden Generating Station Pre-Fire Plan FZ 7.0A.1, “Unit 2 Battery Room Elevation 549’,” Revision 3
- DFPS 4114-01, “Unit 1 Fire Equipment Inspection,” Revision 33
- DFPS 4114-04, “Fire Extinguisher Annual Inspection,” Revision 58
- Dresden Pre-Fire Plan for Fire Zone 1.1.2.5.A, Revision 1
- Dresden Fire Hazard Analysis, Section 4.1.1, “Isolation Condenser Area (Fire Zone 1.1.2.5.A),“ Amendment 15
- Fire Protection Reports, Volume 4, Part 1, Interim Measures/Exemption Requests, Section 3.4.4.4 – Reactor Building – Reactor Floor – South Elevation 589 feet 0 inch (Fire Zone 1.1.2.5.A), Revision 1, September 1985
- City of LA - Department of Building and Safety Information Bulletin / Public Building Code, Reference No. LABC 705.8.2, Document No. P/BC 2014-106, Effective Date 05-22-2014, “Water Curtain in Lieu of Protected Exterior Openings” (Reference for description of a water curtain.)

1R06 Flooding

- WO 01588907-01, “ D3 Refuel (RFL) COM Flood Seals Reactor Building E&W Corner Rooms Walls Against Torus”
- WO 0158849-01, “D3 RFL COM Flood Seals Turbine Building CCSW Vault Walls & FLR, Elevation 495’-0”
- WO 01434193, “D3 RFL COM CCSW Vault Wall at Elevation 495’-0””
- IR 2702517, “West Corner Room Sub Door Gasket is Degraded”
- IR 2701799, “Bedplate of 3D CCSW Pump Overflowing”
- IR 2701434, “U3 RX Bldg 570 Elevation Area Floor Drains Plugged”
- IR 2700945, “U3 CCSW Vault Door Difficult to Operate”

1R11 Licensed Operator Requalification Program

- DOA 0250-01, “Relief Valve Failure,” Revision 31
- DOA 3700-01, “Loss of Cooling by Reactor Building Closed Cooling Water (RBCCW) System,” Revision 20
- DOA 6500-10, “4KV Circuit Breaker Trip,” Revision 07

- DEOP 0200-01, “Primary Containment Control,” Revision 11
- DEOP 0400-05, “Failure to Scram,” Revision 17
- DEOP 0500-05, “Alternate Insertion of Control Rods,” Revision 18
- DGA-07, “Unexpected Reactivity Change,” Revision 25
- DGP 02-03, “Reactor Scram,” Revision 105
- TQ-AA-155-J030, “Simulator Evaluation Job Aid,” Revision 01
- OP-AA-101-113-1006, “4.0 Crew Critique Guidelines,” Revision 7
- WO 01351462, “Contingency Instructions for MO 2-4402D Failure”
- IR 2707307, “AOV 2-5402-A Did Not Auto Open During Flow Reversal”
- IR 2706064, “Spline Adaptor on 2-4402-D Ground Into”
- ECR 424601 for IR 2706064
- OP-AB-300-1003, “Reactivity Maneuver Approval Cover Page,” for Reactivity Maneuver Plan D225-005, dated December 22, 2015
- DGP 03-01, “Power Changes,” Revision 131
- DOP 4400-08, “Circulating Water System Flow Reversal,” Revision 60
- DOP 4400-12, “Circulating Water Isolation to Half Unit Condenser,” Revision 14
- Drawing: 12E-2369A, Schematic Diagram Condenser Flow Reversing Cont. Pt 1 Condenser Reversing System Modification, Revision E
- Drawing: 12E-2369B, Schematic Diagram Condenser Circulating Water Cont. Pt 2 Condenser. Reversing Sys Modification, Revision D
- Drawing: 12E-2369D, Schematic Diagram Condenser Circulating Water Valves 2-4402C & 2D Condenser Reversing System, Revision G
- Drawing: M-36, Diagram of Circulating Water and Hypochlorite Piping, Revision RS

1R12 Maintenance Effectiveness

- IR 2706381, “NRC Identified Issues Dealing with the Isolation Condenser”
- IR 2706359, “2-1301-16 Valve Packing Leak”
- IR 2688489, “2/3A IC Cond Make-up Pump Failed Start”
- IR 2680300, “Historical Operability Review for IR 2668322”
- IR 2665025, “Time Delay Relay 3-0595-117B Out of Tolerance on DIS 1300-08”
- IR 2655325, “2-1350-B Found Out of Tolerance”
- IR 2668322, “MOV 2-1301-3 As Found Stroke Length High”
- IR 2631810, “IEMA Question About 2-1301-16 Valve Packing Leak”
- IR 2624938, “Maint Rule (a)(1) Determination Required for 2/3A ISO M/U PP”
- IR 2609513, “DPIS 3-1350-B As-Found OOT”
- IR 2607347, “2/3 ‘A’ Isolation Condenser MY Pump Failed to Start”
- IR 2602728, “U2 Isolation Condenser Level Increasing”
- IR 2594932, “ISO Cond TDR Historic Operability Review From IR 2569832”
- IR 2590545, “ISO Cond Level (LI 2-1340-2) OOT High”
- IR 2587571, “MOV 2-1301-3 Test Results”
- IR 2581424, “Valve Did Not Reposition During LSFT”
- IR 2577353, “2-1301-16 Valve Has a Packing Leak”
- IR 2569832, “Tech Spec Time Delay 2-0595-117A Found OOT”
- IR 2563937, “2/3A IC Make Up Pump Failed to Start”
- IR 2545803, “Did Not Receive Alarms When Expected”
- IR 2506445, “NRC Mod/5059 Inspection: ISCO Operating Procedures”
- IR 2501100, “Steam Leak on 2-1301-16 Manual Valve”
- IR 2389321, “U2 IC Unforecasted Unavailability September 2014”
- IR 0483919, “Hoffman Junction Box Flooded in ISO Cond. B Pump Rm Basement”
- Maintenance Rule Performance Criteria for FLEX/B.5.b-1, dated 02/12/2016

- Maintenance Rule Performance Criteria for FLEX/B.5.b-2, dated 02/12/2016
- Maintenance Rule Performance Criteria for 19-5, dated 09/22/2015
- (a)(1) Determination for IR 2624938, “Unit 0 Function 13-1: To Provide a Clean Source of Isolation Condenser Makeup Water During a Loss of Offsite Power”
- Action Plan for (a)(1) Determination IR 2624938, dated July 27, 2016
- (a)(1) Determination for IR 2453579, “08-1: Nuclear Fuel Assembly – To Serve as a Fission Product Barrier to Prevent the Release of Fission Products to the Coolant,” dated March 2, 2016
- Drawing: 20700LN-014, Diesel Oil Transfer For IC Makeup Pumps, Revision 00
- Drawing: 20700LN001-012, HVAC System for IC Makeup Pump Building, Revision 00
- Drawing: 20700LN001-011, Isolation Condenser Makeup Pump System, Revision 01
- Drawing: 20700LN001-010, U2 Isolation Condenser Makeup and Drain Flowpaths, Revision 01
- Drawing: 20700LN001-002, Unit 2 Division 1 and 2 Initiation/Isolation Logic, Revision 03
- Drawing: 20700LN001-001, Unit 2 Isolation Condenser System, Revision 0
- IR 2716752, “Maintenance Rule FF Definition for Function 03-03”
- IR 2716610, “Missed CBM Failure on CRD for MR Function 3-3, 3-8”
- IR 2453527, “2A CRD FCV Failed To Respond To Remote Open Demand”
- WO 01808183-01, “2A CRD FCV Failed To Respond To Remote Open Demand”
- ER-AA-310, “Implementation of the Maintenance Rule,” Revision 9
- ER-AA-310-1003, “Maintenance Rule-Performance Criteria Selection,” Revision 5
- ER-AA-310-1004, “Maintenance Rule-Performance Monitoring,” Revision 13
- Maintenance Rule Expert Panel Meeting Notes, Dated 04/16/2009
- Maintenance Rule System Basis Document for CRD Function 03-3, “To Provide Water At The Proper Flow And Pressure For Normal Drive Operation”
- Maintenance Rule System Basis Document for Dresden Unit 2, Function 03-3, “Control Rod Drive (CRD) Hydraulics”

1R13 Maintenance Risk Assessments and Emergent Work Control

- WO 01926055, “D3 QTR TS EDG CLG WTR PMP Test for IST Program Surveillance”
- IR 2709013, “3-3930-500 U3 DGCWP Has a Packing Leak”
- DOS 6600-08, “Diesel Generator Cooling Water Pump Quarterly and Comprehensive/Preservice Test for Operational Readiness and In-Service Test (IST) Program,” Revision 61
- ASME OM Code 2004, Subsection ISTB, Inservice Testing of Pumps in Light-Water Reactor Nuclear Power Plants
- Drawing: 20901-002, ECCS Room Cooling Water/Diesel Generator Cooling Water, Revision 00
- Drawing: 277LN001-001, CCSW Subsystem 1, Revision 06
- Drawing: 27600-001, Service Water System, Revision 03
- Drawing: M-360, Diagram of L.P. Coolant Injection Piping, Revision BF
- Drawing: M-355, Diagram of Service Water Piping, Revision SK
- Drawing: M-517, Diesel Generator Engine Cooling Water System, Revision I
- WO 01868076, “Install the HCVS Main Structure”
- IR 2711494, “WTO Not Properly Implemented Per OP-AA-109-101”
- IR 2710798, “NRC ID Safety Issue During Heavy Lift”
- Exelon Dresden Nuclear Plant, Hardened Containment Vent System (HCVS) – Structure Installation / Rigging Plan, Revision 4
- Work Planning Instructions for EC 400578, Rev.001, “Hardened Containment Vent System Modification (Non-Outage) as Required by NRC Order EA-13-109 – Unit 3”

- Design Considerations Summary for Dresden Station – Unit 3, “Hardened Containment Vent System Modification – U3 Online”
- 50.59 Screening No. 2015-289, Rev. No. 000 for EC 400578, “Hardened Containment Vent System – Modification – U3 Online”
- CC-AA-103-1003, Design Analysis for DRE15-0057, “Analysis for HCVS Steel Tower Load Drop on Ground,” Revision 0
- CC-AA-103-1003, Design Analysis for DRE15-0068, “HCVS Assessment of Buried Utilities,” Revision 0
- MA-AA-716-021, “Rigging and Lifting Program,” Revision 27
- MA-AA-716-022, “Control of Heavy Loads Program,” Revision 12
- OP-AA-109-101, “Clearance and Tagging,” Revision 12
- OP-AA-109-101, Attachment 5, Clearance Preparation/Approval Checklist for Clearance # WTO 2016-1200
- NRC Regulatory Issue Summary 2008-28, “Endorsement of Nuclear Energy Institute Guidance for Reactor Vessel Head Heavy Load Lifts”
- Drawing: RP-01A, Upper Sections Rigging Details, Revision 7
- Drawing: RP-02A, Rigging Elevations, Revision 7
- Drawing: RP-03A, Platform (Lower Section) Rigging Details,” Revision 7
- Drawing: RP-04A, Upper Section Rigging Details, Revision 7
- Drawing: RP-10A, Upper Section Build-Out Details, Revision 7
- Drawing: RP-11A, Platform (Lower Section) Build-Out Details, Revision 7
- Drawing: RP-20A, Main Crane Setup Plan & Elevations, Revision 7
- Drawing: SK-01, Lift Lug Geometry, HCVS Upper Tower Installation, Revision 6
- Drawing: SK-02, Lift Lug Geometry, HCVS Lower Tower Installation, Revision 6
- OP-AA-108-117, Protected Equipment List for U2 Div 2 Core Spray
- OP-AA-108-117, Protected Equipment List for U2 Div 1 Core Spray
- OP-AA-108-117, Protected Equipment List for U2 Div I LPCI
- OP-AA-108-117, Protected Equipment List for U2 Div II LPCI
- OP-AA-108-117, Protected Equipment List for U2 ADS
- OP-AA-108-117, Protected Equipment List for U2 Isolation Condenser
- OP-AA-108-117, Protected Equipment List for U 2/3 345 Kv Switchyard

1R15 Operability Determinations and Functional Assessments

- DOP 0100-00, “RPV Control,” Revision 11
- DSSP-0100-C, “Hot Shutdown Procedure – Path C,” Revision 27
- DSSP 0100-D, “Hot Shutdown Procedure – Path D,” Revision 26
- Letter DRF No. 0000-0031-8074, QDC1-0167 to J. Friedrichsen from K.M. Davis, GE, RE: “Responses to Questions on Operation of Quad Cities HPCI Post-EPU,” dated May 27, 2005
- GE-NE-A22-00103-56-01-D, “Dresden and Quad Cities Extended Power Uprate, Task T0611: Appendix R Fire Protection (Dresden Station),” Revision 1
- Design Analysis for EC 34857, “GE-NE-A22-00103-56-01-D, Task T0611: Appendix R Fire Protection (Dresden Station),” Revision 01A
- EC 350088, “Determine the Maximum HPCI Oil Cooler Oil Side Outlet Temperature”
- EC 355730, “Post – EPU Appendix R Elevated Torus Temperature and HPCI Operation,” Dated 05/27/05
- EC Eval. 403195, “Evaluate GE Document DRF No.0000-0031-8074”
- GE-NE-A22-00103-56-01-D, “Dresden and Quad Cities Extended Power Uprate, Task T0611: Appendix R Fire Protection (Dresden Station),” Revision 0
- Design Analysis for EC 406498, “GE-NE-A22-00103-56-01-D, Task T0611: Appendix R Fire Protection (Dresden Station),” Revision 01BB

- IR 2651479, “EOP Project – UFSAR Change for New HPCI Temp Limit”
- IR 2513249, “Unit 3 Torus Water Level Rising”
- IR 0886454, “LPCI CST Suction Isolation Valve 2-1501-31B Seat is Leaking”
- ER-AA-302-1007, “MOV Limitorque Actuator Capability Determination Methodology,” Revision 9
- MA-AA-716-004, “Troubleshooting Log for Issue Report # 2683634,” Revision 13
- MA-AA-723-301, “Periodic Inspection of Limitorque Model SMB/SB/SBD-000 Through 5 Motor Operated Valves,” Revision 11
- Handwheel Torque Calculation DRE-3-2301-14 (DRE-3), DC Motor Operated GL96-05 Globe Valve With SMB-0, Revision 4
- History for D3 2Y COM Grease Vlv Stem, Threads Only 3-2301-14 Vlv, 06/11/1996 through 03/27/2015
- Operations logs 08/11/2016 16:11 – 08/11/2016 21:05; 08/12/2016 01:10 – 04:20; and 08/14/16 01:13
- Crane-Aloyco, Inc. Report No. OTC-419, “Thrust Analysis for Valve 3-2301-14”
- Drawing: M-374, Diagram of High Pressure Coolant Injection Piping, Revision CV
- USNRC Technical Training Manual, Motor-Operated Valves Course Manual, pages 3-41 through 3-58
- IR 2689786, “10 CFR Part 21 Event 52055”
- IR 2688381, “10 CFR Part 21 – Event Number 52055 (Curtiss Wright)”
- Event Notification # 52055, “Part 21 – Inadequate Swaging and Adherence of Silicone O-Ring and Silicone Pad in Soft Seat Main Disc and Pilot Disc Assemblies”
- Letter from M. Cinque, Curtiss-Wright, Valve Group – Target Rock, to U.S. Nuclear Regulatory Commission, Subject: “Notification of a Defect, Inadequate Swaging and Adherence of Silicone O-ring and Silicone Pad in Soft Seat Main Disc and Pilot Disc Assemblies,” dated June 30, 2016 (NID#16310)

1R19 Post-Maintenance Testing

- WO 01773006-06, “D2/3 24M TS Control Room Air Filter Unit Performance Requirement”
- WO 01934807-04, “Adjustment Field Resistor for U3 HPCI Aux Oil PP Mtr”
- WO 01934807-08, “PMT/Functional Testing of U3 HPCI Aux Oil Pump”
- WO 01910377-01, “D3 Qtr TS HPCI Pump Oper Test and IST Surv”
- EC 406080, “Reduce Vibrations for the U3 HPCI Aux Oil Pump,” Revision 0
- Design Considerations Summary for EC 406080, Rev. 000
- EC 406070, “Provide Technical Assessment of the HPCI Auxiliary Oil Pump’s (AOP) 3-2303-AOP Final Configurations as Left Post Implementation of WO 01934807,” Revision 0
- 50.59 Screening No. 2016-210, for EC 406053, “Unit 3 Bypass of Pressure Switch PA 3-2303-PS4,” Revision 000
- Design Attribute Review (DAR) for EC 406053, Revision 000
- DOS 2300-03, “High Pressure Coolant Injection System Operability and Quarterly IST Verification Test,” Revision 110
- WO 01938475, “Unexpected Alarm – RX Bldg Fuel Pool CHA Downscale”
- DIS 1700-15, “Fuel Pool Channel A and Channel B Area Radiation Monitor Channel Calibration Test,” Revision 29
- DIS 1700-21, “Reactor Building Ventilation Channel A and Channel B Area Radiation Monitor Channel Calibration Test,” Revision 24
- Drawing: 27201-001, ARM Block Diagram, Revision 0
- WO 01762656, “D2 2Y EQ 2B CS Pmp Motor EQ Surv”

- DOP 6500-07, “Racking in 4160 Volt Manually Operated Air Circuit Breaker (ACB), Magna-Blast Hybrid (AMHG) or SF6 Gas Circuit Breaker (GCB) and Hot Canal Cooling Tower 5 kV Rated Switchgear or 5 kV Rated Vacuum Contactor,” Revision 75
- WO 01820265, “U2 DW Inerting PCV Failed to Fully Close”
- Maintenance Material List for WO 01820265-01
- DAP 15-15, “Part Selection Process,” Revision 11
- DIS 1600-10, “Drywell and Torus Pressure Instrumentation Channel Calibration and EQ Surveillance for Age Related Degradation,” Revision 30
- DOP 1600-05, “Primary Containment Inerting and Atmosphere Control,” Revision 53
- MA-AA-743-310, “Diagnostic Testing and Evaluation of Air Operated Valves,”Revision 6
- OP-AA-108-101, “Abnormal Component Position Sheet 16-211,” Revision 12
- Emerson Process Management Product Bulletin 56.1:6000, July 2008, “FlowScanner™ 6000 Valve Diagnostic System”
- Drawing: 223LN001-007, Torus Overhead View, Revision 01
- Drawing: 223LN001-001, Primary Containment Instrumentation, Revision 03
- Drawing: M-25, Diagram of Pressure Suppression Piping, Revision DY
- WO 01936910-01, “D2/3 Qtr TS/Com Valve Timing (IST)”
- WO 01778031-02, “D2/3 2Y COM CR A/C HX Clean, Insp, Eddy Current Test”
- WO 01678642-02, “D2/3 3Y PMST IST Inspect Chk Vlv 2/3-1599-103 per ER-AA-400”
- WO 01374627-03, “D2/3 8Y PM Rebuild Sol Cont Rm HVAC XCV 2/3-5741-48B”
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- IR 2715369, “CREVS Charcoal Trays Must Be Replaced at the Next PM”
- DOS 1600-04, “Unit 2/3 Quarterly Valve Timing,” Revision 27
- DOS 5750-04, “Control Room Train B HVAC and Air Filtration Unit Surveillance,” Revision 51
- Drawing: M-3121, Piping & Instrument Diagram Control Room HVAC, Revision 31
- Drawing: 28803-001, Control Room HVAC, Revision 01
- Drawing: 28803-006, Air Filtration Unit, Revision 01
- Drawing: 28803-007, Control Room HVAC Overview, Revision 00

1R22 Surveillance Testing

- DOS 2300-03, “High Pressure Coolant Injection System Operability and Quarterly IST Verification Test,” Revision 110
- WO 01910377, “D3 Qtr TS HPCI Pump Oper Test and IST Surv”
- WO 01926055, “D3 QTR TS EDG CLG WTR PMP Test for IST Program Surveillance”
- IR 2709013, “3-3930-500 U3 DGCWP Has a Packing Leak”
- DOS 6600-08, “Diesel Generator Cooling Water Pump Quarterly and Comprehensive/Preservice Test for Operational Readiness and In-Service Test (IST) Program,” Revision 61
- ASME OM Code 2004, Subsection ISTB, Inservice Testing of Pumps in Light-Water Reactor Nuclear Power Plants
- Drawing: 20901-002, ECCS Room Cooling Water/Diesel Generator Cooling Water, Revision 00
- Drawing: 277LN001-001, CCSW Subsystem 1, Revision 06
- Drawing: 27600-001, Service Water System, Revision 03
- Drawing: M-360, Diagram of L.P. Coolant Injection Piping, Revision BF

- Drawing: M-355, Diagram of Service Water Piping, Revision SK
- Drawing: M-517, Diesel Generator Engine Cooling Water System, Revision I
- WO 01918171, "U3 Core Spray (CS) Pump Minimum Flow Valve Differential Pressure Instrument Calibration," and WO 01918170-01, "CS Pump Minimum Flow Valve Analog Trip Unit Functional Test and Calibration"
- DIS 1400-01, "Core Spray Header Differential Pressure Instrumentation Calibration," Revision 22
- DIS 1400-07, "Core Spray Pump Minimum Flow Valve Analog Trip Unit Functional Test and Calibration," Revision 19
- DIS 0500-32, "Unit 2 Scram Discharge Volume level Instrumentation Calibration and Functional Tests," Revision 10
- WO 98084362-01, "Replace Circuit Board for FCI Level Switch 2-0302-82A Which Failed During the Performance of DIS 0500-05"
- WO 01734098-01, "D2 2 YR TS/EU SDV Hi LVL Chan Func Test & Trip Unit Cal"
- IR 2694637, "LS 2-302-82A Did Not Actuate as Expected"
- Prompt Investigation for IR 2694637, "Operations Identified that the 2-0302-82A U2 CRD SDIV Tank West Bank SCRAM Level Switch did not Actuate as Expected"
- Main Control Room Operator Logs for July 20, 2016
- Drawing: 12E-6816E, Schematic Diagram CRD/SDV Control Rod Drive, Revision F
- Drawing: 12E-2464, Schematic Diagram Reactor Protection System Channel "A" Trip Auxiliary Relays, Revision AD
- WO 01919691-01, "D3 Qtr TS 3B SBLC Test for IST"
- DOS 1100-04, "Standby Liquid Control System Quarterly/Comprehensive Pump Test for the Inservice (IST) Program," Revision 50
- WO 01016610-1, "SPING Effluent Monitor Quarterly Functional Test"
- DIS 1700-29, "SPING Effluent Monitor Quarterly Functional Test," Revision 06
- WO 01929897-01, "D2/3 1M TS Unit Diesel Generator Operability"
- DOS 6600-01, "Diesel Generator Surveillance Tests," Revision 130

1EP6 Drill Evaluation

- 3Q2016, TSC Focus Area Drill Manual Rev 1
- Data Set #5
- Nuclear Accident Reporting System (NARS) Form, Utility Messages 1, 2, 3, and 4

4OA1 Performance Indicator Verification

- IR 2685054, "2B CCSW Pump Inner Seal Issue"
- NEI 99–02, "Regulatory Assessment Performance Indicator Guideline," Revision 7
- "Reactor Oversight Program MSPI Bases Document, Dresden Nuclear Generating Station," Revision 11
- ER–AA–2008, "Mitigating Systems Performance Index (MSPI) Monitoring and Margin Evaluation," Revision 4
- LS–AA–2200, "Mitigating System Performance Index Data Acquisition & Reporting," Revision 5
- Main Control Room logs April 1, 2015 – June 30, 2016

4OA2 Identification and Resolution of Problems

- EFR 1513452-41, Attachment 1, Collective Effectiveness Review (of actions to address a Minimal Compliance Culture) Date Distributed July 7, 1016 (for MRC review)
- IR 1513452, "NRC Preliminary White Finding – Flood Mitigation Procedure"

- Root Cause Investigation Report (RCR) 1513452-02, “Failure to Recognize Vulnerabilities with Flood Strategies, due to a Historical Minimum Compliance Culture Regarding Flooding Event”
- WO 01934807-04, “Adjust Shunt Field Resistor for U3 HPCI Aux Oil Pump Motor 3-2303-AOP”
- WO 01934807-26, “Damaged U3 HPCI Aux Oil Pump Motor”
- WO 01825228-01, “U3 HPCI Aux Oil Pump Elevated Vibration”
- WO 01825228-06, “TS/Repair (HPCI Aux Oil Pump Motor 3-2303-AOP)”
- WO 01818352-04, “Adjust Shunt Field Resistor for U3 HPCI Aux Oil PP Motor”
- WO 0501804-01, “Trouble Shoot Low RPM Reading on HPCI Oil Pump Motor”
- WO 0422001-07, “Replace HPCI Aux Oil Pump Motor”
- IR 2716049, “Internal Inspection of MOV 3-3203 to Support FFWTR [Final Feedwater Temperature Reduction] Project”
- IR 2686163-04, “RCR for HPCI AOP Motor Failure”
- IR 2686163-30, “RCR for HPCI AOP Motor Failure”
- IR 2686163-35, “RCR for HPCI AOP Motor Failure”
- IR 2476080, “U3 HPCI Aux Oil Pump Elevated Vibration”
- IR 1490301, “U3 HPCI Aux Oil Pump Motor Sparking”
- IR 0128822, “HPCI Aux Oil Pump High Vibration and Low RPM on New Motor”
- History for D2 4Y PM Insp DC Motor/Brush HPCI Turbine Aux Oil Pump 03/01/1996 through 03/24/2015
- Letter CHRON# 187593, to C.W. Schroeder from S. Gaconis, RE: “HPCI Auxiliary Oil Pump Motor Replacement Unit 2, Dresden Station,” dated June 19, 1992
- Letter GE# 190537 to B. Wong, Commonwealth Edison Company from M.W. Hansen, RE: “Dresden 3 HPCI Aux Oil Pump Motor Shunt Resistor,” dated August 10, 1992
- DVR[Deviation Report] D-12-2-92-158, “HPCI Auxiliary Oil Pump Motor Failure Due to an Internal Fault on the Armature”
- Apparent Cause Evaluation (ACE) for AR 122822, “HPCI Auxiliary Oil Pump Vibrations and Low RPM on New Motor”
- EACE for CR 2498875-02, “Unit 3 HPCI Aux Oil Pump (AOP) Motor Failure Mechanism,” Revision 2
- Root Cause Report (RCR) for IR 2686163, “ U3 HPCI Aux Oil Pump on Fire,” dated 08/16/2016
- EC[Engineering Change] 00006421, “Revise the Setpoint for U-3 HPCI Turbine Oil Header Aux Pump”
- ECR[Engineering Change Request] 0000057672, “Provide Justification for HPCI Aux Oil Pump Shunt Readings,” dated 10/5/1999
- Procurement Evaluation 16258, “U3 AOP Install”
- PE Evaluation 21647, for AR 128822
- EC 401652, “Evaluation of Elevated Vibration Readings on U3 HPCI Aux Oil Pump Motor,” Revision 000
- ICES 323383, “Alert Declaration Due to Fire in High Pressure Coolant Injection Auxiliary Oil Pump Motor,” dated 09/22/16
- SM-AA-300, “Procurement Engineering Support Activities,” Revision 0
- DES 8300-04, “Inspection of DC Motors and Brushes,” Revision 18
- MA-AB-MM-4-00427, “HPCI Auxiliary Oil Pump Maintenance,” Revision 0
- DMP 2300-10, “HPCI Auxiliary Pump Maintenance,” Revision 03
- SMP-E-03, “Inspection and Maintenance of DC Motors,” Revision 0
- DOS 2300-03, “High Pressure Coolant Injection System Operability and Quarterly IST Verification Test,” Revision 110
- NES-EIC-40.02, Repair Requirements for Small Motors (Nuclear Safety-Related and Non Safety-Related) up to 600 VAC and 250 VDC,” Revision 5

- CC-AA-204, “Control of Vendor Equipment Manuals,” Revision 10
- DGA-03, “Loss of 250 VDC Battery Chargers With Simultaneous Loss of Auxiliary Electrical Power,” Revision 14
- DOP 2300-02, “HPCI System Turning Gear Operation,” Revision 10
- GEH-3967M, ‘Direct Current Motors and Generators Frames CD180AT-CD500AT”
- Nutherm International, Inc. Test Specification TPG-0002, No. 13016-01, GE Model 5CD173XD817A800
- IEEE Standard 334-2006, “iEEE Standard for Qualifying Continuous Duty Class 1E Motors for Nuclear Power Generating Stations”
- Analysis No. DRE96-0189, “Voltage on Loads Fed from the Safety Related 250V Batteries,” Revision 003
- Drawing: GEH-3967L, CD210AT-CD500AT Frames, Exploded View, no revision
- Drawing: 12E-3819E, Wiring Diagram HPCI Junction Boxes 3RB-50, 3RB-53, 3RB-64, 3TB-89 & 3TN-91 & Auxiliary Oil Pump Resistor Box, Revision O
- Drawing: 12E-3819E, Wiring Diagram HPCI Junction Boxes 3RB-50, 3RB-53, 3RB-64, 3TB-89 & 3TN-91 & Auxiliary Oil Pump Resistor Box, Revision S
- Drawing: 12E-3532, Schematic Diagram High Pressure Coolant Injection System Turbine Auxiliary Pumps, Revision AH
- Drawing: 12E-3532, Schematic Diagram High Pressure Coolant Injection System Turbine Auxiliary Pumps, no revision
- Drawing: 20600-005, HPCI Turbine Oil System, Revision 2

4OA3 Follow-Up of Events and Notices of Enforcement Discretion

- Apparent Cause Report(ACE) for IR 2670087, “Steam Leak on HPCI Piping Upstream of the 2-2301-29 AOV,” dated 06/20/2016
- Event Notification #51934, “HPCI Declared Inoperable”
- Focused Area Self-Assessment(FASA) for IR 02671097, “Flow Accelerated Corrosion Program (5-Year FASA),” dated 08/31/2016
- IR 1392823-11, “Track Completion of the Unit 3 HPCI Drain Pot Line (3-2323-1”)”
- IR 1392823-12, “Track Completion of the Unit Replacement of the HPCI Drain Pot Line (2-2323-1”)”
- IR 1392823-14, “Implement 5 Year PM for the Inspection of Elbows if 300 Series Stainless Steel Material is Used for Replacement. If Duplex Stainless Steel is Utilized a 10 Year PM Should be Created.”
- IR 1392823-18, “Present Work Orders 01571975 & 01571978 to PHC to have PH Codes Applied.”
- WO 01571975-01, “Replace Degraded Areas of Chrome-moly Piping with Stainless Steel Upstream of the 2-2301-29 Valve”
- WO 01611800-01, “Replace Most HPCI Drain Pot Piping RX Side”
- Root Cause Report for IR 2695353, “Root Cause for HPCI Piping Steam Leak,” dated 09/26/2016
- Apparent Cause Report(ACE) for IR 2670087, “Steam Leak on HPCI Piping Upstream of the 2-2301-29 AOV,” dated 06/20/2016
- ACE AR 1392823-02, for IRs 1369302 & 1376323, “Steam Leaks Found on HPCI ASME Code Class Piping”
- DAP 15-18, “Work Order Supplemental Information and Lessons Learned,” Revision 20
- MA-AA-716-010, “Maintenance Planning,” Revision 24
- WC-AA-101-1002, “On Line Scheduling Process,” Revision 17
- Regulatory Guide 1.33, “Quality Assurance Program Requirements (Operation),” Revision 2

LIST OF ACRONYMS USED

ACE	Apparent Cause Evaluation
ADAMS	Agencywide Document Access Management System
AOP	Abnormal Operating Procedure
AOP	Auxiliary Oil Pump
ASME	American Society of Mechanical Engineers
CAP	Corrective Action Program
CAPR	Corrective Actions to Prevent Recurrence
CCSW	Containment Cooling Service Water
CFR	Code of Federal Regulations
CREVS	Control Room Envelope Ventilation System
CS	Core Spray
CST	Condensate Storage Tank
EACE	Equipment Apparent Cause Evaluation
ECCS	Emergency Core Cooling System
EDG	Emergency Diesel Generator
FAC	Flow Accelerated Corrosion
HPCI	High Pressure Coolant Injection
HVAC	Heating, Ventilation and Air Conditioning
IC	Isolation Condenser
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
IR	Issue Report
IST	In-Service Testing
LER	Licensee Event Report
LLC	Limited Liability Corporation
LPCI	Low Pressure Coolant Injection
MOV	Motor Operated Valve
MRC	Management Review Committee
MSPI	Mitigating Systems Performance Index
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
PI	Performance Indicator
PMF	Probable Maximum Flood
PMT	Post-Maintenance Testing
RCR	Root Cause Report
SBLC	Standby Liquid Control
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
WO	Work Order

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Sincerely,

/RA/

Jamnes Cameron, Chief
Branch 4
Division of Reactor Projects

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