



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

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

July 19, 2017

Mr. Bryan C. Hanson
Senior VP, Exelon Generation Co., 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 05000237/2017002 AND 05000249/2017002**

Dear Mr. Hanson:

On June 30, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Dresden Nuclear Power Station, Units 2 and 3. On June 30, 2017, the NRC inspectors discussed the results of this inspection with Mr. J. Washko and other members of your staff. The results of this inspection are documented in the enclosed report.

Based on the results of this inspection, one issue was self-revealed and was evaluated under the risk significance determination process as having very low safety significance (Green). The NRC has also determined a violation is associated with this issue. Because the licensee initiated a condition report to address this issue, the violation is being treated as a Non-Cited Violation (NCV), consistent with Section 2.3.2 of the Enforcement Policy. This NCV is described in the subject inspection report.

If you contest the violations or significance of this NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, Region III; the Director, Office of Enforcement; and the NRC Resident Inspector at the Dresden Nuclear Power Station.

If you disagree with the cross-cutting aspect assignment or any finding not associated with a regulatory requirement 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 U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region III; and the NRC Resident Inspector at the Dresden Nuclear Power Station.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Request for Withholding."

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 05000237/2017002; 05000249/2017002

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Letter to Bryan C. Hanson from Jamnes Cameron dated July 19, 2017

SUBJECT: DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3—NRC INTEGRATED INSPECTION REPORT 05000237/2017002 AND 05000249/2017002

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REGION III

Docket Nos: 05000237; 05000249
License Nos: DPR-19; DPR-25

Report Nos: 05000237/2017002; 05000249/2017002

Licensee: Exelon Generation Company, LLC

Facility: Dresden Nuclear Power Station, Units 2 and 3

Location: Morris, IL

Dates: April 1 through June 30, 2017

Inspectors: G. Roach, Senior Resident Inspector
J. Wojewoda, Acting Resident Inspector
R. Elliott, Resident Inspector
G. Edwards, Health Physicist
L. Kozak, Senior Reactor Analyst
V. Myers, Senior Health Physicist

Approved by: J. Cameron, Chief
Projects Branch 4
Division of Reactor Projects

Enclosure

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SUMMARY

Inspection Report 05000237/2017002, 05000249/2017002; 04/01/2017 – 06/30/2017; Dresden Nuclear Power Station, Units 2 and 3; Operability Determinations and Functional Assessments.

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. One Green finding was self-revealed. 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 November 1, 2016. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6.

Cornerstone: Mitigating Systems

- Green. A finding of very low safety significance and associated non-cited violation of Technical Specification (TS) 5.4.1, "Procedures", was self-revealed on May 26, 2017, for the licensee's failure to maintain configuration control in the Unit 2 containment pressure suppression system. Specifically, the licensee failed to maintain the instrument air stop valve to the actuator for the Unit 2 torus vent, air operated valve (AOV) 2-1601-60, open with the reactor mode switch in Run (Mode 1) and reactor power approximately 100 percent rated thermal power (RTP).

The inspectors determined that the licensee's failure to maintain configuration control of the Unit 2 containment pressure suppression system was contrary to procedures for the emergency depressurization of containment with the reactor in Mode 1 and was a performance deficiency. The inspectors determined that the performance deficiency was 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 configuration control with regards to the plant's operating equipment alignment while affecting the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The inspectors determined that a Detailed Risk Evaluation was required to be performed based on answering "Yes" to the Mitigating Systems screening question A.4 in IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," Exhibit 2. The result of the detailed risk evaluation was a finding of very low safety significance (Green). This finding has a cross-cutting aspect of Resolution in the area of Problem Identification and Resolution because the licensee did not implement appropriate robust barriers to prevent bumping of the 2-1601-60SV in response to previous corrective actions 511878-02 and 2414608-16. Specifically, an identical maintenance induced bumping event resulted in the instrument air stop valve to the Unit 3 torus main vent AOV 3-1601-60 being unintentionally repositioned closed in November 2014. Licensee corrective actions from that event addressed restraining potentially vulnerable valves prior to maintenance activities as well reassessing which ball valves required permanent robust barrier installation. [P.3] (Section 1R15)

REPORT DETAILS

Summary of Plant Status

Unit 2

Unit 2 operated at or near full power for the duration of the inspection period.

Unit 3

Unit 3 operated at or near full power for the duration of the inspection period.

1. REACTOR SAFETY

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

1R01 Adverse Weather Protection (71111.01)

.1 Readiness of Offsite and Alternate Alternating Current Power Systems

a. Inspection Scope

The inspectors verified that plant features and procedures for operation and continued availability of offsite and alternate alternating current (AC) power systems during adverse weather were appropriate. The inspectors performed walkdowns of the site's 345Kv, 138Kv, and 34Kv switchyards as well as the Unit 2 and Unit 3 transformer yards. The inspectors also reviewed the licensee's procedures affecting these areas and the communications protocols between the transmission system operator (TSO) and the plant to verify that the appropriate information was being exchanged when issues arose that could impact the offsite power system. Examples of aspects considered in the inspectors' review included:

- coordination between the TSO and the plant during off-normal or emergency events;
- explanations for the events;
- estimates of when the offsite power system would be returned to a normal state; and
- notifications from the TSO to the plant when the offsite power system was returned to normal.

The inspectors also verified that plant procedures addressed measures to monitor and maintain availability and reliability of both the offsite AC power system and the onsite alternate AC power system prior to or during adverse weather conditions. Specifically, the inspectors verified that the procedures addressed the following:

- actions to be taken when notified by the TSO that the post-trip voltage of the offsite power system at the plant would not be acceptable to assure the continued operation of the safety-related loads without transferring to the onsite power supply;
- compensatory actions identified to be performed if it would not be possible to predict the post-trip voltage at the plant for the current grid conditions;

- re-assessment of plant risk based on maintenance activities which could affect grid reliability, or the ability of the transmission system to provide offsite power; and
- communications between the plant and the TSO when changes at the plant could impact the transmission system, or when the capability of the transmission system to provide adequate offsite power was challenged.

Documents reviewed are listed in the Attachment to this report. The inspectors also reviewed corrective action program (CAP) items to verify that the licensee was identifying adverse weather issues at an appropriate threshold and entering them into their CAP in accordance with station corrective action procedures.

This inspection constituted one readiness of offsite and alternate AC power systems sample as defined in Inspection Procedure (IP) 71111.01–05.

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04)

.1 Quarterly Partial System Walkdowns

a. Inspection Scope

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

- 2/3A standby gas treatment (SBGT) with 2/3B out-of-service (OOS);
- Unit 3 Division I low pressure coolant injection (LPCI) with Division II OOS; and
- 2B core spray (CS) with 2A OOS.

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

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

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05)

.1 Routine Resident Inspector Tours (71111.05Q)

a. Inspection Scope

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

- Fire Zone 2.0, Unit 2 main control room, elevation 534’;
- Fire Zone FZ 1.1.1.5D, Unit 3 standby liquid control (SBLC) area, elevation 589’;
- Fire Zone 8.2.5A, Unit 2 reactor feed pump room, elevation 517’; and
- Unit 3 station blackout (SBO) diesel generator and switchgear rooms.

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 four quarterly fire protection inspection samples as defined in IP 71111.05–05.

b. Findings

No findings were identified.

.2 Annual Fire Protection Drill Observation (71111.05A)

a. Inspection Scope

On April 26, 2017, the inspectors observed an unannounced fire brigade activation for a fire drill occurring in the Unit 3 reactor building 570’ elevation, spent fuel pool (SFP) pump and heat exchanger area. Based on this observation, the inspectors evaluated the readiness of the plant fire brigade to fight fires. The inspectors verified that the

licensee staff identified deficiencies openly discussed them in a self-critical manner at the drill debrief, and took appropriate corrective actions. Specific attributes evaluated were:

- proper wearing of turnout gear and self-contained breathing apparatus;
- proper use and layout of fire hoses;
- employment of appropriate firefighting techniques;
- sufficient firefighting equipment brought to the scene;
- effectiveness of fire brigade leader communications, command, and control;
- search for victims and propagation of the fire into other plant areas;
- smoke removal operations;
- utilization of pre-planned strategies;
- adherence to the pre-planned drill scenario; and
- drill objectives.

Documents reviewed are listed in the Attachment to this report.

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

b. Findings

No findings were identified.

1R06 Flooding (71111.06)

.1 Internal Flooding

a. Inspection Scope

The inspectors reviewed the licensee’s process for maintaining underground cable vaults containing risk significant cables free from ground water intrusion. 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 the flooding of cable vaults containing risk significant cables. 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 visual inspection of the following plant areas to assess the adequacy of moisture alarms as well as cable vault pumping periodicity, and that the licensee complied with its commitments:

- Switchyard and SBO diesels’ manholes cable vault inspection.

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 April 10, 2017, 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.

On April 26, 2017, the inspectors satisfied the inspection program requirement for the resident inspectors to observe a portion of an in-progress annual requalification operating test during a training cycle in which it was not observed by the NRC during the biennial portion of this inspection procedure.

b. Findings

No findings were identified.

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

a. Inspection Scope

On May 21, 2017, the inspectors observed operators prepare for a Unit 2 down-power for rod pattern adjustment and surveillance testing. 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 high pressure coolant injection (HPCI);
- auxiliary electrical equipment room (AEER) heating, ventilation and air conditioning (HVAC); and
- Unit 2 and Unit 3 nuclear instrumentation.

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 Title 10 of the *Code of Federal Regulations* (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 three 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:

- Unit 2 Yellow risk with Division I LPCI and containment cooling service water (CCSW) OOS;
- Unit 2 and 3 Yellow risk during transfer to and from the alternate 125VDC battery; and
- Unit 3 Yellow risk with Division II LPCI OOS.

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

These maintenance risk assessments and emergent work control activities constituted three 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:

- Unit 3 HPCI booster pump degraded bearing;
- 2–2301–3 Unit 2 HPCI steam admission valve did not open during testing;
- 2C reactor building exhaust fan fails to trip, potential emergency diesel generator (EDG) load shed issue;
- Unit 3 EDG fuel oil storage tank wall thickness evaluation;
- Anchor-Darling double disk gate valve wedge pin failure susceptibility following failure of LaSalle Station high pressure core spray injection valve; and
- torus vent valve 2–1601–60 valve fails to operate from the main control room due to mispositioning of instrument air supply isolation valve.

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 USFAR 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 six samples as defined in IP 71111.15–05.

b. Findings

Failure to Maintain Configuration Control in the Unit 2 Containment Pressure Suppression System

Introduction: A finding of very low safety significance and associated non-cited violation of TS 5.4.1, “Procedures”, was self-revealed on May 26, 2017, for the licensee’s failure to maintain configuration control in the Unit 2 containment pressure suppression system. Specifically, the licensee failed to maintain the instrument air stop valve to the actuator for the Unit 2 torus vent, air operated valve (AOV) 2–1601–60, open with the reactor mode switch in Run (Mode 1) and reactor power approximately 100 percent rated thermal power (RTP).

Description: On May 26, 2017 at approximately 0200 CT, while performing Technical Specification surveillance test DOS 1600–03, “Unit 2 Quarterly Valve Timing,” the licensee was unable to open torus vent valve, AOV 2–1601–60, from the main control room in accordance with the procedure. This condition would have prevented operators from remotely performing actions to emergency vent the primary containment using the torus main vent line in accordance with Dresden Emergency Operating Procedure DEOP 0500–04, “Containment Venting” if accident conditions were to have existed.

With the torus vent valve unable to be operated from the main control room, equipment operators were dispatched to the valve to investigate. The operators immediately identified that the instrument air stop valve to the valve actuator was in the closed

position, and after receiving permission, the equipment operator repositioned the stop valve to the open position.

Starting on May 22, 2017, contract maintenance personnel were performing work order (WO) 01828210, which included installing ½ inch tubing for nitrogen lines leading to the AOV 2–1601–60 in support of the severe accident capable hardened containment ventilation modification. This work was in the immediate vicinity of the AOV 2–1601–60, and would have required workers to maneuver their bodies in a relatively tight space past the affected instrument air stop valve to get to their work area.

The licensee's prompt investigation revealed that the last time the instrument air stop valve for the air operated main torus vent valve was intentionally operated was during WO 01746962 on September 1, 2016. AOV 2–1601–60 had been successfully operated from the main control room on three instances subsequent to September 2016. This would therefore indicate that the instrument air stop valve was correctly returned to its open position at the end of the September 2016 maintenance.

Procedure DOP 1600–M1/E1, "Unit 2 Pressure Suppression System Checklist," Step 102, states in part, that the Unit 2 instrument air supply valve to Air Operated Valve 2–1601–60 shall be open. In addition, Emergency Operating Procedure DEOP 0500–04, "Containment Venting," Step D.3, states in part, that instrument air shall be available to supply motive force to operate vent valves. With the reactor in Mode 1, the failure to maintain configuration control of the instrument air stop valve to the torus vent valve actuator adversely affected the licensee's ability to implement each of these procedures and remotely vent the containment from the torus if required by plant conditions.

Analysis: The inspectors determined that the licensee's failure to maintain configuration control of the Unit 2 containment pressure suppression system was contrary to procedures for the emergency depressurization of containment with the reactor in Mode 1 and was a performance deficiency. Specifically, the licensee failed to maintain the instrument air stop valve to the actuator for Unit 2 torus vent AOV 2–1601–60 open with the reactor mode switch in Run (Mode 1) and reactor power approximately 100 percent RTP.

The inspectors determined that the performance deficiency was more than minor, and thus a finding, in accordance with Inspection Manual Chapter (IMC) 0612, Appendix B, "Issue Screening," dated September 7, 2012, because it was associated with the mitigating systems cornerstone attribute of configuration control with regards to the plant's operating equipment alignment while affecting the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, with the instrument air stop valve out of the required open position, torus hardened vent valve AOV 2–1601–60 was unable to be remotely repositioned open. This condition would have prevented the main torus vent valve from being operable from the main control room during an accident scenario with operators attempting to protect the primary containment from over pressurization.

In accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings," dated June 19, 2012, Table 2, the inspectors determined the finding affected the Mitigating Systems cornerstone as the hardened vent is used to remove energy from the containment

during accident conditions. The inspectors determined the finding could be evaluated using Appendix A, "The Significance Determination Process for Findings At-Power," Exhibit 2, Section A, Mitigating SSCs and Functionality, dated June 19, 2012. In Exhibit 2, the inspectors answered "Yes" to question 4: "Does the finding represent an actual loss of function of one or more non-Tech Spec Trains of equipment designated as high safety-significant in accordance with the licensee's maintenance rule program for >24 hrs?" Answering "Yes" to this question directed the inspectors to interface with the Region III Senior Risk Analyst (SRA) to perform a detailed risk evaluation.

A regional SRA performed the detailed risk evaluation using the Dresden Standardized Plant Analysis Risk (SPAR) Model, Revision 8.50. The SRA assumed the Unit 2 torus vent AOV 2-1601-60 was failed in the closed position for four days due to the performance deficiency. The change in core damage frequency due to this degraded condition was less than $1E-7$ /yr., which represents a finding a very low safety significance (i.e., Green). The dominant core damage sequence was a small loss of coolant event (LOCA) followed by successful reactor pressure vessel injection but the failure of both suppression pool cooling and containment venting to remove decay heat.

This finding has a cross-cutting aspect of resolution in the area of Problem Identification and Resolution because the licensee did not implement appropriate robust barriers to prevent bumping of the 2-1601-60SV in response to corrective actions 511878-02 and 2414608-16. Specifically, an identical maintenance induced bumping event resulted in the instrument air stop valve to the Unit 3 torus main vent, AOV 3-1601-60, being unintentionally repositioned closed in November 2014. Licensee corrective actions from that event addressed restraining potentially vulnerable valves prior to maintenance activities as well reassessing which ball valves required permanent robust barrier installation. [P.3]

Enforcement: Technical Specification Section 5.4.1.a states, 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." NRC Regulatory Guide 1.33, Appendix A, Section 4 addresses "Procedures for Startup, Operation, and Shutdown of Safety-Related BWR Systems." Procedure DOP 1600-M1/E1, "Unit 2 Pressure Suppression System Checklist," Step 102, states, that the Unit 2 instrument air supply valve to air operated valve 2-1601-60 shall be open. Emergency Operating Procedure DEOP 0500-04, "Containment Venting," Step D.3, states in part, that instrument air shall be available to supply motive force to operate vent valves.

Contrary to the above, between May 22 and May 26, 2017, the licensee failed to implement Step 102 of procedure DOP 1600-M1/E1 and as such Step D.3 of emergency operating procedure DEOP 0500-04. Specifically, the licensee failed to maintain the instrument air stop valve to the torus vent valve in the open position, thereby preventing remote operation of the torus hardened vent line from the main control room.

This violation is being treated as a Non-Cited Violation (NCV), consistent with Section 2.3.2 of the Enforcement Policy because it was of very low safety significance and was entered into the licensee's CAP as Issue Report (IR) 4015141. The licensee's corrective actions included opening the instrument air stop valve to 2-1601-60, placing a robust barrier over the valve handle to minimize the possibility of future valve

mispositioning, and identifying a compilation of similarly susceptible components.
(NCV 05000237/2017002-01, Failure to Maintain Configuration Control in the Unit 2 Containment Pressure Suppression System)

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:

- Unit 2 Division I LPCI/CCSW following a maintenance window;
- Unit 2 EDG following replacement of the auto start circuit diode;
- 2/3 EDG following a maintenance window;
- 2A core spray (CS) following a maintenance window; and
- Unit 3 EDG following a maintenance 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 Updated Final Safety Analysis Report (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:

- Unit 2 CS capacity test and in-service testing (IST);
- Unit 3 isolation condenser steam and condensate line high flow calibration (routine);
- Unit 2 and Unit 3 LPCI 1501–22 injection valve stroke time testing (routine);
- Unit 2 average power range monitors calibration (routine); and
- Engineered Safety Bus 23–1 degraded voltage relay calibration (routine).

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

- preconditioning occurred;
- 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 in-service 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 four routine surveillance testing samples, and one in-service test sample as defined in IP 71111.22, Sections–02 and–05.

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06)

.1 Training Observation

a. Inspection Scope

The inspector observed a simulator training evolution for licensed operators on April 26, 2017, which required emergency plan implementation by a licensee operations crew. 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 crew. 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 crew'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 training evolution with emergency preparedness drill aspects constituted one sample as defined in IP 71114.06–05.

b. Findings

No findings were identified.

.2 Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of a routine licensee emergency drill on June 27, 2017, to identify any weaknesses and deficiencies in classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the Technical Support Center to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the licensee drill critique to compare any inspector-observed weakness with those identified by the licensee staff in order to evaluate the critique and to verify whether the licensee staff was

properly identifying weaknesses and entering them into the corrective action program. As part of the inspection, the inspectors reviewed the drill package and other documents listed in the Attachment to this report.

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

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstones: Public Radiation Safety and Occupational Radiation Safety

2RS6 Radioactive Gaseous and Liquid Effluent Treatment (71124.06)

.1 Walkdowns and Observations (02.02)

a. Inspection Scope

The inspectors walked down select effluent radiation monitoring systems to evaluate whether the monitor configurations aligned with Offsite Dose Calculation Manual (ODCM) descriptions and to observe the materiel condition of the systems.

The inspectors walked down selected components of the gaseous and liquid discharge systems to evaluate whether equipment configuration and flow paths align with plant documentation and to assess equipment materiel condition. The inspectors also assessed whether there were potential unmonitored release points, building alterations, which could impact effluent controls, and ventilation system leakage that communicated directly with the environment.

For equipment or areas associated with the systems selected for review that were not readily accessible, the inspectors reviewed the licensee's materiel condition surveillance records.

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

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

The inspectors determined whether the licensee had made significant changes to their effluent release points.

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

These inspection activities constituted one complete sample as defined in Inspection Procedure (IP) 71124.06-05.

b. Findings

No findings were identified.

.2 Calibration and Testing Program (02.03)

a. Inspection Scope

The inspectors reviewed calibration and functional tests for select effluent monitors to evaluate whether they were performed consistent with the ODCM. The inspectors assessed whether National Institute of Standards and Technology traceable sources were used, primary calibration represented the plant nuclide mix, secondary calibrations verified the primary calibration, and the calibration encompassed the alarm set points.

The inspectors assessed whether effluent monitor alarm set points were established as provided in the ODCM and procedures.

The inspectors evaluated the basis for changes to effluent monitor alarm set points.

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

b. Findings

No findings were identified.

.3 Sampling and Analyses (02.04)

a. Inspection Scope

The inspectors reviewed select effluent sampling activities and assessed whether adequate controls had been implemented to ensure representative samples were obtained.

The inspectors reviewed select effluent discharges made with inoperable effluent radiation monitors and assessed whether controls were in place to ensure compensatory sampling was performed consistent with the ODCM and that those controls were adequate to prevent the release of unmonitored effluents.

The inspectors determined whether the facility was routinely relying on the use of compensatory sampling in lieu of adequate system maintenance.

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

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

b. Findings

No findings were identified.

.4 Instrumentation and Equipment (02.05)

a. Inspection Scope

The inspectors reviewed the methodology used to determine the effluent stack and vent flow rates to determine whether the flow rates were consistent with plant documentation, and that differences between assumed and actual stack and vent flow rates did not affect the results of the projected public doses.

The inspectors assessed whether surveillance test results for Technical Specification required ventilation effluent discharge systems met Technical Specification acceptance criteria.

The inspectors assessed calibration and availability for select effluent monitors used for triggering emergency action levels or for determining protective action recommendations.

These inspection activities constituted one complete sample as defined in IP 71124.06–05.

b. Findings

No findings were identified.

.5 Dose Calculations (02.06)

a. Inspection Scope

The inspectors reviewed significant changes in reported dose values compared to the previous radiological effluent release report to evaluate the factors, which may have resulted in the change.

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

Inspectors evaluated the isotopes that are included in the source term to assess whether analysis methods were sufficient to satisfy detectability standards. The review included the current Part 61 analyses to ensure hard-to-detect radionuclides are included in the source term.

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

The inspectors reviewed the latest Land Use Census to assess whether changes have been factored into the dose calculations.

For select radioactive waste discharges, the inspectors evaluated whether the calculated doses were within the 10 CFR Part 50, Appendix I and Technical Specification dose criteria.

The inspectors reviewed select records of abnormal radioactive waste discharges to ensure the discharge was monitored by the discharge point effluent monitor. Discharges made with inoperable effluent radiation monitors, or unmonitored leakages were reviewed to ensure that an evaluation was made to account for the source term and projected doses to the public.

These inspection activities constituted one complete sample as defined in IP 71124.06–05.

b. Findings

No findings were identified.

.6 Problem Identification and Resolution (02.07)

a. Inspection Scope

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

These inspection activities constituted one complete sample as defined in IP 71124.06–05.

b. Findings

No findings were identified.

2RS7 Radiological Environmental Monitoring Program (71124.07)

.1 Site Inspection (02.02)

a. Inspection Scope

The inspectors walked down select air sampling stations and dosimeter monitoring stations to determine whether they were located as described in the ODCM and to determine the equipment material condition.

The inspectors reviewed calibration and maintenance records for select air samplers, dosimeters, and composite water samplers to evaluate whether they demonstrated adequate operability of these components.

The inspectors assessed whether the licensee had initiated sampling of other appropriate media upon loss of a required sampling station.

The inspectors observed the collection and preparation of environmental samples from select environmental media to determine whether environmental sampling was

representative of the release pathways specified in the ODCM and whether sampling techniques were in accordance with procedures.

The inspectors assessed whether the meteorological instruments were operable, calibrated, and maintained in accordance with guidance contained in the Final Safety Analysis Report, U.S. Nuclear Regulatory Commission (NRC) Regulatory Guide 1.23, "Meteorological Monitoring Programs for Nuclear Power Plants," and licensee procedures. The inspectors assessed whether the meteorological data readout and recording instruments were operable.

The inspectors evaluated whether missed and/or anomalous environmental samples were identified and reported in the annual environmental monitoring report. The inspectors selected events that involved a missed sample, inoperable sampler, lost dosimeter, or anomalous measurement to determine whether the licensee had identified the cause and had implemented corrective actions. The inspectors reviewed the licensee's assessment of any positive sample results and reviewed any associated radioactive effluent release data that was the source of the released material.

The inspectors selected structures, systems, or components that involve or could reasonably involve a credible mechanism for licensed material to reach ground water, and assessed whether the licensee had implemented a sampling and monitoring program sufficient to detect leakage to ground water.

The inspectors evaluated whether records important to decommissioning, as required by 10 CFR 50.75(g), were retained in a retrievable manner.

The inspectors reviewed any significant changes made by the licensee to the ODCM as the result of changes to the land census, long-term meteorological conditions, or modifications to the sampler stations since the last inspection. The inspectors reviewed technical justifications for any changed sampling locations to evaluate whether the licensee performed the reviews required to ensure that the changes did not affect its ability to monitor the impacts of radioactive effluent releases on the environment.

The inspectors assessed whether the appropriate detection sensitivities with respect to the ODCM were used for counting samples. The inspectors reviewed the quality control program for analytical analysis.

The inspectors reviewed the results of the licensee's inter-laboratory comparison program to evaluate the adequacy of environmental sample analyses performed by the licensee. The inspectors assessed whether the inter-laboratory comparison test included the media/nuclide mix appropriate for the facility. The inspectors reviewed the licensee's determination of any bias to the data and the overall effect on the radiological environmental monitoring program.

These inspection activities constituted one complete sample as defined in IP 71124.07-05.

b. Findings

No findings were identified.

.2 Groundwater Protection Initiative (GPI) Implementation (02.03)

a. Inspection Scope

The inspectors reviewed monitoring results of the GPI to evaluate whether the licensee had implemented the program as intended and to assess whether the licensee had identified and addressed anomalous results and missed samples.

The inspectors evaluated the licensee's implementation of the minimization of contamination and survey aspects of the GPI and the Decommissioning Planning Rule requirements in 10 CFR 20.1406 and 10 CFR 20.1501.

The inspectors reviewed leak and spill events and 10 CFR 50.75 (g) records and assessed whether the source of the leak or spill was identified and appropriately mitigated.

The inspectors assessed whether unmonitored leaks and spills were evaluated to determine the type and amount of radioactive material that was discharged. The inspectors assessed whether the licensee completed offsite notifications in accordance with procedure.

The inspectors reviewed evaluations of discharges from onsite contaminated surface water bodies and the potential for ground water leakage from them. The inspectors assessed whether the licensee properly accounted for these discharges as part of the effluent release reports.

The inspectors assessed whether on-site ground water sample results and descriptions of any significant on-site leaks or spills into ground water were documented in the Annual Radiological Environmental Operating Report or the Annual Radiological Effluent Release Report.

The inspectors determined whether significant new effluent discharge points were updated in the ODCM and the assumptions for dose calculations were updated as needed.

These inspection activities constituted one complete sample as defined in IP 71124.07-05.

b. Findings

No findings were identified

.3 Problem Identification and Resolution (02.04)

a. Inspection Scope

The inspectors assessed whether problems associated with the radiological environmental monitoring program were being identified by the licensee at an appropriate threshold and were properly addressed for resolution. The inspectors assessed the appropriateness of the corrective actions for a selected sample of problems documented by the licensee that involved the radiological environmental monitoring program.

These inspection activities constituted one complete sample as defined in IP 71124.07–05.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

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

4OA1 Performance Indicator Verification (71151)

.1 Mitigating Systems Performance Index—Emergency Alternating Current Power System

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index (MSPI)—Emergency Alternating Current (AC) Power System (MS06) performance indicator for Dresden Nuclear Power Station, Units 2 and 3, for the period from the second quarter of 2016 through the first quarter of 2017. To determine the accuracy of the performance indicator (PI) data reported during those periods, PI definitions and guidance contained in the Nuclear Energy Institute (NEI) Document 99–02, “Regulatory Assessment Performance Indicator Guideline,” Revision 7, dated August 31, 2013, were used. The inspectors reviewed the licensee’s operator narrative logs, issue reports, event reports and NRC Integrated Inspection Reports for the period of April 1, 2016, through March 31, 2017, 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 emergency AC power system samples as defined in IP 71151–05.

b. Findings

No findings were identified.

.2 Mitigating Systems Performance Index—High Pressure Injection Systems

a. Inspection Scope

The inspectors sampled licensee submittals for the MSPI High Pressure Injection System (MS07) performance indicator for Dresden Nuclear Power Station, Units 2 and 3, for the period from the second quarter of 2016 through the first quarter of 2017. 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, issue reports, event reports and NRC Integrated Inspection Reports for the period of April 1, 2016, through March 31, 2017, 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 high pressure injection system samples as defined in IP 71151-05.

b. Findings

No findings were identified.

.3 Reactor Coolant System Specific Activity

a. Inspection Scope

The inspectors sampled licensee submittals for the reactor coolant system specific activity Performance Indicator for Dresden Nuclear Power Station, Units 2 and 3 for the period from the second quarter of 2016 through the first quarter of 2017. The inspectors used Performance Indicator definitions and guidance contained in the Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 2013, to determine the accuracy of the Performance Indicator data reported during those periods. The inspectors reviewed the licensee's reactor coolant system chemistry samples, technical specification requirements, issue reports, event reports and NRC Integrated Inspection Reports to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the Performance Indicator data collected or transmitted for this indicator. In addition to record reviews, the inspectors observed a chemistry technician obtain and analyze a reactor coolant system sample. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two reactor coolant system specific activity 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 are 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 1 Annual Follow-Up of Selected Issues: Review of Corrective Actions Associated with the Licensee's Assessment of Operating Experience Gained Subsequent to an Arkansas Nuclear One Emergency Diesel Generator Failure and the Associated Engine Systems Inc. Title 10 of the Code of Federal Regulations Part 21 Report (10CFR21-0115)

a. Inspection Scope

The inspectors performed a review of the licensee's corrective action program (CAP) and associated documents, specifically Issue Report (IR) 3963606, "...EDG Fuel Injector Control Linkage Vulnerability Identified." The inspectors interviewed personnel, performed walkdowns, reviewed component failure documentation from the Arkansas Nuclear One (ANO) event, reviewed Dresden design change documents, observed the installation of plant modifications, reviewed post maintenance testing documentation, and verified the completion of and assessed the adequacy of plant design corrective actions taken in response to Assessment of Operating Experience (OPEX) regarding an emergency diesel generator (EDG) failure at the ANO Nuclear Station on November 12, 2016.

The inspectors' review and evaluation was focused on the licensee's corrective actions to ensure they: were complete, accurate, and timely; considered extent of condition; provided appropriate classification and prioritization; provided identification of root and contributing causes; were appropriately focused; included action taken which resulted in the correction of the identified problem; ensured operating experience was adequately evaluated for applicability; and communicated applicable lessons learned to appropriate organizations. The inspectors noted that the licensee's corrective actions addressed deficiencies which resulted in the failure of an EDG at the ANO Nuclear Station associated with the fuel injection system and which was reported through 10 CFR Part 21.

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

b. Background

On November 12, 2016, a fuel injector seizure was experienced on the number 7 cylinder of the K4A EDG at ANO resulting in a loss of control of the K4A EDG. A failure analysis was performed by the vendor Engine Systems Inc., which determined that foreign material in the fuel injector was the cause of the seizure in the number 7 cylinder. The seizure of the cylinder, coupled with the K4A EDG having a solid injector linkage

design meant that one seized cylinder would be translated through the fuel injector linkage to the fuel racks therefore locking up the ability of the governor to control fuel distribution to all of the cylinders of the K4A EDG. In order to account for a single cylinder seizure, several nuclear industry licensees have fitted their EDGs with spring loaded fuel injector linkages. The spring loaded linkage provides adequate rigidity to adjust the fuel injectors during normal EDG control operations, but provides the spring flexibility to prevent translating a seized fuel injector to the fuel racks affecting all of the EDGs cylinders and thereby allowing operators to shutdown the engine in a controlled manner or maintain control during emergency operations.

c. Observations

As discussed in the “Inspection Scope” section above, the inspectors’ review was focused on the licensee’s installation of a plant design modification to mitigate the effects of a seized cylinder on the ability of the licensee to control a loaded EDG. The inspectors visually verified the installation of spring loaded fuel injector linkages on all twenty cylinders for each safety-related EDG (Unit 2, Unit 3, and 2/3 EDGs) as well as the 28 cylinders of the Unit 2 Station Blackout Diesel. The Unit 3 station blackout (SBO) Diesel will receive the modification during its next maintenance outage. The inspectors noted that Dresden was the only station in the Exelon fleet which was still operating with the solid fuel injector linkage design at the time of the ANO event. It was not apparent why Dresden had not previously upgraded to the spring loaded linkage.

d. Findings

No findings were identified.

.3 Annual Follow-Up of Selected Issues: Review of the Licensee’s Apparent Cause Evaluation and Corrective Actions Associated with the Failure of the Unit 3 Torus Spray Isolation Valve 3–1501–18A

a. Inspection Scope

The inspectors performed a review of the licensee’s CAP and associated documents, specifically Corrective Action Program Evaluation Report 3972295, “Motor Operated Valve (MOV) 3–1501–18A Motor Failed.” The inspectors interviewed personnel, reviewed component failure documentation, reviewed historical maintenance and performance records for the valve and motor operator, reviewed licensee MOV diagnostic testing procedures, and assessed preventative maintenance periodicity and content in comparison to American Society of Mechanical Engineers (ASME) Code standards for MOV’s.

The inspectors’ review and evaluation was focused on the causal determination for this safety-related component which serves as a primary containment isolation valve and an injection source isolation valve for the torus spray system. In addition, the licensee’s corrective actions were reviewed to ensure they: were complete, accurate, and timely; considered extent of condition; provided appropriate classification and prioritization; provided identification of apparent and contributing causes; were appropriately focused; included action taken which resulted in the correction of the identified problem; 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

On November 9, 2016, during the performance of Technical Specification surveillance procedure DOS 0040-07, "Verification of Remote Position Indication for Valves Included in In-service Testing (IST) Program," field operations personnel noted no stem movement and a motor binding sound emanating from the MOV 3-1501-18A when the valve was being cycled open and then shut from the main control room. Operators attempted to position the valve one additional time from the main control room, resulting in the same response. The licensee's laboratory analysis of the failed motor operator, along with a vendor review of the results indicated that the outboard bearing of the motor operator was severely degraded with its lubricating grease dry. The bearing housing was factory lubricated during initial assembly, and was not re-opened during the life of the component. The motor operator for this valve was fabricated at initial construction of Dresden Unit 3 in the late 1960's. Vendor analysis of MOV 3-1501-18A indicated a 60 year life rating based on environmental conditions in the torus catwalk area of the reactor building where the MOV is situated. In addition, the MOV had a 2000 cycle performance rating, having completed an estimated 750 cycles during its lifetime. In its causal analysis, the licensee noted that the MOV 3-1501-18A operated with excessive thrust and higher than normal current conditions for some of the period between 1994 and 2004 when diagnostic testing identified the conditions to exist. Higher current draw for the motor operator could have resulted in higher temperature conditions in the vicinity of the outboard bearing resulting in drying and degradation of the outboard bearing lubrication. MOV diagnostic results between 2004 and the 2016 failure, exhibited acceptable current draw and motor thrust values. There were no other environmental or MOV performance indications which presented over the lifetime of the component which would lead to a degradation of the outboard bearing's lubricant.

c. Observations

The inspectors validated that the licensee replaced the motor operator for MOV 3-1501-18A and successfully tested that the valve opened and closed from the main control room. The inspectors also noted that the licensee's causal determination was indeterminate, with a most likely cause of failure attributed to a historic high current draw and over thrust condition which was identified to have existed for some period between 1994 and 2004. The inspectors' independent review of maintenance history and valve performance did not note anything which contradicted this assessment. Licensee IR 2742041 reported that during post maintenance testing of the newly installed motor operator, motor running current exceeded the 130 percent nameplate label running current value. This did not affect an acceptance criteria of testing, but indicated a potential abnormality. The licensee's initial assessment of this condition included an action to perform a motor voltage monitoring test for the MOV prior to 2020. The inspectors challenged the licensee regarding the timeliness of this due date, as the licensee's most likely cause of the previous motor operator's failure was centered on over current heating of the motor adversely affecting lubricant in a bearing housing. The licensee responded to the inspectors' concerns by adjusting the timing of motor voltage monitoring to 2018. Lastly, the licensee's extent of condition identified an adverse trend between packing friction and running current for the MOV 3-1501-21A

low pressure coolant injection (LPCI) Division I injection isolation valve. As a result, this MOV will be replaced during the 2018 Unit 3 refueling outage.

d. Findings

No findings were identified.

.4 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a review of the licensee's corrective action program and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on repetitive equipment issues, but also considered the results of daily inspector corrective action program item screening discussed in Section 4OA2.1 above, licensee trending efforts, and licensee human performance results. The inspectors' review nominally considered the 6-month period of January 1, 2017, through June 30, 2017, although some examples expanded beyond those dates where the scope of the trend warranted.

The review also included issues documented outside the corrective action program in major equipment problem lists, repetitive and/or rework maintenance lists, departmental problem/challenges lists, quality assurance audit/surveillance reports, self-assessment reports, and Maintenance Rule assessments. The inspectors compared and contrasted their results with the results contained in the licensee's corrective action program trending reports. Corrective actions associated with a sample of the issues identified in the licensee's trending reports were reviewed for adequacy.

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

b. Observations

During the period covered in this inspection sample, the inspectors and the licensee noted similar trends in equipment and program performance. Although these errors did not always result in any immediate adverse consequences, a potential trend in these areas is apparent and suggests that additional licensee attention to affect corrective actions may be appropriate. The licensee entered the following potential adverse trends into their CAP during this time period: intermediate range monitor performance on Unit 3 (IR 3959793); digital electro-hydraulic control equipment issues (IR 3973819); transient combustible material control (IR 3984473); process radiation monitor performance (IR 4012882); screen refuse system issues (IR 4015002); and 4kV breaker issues (IR 4021996). The inspectors also identified a weakness in resolving items entered into the corrective action program and degraded Unit 2 reactor recirculation/adjustable speed drive (ASD) system performance as potential adverse trends. Specific examples associated with these trends included, but were not limited to:

- EDG single largest load surveillance not testing to design conditions – IR 2501498 and re-identified by NRC in IR 3964435
- 2/3 Cable Tunnel drains clogged and missing screens – IR 2687549 and re-identified in IR 3961950 (both issues NRC identified)

- U3 high radiation sample system building fan belt and cover and sheet metal by the Unit 1 sphere unsecured with impending high winds – IR 3979631 and re-identified in IR 3996728 (both issues NRC identified)
- instrument air stop valve to Unit 2 torus vent valve actuator bumped closed during maintenance in vicinity of valve. Identical issue entered into CAP in 2014 for Unit 3 torus vent valve – IR 2414608 and re-identified in IR 4015141 (both issues were self-revealing during subsequent surveillance testing)
- Unit 2 ASD cell A2/B2/C2 cabinet cooling fan degraded – IR 2611828
- 2B ASD cell A4 overheat requiring bypass – IR 3972322
- 2B ASD controlling processor failure creating loss of redundancy – IR 4022823

c. Findings

No findings were identified.

4OA6 Management Meetings

.1 Exit Meeting Summary

On June 30, 2017, the inspectors presented the inspection results to Mr. J. Washko, and other members of the licensee staff. The licensee acknowledged the issues presented.

.2 Interim Exit Meetings

An interim exit was conducted for:

- The inspection results for the Radiation Safety Program review with Mr. J. Washko, Station Manager, on May 12, 2017.

.3 Regulatory Performance Meetings

On May 25, 2017, a Regulatory Performance Meeting was conducted between Mr. J. Cameron of the NRC and Mr. J. Washko of EGC discussing the corrective actions implemented in response to the White inspection finding and Notice of Violation associated with the June 27, 2016, failure of the Unit 3 high pressure coolant injection (HPCI) auxiliary oil pump.

The inspectors confirmed that none of the potential report input discussed was considered proprietary. Proprietary material received during the inspection period was returned to the licensee.

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
R. Bauman, Shift Operations Superintendent
M. Budelier, Senior Engineering Manager
H. Bush, Acting Radiation Protection Manager
J. Condreay, Operations Training Instructor
D. Doggett, Emergency Preparedness Manager
B. Franzen, Regulatory Assurance Manager
F. Gogliotti, Director, Site Engineering
P. Hansett, Operations Director
K. Kretsinger, Security Operations Supervisor
S. Matzke, Corrective Action Program Coordinator
A. McMartin, Manager Site Chemistry, Environment & Radwaste
M. Pavey, Senior Radiation Protection Technical Specialist
J. Quinn, Director, Site Maintenance
W. Remiasz, Work Control Director
B. Sampson, OR Manager
D. Thomas, Director, Site Training
D. Walker, Regulatory Assurance – Senior 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 and Closed

05000237/2017002-01	NCV	Failure to Maintain Configuration Control in the Unit 2 Containment Pressure Suppression System
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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

- EC 403424, Revision 000, Design Consideration Summary
- EC 403299, "Bypassing MPT Diff BDD Relays During Backfeed," Revision 000
- IR 4016460, "NRC Senior Resident Concern"
- IR 3996728, "Follow-Up from IR 3979631"
- IR 3993936, "3 Cells Read Low During DOS 8300-14 for TR-86 System 2"
- IR 3989725, "TR-13 Oil Absorbent Stone Saturated"
- IR 3979631, "NRC Walkdown of Site in Preparation for Severe Weather"
- IR 3976239, "Unexpected Alarms Received 901-B-1 and 923-6 A-1"
- IR 3976012, "MPT 3 Trouble DOA Entry"
- IR 2708697, "Failed WO Due to Low Oil Level in TR39"
- IR 2699816, "Unexpected Alarm 923-2 C-3, TR81 TR83 TR86 Minor"
- IR 2688588, "TR-22 Trouble Alarm"
- IR 2685211, "TR 2 CLG Fan #28 Fan Tripped"
- IR 2672399, "AVR Not Responding to Voltage Adjustments"
- IR 2628834, "DOA 0040-03 Loss of Power to Non-Power Block Buildings"
- IR 2546771, "345KV Panel Will Not Stay Closed"
- IR 2540407, "MPT 2 Differential Relays Need Evaluation. LaSalle OPEX"
- IR 2499443, "Hot Leads Identified in TR-2 Control Cabinet"
- IR 2475870, "Evaluate COMED 345kv Switchyard for Potential Missile Hazards"
- IR 1690125, "TR86 LTC Cycling"
- DOA 0010-02, "Tornado Warning/Severe Winds," Revision 22
- DOA 6520-01, "Loss of SBO 4 kV Bus 61 and/or Bus 71," Revision 06
- DOA 6500-12, "Low Switchyard Voltage"
- DOP 6400-08, "345 kV Voltage Control," Revision 39
- OP-AA-108-111-1001, "Severe Weather and Natural Disaster Guidelines," Revision 15
- OP-AA-108-107, "Switchyard Control," Revision 4
- OP-AA-108-107-1001, "Station Response to Grid Capacity Conditions," Revision 7
- OP-AA-108-107-1002, "Interface Procedure Between BGE/COMED/PECO and Exelon Generation (Nuclear/Power) For Transmission Operations," Revision 10
- WC-AA-101, "On-Line Work Control Process," Revision 26
- WC-AA-107, "Seasonal Readiness," Revision 18
- WC-DR-8003-1003, "Dresden Station Units 2 and 3 Nuclear Plant Interface Requirements (NPIRs)," Revision 3

1R04 Equipment Alignment

- DOP 1400-E1, "Unit 2 Core Spray System Electrical Checklist," Revision 04
- DOP 1400-M1, "Unit 2 Core Spray System," Revision 24
- Drawing: M-27, Diagram of Core Spray Piping, Revision AAN
- IR 4001571, "2/3-7509 SGBT X-Tie Damper Limit Switch Not Indicating Closed"
- IR 3996171, "Ops Crew 5 Clock Reset: SGBT Run Coordination Improvements"

- IR 3959258, "Use of Hydrocarbon Compounds and Effect on Standby Gas"
- IR 3959045, "Potential Use of Volatile Organic Carbon-Containing Chemical"
- IR 2731869, "Labeling Issue: SGBT Wrong Power Supply Listed"
- DOP 7500-M1/E1, "Unit 2/3 Standby Gas Treatment," Revision 06
- Drawing: M-49, Diagram of Standby Gas Treatment, Revision RA
- Drawing: 26100-001, Standby Gas Treatment, Revision 04
- Drawing: 26100-002, Containment Venting," Revision 03
- IR 4014196, "Acrid Odor While Breaker Charging at Bus 4-1 Cubicle 11"
- DOP 1500-E1, " Unit 3 LPCI and CCSW System Electrical Checklist," Revision 14
- DOP 1500-M1, "Unit 3 LPCI and Containment Cooling Valve Checklist," Revision 36

1R05 Fire Protection

- Dresden Generating Station Pre-Fire Plan for Fire Zone 2.0
- IR 3996053, "Condition That Appears to be a Large Hole in Fire Rated Wall"
- Drawing: B-1895A, Main Control Room Floor Plan Floor Elevation 534'-0", Revision T
- Drawing: F-8-1, Detection & Suppression Control Room Floors, Revision C
- Dresden Generating Station Pre-Fire Plan for Fire Zone 1.1.1.5D
- Fire Load Calculation Sheet, Calculation No. DRE97-0105, Revision 09, Amendment 18
- Dresden Fire Protection Plan, Section 4.5.5, Amendment 17; Section 4.5, Amendment 13; Section 4.4, Amendment 1
- Fire Detection Trouble Log May 22, 2017 14:21:31 – 14:22:59
- Dresden Generating Station Pre-Fire Plan for Fire Zone 8.2.5A, Unit 2 Reactor Feed Pump Room
- Dresden Generating Station Pre-Fire Plan for U3 SBO DG and U3 SBO SWG EER 3rd Floor West
- IR 4005714, "4.0 Critique for Fire Drill"
- IR 3972878, "Crew 1 Clock Rest – Fire Drill"
- IR 3966553, "4Q2016 Fire Drill Roundup"

1R06 Flood Protection Measures

- IR 4012209, "Security MH-2 Shows Degraded Battery Voltage"
- IR 4011696, "SBO Cable Vault (SBO MH-1) Inundated with High Wtr Level"
- IR 4011690, "Security MH-1 Needs Dewatering"
- IR 4005489, "Security MH-2 Needs Dewatering"
- IR 4005484, "Security MH-1 Needs Dewatering"
- IR 3999773, "Security MH-1 Needs Dewatering"
- IR 3997085, "Security MH-2 Vault Needs Dewatering"
- IR 3996818, "Security MH-2 Vault Lid Degraded"
- IR 3996370, "Security MH-2 Vault Lost Communications"
- IR 3996339, "Security MH-3 Vault Needs Dewatering"
- IR 3996332, "Security MH-2 Vault Needs Dewatering"
- IR 3996329, "Security MH-1 Vault Needs Dewatering"
- IR 3996326, "Security MH-1 Needs Dewatering"
- ER-AA-300-150, "Cable Condition Monitoring Program," Revision 4
- Drawing: Manhole Location Drawing Dresden Station, Revision n/a

1R11 Licensed Operator Regualification Program

- OP-AA-101-113-1006, "4.0 Crew Critique Guidelines," Revision 7
- OP-AA-103-103, "Operation of Plant Equipment," Revision 1

- OP-AA-104-101, "Communications," Revision 3
- DOP 0202-03, "Reactor Recirculation Flow Control System Operation," Revision 44
- DOP 3200-05, "Reactor Feed Pump Shutdown," Revision 42
- DOS 5600-09, "Cycling Main Turbine Bypass Valves at Power," Revision 10

1R12 Maintenance Effectiveness

- IR 2559585, "U2 HPCI MGU Possible Failure"
- IR 2670087, "Steam Leak on HPCI Piping Upstream of the 2-2301-29 AOV"
- IR 2718004, "Relay 2-2330-150 Contacts Required Burnishing"
- IR 2729541, "Historical Operability Result for 2-2330-150"
- IR 3993456, "Unit 2 HPCI Maintenance Rule Function 23-2 A(2) At-Risk"
- IR 3995596, "Unit 2 HPCI March 2017 SSPI Unavailability"
- DAN 902(3)-3 A-12, HPCI Cond Stg TK LVL Lo Lo Setpoint, Revision 08
- DAN 902(3)-3 B-12, Torus LVL HI Setpoint, Revision 09
- DIS 2300-04, "HPCI System Logic System Functional Test Without HPCI Turbine Accessories," Revision 35
- Actuator Sizing Calculation Report and Assessment AirBase Version 3.1, Calculation ID: AOV-MARG-DRE-23-001, "HPCI Turbine Stop Valve Above Seat Drain Isolation Valve," Revision 0
- Actuator Sizing Calculation Report and Assessment AirBase Version 3.1, Calculation ID: AOV-MARG-DRE-23-003, "HPCI Turbine Stop Valve Above Seat Drain Isolation Valve," Revision 0
- Drawing: 12E-2530, Schematic Diagram High Press. Coolant Injection Sys Auxiliary Valves, Revision AI
- IR 4010930, "NRC Identified Abandoned Equipment in DGA-12"
- IR 4010982, "NRC Identified That Procedure Clarification Needed in DGA-12"
- IR 4010989, "AEER MR Function 5714-01 MRFF Typo"
- IR 4011105, "Maintenance Rule Function 5711-2 Needs (a)(1) Determination"
- IR 4008298, "B' AEER Compressor Trip on Oil # and Breaker Trip"
- IR 4007654, "DOA 5750-01 Entry for AEER High Temp"
- IR 4007445, "AEER/ACR A/C Trip"
- IR 4007158, "AEER/ACR A/C Trip"
- IR 3992656, "Entered DOA 5750-01"
- IR 3995548, "AEER Air Conditioning Unit Trip"
- IR 3944722, "WO# 1945106-01 Not Completed as Scheduled"
- IR 2597789, "Explanation for the AEER 'B' Compressor Trips During Winter"
- IR 2597433, "AEER A/C Compressor Trip"
- IR 2593346, "AEER B Compressor Discharge Gauge Reading Incorrectly"
- IR 2593343, "TXV Adjustment Needed for 2/3 B AEER HVAC Compressor Line"
- IR 2592886, "Elevated AEER Temperature"
- IR 2592985, "AEER Compressor Trip"
- IR 2591665, "AEER Temp High"
- IR 2532564, "2/3-57214B AEER/ACR Compressor Tripped"
- IR 2532115, "AEER Compressor Trip"
- IR 2490224, "AEER A/C Compressor Still Tripping"
- IR 2479797, "AEER A/C Compressor Still Tripping"
- IR 2479651, "Entered DOA 5700-01"
- IR 2470141, "AEER Compressor 2 Trip"
- IR 2469979, "AEER A/C 2/3-57214-B Trip"
- IR 2465098, "Entered DOA 5750-01, Aux Comp Room Temp Hi"

- IR 2455778, "Entered DOA 5750-01, Aux Comp Room Temp Hi"
- IR 2455224, "2/3B AEER A/C Compressor Was Found Tripped"
- IR 2452773, "3-5742-A Has a Broken Fitting"
- Engineering Change 618241, "AEER Condensing Unit B Compressor Permissive Needs to be Added to Circuit," Revision 000
- (a)(1) Action Plan Development and Action Plan (Monitoring) Goal Setting Template for IR 02419701, Revisions 3 and 4
- Expert Panel Meeting Date 06/23/2015 for EACE 02488474
- ER-AA-310, "Implementation of the Maintenance Rule," Revision 10
- ER-AA-310-1004, "Examples of Functional Failures," Revision 13
- DGA-12, "Loss of Offsite Power," Revision 75
- DOA 5750-01, "Ventilation System Failure," Revision 67
- DOP 5750-09, "Auxiliary Electrical Equipment Room Air Conditioning Unit," Revision 32
- Maintenance Rule Program Documents for Control AEER HVAC
- IR 1359028, "IRM 18 Indicating Low Counts"
- IR 1368572, "Unit 3 RWM Issues During Downpower"
- IR 1370895, "Unit 3 LPRM 08-17 "A" Level Spiked"
- IR 1476197, "Meter Function Switch S2 Needs to be Replaced"
- IR 1476200, "OPRM Wires Need to be Trained"
- IR 1494654, "APRM 2 Meter May Have Become Non-Linear"
- IR 1495729, "Unit 3 LPRM 24-25C Bypassed"
- IR 1531052, "LPRM Light Socket Needs Replacing"
- IR 1531830, "SRM 24 Inop Trip Setpoint Found O.O.T."
- IR 1532707, "Remove IRM Functional Testing and Move Commitment"
- IR 1532752, "U3 D TIP Machine Requires Troubleshooting"
- IR 1533897, "903-5 Panel LPRM 'A' Detector Bypass Light (Lower Left)"
- IR 1541903, "U3 RBM Issue"
- IR 1546374, "APRM 4 Power Potentiometer Needs to be Replaced"
- IR 1583909, "IRM 14 High Indication Light Not Working"
- IR 2444688, "RBM 8 Inop Alarms"
- IR 2526972, "RBM 8 Inop Alarms"
- IR 2574060, "ERVR. DRE Nuclear Instrumentation – TIP System Gaps"
- IR 2580999, "IRM 13 Drive Module Control Cable Needs Repair"
- IR 2581000, "Unit 2 IRM 15 Drive Module Cable Needs Repair"
- IR 2581001, "Unit 2 SRM 21 Drive Module Cable Needs Repair"
- IR 2593319, "Unexpected Alarms and U3 RPS Channel "A" Half-Scram"
- IR 2593347, "Unexpected Alarms and U3 RPS Channel "A" Half-Scram"
- IR 2593930, "RBM 7 Not Bypassing"
- IR 2596198, "U3 SRM 24 Reading High"
- IR 2596416, "U3 SRM 24 Erratic During Reactor Startup from D3M19"
- IR 2601933, "Thermal Limit Penalties Required on Unit 3"
- IR 2615126, "Power Supply PS-9 Output Found at)V for LPRM 3-56-41D"
- IR 2619680, "IRM 15 Spiking Hi=Hi Causing Numerous Alarms"
- IR 2638012, "MRC Rejects ACE 2600093"
- IR 2667564, "U2 IRM 13 Downscale in Range 2"
- IR 2678199, "OPRM 3 Not Completing Self-Test"
- IR 2679545, "3C and 3D TIP Machine Require Calibration per DTS 8233"
- IR 2691702, "Out of Tolerance"
- IR 2698270, "Issue Identified with SRM/IRM Drive Push Buttons"
- IR 2698347, "Issue Identified with SRM/IRM Drive Pushbuttons"
- IR 2698366, "LPRM 1B-32-49 (APRM 1) Testing Issues During DIP 0700-15"

- IR 2700730, "Trend IR: LPRM Connector Trend"
- IR 2706957, "Unexpected Response from U3 RBM 7 and RBM 8"
- IR 2708059, "LPRM 0825 D Failed Downscale"
- IR 2708771, "D3 LPRM P/S OOT During DIS 0700-09"
- IR 2717505, "RBM 8 LPRM Input Voltage Out of Tolerance Per DIS 0700-08"
- IR 2728310, "DOS 0500-06 FWT VS CTP Check Close to Limit Due to Coastdown"
- IR 2732758, "SRM 24 Erratic Behavior"
- IR 2740072, "U3 IRM 12 Degraded Condition"
- IR 2740076, "U3 IRM 17 Degraded Condition"
- IR 2741344, "OPRM 2 Trip/Enable During DOS 0500-03"
- IR 3942881, "IRM 12 Potential Attenuator Failure"
- IR 3942885, "IRM 18 Erratic During Startup"
- IR 3945096, "Unit 3 LPRM 24-25C Performance"
- IR 3956662, "Unexpected Alarm 0903-5 C-10"
- IR 3953186, "LPRM 32-49B Erratic"
- IR 3958588, "U3 IRM 11 Hi-Hi Alarm, No 1/2 Scram"
- IR 3959793, "Dresden IRM Performance"
- IR 3971903, "U2 CMS Not Displaying in MCR"
- IR 3973220, "IRM 18 is Pegged Upscale"
- IR 3973797, "U3 LPRM 16-33B Spike"
- IR 3984274, "IRM 15 Spiked and Caused Alarms"
- IR 3996582, "U3 IRM 15 Spiking"
- IR 4003339, "Long Term Trend Identified With Out of Tolerance SRM"
- IR 4003642, "3-750-10D Green Pen Not Working"
- IR 4004057, "Long Term Trend Identified With Out of Tolerance RBM"
- IR 4006829, "SRM Recorder Isolator Will Not Calibrate"
- IR 4017522, "Unexpected Alarm 902-5 B-4 OPRM Trouble/Inop"
- IR 4018045, "IRM 15 Spiking"
- IR 4018136, "Unexpected Alarm, U2 LPRM 32-09-B Failed Downscale"
- IR 4023720, "NRC Identified Issue: Maintenance Rule Potentially Outdated"
- Maintenance Rule History for System 0701: Source Range Monitoring (SRM)
- Maintenance Rule History for System 0702: Intermediate Range Monitoring
- Maintenance Rule History for System 0703: SRM/IRM Drive Control
- Maintenance Rule History for System 0708: Rod Block Monitor (RBM)
- Maintenance Rule History for System 0709: Oscillation Power Range Monitor
- ER-AA-310-1001, "Maintenance Rule - Scoping," Revision 4
- ER-AA-310-1004, "Maintenance Rule - Performance Monitoring," Revision 13
- ER-AA-310-1005, "Maintenance Rule - Dispositioning Between (a)(1) AND (a)(2)," Revision 7
- NEI NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Revision 4

1R13 Maintenance Risk Assessments and Emergent Work Control

- Protected Equipment List for Unit 2 ADS (Automatic Depressurization System)
- Protected Equipment List for Unit 2 HPCI
- Protected Equipment List for Unit 2 Division I Core Spray
- Protected Equipment List for Unit 2 Division II Core Spray
- Protected Equipment List for Unit 2 Division II LPCI
- Protected Equipment List for Unit 2 Division II CCSW
- DES 8300-28, "Unit 2 125 Volt Main Station Battery Service Test," Revision 24

- Protected Equipment List for Unit 3 ADS
- Protected Equipment List for Unit 3 HPCI
- Protected Equipment List for Unit 3 Division 1 Core Spray
- Protected Equipment List for Unit 3 Division 2 Core Spray
- Protected Equipment List for Unit 3 Division II LPCI
- Protected Equipment List for Unit 3 Division 2 CCSW

1R15 Operability Evaluations

- WO 01419969-01 and 01419969-02 "DTP 09 Leakage Related – U3 HPCI Booster Pump OB Seal Leak"
- IR 4012762, "Additional Evaluation Required to Address As-Found Oil Condition"
- IR 4012684, "Clarification to IR 3985063, U3 HPCI Oil Discoloration"
- IR 3985063, "Grey Discoloring in U3 HPCI Booster Pump Out Bearing Sample"
- MA-AA-716-230-1001, "Oil Analysis Interpretation Guideline," Revision 20
- MA-AB-734-448, "HPCI Booster Pump Maintenance," Revision 1
- OP-AA-109-101, "Clearance and Tagging," Revision 12
- OP-AA-108-115-1002, "Supplemental Consideration for On-Shift Immediate Operability Determinations (CM-1)," Revision 3
- Analysis Report for 3-2302-1-OB, Pump Bearing, dated Mar 15, 2017
- IR 3991760, "2-2301-3 Weak Link Calculation Revision Required for Disc and Stem"
- IR 3988159, "2-2301-3 U2 HPCI Turbine Steam Supply MOV Did Not Open"
- MRC Meeting Notes for IR 3988159, dated 05/25/2017
- Drawing: M-51, Diagram of High Pressure Coolant Injection Piping, Revision CS
- Drawing 061023, NPS 1 to 12 Class 150 U.S.V. Gate Valves, FIC.No. 1503, Revision C
- IR 3999014, "Historical Operability Review for IR 03986581"
- IR 3986581, "2C RX Building Exhaust Fan Has No On Indication While Running"
- Calculation # 9389-46-19-2, "Diesel Generator 2 Loading under Design Basis Accident Condition," Revision 003F
- WO 00909913-01, "D2/3 8Y TS Clean/UT EDG Fuel Oil Storage Tank"
- WO 01005939-01, "D2 8Y TS Lean EDG Fuel Oil Storage Tank"
- IR 3976504, "U3 EDG Fuel Oil Storage Tank Wall Thickness Results and Remaining Life"
- EC 388857, "Evaluation of Unit 3 EDG Fuel Oil Storage Tank 3-5201 Corrosion Rate and Remaining Life," Revision 000
- EC Evaluation 366134, "Evaluate Regulator Issues for EDG Fuel Oil Storage Tank Wall Thickness Measurements," Rev. 0
- 50.59 Review for EC 360239, "Evaluate the Effects of Below Minimum Wall Thickness Values in the 15,000 Gallon 2/3 EDG Fuel Oil Storage Tanks," Revision 000
- Calculation Number 8.11.6-11, "Seismic Qualification of Buried Diesel Fuel Tanks," Revision 000A
- Ultrasonic Thickness Calibration Sheet 17-036, for WO 01512242-04
- WO 01188350-02, "Disassemble Valve 3-1201- in accordance with DMP 0040-58 Anchor Darling Double Disk Gate Valve Maintenance"
- IR 3998167, "NRC Question on NER NC-017-008-Y"
- IR 1484815, "Flowserve 10CFR21 Valve Wedge Pin Failure – Anchor Darling"
- DMP 0040-58, "Anchor Darling Double Disk Gate Valve Maintenance," Revision 06
- DMP 0040-58, "Anchor Darling Double Disk Gate Valve Maintenance," Revision 05
- MD 8.3 Evaluation, Determination Criteria Evaluation for LaSalle Unit 2 for Event Date 2/11/2017

- Letter to NRC from J. Tucker, Flowserve Corporation, Subject: Wedge Pin Failure of an Anchor/Darling Double-Disc Gate Valve at Browns Ferry Nuclear Plant Unit 1, dated February 25, 2013
- Letter to NRC from K.J. Poison, Tennessee Valley Authority, Subject: Anti-Rotation Pin Failure in Anchor Darling (Flowserve) Double Disc Gate Valve, dated January 4, 2013
- IR 2414608, "3-1601-60 Failed to Operate From MCR"
- IR 4015141, "IA Valve to 2-1601-60 Found Out of Position"
- Prompt Investigation Report for IR 04015141
- ACE for Condition Report 2414608-02, "Torus Vent Valve (3-1601-60) Failed to Open From Main Control Room"
- Work Planning Instructions for EC 400930, "Hardened Containment Vent System Modification – Unit 2," Revision 002
- DEOP 0500-04, "Containment Venting," Revision 17
- DOA 1600-09, "Emergency Containment Venting," Revision 07
- DOP 1600-M1/E1, "Unit 2 Pressure Suppression System Checklist," Revision 32
- DOS 1600-03, "Unit 2 Quarterly Valve Timing," Revision 53
- Drawing: M-25, Diagram of Pressure Suppression Piping, Revision DY
- Drawing: M-37, Diagram of Instrument Air Piping, Revision AM

1R19 Post Maintenance Testing

- WO 01885755-03, "Historical OP OF MCC 28-1 Cub. L1 Degraded Contactor"
- WO 01837695-02, "D2 4Y TS 2A ISI LPCI Pump Motor Surveillance"
- WO 01837694-02, "D2 4Y TS 2B ISI LPCI Pump Motor Surveillance"
- WO 01813257-02, "D2 2Y EQ GE 2B LPCI Pump Motor Surveillance"
- WO 01813256-02, "D2 2Y EQ GE 2A LPCI Pump Motor Surveillance"
- WO 01807857-02, "Trend in ECCS Motor Oil Coil Leaks"
- WO 01807856-02, "Trend in ECCS Motor Oil Coil Leaks"
- WO 01619241-01, "D2 4Y PM PLCI B PP CST Suction Valve Full Stroke"
- WO 01618966-01, "D2 4Y PM LPCI A PP CST Suction Valve Full Stroke"
- WO 01424259-02, "D2 8Y TS/IST Disassemble & Insp 2-1501-65B"
- WO 01419071-03, "D2 6Y COM MOV DIAG Testing & Limitorque Surveillance 2-1501-38A"
- WO 01414694-02, "D2 6Y PM Lube/Insp Limitorque Valve Operator 2-1501-38A"
- WO 01218659-03, "D2 8Y PM INSP 480V MCC Breaker MOV 2-1501-5A Group 1"
- WO 01218659-02, "D2 8Y PM INSP 480V MCC Breaker MOV 2-1501-5A Group 1"
- WO 01057160-02, "D2 6Y COM MOV Diagnostic & Limitorque Surveillance 2-1501-19A"
- IR 3995614, "New Breaker Failed to Close"
- DOS 1500-10, "LPCI System Pump Operability and Quarterly Test With Torus Available and Inservice Testing (IST) Program," Revision 70
- DOS 1500-01, "LPCI System Valve Operability," Revision 39
- DOS 0040-07, "Verification of Remote Position Indication For Valves Included in Inservice Testing (IST) Program," Revision 45
- WO 04622946-01, "TS/Repair U2 EDG Emergency Start Ckt"
- WO 04622946-02, "Unexpected Annunciator 902-8 B-7 During Monthly EDG Run"
- IR 3994711, "Unexpected Annunciator 902-8 B-7 During Monthly EDG Run"
- Drawing: 12E-2350A, Schematic Diagram Engine Control & Gen. Excitation Standby Diesel Generator-2, Revision AV
- Drawing: 12E-2336, Relay Metering and Excitation Diagram Standby Diesel Generator2, Revision AC
- Drawing: 12E-2649B, Wiring Diagram Standby Diesel Generator 2/3 Excitation Cabinet 2223-41, Revision X

- WO 04621978-01, "D2/3 1M TS Diesel Generator Fuel Oil Day Tank Sample"
- WO 04621974-01, "D2/3 1M COM Diesel Generator Sample Crankcase Oil"
- WO 04621973-01, "D2/3 1M TS Main DG, Sample Fuel Oil, Main Storage Tank"
- WO 04620607-01, "D2/3 1M TS Unit Diesel Generator Operability"
- WO 01924140-02, "D2/3 AN COM Replace Air Start Regulating Valve on EDG"
- WO 01922271-03, "One Time Replacement of EDG Component Per FASA 02601715"
- WO 01828114-08, "D2/3 2Y PM Standby Diesel Generator Inspection"
- WO 01822038-03, "D2/3 2Y PM D/G Engine Temp Instrument Cal"
- WO 01822036-03, "D2/3 10Y PM Replace "FFC" and "EXC" 2/3 EDG Relays"
- WO 01820538-02, "D2/3 2Y PM Overhaul Valve"
- WO 01739540-03, "One Time Replacement of 2/3 EDG Copper Tubing"
- WO 01535158-04, "Extent of Condition Review – QC IR 1351061"
- IR 3997972, "2/3 EDG – Small Smoke Plume From Top of Engine Exhaust Area"
- IR 3997919, "Testing Error During DES 6600-03"
- IR 3997437, "2/3 EDG Kinked Air Start Tube to Lower Air Start Motor"
- IR 3996861, "2/3 EDG Main Tank and Day Tank Sample Results"
- IR 3996563, "2/3 "B" EDG Heat Exchanger: Material Found in Tubes"
- IR 3996562, "2/3 "A" EDG Heat Exchanger: Material Found in Tubes"
- DOS 6600-12, "Diesel Generator Tests Endurance and Margin/Full Load Rejection/ECCS/Hot Restart," Revision 66
- DOS 6600-01, "Diesel Generator Surveillance Tests," Revision 136
- Design Considerations Summary for EC 366676, Rev. 000, "Add Interposing Relay for Diesel Generator Output Breaker Unit 2"
- Design Considerations Summary for EC 366256, Rev. 000, "Add Interposing Relay for Unit 3 Diesel Generator Output Breaker"
- Drawing: 12E-2346, Schematic Diagram 4160V Bus 24-1, Standby Diesel 2 Feed, Revision AT
- Drawing: 12E-3346, Schematic Diagram 4160V Bus 34-1 Standby Diesel 3 Feed & 24-1 Tie Breaker, Revisions AS and AT
- Drawing: 12E-3656A, "Wiring Diagram 4160V SWGR Bus 34-1 Cubicles 1,2,3,4,5,6,7,8, Revision AL
- Drawing: 12E-3656F, Internal Schematic & Device Location Diagram 4160V SWGR Bus 34-1, Cubicle 7, Revision Z
- WO 01839583-04, "PMT 2A CS Motor Run Testing"
- WO 01838976-02, "PMT Functional Test 2-1401-2A"
- WO 01838461-03, "PMT MOV 2-1402-38A"
- WO 01642736-04, "PMT 4kv Breaker 23-1 Cubicle 10"
- IR 4016469, "MOV 2-1402-38A Will Not Return to Motor Operation"
- DOS 0040-07, "Verification of Remote Position Indication for Valves Included in Inservice Testing (IST) Program," Revision 45
- DOS 1400-02, "Core Spray System Valve Operability," Revision 31
- DOS 1400-05, "Core Spray System Pump Operability and Quarterly IST Test with Torus Available," Revision 52
- IR 4014904, "NRC Questions EQ for EDG Auto Start Relay"
- WO 00865482, "Non-EQ HGA Relay Installed in EQ Application of ASR Relay"
- WR 00291869, "Non-EQ HGA Relay Installed in EQ Application of ASR Relay"
- WR 00291867, "Non-EQ HGA Relay Installed in EQ Application of ASR Relay"
- WO 01263420, "Non-EQ HGA Relay Installed in EQ Application of ASR Relay"
- WO 0864025, "Non-EQ HGA Relays Installed in EQ Applications of ASR Relays"
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- DOS 6600-01, "Diesel Generator Surveillance Tests," Revision 137

- OP-AA-108-115, "Operability Determinations (CM-1)," Revision 8
- EQ-44D, "General Electric Switchgear Components (Model: MC-4.76), Tab C, Justification and Analysis," Revision 13
- EQ-44D, "General Electric Auxiliary Relay (P/N 12HGA11J52G), Tab C3, Justification and Analysis," Revision 13
- CC-AA-203, "Environmental Qualification Program," Revision 12
- CC-AA-304, "Component Classification," Revision 5
- Maintenance Material List (MML) for WO 485003-01

1R22 Surveillance Testing

- WO 01806107-01, "D2 2YR TS CS PMP Comp Test with Torus Avail for IST Surveillance"
- IR 4006054, "U2 Core Spray High Differential Pressure"
- IR 2609851, "IST Class 2 Relief Valves Required to be Within 10 Years"
- IR 2613723, "U3 CS Check Valve Possibly Sticking"
- IR 2628335, "DTP 09, Leak Detection Procedure Enhancement"
- IR 2642031, "High Packing Loads MOV 2-1402-24B"
- IR 2656301, "Tech Spec Review Required"
- IR 2666496, "Unexpected Alarm: 2B Core Spray Pump at Pressure"
- IR 2696930, "Upgrade Torque Switch on MOV 2-1402-38A"
- IR 2704562, "DPT 2-1459-A Has Output Oscillations"
- IR 2719721, "U2 CS Header DP are Approximately 25 PSI Apart"
- DOS 1400-09, "Core Spray System IST Comprehensive/Preservice Pump Test with Torus Available," Revision 15
- Calibration # 0050102413, Format # 12868, dated 5/3/2017
- Performance Trend Data for 2-1401A, dated 5/3/2017
- ASME Code-2004, "Subsection ISTB, Inservice Testing of Pumps in Light-Water Reactor Nuclear Power Plants"
- DIS 1300-07, "Unit 3 Isolation Condenser Steam/Condensate Line High Flow Calibration," Revision 29
- WO 04591517-01, "D3 Quarterly TS ISO Cond Steam and Cond Line Hi Flow Cal"
- WO 01885355-01, "DPIS-3-1350-B Galled Test Taps"
- IR 2568632, "Galled Test Taps"
- IR 2568633, "Galled Test Taps"
- IR 2568635, "Galled Test Taps"
- IR 2609513, "DPIS 3-1350-B As Found OOT"
- Drawing: 12E-3502, "Schematic Diagram Primary Containment Isolation Sys. Switch Development, Reset Circuit. Tip. Isolation Recirculation Loop Interlock, Revision AF
- Drawing: 12E-3502A, Schematic Diagram Primary Containment Drywell Isolation Reset Circuit System, Revision K
- Drawing: 12E-3506, Schematic Diagram Primary Containment Isolation System Isolation Condenser Control Logic, Revision AG
- Drawing: 12E-3506, Schematic Diagram Primary Containment Isolation System Isolation Condenser Control Logic, Revision AF
- Drawing: 12E-3506, Schematic Diagram Primary Containment Isolation System Isolation Condenser Control Logic, Revision AB
- Drawing: 12E-3507, Schematic Diagram Primary Containment Isolation System Isolation Condenser Vlv-Outboard MOV 1301-3, Revision AF
- Drawing: 12E-3507A, Schematic Diagram Primary Containment Isolation System MOV 1301-2, Revision W

- Drawing: 12E-3507B, Schematic Diagram Isolation Condenser Reactor Inlet Valves 3-1301-1 & 3-1301-4, Revision R
- Drawing: 12E-3788, "Wiring Diagram Instrument Rack 2203-28 Leak Detection Monitoring Section A and B, Revision L
- WO 01630526-01, "D2 Quarterly TS LPCI MO Valve Operability and IST Timing"
- EC 0401632, "Dresden MOV Program Scope Determination and Risk Ranking," Revision 000
- ER-AA-321-1006, "Inservice Testing of Motor Operated Valves," Revision 2
- ER-AA-302-1008, "MOV Diagnostic Test Preparation Instructions," Revision 12
- ER-AA-302-1003, "MOV Margin Analysis and Periodic Verification Test Intervals," Revision 8
- MA-AA-723-300, "Diagnostic Testing of Motor Operated Valves," Revision 11
- Regulatory Guide 1.192, "Operation and Maintenance Code Case Acceptability ASME OM Code," Revision 1
- Letter from T. Tate, NRR to M. Pacilio, Exelon Subject: Dresden Nuclear Power Station, Units 2 and 3 – Safety Evaluation in Support of Request for Relief RV-02 Associated with the Fifth 10-Year Interval Inservice Testing Program, dated October 30, 2013
- IST-DRE-PLAN, Inservice Testing Program Plan, Dresden Station Units 2 & 3, Fifth Interval, Revision 1
- ASME Omb Code-2006, Code Case OMN-1, "Alternative Rules for Preservice and Inservice Testing of Active Electric Motor-Operated Valve Assemblies in Light-Water Reactor Power Plants"
- WO 01922789-01, "D2 QTR TS APRM Surveillance"
- WO 01941513-01, "D2 QTR TS APRM Surveillance"
- WO 01962304-01, "D2 QTR TS APRM Surveillance"
- WO 04595973-01, "D2 QTR TS APRM Surveillance"
- IR 2613951, "APRM 4 Bulk Power Supply PS-12 OOT During DIS 0700-09"
- IR 2651457, "APRM 4 Hi-Hi Scram Trip Found Out of Tolerance"
- IR 2660733, "APRM 6 Inoperable Count Trip OOT Not Tech Spec"
- IR 2691702, "Out of Tolerance"
- IR 2724544, "APRM 5 Upscale High Rod Block Trip OOT High, No TS Violation"
- IR 2741344, "OPRM 2 Trip/Enable During DOS 0500-03"
- IR 3946512, "DOS 0500-03OPRM Response Review Required"
- DOS 0500-03, "APRM Rod Block and Scram Functional Test," Revision 63
- DOS 0500-26, "APRM Flow Bias Calibration Check," Revision 01
- WO 01893641-01, "D2 18M TS Bus 23-1 Degraded Voltage Relay Calibration"
- EC 402247, "Technical Specification Requirements Satisfied by DOS 6600-03 through 06, Revision 0
- EC 359082, "Second Level Degraded Voltage Relay Setpoint Change per Technical Specification Amendment Change, 4kV Bus Overvoltage Alarm Setpoint Change and New RAT X-winding Ampere Low Limit Alarm"
- Design Consideration for EC No. 359082, Revision 001, "Second-Level Degraded Voltage Relay Setpoint Change per Technical Specification Amendment Change, 4 kV Bus Overvoltage Alarm Setpoint Change and New RAT X-Winding Ampere Low Limit Alarm"
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- 50.59 Review Document Number MA-DR-771-402, "Unit 2 – 4 kV Tech Spec Undervoltage and Degraded Voltage Relay Routines," Revision 5 and Revision 15
- MA-DR-771-402, "Unit 2 – 4kV Tech Spec Undervoltage and Degraded Voltage Relay Routines," Revision 15
- Letter from P. Simpson, Exelon Nuclear to US NRC, Letter RS-05-037, Subject: Request for License Amendment Regarding Offsite Power Instrumentation and Voltage Control, dated April 4, 2005

- Letter from US NRC to O. Kingsley, Exelon Nuclear, Subject: Issuance of Amendments (TAC Numbers. MA8382 and MA8383), dated March 30, 2001
- License Amendments 219 (Unit 2) and 210 (Unit 3), "Offsite Power Instrumentation and Voltage Control," March 17, 2006
- Surveillance History for D2 18M TS Bus 23-1 Degraded Voltage Relay Calibration
- Drawing: 12E-2334, Relaying & Metering Diagram 4160V Switchgears 24-1 and 23-1, Revision AD
- Drawing: 12E-2345, "Schematic Diagram 4160V Bus 23-1 Undervoltage Relays, Revision AM
- Drawing: 12E-2345, "Schematic Diagram 4160V Bus 23-1 4kv Switchgear Bus 40 Feed Breaker, Revision AU
- Drawing: 12E-2650B, Wiring Diagram 4KV Bus 23-1 2nd Level Undervoltage Panel 2252-83, Revision G

1EP6 Drill Evaluation

- EP-AA-1004, "Radiological Emergency Plan Annex For Dresden Station," Revision 35
- EP-AA-113-F-19, "Dresden Assembly, Accountability and Evacuation Guidelines," Revision D
- EP-MW-114-100, "Midwest Region Off-Site Notifications," Revision 16
- 2017 Performance Indicator Drill Manual
- IR 3962228, "EP-4Q16 Focus Area Drill Facilities and Equipment Issues"
- IR 3962230, "EP-4Q16 Focus Area Drill Scenario Comments"
- IR 3962232, "EP-4Q16 – Focus Area Drill TSC Comments"
- IR 3968580, "Receipt of NRC 4Q16 Report and NCV for EP"
- IR 3983452, "DRE-EP-2017-PEX-CR Sim-Failed Objective"
- IR 3983473, "DRE-EP-2017-PEX-EM&SC-Failed DC"
- IR 3983867, "DRE-EP-2017-PEX-OSC-Failed Objective"
- IR 3986464, "DRE-EP-2017-PREX-TSC Failed DCS"
- IR 3986472, "DRE-EP-2017-PREX-TSC-Other Issues"
- IR 3998228, "EP 1Q2017 FAD Combined Facility Comments"
- IR 3998231, "EP 1Q17 FAD Facilities and Equipment"
- IR 3998237, "EP 1Q17 FAD Procedure Enhancement"
- IR 4003030, "DRE-EP-2017-NRC-Site-EM&SC"
- IR 4003359, "DRE-EP-2017-NRC-Site-PQ"
- 2017 PI Drill Manual
- Nuclear Accident Reporting System (NARS) Form, Utility Messages 1, 2, and 3
- EP-AA-111-F-04, "Initial Protective Action Recommendation ONLY," Revision G
- EP-AA-112, "Emergency Response Organization (ERO)/Emergency Response Facility (ERF) Activation and Operation," Revision 18
- EP-AA-112-200, "TSC Activation and Operation," Revision 10
- EP-AA-112-200-F-31, "TSC Security Coordinator Hostile Action Event Checklist," Revision A
- EP-AA-113-F-19, "Dresden Assembly, Accountability and Evacuation Guidelines," Revision D
- EP-MW-114-100-F-03, "Management State Update Information (BWR)," Revision C

2RS6 Radioactive Gaseous and Liquid Effluent Treatment (71124.06)

- Gas Permit G-20160601-504-B; dated August 30, 2016
- DUR-2016-07, "Unit 3 Isolation Condenser Actuation for Testing"

- WO 01827822-02, "D2/3 18M TS Chimney SPING-4 Eff Mon Cal," dated December 15, 2016
- WO 04623574, "D2/3 1M TS ODCM Chimney SPING Channel 7 Source Check," dated May 8, 2017
- WO 01766038, "D2/3 18M TS Rx Building Vent SPING Cal," dated February 5, 2017
- WO 01930206, "D3 12M TS ODCM Off-Gas Rad Monitor Calibration," dated May 8, 2017
- WO 01769180, "D2/3 24M TS 'A' SGBT HEPA Filter Leak Test DTS 7500-11," dated April 20, 2016
- WO 01770996, "D2/3 24M TS 'A' SGBT Charcoal Sample Iodine Removal Effluent Test," dated April 18, 2016
- Offsite Dose Calculation Manual, Revision 13
- Dresden Nuclear Station 2015 & 2016 Radioactive Effluent Release Reports
- DIS 1700-02, "Off-Gas Log Radiation Monitor Functional Check," Revision 20
- DIS 1700-08, "Off-Gas Log Radiation Monitor Calibration with Source and Off-Gas Timer Trip Check," Revision 27
- DIS 1700-26, "Off-Gas Radiation Monitor Calibration," Revision 05
- DRS 5821-56, "SPING Effluent Monitor Calibration," Revision 10
- DIS 3900-06, "Unit 3 Service Water Effluent Sample Radiation Monitor Calibration and Functional Test," Revision 18
- CY-DR-170-2030, "Unmonitored Radiological Release," Revision 1
- CY-DR-170-2020, "Abnormal Radiological Release," Revision 1
- CY-DR-170-220, "Reactor Building Vent," Revision 23
- IR 02676946, "OGFB Pressurized and Not Sending Exhaust Air Up Chimney"
- IR 04009983, "Untimely Evaluation of Potential Abnormal Release from OGFB"

2RS7 Radiological Environmental Monitoring Program (71124.07)

- Annual Report on the Meteorological Monitoring Program at the Dresden Nuclear Power Station 2015 & 2016
- Quarterly Collection Schedule, Various Dates
- Sample Collection Data Sheet, Various Dates
- Field Rotameter Calibration, Various Dates
- CY-AA-170-1000, "Radiological Environmental Monitoring and Meteorological Program Implementation," Revision 8
- EN-AA-408-4000, "Radiological Groundwater Protection Program Implementation," Revision 7
- Dresden Nuclear Station 2015 & 2016 Radiological Environmental Operating Reports
- IR 02617150, "IR Initiated For REMP Sampling Issues"
- IR 03979628, "IR Initiated For REMP Sampling Issues"
- IR 04009972, "Evaluation of Braidwood REMP IR 4002540"
- Offsite Dose Calculation Manual, Revision 13

4OA1 Performance Indicator Verification

- 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
- "Reactor Oversight Program MSPI Bases Document, Dresden Nuclear Generating Station," Revision 11
- NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7
- IR 2388132, "MSPI Failure Determination," dated 10/30/2014
- IR 2488474, "MSPI Failure Determination," dated 05/19/2015

- IR 2479188, "MSPI Failure Determination," dated 07/10/2015
- IR 2573588, "MSPI Failure Determination," dated 10/20/2015
- IR 2662709, "MSPI Failure Determination," dated 05/06/2016
- IR 2663921, "MSPI Failure Determination," dated 05/06/2016
- Special Plant Condition Tracking Assignment (SPC) for IR 2507485, "U3 EDG Failed to Start"
- MSPI Aggregate Status Summary dated 05/05/2017
- Dresden Aggregate MSPI Margin Report dated 10/24/2016
- IR 2662709, "MSPI Failure Determination," dated 07/28/2016
- IR 2676458, "Unreported MSPI Failures"
- IR 2686163, "MSPI Failure Determination," dated 08/09/2016
- IR 2691264, "DOS 2300-07 Requires Enhancement"
- IR 2695768, "HPCI AOP Motor Heaters at Different Temperatures"
- IR 2724826, "U3 HPCI MSPI Meets "At-Risk" Exelon Action Level"
- IR 3957459, "MOV 3-2301-8 Trending Results"
- IR 3964449, "HPCI Turbine Control Valve Leaking By"
- IR 3974596, "Historical QDC LER [Licensee Event Report] Applicability to Dresden"
- IR 3985063, "Grey Discoloring in U3 HPCI Booster Pump Out Bearing Sample"
- Engineering Change (EC) 0401632, "Dresden MOV Program Scope Determination and Risk Ranking," Revision 000
- CY-AA-130-3010-F-03; Dose Equivalent Iodine Determination; Various Dates

40A2 Problem Identification and Resolution

- WO 04597227-03, "2/3 EDG Fuel Injector Ctrl Linkage – WR Needed"
- WO 00509315, "D2 18Y PM Replace Head/Liner Gaskets, Head Seat Rings & Cyl Lin"
- IR 3963606, "2/3 EDG Fuel Inj. Control Linkage Vulnerability Identified"
- IR 3963613, "3B SBO Fuel Injector Ctrl Linkage Vulnerability Identified"
- IR 3966137, "2A SBO Fuel Injector Ctrl Linkage – WR Needed"
- IR 3966138, "2B SBO Fuel Injector Ctrl Linkage – WR Needed"
- IR 3966144, "2 EDG Injector Control Linkage – WR Needed"
- IR 3966147, "3 EDG Injector Control Linkage – WR Needed"
- IR 3966148, "2/3 EDG Fuel Injector Control Linkage – WR Needed"
- IR 3966150, "3A SBO Fuel Injector Control Linkage – WR Needed"
- IR 3966152, "3B SBO Fuel Injector Control Linkage – WR Needed"
- IR 3971520, "2016 EDG Reliability FASA Issues"
- DMS 6600-03, "Diesel Generator Mechanical Inspection and Preventive Maintenance," Revision 24
- Procurement Evaluation(PE) 100161, Item Equivalency Evaluation (IEE) for Spring Loaded Linkage
- Engine Systems, Inc. Report No. 10CFR21-0115, Rev. 0, for a 10CFR21 Reportable Notification on an EMD Fuel Injector, dated January 6, 2017
- Engine Systems, Inc. Document 8002768-FA, Revision 1, "Failure Analysis of Fuel Injector," dated 12/12/16
- EC 354280, "Evaluation and Acceptance of Valve at Risk of Higher Than Allowed Maximum Thrust From EACE 00267779"
- WO 00344495, "D3 10Y PM Lube/Insp Limitorque Valve Operator 3-1501-18A"
- WO 00750834, "Actuator Replacement/Refurbishment/Valve Inspection"
- WO 00752040, "D3 6Y COM MOV Diagnostic & Limitorque Surveillance 3-1501-18A"
- WO 01168304, "6Y COM MOV Diagnostic & Limitorque Surveillance 3-1501-18A"
- WO 01966473-04, "Valve Failed to Move (3-1501-18A)"
- WO 99019388-01, "D3 10Y PM MOV Diagnostic Testing 3-1501-18A"

- IR 0188997, "Trend Identified in MOV Trend Report"
- IR 0213315, "Higher Than Expected As-Found 3-1501-21A Thrust"
- IR 0267779, "Higher Than Expected As-Found Thrust on 3-1501-27A"
- IR 0268559, "Higher Than Expected As-Found Thrust Measured on 3-1501-18A"
- IR 2739263, "Valve Failed to Move (3-1501-18A)"
- IR 2742041, "MOV 3-1501-18A High Motor Current"
- IR 4009704, "NRC/IEMA Discussion on 3-1501-18A MOV Failure ECAP Evaluation"
- EACE 00267779, "Higher Than Expected As-Found Thrust on 3-1501-27A, 3-1501-18A, and 3-2301-14 During D3R18," 11/01/04
- ECAP[Corrective Action Program Evaluation Report (Equipment)] for CR 03972295, 02739263, "MOV 3-1501-18A Motor Failed," dated 03/20/2017
- DEP 0040-09, "Limiterque Valve Operator Maintenance," Revision 14
- DOP 0040-01, "Station Motor Operated Valve Operations," Revision 39
- DOP 1400-03, "ECCS Fill System," Revision 63
- DOS 0040-07, "Verification of Remote Position Indication for Valves Included in Inservice Testing (IST) Program," Revision 45
- ER-AA-200-1001, "Equipment Classification," Revision 3
- ER-AA-302-1003, "MOV Margin Analysis and Periodic Verification Test Intervals," Revision 8
- MA-AA-723-301, "Periodic Inspection of Limitorque Model SMB/SB/SBD-000 Through 5 Motor Operated Valves," Revision 12
- Surveillance History D3 6Y Com Lube Valve Stem, Threads Only 3-1501-18A
- Surveillance History D3 10Y COM MOV Diagnostic Testing & Limitorque Surveillance 3-1501-18A
- Surveillance History D3 10Y PM Lube/Insp Limitorque Valve Operator 3-1501-18A
- Letter from L. Rossbach, NRC to O. Kingsley, President, Nuclear Generation Group, Commonwealth Edison Company, Subject: Dresden – Safety Evaluation of Licensee's Response to Generic Letter 96-05 (TAC Numbers. M97042 and M97043," dated January 31, 2000
- Generic Letter 96-05, "Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves"
- Generic Letter 89-10, "Safety-Related (1) Motor-Operated Valve Testing and Surveillance Results of the Public Workshops"
- Letter from A. Gibson, NRC to O. Kingsley, Subject: Meeting Summary Motor-Operated Valve Issues With Special Emphasis on the Process for Closing Out Generic Letter 89-10, dated December 8, 1994
- Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Alternative Request RV-02 for the Fifth 10-Year Interval Inservice Testing Program Exelon Generation Company, LLC Dresden Nuclear Power Station, Unit Nos. 2 and 3 Docket Numbers 50-237 and 50-249
- Idaho State University, Presentation by Mark Holbrook, May 2010, "MOV Lessons Learned"
- WO 04600875-02, "Download 2A ASD event data for Unexpected Alarm 3-40, 2A Recirc Drive Minor Trouble"
- IR 2414608, "3-1601-60 Failed to Operate from MCR"
- IR 2520577, "Unexpected ASD Control Fiber Alarm (4-16)"
- IR 2599634, "903-4 B-5 3B Recirc Drive Minor Trouble"
- IR 2611828, "U2 ASD A2/B2/C2 Cell Cabinet Buzzing is Getting Louder"
- IR 3959345, "Total HPCI DTP 09 System Leakage Exceeds Gal/Hr"
- IR 3959793, "Trend IR" Dresden IRM Performance"
- IR 3959767, "Trend: Actions from Dec 2016 Semi-Annual Safety Culture Mtg"
- IR 3959897, "2B LPCI Heat Exchanger Thermal Performance"
- IR 3964519, "Trend IR: Unable to Perform PM on All Cams"
- IR 3967126, "Unexpected Alarm 902-4 B-1, 2A Recirc Drive Minor Trouble"

- IR 3972322, "2B ASD Speed Hold Due to Cell Bypass"
- IR 3973819, "Trend IR: DEHC Equipment Issues"
- IR 3979631, "NRC Walkdown of Site in Preps for Severe Weather"
- IR 3984473, "Trend IR: Transient Combustible Material Controls"
- IR 3986824, "2A Recirc Drive Minor Trouble"
- IR 3996728, "Follow-Up from IR 3979631"
- IR 4003339, "PMC: Long Term Trend Identified With Out of Tolerance SRM"
- IR 4011540, "Trend IR: Transient Combustible Material Control for MMD"
- IR 4011542, "Trend IR: Transient Combustible Material Control for EMD"
- IR 4012882, "Trend IR: Process Radiation Monitors"
- IR 4015002, "Trend IR: Issues with Screen Refuse System"
- IR 4021996, "Trend: Issues Encountered with 4kv Breakers"
- IR 4022823, "2B Recirc System Flow Control Failure"
- OP-AA-108-111, "Adverse Condition Monitoring and Contingency Plan," Revision 10
- OP-AA-201-009, "Control of Transient Combustible Material," Revision 19
- Root Cause Investigation Report for IR 3983380, "Dresden's Maintenance Department has Experienced Six Human Performance/Technical Human Performance Events, Between January 11 and March 8, 2017"
- Memorandum From Plant Engineering to Plant Health Committee[PHC],
Subject: May 15, 2017 PHC Meeting," dated May 12, 2017
- "T-18 FA" GAP to Excellence – Work Management," Condition Report 04002490, Report Date June 8 2017
- Dresden Quarterly Station Rework Report for the Period 01/01/17 to 03/30/17

LIST OF ACRONYMS USED

AC	Alternating Current
ACE	Apparent Cause Evaluation
ADAMS	Agencywide Document Access and Management System
AEER	Auxiliary Electrical Equipment Room
ANO	Arkansas Nuclear One
AOV	Air Operated Valve
ASD	Adjustable Speed Drive
ASME	American Society of Mechanical Engineers
CAP	Corrective Action Program
CCSW	Containment Cooling Service Water
CFR	<i>Code of Federal Regulations</i>
CS	Core Spray
ECCS	Emergency Core Cooling System
EDG	Emergency Diesel Generator
HPCI	High Pressure Coolant Injection
HVAC	Heating, Ventilation and Air Conditioning
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
IR	Issue Report
LLC	Limited Liability Corporation
LPCI	Low Pressure Coolant Injection
MOV	Motor Operated Valve
MSPI	Mitigating Systems Performance Index
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
OPEX	Assessment of Operating Experience
OOS	Out-of-service
PI	Performance Indicator
PMT	Post-Maintenance Testing
RTP	Rated Thermal Power
SBGT	Standby Gas Treatment
SBO	Station Blackout
SRA	Senior Reactor Analyst
SSC	Structure, System, and Component
TS	Technical Specification
TSO	Transmission System Operator
UFSAR	Updated Final Safety Analysis Report
WO	Work Order