

## Dresden 2

# 1Q/2016 Plant Inspection Findings

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## Initiating Events

**Significance:** G Jun 30, 2015

Identified By: Self-Revealing

Item Type: FIN Finding

### **Reactor Scram Due to Feedwater Level Control System Failure with a Reactor Recirculation Pump Runback**

A finding of very-low safety significance (Green) was self-revealed on January 13, 2015, and again on February 6, 2015, when a loss of power to the Unit 2 feedwater level control (FWLC) system resulted in a reactor scram. The loss in power to the Unit 2 FWLC system was determined to be the result of a human performance error during the original installation of the system under Work Order (WO) 97102835, in that two spade-lug connections associated with the system's +5 Vdc power supply were not properly landed resulting in the intermittent losses in power, and reset of the FWLC system. In addition, a dual in-line package switch on a FWLC Input/Output card was improperly positioned which led to an improper anti-cavitation reactor recirculation pump runback during both events.

The inspectors determined that the failure to properly land the leads associated with the Unit 2 FWLC system +5 Vdc power supply in accordance with the work instructions in WO 97102835 was a performance deficiency that was determined to be more than minor, and thus a finding, because it was associated with the configuration control attribute of the Initiating Events cornerstone, and affected its objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. The finding was determined to be of very-low safety significance (Green), because the inspectors answered "No" to the screening question, "Did the finding cause a reactor trip AND the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition (e.g., loss off condenser, loss of feedwater)?" This finding was determined to have a cross-cutting aspect in the area of Problem Identification and Resolution, Evaluation, because the licensee did not thoroughly evaluate repetitive alarms and a failure of the FWLC system to ensure that resolutions addressed causes and extent of condition prior to restart following the January 13, 2015, FWLC failure and reactor scram. Specifically, licensee analysis of alarms received prior to the January 13, 2015, scram and troubleshooting of the FLWC system failure on January 13, 2015, was overly focused on multi-functional processor cards which happened to be approaching their

end of expected life. Activities to investigate loose wiring connections following the January 13, 2015, scram failed to identify the incorrectly landed spade-lug connections for the +5 Vdc power supply. [P.2]

Inspection Report# : [2015002](#) (*pdf*)

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## Mitigating Systems

**Significance:** G Mar 31, 2016

Identified By: Self-Revealing

Item Type: NCV Non-Cited Violation

### **Failure to Maintain Design Control of the 2/3 Emergency Diesel Generator**

A finding of very low safety significance and an associated NCV of Title 10 of the Code of Federal Regulations Part 50, Appendix B, Criterion III, "Design Control," was self-revealed associated with the licensee's failure to assure that the applicable design basis for applicable structures, systems, and components were correctly translated into specifications, procedures, and instructions. Specifically, since initial plant construction the licensee failed to correctly identify the effect a loss of non-safety 2/3 emergency diesel generator (EDG) room ventilation could have on maintaining operability of the 2/3 EDG. On November 6, 2015, during a planned maintenance outage of the normal non-safety related instrument air pneumatic supply and a failure resulting in the depressurization of the back-up non-safety related nitrogen system, the 2/3 EDG ventilation intake and exhaust dampers failed closed making the 2/3 EDG inoperable for approximately 20 minutes on two occasions from the time of discovery of the condition. The licensee incorrectly believed that a loss of the non-safety related instrument air system and its non-safety related back-up nitrogen system would cause the dampers to fail in the conservative open position. This feature was never tested; and therefore the licensee incorrectly believed the non-safety related control systems for the room ventilation system would not adversely affect the safety-related EDG's operability.

The performance deficiency was determined to be more than minor, and thus a finding, in accordance with IMC 0612, Appendix B, "Issue Screening," dated September 7, 2012, because it was associated with the Design Control attribute of the Mitigating Systems Cornerstone and affected the associated cornerstone objective to ensure availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences, and if left uncorrected could lead to a more significant safety concern. The finding screened as very low safety significance (Green) because the inspectors answered "no" to questions A.1. through A.4. of IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," Exhibit 2, dated June 19, 2012. This finding has a cross-cutting aspect in the area of Human Performance, Training, because the licensee did not ensure licensed operations and engineering personnel properly understood the operation and configuration of the 2/3 diesel generator ventilation system under accident conditions and its impact on the safety-related 2/3 EDGs ability to accomplish its design function. Specifically, the licensee incorrectly believed that the 2/3 EDG room ventilation system failed in a conservative manner with a loss of its non-safety related pneumatic supply systems. Corrective Action Program documents and other engineering products up until September 2015 incorrectly state that the 2/3 EDG's operability was not adversely affected by a loss of damper control pneumatics as the dampers were expected to fail open. [H.9] Inspection Report# : [2016001](#) (pdf)

**Significance:** G Sep 30, 2015

Identified By: NRC

Item Type: NCV Non-Cited Violation

### **Failure to Evaluate the Available Net Positive Suction Head for the Diesel Generator Cooling Water Pumps Following a Dam Failure**

The inspectors identified a finding of very low safety significance, and an associated NCV of Title 10, Code of Federal Regulations (CFR), Part 50, Appendix B, Criterion III, "Design Control," for the failure to verify the adequacy of the diesel generator cooling water (DGCW) pumps' design. Specifically, the licensee failed to evaluate the net positive suction head (NPSH) available to the DGCW pumps at the most limiting ultimate heat sink (UHS) level after a postulated dam failure where they are expected to perform a safety function. The licensee entered this finding into their Corrective Action Program (CAP) and, after a review of their DGCW pump NPSH calculation and an evaluation, concluded that the DGCW pumps had adequate NPSH available to them at the most limiting UHS level after a postulated dam failure, and therefore remained operable.

The performance deficiency was determined to be more than minor because it was associated with the Mitigating Systems cornerstone attribute of equipment performance, and adversely affected the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The finding screened as very low safety significance (Green) because although it affected the design or qualification of the DGCW pumps, it did not result in the loss of operability or functionality of the pumps. The

inspectors did not identify a cross-cutting aspect associated with this finding because it was not confirmed to reflect current performance due to the age of the performance deficiency.

Inspection Report# : [2015003](#) (*pdf*)

**Significance:**  Sep 30, 2015

Identified By: NRC

Item Type: NCV Non-Cited Violation

**Failure to Perform Ultimate Heat Sink Surveys in Accordance With Quality Assurance Program**

The inspectors identified a finding of very low safety significance, and an associated NCV of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," for the failure to perform surveys of the UHS in accordance with the Quality Assurance Program. Specifically, the licensee failed to ensure that: (1) the requirements and acceptance limits in the Updated Final Safety Analysis Report (UFSAR) and other applicable design documents for the high points of the intake and discharge canals were incorporated into the UHS test; (2) the evaluation of the bathymetric survey results accounted for the instrument uncertainty of the test equipment; and (3) the UHS

bathymetric survey results were evaluated in accordance with the Quality Assurance Program to assure that the UFSAR required UHS volume was satisfied. The licensee entered this finding into their CAP and, after a review of past bathymetric surveys and other information, determined that: (1) the discharge canal high point had not degraded and was not expected to significantly degrade; and (2) the UHS remained operable because the available UHS water volume still remained above the UFSAR required volume.

The performance deficiency was determined to be more than minor because it was associated with the Mitigating Systems cornerstone attribute of procedure quality, and adversely affected the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The finding screened as very low safety significance (Green) because although it affected the design or qualification of the UHS, it did not result in the loss of operability or functionality of the UHS. The inspectors determined this finding had an associated cross-cutting aspect in the area of Human Performance, Design Margins, because the licensee did not pay special attention to maintaining the safety-related UHS. Specifically, special attention was not placed on guarding the design margin of the UHS, and a test program that did not meet all the quality assurance requirements was accepted to demonstrate the adequacy of the UHS.

Inspection Report# : [2015003](#) (*pdf*)

**Significance:**  Jun 30, 2015

Identified By: Self-Revealing

Item Type: FIN Finding

**Failure to Meet Technical Specification Surveillance Requirements Due to Foreign Material Left in the Unit 2 EDG Starting Circuit (1R13)**

A finding of very-low safety significance (Green) was self-revealed on April 21, 2015 while performing TS Surveillance DOS 6600-12, "Diesel Generator Tests: Endurance and Margin/Full Load Rejection/ECCS [Emergency Core Cooling System]/Hot Restart," in support of Surveillance Requirement 3.8.1.16 which requires the EDG to achieve rated frequency and voltage conditions within 13 seconds when started less than or equal to five minutes from a previously loaded run, the Unit 2 Emergency Diesel Generator (EDG) failed to complete a hot restart. Licensee troubleshooting identified a degraded pressure switch associated with main bearing lube oil pressure in the start circuit which was taking several minutes to return to a low-pressure condition upon shutting down the EDG. This resulted in a failure of the start circuit relay to be energized upon initiating a start of the EDG, until the pressure switch returned to its appropriate low-pressure state. An internal investigation of the pressure switch identified strips of Teflon tape in the bellows of the pressure switch, which resulted in the pressure switch's sluggish response to lowering lube oil pressure, and a failure to meet the TS hot restart criteria.

The inspectors determined that the failure to implement Procedure MA-AA-716-008, “Foreign Material Exclusion Program,” and therefore the inability to perform TS Surveillance Requirement 3.8.1.16 was a performance deficiency, and was considered more than minor because it was associated with the equipment performance attribute of the Mitigating Systems cornerstone, and impacted the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors utilized Attachment 0609.04, “Initial Characterization of Findings,” and determined that this issue was of very-low safety significance because each question provided in Inspection Manual Chapter (IMC) 0609, Appendix A, Exhibit 2, “Mitigating Systems Screening Questions,” was answered “No.” The inspectors concluded that this finding was cross-cutting in the Human Performance, Documentation area, because licensee procedure MA-AA-716-008, “Foreign Material Exclusion Program,” work instructions associated with Work Order 01410972-01, and previous calibrations of pressure switch 2-6641-526 did not include specific instructions and warnings regarding the proper use of Teflon tape with regards to preventing it from becoming foreign material. Other Dresden maintenance procedures, specifically MA-DR-0300-001, “Preventive Maintenance of Hydraulic Control Unit,” and DEP 0300-16, “Rebuilding the Unit 2 (3) ASCO Scram Solenoid Pilot Valves,” have specific warnings regarding the proper use and potential for Teflon tape to become foreign material. [H.7]  
 Inspection Report# : [2015002](#) (*pdf*)

**Significance:**  Jun 30, 2015

Identified By: Self-Revealing

Item Type: NCV Non-Cited Violation

**Inadvertent Manipulation of a Test Switch at ESF Bus 23-1 During Surveillance Testing Results in the Inoperability of the 2/3 EDG to Unit 2**

A finding of very low safety significance (Green), and an associated NCV of TS 5.4.1, “Procedures,” was self-revealed on May 19, 2015, when the 2/3 EDG was made inoperable to Unit 2 due to the incorrect manipulation of a test switch by operations personnel during a TS required surveillance test. Specifically, while the licensee performed procedure DIS 1500-05, “Division I and II Low-Pressure Coolant Injection ECCS Initiation Circuitry Logic System Functional Test,” Step 106 of Checklist B, operations personnel incorrectly opened test switch TS-159SD2/3 at motor control center 23-1 removing the under-voltage trip associated with the feed breaker for the Division I safety-related 4.16 kV engineered safeguards bus, causing the 2/3 EDG to be inoperable to Unit 2.

The licensee’s failure to properly implement steps in the procedure was a performance deficiency that was determined to be more than minor, and thus a finding, because it was associated with the Mitigating Systems Cornerstone Attribute of Configuration Control, and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The finding was determined to be of very- low safety significance (Green), because each of the questions provided in IMC 0609, Appendix A, Exhibit 2, “Mitigating Systems Screening Questions,” were answered “No.” The finding has a cross-cutting aspect in the area of Human Performance, Field Presence, for failing to ensure senior managers applied the appropriate oversight of infrequently performed and first time work activities. Specifically, the licensee field supervisor or another senior operations manager was not present for the switching activities, which led to the configuration control error. In this instance, the surveillance test is infrequently performed (every 24 months), and the activity, which included using a maintenance procedure vice an operating procedure, was a first time evolution for both equipment operators involved. [H.2]

Inspection Report# : [2015002](#) (*pdf*)

**Significance:**  Jun 30, 2015

Identified By: NRC

Item Type: VIO Violation

### **Failure to Ensure Continued Operability of Unit 2 Electromatic Relief Valve 2-0203-3C (2C) Following Implementation of Extended Power Uprate Plant Conditions**

A finding of low- to-moderate safety significance, and an associated Violation of Title 10 of the Code of Federal Regulations, Part 50, Appendix B, Criterion III, "Design Control";

TS 3.4.3, "Safety and Relief Valves"; and TS 3.5.1, "ECCS Operating", was self-revealed on February 7, 2015, following the discovery that one of the Unit 2 electromatic relief valves (ERVs) would not have performed its intended safety function. Vibration

induced wear experienced while operating at extended power uprate (EPU) power levels resulted in the degradation of multiple ERV actuator subcomponents, which rendered the valve inoperable. This finding does not represent an immediate safety concern in that the licensee has replaced all Unit 2 and 3 ERV actuators with a hardened design successfully utilized at the Quad Cities Nuclear Power Station, which has also experienced significant steam line vibrations post EPU.

The inspectors determined that the licensee's apparent failure to ensure measures be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of SSCs, in particular ERV 2-0203-3C (2C), was a performance deficiency warranting a significance evaluation. The finding was determined to be more than minor in accordance with

IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening," dated September 7, 2012, because it was associated with the Mitigating Systems Cornerstone attributes of design control and equipment performance, and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. A Significance and Enforcement Review Panel, using IMC 0609, Appendix A, "Significance Determination Process for Findings At-Power," dated June 19, 2012, determined the finding to be of low to moderate safety significance. The inspectors determined that this finding has a cross-cutting aspect of Resolution in the area of Problem Identification and Resolution, since it involves the failure to implement effective corrective actions to address issues in a timely manner commensurate with their safety significance. This cross-cutting issue is conditional depending on the outcome of the preliminary White finding. [P.3]

Inspection Report# : [2015002](#) (*pdf*)

Inspection Report# : [2015010](#) (*pdf*)

Inspection Report# : [2015011](#) (*pdf*)

**Significance:** G May 29, 2015

Identified By: NRC

Item Type: NCV Non-Cited Violation

### **Procedure Revisions Resulted in Isolation Condenser Unable to Meet Design Basis**

The inspectors identified a finding of very-low safety significance, and an associated Non-Cited Violation (NCV) of Title 10, Code of Federal Regulations (CFR), Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to ensure that applicable regulatory requirements and the isolation condenser's (IC's) design bases were correctly translated into procedures. Specifically, the licensee added steps to the IC control procedures which directed operators to secure the IC in order to prevent the water level in the shell from going below 3.5 feet. The added steps would result in the IC being shutdown when required to operate per the IC's design bases. The licensee entered the issue into their Corrective Action Program (CAP) as Action Request 02506445, "NRC MOD/5059 Inspection: ISCO [Isolation Condenser] Operating Procedures," dated May 28, 2015.

The performance deficiency was determined to be more than minor because the finding was associated with the Mitigating Systems cornerstone attribute of Procedure Quality, and affected the cornerstone's objective of ensuring the capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the inadequate procedures would drive the operators to stop the IC during a design bases event and prevent the IC from performing its design function of removing decay heat from the reactor. The finding has a cross-cutting aspect in the area of Human Performance; Teamwork, because the licensee did not communicate and coordinate activities within and across organizational boundaries to ensure nuclear safety is maintained. Specifically,

the Operations Department failed to communicate and coordinate with the Engineering Department when developing the procedural changes. [H.4]

Inspection Report# : [2015007](#) (pdf)

**Significance:** G May 29, 2015

Identified By: NRC

Item Type: NCV Non-Cited Violation

### **EDG Usable Fuel Calculations Failed to Consider Appropriate EDG Frequency Variations**

The inspectors identified a finding of very-low safety significance, and an associated NCV of 10 CFR Part 50, Appendix B, Criterion III, “Design Control,” for the failure to account for increased fuel oil consumption during the development of the Emergency Diesel Generator (EDG) Calculation 10553 CALC 07, “Dresden Station Emergency Diesel Generators Endurance Calculations,” Revision 2, which resulted in non-conservative Technical Specifications (TS). Specifically, the licensee failed to account for the increased fuel oil consumption at an EDG frequency of 61.2 Hertz (Hz), and ensure that the minimum fuel oil level in the EDG day tanks, as required per TS 3.8.1.4, was adequate to support the EDGs’ mission time at 110 percent for one hour. The licensee entered the issue into their CAP as Action Request 02506869, “NRC MOD/5059 Inspection: Emergency Diesel Generator Fuel Consumption,” dated May 28, 2015.

The performance deficiency was determined to be more than minor because the finding was associated with the Mitigating Systems cornerstone attribute of design control and affected the cornerstone’s objective of ensuring the capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the licensee failed to account for the increased fuel oil consumption resulting from operation at a higher EDG frequency. Therefore, the licensee did not ensure that the minimum fuel oil level in the day tanks, as required per TS 3.8.1.4, was adequate to support the EDGs’ mission time at 110 percent for one hour. This finding has a cross cutting aspect in the area of Problem Identification and Resolution; Identification, because the licensee did not did not thoroughly evaluate the EDG fuel oil consumption when considering EDG frequency variation. Specifically, the licensee failed to translate applicable design bases into specifications which resulted in non-conservative TS. [P.1]

Inspection Report# : [2015007](#) (pdf)

## **Barrier Integrity**

**Significance:** G Dec 31, 2015

Identified By: Self-Revealing

Item Type: NCV Non-Cited Violation

### **Failure to Maintain Design Control of Secondary Containment Interlock Doors**

A finding of very low safety significance (Green) and an associated NCV of 10 CFR Part 50, Appendix B, Criterion III, “Design Control,” was self-revealed on September 4, 2015, when the integrity of the Secondary Containment for Units 2 and 3 was not maintained for 39 minutes when interlock features designed to prevent both doors of a Secondary Containment interlock from being simultaneously open prevented the closure of Reactor Building to Turbine Building doors 47 and 48 following simultaneous operation during routine access of the interlock by plant personnel.

The performance deficiency was determined to be more than minor because it was associated with the Barrier Integrity cornerstone attribute of design control, and adversely affected the associated cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. The finding screened as very low safety significance (Green) because the inspectors answered yes to the

Barrier Integrity Screening Question C.1, Exhibit 3 of IMC 0609, Appendix A. This finding has a cross cutting aspect in the area of Human Performance, Conservative Bias, because the licensee did not use decision making-practices that emphasize prudent choices over those that are simply allowable. Specifically, the licensee failed to implement a modification which addressed a known design deficiency in the 570 foot elevation Secondary Containment interlock in 2013. The licensee reasoned that the interlock was a low traffic area and that it would be unlikely that the doors would be open simultaneously. [H.14]  
Inspection Report# : [2015004](#) (*pdf*)

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## Emergency Preparedness

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## Occupational Radiation Safety

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## Public Radiation Safety

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## Security

Although the Security Cornerstone is included in the Reactor Oversight Process assessment program, the Commission has decided that specific information related to findings and performance indicators pertaining to the Security Cornerstone will not be publicly available to ensure that security information is not provided to a possible adversary. Other than the fact that a finding or performance indicator is Green or Greater-Than-Green, security related information will not be displayed on the public web page. Therefore, the [cover letters](#) to security inspection reports may be viewed.

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## Miscellaneous

Last modified : July 11, 2016