

Davis-Besse

4Q/2015 Plant Inspection Findings

Initiating Events

Significance: G Sep 30, 2015

Identified By: Self-Revealing

Item Type: FIN Finding

FLOW ACCELERATED CORROSION MODEL NOT MAINTAINED IN ACCORDANCE WITH INDUSTRY STANDARDS AND GUIDANCE

A self-revealed finding of very low safety significance was identified for the licensee's failure to maintain an adequate flow accelerated corrosion (FAC) program in accordance with station procedures and applicable industry guidance. Specifically, an incorrect restriction orifice size entered into the FAC program software in the late 1980s significantly underestimated the wear rate of a section of moisture separator reheater (MSR) piping that ultimately failed causing control room operators to conduct a rapid power reduction and manual reactor trip and declare an unusual event in accordance with the station's emergency plan. The failed section of piping had not been previously inspected in accordance with industry guidance and station procedures, and the incorrect FAC program software inputs had never been validated. This finding was associated with the Initiating Events Cornerstone of reactor safety and was of more than minor significance because it directly impacted the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. The inspectors evaluated the finding using IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power." Using Exhibit 1, which contains the screening questions for the Initiating Events Cornerstone of Reactor Safety, the inspectors determined a detailed risk evaluation was required because the finding was a transient initiator that resulted in both 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 (i.e., the loss of the main condenser as a heat sink and the loss of main feedwater). The inspectors contacted the NRC Region III Senior Reactor Analyst (SRA) to perform a detailed risk evaluation. The assumed core damage sequence used by the SRA was that the MSR pipe break occurs, followed by either main steam isolation valve (MSIV) failing to close, followed by any of four in-series main turbine stop valves (SVs) and control valves (CVs) failing to close. Mathematically, the change in core damage frequency (?CDF) was estimated at:

$$?CDF = 1 \text{ (event occurs)} \times (9.51E-4 + 9.51E-4) \times 4 \times 1.5E-3 \times 1.5E-3 = 1.71E-8/\text{yr}$$

The SRA concluded the risk associated with this performance deficiency was, therefore, of very low safety significance (Green). Because the causes for the finding stemmed from deficiencies going back several years or more, the inspectors concluded that the finding represented a latent issue not necessarily indicative of present licensee performance. As a result, no cross cutting aspect was assigned to this finding.

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

Significance: G Jan 09, 2015

Identified By: NRC

Item Type: NCV Non-Cited Violation

Failure to Install and Control RCP Seal Cavity Vent Flexible Hoses Per Design Basis Analysis

The inspectors identified a finding of very-low safety significance (Green) and associated Non-Cited Violation (NCV) of 10 CFR Part 50, Appendix B, Criterion III, "Design Control" for the licensee's failure to install and control the Reactor Coolant Pump (RCP) seal cavity vent flexible hoses per the design basis analysis. Specifically, the licensee failed to correctly translate the design basis installation configuration and installation fatigue analysis in calculation

SP-274-I, "Pipe Stress Analysis: Reactor Coolant Pump 1-1-1 Seal Cavity Vent," into specifications, drawings, procedures, and instructions. The licensee entered this finding into their Corrective Action Program (CAP) to review the lack of controls over the installation of the flexible hoses, but determined that the flexible hoses remained operable.

The performance deficiency was determined to be more than minor because, if left uncorrected, it would have the potential to lead to a more significant safety concern. Specifically, the failure to install and control the flexible hoses in accordance with the design basis analysis could lead to failure of the hoses due to operation beyond their analyzed limits. The finding screened as of very-low safety significance (Green) because the finding could not result in exceeding the Reactor Coolant System (RCS) leak rate for a small Loss of Coolant Accident (LOCA) after a reasonable assessment of degradation, and it could not have likely affected other systems used to mitigate a LOCA resulting in a total loss of their function after a reasonable assessment of degradation. The inspectors determined this finding had an associated cross-cutting aspect, Design Margins, in the Human Performance cross-cutting area. Specifically, the licensee did not carefully guard and change the RCP seal cavity vent lines, which form part of the RCS fission product barrier, through a systematic and rigorous process. [H.6] (Section 1R17.2.b.(1))

Inspection Report# : [2014007](#) (*pdf*)

Mitigating Systems

Significance:  Dec 31, 2015

Identified By: NRC

Item Type: NCV Non-Cited Violation

FAILURE TO USE WORST CASE 4160 VAC BUS VOLTAGE IN DESIGN CALCULATIONS

The inspectors identified a finding of very low safety significance (Green), and an associated NCV of Title 10, Code of Federal Regulations (CFR), Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to have adequate analysis related to the degraded voltage relay (DVR) setpoints as specified in Technical Specifications. Specifically, the licensee's analysis failed to demonstrate that the DVR setpoints would provide adequate starting and running voltage to safety related equipment during the most limiting case accident loading. This issue was entered into the licensee's corrective action program (CAP). Corrective actions planned and completed by the licensee included analysis to determine the appropriate DVR setpoints and interim compensatory measures to maintain minimum voltage on 4160 volts alternating current (Vac) essential buses above 4070 Vac to ensure adequate voltage for safety related components. This finding was of more than minor safety significance because it affected the Design Control attribute of the Mitigating Systems Cornerstone of reactor safety, and adversely impacted the cornerstone objective of ensuring the availability, reliability, and capability of the site's 4160 Vac safety related electrical buses. Specifically, the licensee failed to perform and maintain an analysis demonstrating that all safety related loads had adequate starting voltage at the DVR setpoint. The finding was determined to be of very low safety significance since the finding did not result in a loss of operability of any system or component. The inspectors determined that there was no cross cutting aspect associated with this finding because the finding represented a legacy issue that was not representative of current licensee performance. (Section 40A5.1)

L

Inspection Report# : [2015004](#) (*pdf*)

Significance:  Feb 27, 2015

Identified By: NRC

Item Type: NCV Non-Cited Violation

Vulnerability of EDG Crosstie to a Non-Essential Bus (1R21.3.b.(1))

The inspectors identified a finding of very-low safety significance (Green), and an associated NCV of Title 10, Code of Federal Regulations (CFR) Part 50, Appendix B, Criterion III, "Design Control," for the failure to assure that applicable regulatory requirements, and the design basis were correctly translated into specifications, drawings, procedures, and instructions, and verifying the adequacy of design. Specifically, the licensee failed to verify the adequacy of procedures controlling alignment of non essential busses to the emergency diesel generators during a design basis event. The procedure's guidance could put the plant in an unanalyzed alignment with the potential to result in the failure of safety-related equipment. The licensee entered this finding into their Corrective Action Program (CAP), and initiated a Standing Order to preclude the unanalyzed alignment.

The finding 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 objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The finding screened as very low-safety significance (Green) because the inspectors were able to answer "Yes" to screening question A1 because the finding represents a design deficiency confirmed not to result in loss of operability. The inspectors did not identify a cross-cutting aspect associated with this finding as it did not reflect current performance. Inspection Report# : [2015008](#) (*pdf*)

Significance:  Feb 27, 2015

Identified By: NRC

Item Type: NCV Non-Cited Violation

Failure to Comply with IEEE 308-1971 for the Required Independence of Safety-Related Essential Inverter Distribution Systems (1R21.3.b.(2))

The inspectors identified a finding of very-low safety significance (Green), and an associated NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the failure to demonstrate compliance with Institute of Electrical and Electronics Engineers (IEEE) 308 1971, "IEEE Standard Criteria for Class 1E Electric Systems for Nuclear Power Generating Stations," for the required independence of essential safety related inverter distribution system channels. Specifically, a common mode failure due to inadequate fault protection on several outside distribution panels could cause the loss of redundant safety-related inverters. The licensee entered this finding into their CAP, and initiated a Standing Order that would identify the affected circuit breakers and require they be opened based on a tornado warning that could potentially affect the site.

The finding was determined to be more than minor because it was associated with the Mitigating System cornerstone attribute of Protection Against External Factors, and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The finding screened as of very-low safety significance (Green) based on a SDP Phase II analysis that determined a conservative delta core damage frequency (?CDF) of $1.29E^{-7}/yr$. The inspectors did not identify a cross-cutting aspect associated with this finding because the finding was not representative of current performance.

Inspection Report# : [2015008](#) (*pdf*)

Significance:  Feb 27, 2015

Identified By: NRC

Item Type: NCV Non-Cited Violation

Failure to Incorporate the Design Analysis Required Acceptance Limit into Surveillance Procedure (1R21.3.b.(3))

The inspectors identified a finding of very-low safety significance (Green), and an associated NCV of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," for the licensee failing to incorporate the design requirements and acceptance limits into test procedures. Specifically, the design limit for the minimum voltage on essential safety related inverter YV1 bus during Modes 5 and 6 was not correctly incorporated into surveillance test procedures. The licensee entered this finding into their CAP and re analyzed for the 116 volts as-found value at panel Y1, and determined the loads that did not have adequate rated voltage at the surveillance procedure minimum acceptance

criteria voltage, 114 volts, would have had sufficient voltage to operate at the as-found measured voltage to perform their intended safety function.

The finding was determined to be more than minor because it was associated with the Mitigating System cornerstone attribute of Procedure Quality and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The finding screened as of very-low safety significance (Green) because the deficiency was confirmed not to result in a loss of safety function. The inspectors did not identify a cross-cutting aspect associated with this finding because the finding was not representative of current performance.

Inspection Report# : [2015008](#) (pdf)

Significance:  Feb 27, 2015

Identified By: NRC

Item Type: NCV Non-Cited Violation

Failure to Verify Several CCW System Manual Valves Were in the Correct Position (1R21.3.b.(4))

The inspectors identified a finding of very-low safety significance (Green), and an associated NCV of Technical Specification (TS) Surveillance Requirement 3.7.7.1, for the licensee's failure to verify several component cooling water (CCW) system manual valves in the flow path servicing safety-related equipment that were not locked, sealed, or otherwise secured, were in the correct position every 31 days. Specifically, the unsecured CCW pump seal water flush isolation valves (two valves per pump) for the two required operable CCW pumps were not verified open every 31 days. The licensee entered this finding into their CAP, verified the correct position of the valves, and planned to revise the Locked Valve Program to include the requirement to have the valves in the locked open position.

The finding was determined to be more than minor because it was similar to IMC 0612, Appendix E, Example 3.c, because more than one valve was in the required position, but not locked, sealed, or otherwise secured in the correct position, and because it was associated with the Mitigating Systems cornerstone's attribute of Configuration Control, and affected the cornerstone's objective of ensuring the availability, reliability, and capability of systems to respond to initiating events to prevent undesirable consequences. The finding screened as of very-low safety significance (Green) because the deficiency was confirmed not to result in a loss of safety function. The inspectors did not identify a cross-cutting aspect associated with this finding because the finding was not representative of current performance.

Inspection Report# : [2015008](#) (pdf)

Significance:  Feb 27, 2015

Identified By: NRC

Item Type: NCV Non-Cited Violation

Failure to Comply with Technical Specifications for the Borated Water Storage Tank (1R21.4.b.(1))

The inspectors identified a finding of very-low safety significance (Green), and an associated NCV of TS 3.5.4, "Borated Water Storage Tank (BWST)," for the failure to comply with the limiting condition for operation (LCO) while the BWST was aligned to the non-seismic spent fuel pool purification system, causing the BWST to be inoperable based on no longer meeting the tank's seismic requirement. The licensee entered this finding into their CAP, and initiated an LCO Tracking Log entry to not place the BWST on spent fuel pool purification in Modes 1 through 4.

The finding was determined to be more than minor because it was associated with the Mitigating Systems attribute of Protection Against External Factors, and affected the cornerstone's objective of ensuring the availability, reliability, and capability of systems to respond to initiating events to prevent undesirable consequences. The finding resulted in the loss of system safety function (i.e., the BWST). The finding screened as of very-low safety significance (Green) based on a SDP Phase II analysis that determined the ?CDF for the finding was 1.17E-7/yr. This finding has a cross-cutting aspect in the area of Problem Identification and Resolution because recent operating experience was not adequately evaluated to prevent the identified finding. [P.5, Operating Experience]

Inspection Report# : [2015008](#) (pdf)

Barrier Integrity

Significance:  Jun 30, 2015

Identified By: NRC

Item Type: NCV Non-Cited Violation

Departure from Method of Evaluation Required Prior NRC Approval Under 10 CFR 50.59 (c)(2) with respect to licensee acceptance of the shield building laminar cracking.

Severity Level IV - Green. The inspectors identified a Severity Level IV NCV of Title 10, Code of Federal Regulations (CFR) Part 50.59(c)(2), and an associated finding of very low safety significance for the licensee's failure to request and obtain a license amendment pursuant to 10 CFR 50.90. Specifically, the licensee's method of evaluation that accepted shield building laminar cracking represented a departure from the method of evaluation described in the Final Safety Analysis Report (as updated), and required prior NRC approval with respect to the design and licensing basis. The licensee entered this finding into its Corrective Action Program; the licensee's immediate corrective action determined that shield building remained operable and capable to perform its design safety functions; the licensee's planned corrective actions included revising 10 CFR 50.59 Evaluation 13-00918, and preparation of additional documents for inclusion in a license amendment request.

The finding was determined to be more than minor because the finding was associated with the Barrier Integrity cornerstone attribute of Design Control, and affected the cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. The inspectors evaluated the finding using IMC 0609, Appendix A, "The SDP for Findings At Power." Using Exhibit 3, the inspectors determined that the finding screened as very low safety significance because all the Reactor Containment screening questions for the Barrier Integrity Cornerstone were answered "No." Specifically, the inspectors concluded that the shield building remained capable of performing its design safety functions despite the identified laminar cracking. The associated violation was categorized as Severity Level IV because the issue was determined to be of very low safety significance under the SDP. This finding had a cross-cutting aspect in the area of Human Performance, Conservative Bias, because the licensee did not take a conservative approach to decision making for evaluation of shield building laminar cracking, particularly when information is incomplete or conditions are unusual. [H.14, Conservative Bias] (Section 40A2.2)

Inspection Report# : [2014008](#) (*pdf*)

Emergency Preparedness

Occupational Radiation Safety

Public Radiation Safety

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.

Miscellaneous

Last modified : March 01, 2016