



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION III
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August 17, 2018

Mr. Keith Polson, Senior VP
and Chief Nuclear Officer
DTE Energy Company
Fermi 2 – 260 TAC
6400 North Dixie Highway
Newport, MI 48166

SUBJECT: ERRATA—FERMI POWER PLANT, UNIT 2—NRC INTEGRATED INSPECTION
REPORT 05000341/2018002

Dear Mr. Polson:

The U.S. Nuclear Regulatory Commission (NRC) identified an administrative error in the NRC Integrated Inspection Report 05000341/2018002 (ADAMS Accession Number ML18227A091), dated August 14, 2018. Specifically, the Sections entitled “71111.15—Operability Determination and Functionality Assessments” was edited to to provide a more accurate summary of the inspection results. As a result, the NRC has reissued the report in its entirety with this Section corrected.

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, Requests for Withholding.”

Sincerely,

/RA/

Billy Dickson, Chief
Branch 5
Division of Reactor Projects

Docket Nos. 50–341
License Nos. NPF–43

Enclosure:
Inspection Report 05000341/2018002

cc: Distribution via LISTSERV®

Letter to Keith Polson from Billy Dickson dated August 17, 2018

SUBJECT: ERRATA— FERMI POWER PLANT, UNIT 2—NRC INTEGRATED INSPECTION
REPORT 05000341/2018002

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REGION III

Docket Numbers: 50–341

License Numbers: NPF–43

Report Numbers: 05000341/2018002

Enterprise Identifier: I–2018–002–0020

Licensee: DTE Energy Company

Facility: Fermi Power Plant, Unit 2

Location: Newport, MI

Dates: April 1 through June 30, 2018

Inspectors: T. Briley, Senior Resident Inspector
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Approved by: B. Dickson, Chief
Branch 5
Division of Reactor Projects

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring licensee's performance by conducting an integrated quarterly inspection at Fermi Power Plant, Unit 2 in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information. Findings and violations being considered in the NRC's assessment are summarized in the table below. Licensee-identified non-cited violations are documented in report sections: 71111.12 and 71153.

List of Findings and Violations

Failure to Document a Condition Assessment Resolution Document for Reactor Recirculation Motor-Generator Set 'A' Brush Gear Sparking			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green FIN 05000341 /2018002-01 Closed	[H.14] – Human Performance – Conservative Bias	71111.11 – Licensed Operator Performance
A self-revealed Green finding was identified for failure to document a Condition Assessment Resolution Document (CARD) for 5-inch rooster tail sparking on reactor recirculation motor-generator set 'A' brush gear, which ultimately resulted in a manual recirculation pump 'A' trip and plant transient.			

Inadequate Preventative Maintenance in Residual Heat Removal Service Water System Outlet Flow Control Valves Results in Lower Bonnet (Backseat) Bushing Failure			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000341/2018002-02 Closed	[P.2] – Problem Identification and Resolution – Evaluation	71111.12 – Maintenance Effectiveness
A self-revealed Green finding and associated non-cited violation (NCV) of 10 <i>Code of Federal Regulations</i> (CFR) Part 50, Appendix Criterion V, "Instructions, Procedures, and Drawings" were identified for failure to ensure activities affecting quality were prescribed in a manner consistent with the circumstances to the residual heat removal service water system (RHRSW). Specifically, preventative maintenance procedure M-681 failed to establish an appropriate interval and guidance for periodic valve internals inspections on the Division 2 RHRSW system outlet flow control valve to prevent significant degradation from galvanic corrosion given known internal and external operating experience.			

Failure to Adequately Evaluate the Operability of Emergency Diesel Generator 11			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000341/2018002-03 Closed	[P.2] – [Evaluation]	71111.15
A finding of very low safety significance and an associated non-cited violation was self-revealed for the licensee's failure to adequately evaluate the operability of a condition adverse to quality identified on Emergency Diesel Generator (EDG) 11. Specifically, a lube oil leak was evaluated as having no impact to the operation of the emergency diesel generator. However, during the next surveillance run of EDG 11, the engine had to be shut down and declared inoperable due to the lube oil leak degrading during operation.			

Failure to Identify a Condition Adverse to Quality on Division 2 Residual Heat Removal Service Water Outlet Flow Control Valve			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	TBD Apparent Violation 05000341/2018002-04 Open	[H.11] – Human Performance – Challenge the Unknown	71153 – Followup of Events and Notices of Enforcement Discretion
A self-revealed TBD finding and an associated apparent violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," and Technical Specification 3.7.1 "Residual Heat Removal Service Water (RHRSW) System", were identified for failure to identify a condition adverse to quality while performing corrective maintenance on Division 2 RHRSW outlet flow control valve E1150F068B prior to returning the Division 2 RHRSW system to service. Specifically, troubleshooting and associated post maintenance testing failed to identify and correct a failed anti-rotation key which resulted in an inoperable Division 2 RHRSW system for longer than its Technical Specification 3.7.1 allowed outage time.			

Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
URI	05000341/2017004-01	Reactor Recirculation Motor-Generator Set 'A' Brush Gear Failure	71111.11	Closed
URI	05000341/2017004-02	Division 2 Residual Heat Removal Service Water System Outlet Flow Control Valve Lower Bonnet (Backseat) Bushing Failure	71111.12	Closed
LER	05000341/2017-003-00	Division 2 Residual Heat Removal Service Water System Inoperable due to Inoperable RHRSW Outlet Flow Control Valve	71153	Closed

Type	Issue Number	Title	Report Section	Status
LER	05000341/2018-001-00	Secondary Containment Pressure Exceeded Technical Specification Due to Reactor Building HVAC	71153	Closed

TABLE OF CONTENTS

PLANT STATUS	6
INSPECTION SCOPES	6
REACTOR SAFETY	6
RADIATION SAFETY	9
OTHER ACTIVITIES – BASELINE	10
INSPECTION RESULTS	11
EXIT MEETINGS AND DEBRIEFS	22
DOCUMENTS REVIEWED	23

PLANT STATUS

Unit 2 began the inspection period at approximately 100 percent rated thermal power. On April 14, 2018, the unit automatically scrambled due to the loss of station service transformer 64 and the associated plant transient described in NRC Event Notification No. 53336. The unit was restarted on May 5, 2018 and synchronized to the grid on May 6, 2018. On May 8, 2018, the unit reached 91.5 percent rated thermal power when vibrations on the north reactor feedwater pump (NRFP) limited power ascension. The unit remained between approximately 87 percent and 92 percent rated thermal power for troubleshooting of the vibration issues on the NRFP until May 16, 2018, when power was reduced to approximately 55 percent rated thermal power to remove the NRFP from service for maintenance. The unit remained at approximately 55 percent rated power until May 24, 2018, when the NRFP was restored to service. The unit returned to approximately 100 percent rated thermal power on May 25, 2018. On June 23, 2018, the unit was reduced to approximately 60 percent rated thermal power for planned main steam line isolation channel functional testing and a rod pattern adjustment. The unit returned to approximately 100 percent rated thermal power on June 24, 2018, for the remainder of the inspection period.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors performed plant status activities described in IMC 2515 Appendix D, "Plant Status" and conducted routine reviews using IP 71152, "Problem Identification and Resolution." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

REACTOR SAFETY

71111.01—Adverse Weather Protection

Impending Severe Weather (1 Sample)

The inspectors evaluated readiness for impending adverse weather conditions for severe thunderstorms forecasted from May 2, 2018 through May 3, 2018.

Seasonal Extreme Weather (1 Sample)

The inspectors evaluated readiness for seasonal extreme weather conditions prior to the onset of hot weather forecasted May 26, 2018 through June 2, 2018.

71111.04—Equipment Alignment

Partial Walkdown (3 Samples)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

- (1) Division 1 emergency equipment cooling water system (EECW) during planned Division 2 maintenance during the week ending May 26, 2018;
- (2) Division 1 core spray system during Division 2 maintenance during the week ending June 23, 2018; and
- (3) Reactor core isolation cooling system (single train risk significant system) during the week ending June 30, 2018.

71111.05AQ—Fire Protection Annual/Quarterly

Quarterly Inspection (6 Samples)

The inspectors evaluated fire protection program implementation in the following selected areas:

- (1) Reactor Building Second Floor — Division 1 EECW area during the week ending May 26, 2018;
- (2) Auxiliary Building Fourth Floor — control room during the week ending June 9, 2018;
- (3) Auxiliary Building Fourth Floor — computer room and area above control room during the week ending June 9, 2018;
- (4) Turbine Building Second Floor — main turbine lube oil reservoir on June 9, 2018;
- (5) Reactor Building Sub-Basement & Basement — Division 2 core spray pump room during the week ending June 9, 2018; and
- (6) Auxiliary Building Sub Basement — high pressure coolant injection pump room during the week ending June 9, 2018.

71111.07—Heat Sink Performance

Heat Sink (1 Sample)

The inspectors evaluated Division 2 EECW backup heat exchanger performance during the week ending June 30, 2018.

71111.11—Licensed Operator Requalification Program and Licensed Operator Performance

Operator Requalification (1 Sample)

The inspectors observed and assessed an operations crew evaluated scenario in the plant training simulator on May 29, 2018.

Operator Performance (1 Sample)

The inspectors observed and evaluated operations crew response to an automatic reactor scram on April 14, 2018; reactor start up activities May 4–6, 2018; and north reactor feedwater pump restoration following corrective maintenance on May 25, 2018.

The inspectors also reviewed the status of URI 05000341/2017004–01, Reactor Recirculation Motor-Generator Set ‘A’ Brush Gear Failure. This did not constitute an inspection sample.

71111.12—Maintenance Effectiveness

Routine Maintenance Effectiveness (3 Samples)

The inspectors evaluated the effectiveness of routine maintenance activities associated with the following equipment and/or safety significant functions:

- (1) Reactor feedwater pumps;
- (2) Control center heating, ventilation, and air conditioning (CCHVAC); and
- (3) Division 1 EECW system.

The inspectors also reviewed the status of URI 05000341/2017004–02, Division 2 Residual Heat Removal Service Water System Outlet Flow Control Valve Lower Bonnet (Backseat) Bushing Failure. This did not constitute an inspection sample.

Quality Control (1 Sample)

The inspectors evaluated maintenance and quality control activities associated with the following equipment performance issues:

- (1) Division 1 CCHVAC motor vibrations in February and March 2018.

71111.13—Maintenance Risk Assessments and Emergent Work Control (2 Samples)

The inspectors evaluated the risk assessments for the following planned and emergent work activities:

- (1) Emergent work on reactor recirculation pump ‘A’ discharge valve B3015F031B stem during the weeks ending April 28, 2018 and May 5, 2018; and
- (2) Maintenance during the week ending May 26, 2018, including emergent work on the north reactor feedwater pump and planned work on the Division 1 EECW room cooler.

71111.15—Operability Determinations and Functionality Assessments (2 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

- (1) Operability and functionality of reactor recirculation pump ‘A’ discharge valve B3015F031B following identification of valve stem indications documented in CARD 18–23497, during the week ending May 3, 2018; and
- (2) Operability and functionality of emergency diesel generator 11 following identification of a lube oil leak as documented in CARD 18–24354, during the week ending June 9, 2018.

71111.19—Post Maintenance Testing (3 Samples)

The inspectors evaluated the following post maintenance tests:

- (1) Reactor recirculation pump 'A' discharge valve following stem repairs during the week ending May 5, 2018;
- (2) Identification and removal of a fuel bundle with a small fuel element defect during the week ending April 28, 2018; and
- (3) North reactor feedwater pump following disassembly and repairs of elevated vibrations during the week ending May 26, 2018.

71111.20—Refueling and Other Outage Activities (1 Sample)

The inspectors evaluated forced outage activities due to the loss of station service transformer 64 from April 14, 2018 to May 6, 2018.

71111.22—Surveillance Testing

The inspectors evaluated the following surveillance tests:

Routine (1 Sample)

- (1) Reactor protection system manual scram weekly during the week ending May 19, 2018.

In-service (1 Sample)

- (1) High pressure coolant injection pump and valve operability test at 1025 psi during the week ending June 9, 2018.

71114.06—Drill Evaluation

Emergency Planning Drill (1 Sample)

The inspectors evaluated a graded emergency planning drill on May 15, 2018.

RADIATION SAFETY

71124.02—Occupational As Low As Reasonably Achievable Planning and Controls

Radiological Work Planning (1 Sample)

The inspectors evaluated the licensee's radiological work planning by reviewing the following activities:

- (1) RWP 17-4004, Reactor Reassembly and Support Activities;
- (2) RWP 17-4002, Reactor Core Alteration, Bridge Maintenance, LPRM [Local Power Range Monitor] Replacement and Support Activities;
- (3) RWP 17-4003, RB - 5 ISI/IVVI [Inservice inspection/In-Vessel Visual Inspection] and Support Activities;
- (4) RWP 17-3017, SRVs [Safety/Relief Valves] — Maintenance and Inspection, Including Replacement and Support Tasks — Drywell and RB Bullpen; and

- (5) RWP 17–3015, CRDM [Control Rod Drive Mechanism] Exchange/Support Tasks – Drywell and RB Bullpen.

Verification of Dose Estimates and Exposure Tracking Systems (1 Sample)

The inspectors evaluated dose estimates and exposure tracking.

OTHER ACTIVITIES – BASELINE

71151—Performance Indicator Verification (3 Samples)

The inspectors verified licensee performance indicators submittals listed below:

- (1) MS06: Emergency alternate current power system – 1 Sample (April 1, 2017 – March 30, 2018);
- (2) MS07: High pressure injection system – 1 Sample (April 1, 2017 – March 30, 2018); and
- (3) BI02: Reactor coolant system leak rate sample – 1 Sample (April 1, 2017 – March 30, 2018).

71152—Problem Identification and Resolution

Annual Follow-Up of Selected Issues (2 Samples)

The inspectors reviewed the licensee’s implementation of its corrective action program related to the following issues:

- (1) Root cause evaluation and associated corrective actions associated with reactor recirculation motor-generator set ‘A’ brush gear failure as documented in CARD 17–29439; and
- (2) Root cause evaluation and associated corrective actions associated with Division 2 RHRSW outlet flow control valve lower bonnet (backseat) bushing failure as documented in CARD 17–28611.

71153—Follow-Up of Events and Notices of Enforcement Discretion

Events (1 Sample)

The inspectors evaluated Event Notification No. 53336, Reactor Scram due to Loss of Station Service Transformer 64, and licensee’s response on April 14, 2018.

Licensee Event Reports (2 Samples)

The inspectors evaluated the following licensee event reports which can be accessed at <https://lersearch.inl.gov/LERSearchCriteria.aspx>:

- (1) Licensee Event Report (LER) 05000341/2017–003–00, Division 2 RHRSW Inoperable due to Inoperable RHRSW Outlet Flow Control Valve; and
- (2) Licensee Event Report (LER) 05000341/2018–001–00, Secondary Containment Pressure Exceeded Technical Specification Due to Rector Building HVAC System Manipulation.

INSPECTION RESULTS

71111.11—Licensed Operator Requalification Program and Licensed Operator Performance

Failure to Document a Condition Assessment Resolution Document for Reactor Recirculation Motor-Generator Set 'A' Brush Gear Sparking			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green FIN 05000341/2018002-01 Closed	[H.14] – Human Performance – Conservative Bias	71111.11 – Licensed Operator Performance
A self-revealed Green finding was identified for failure to document a Condition Assessment Resolution Document (CARD) for 5-inch rooster tail sparking on reactor recirculation motor-generator set 'A' brush gear, which ultimately resulted in a manual recirculation pump 'A' trip and plant transient.			
<p><u>Description:</u></p> <p>On November 25, 2017, while performing a routine reactor building rounds tour, a non-licensed operator identified 5-inch rooster tail sparks on the generator end of reactor recirculation motor-generator set 'A' brush gear. The non-licensed operator immediately contacted the control room to report the observed conditions and marked the routine brush gear inspection unsatisfactory for the shiftly reactor building rounds tour. The licensed reactor operators in the control room discussed the information and determined the sparking to not be of significance given previous experience and not having a clear understanding of what is or is not acceptable sparking for brush gear assemblies. As a result, no condition assessment resolution document was generated.</p> <p>As discussed in Section 1R11.1 of Inspection Report 05000341/2017004 (ADAMS Accession Number ML18036A012), at approximately 2:38 p.m., on November 26, 2017, while the plant was operating at 100 percent reactor thermal power, the control room unexpectedly received a recirculation system 'A' generator field ground alarm with no other abnormal indications noted in the control room. A non-licensed operator was dispatched to the reactor recirculation motor-generator room in the reactor building and immediately noted an acrid odor along with significant arcing and sparking on the generator end of reactor recirculation motor-generator set 'A'. Subsequently, at 2:56 p.m., control room operators manually tripped reactor recirculation motor-generator set 'A' and entered abnormal operating procedure 20.138.01, Reactor Recirculation Pump Trip. In accordance with the abnormal operating procedure, the control room operators promptly inserted control rods and stabilized the plant at approximately 35 percent reactor thermal power in single loop operation. The abnormal operating procedure was exited at 4:37 p.m. following completion of associated operator actions and plant stabilization.</p> <p>Procedure MOP01, Conduct of Operations, Revision 27, step 3.29.10 instructs rounds operators to "report all concerns to the control room. Generate CARDS as necessary to correct identified deficiencies." The rounds were marked as unsatisfactory for the brush gear inspection on November 25, 2017 and reported to the control room. A CARD was not generated to evaluate the condition. Procedure MQA11, Condition Assessment Resolution Document, step 5.1.1 for initiating a CARD states "when a condition (see definition in step 4.4.7) is identified, complete the initiator section of the E-CARD [computer software program</p>			

for writing CARDS].” A condition is defined as “a potential or real situation that may require further review, evaluation, or action for resolution. The situation may be adverse to quality, may not meet Fermi expectations, or may provide opportunities for improvement.” The five-inch rooster tail sparks and unsatisfactory rounds reading fall under the framework of that definition.

Corrective Actions: The reactor recirculation motor-generator set ‘A’ brush gear was repaired, conduct of operations and operator rounds procedures were revised to clearly establish acceptance criteria for arcing and/or sparking and expectations for generating CARDS, and training was provided to operations personnel on expectations for CARD generation.

Corrective Action Reference: CARD 17–29439

Performance Assessment:

Performance Deficiency: The inspector determined that the licensee’s failure to document a CARD for 5-inch rooster tail sparking on reactor recirculation motor-generator Set ‘A’ brush gear was a performance deficiency. This ultimately resulted in a manual recirculation pump ‘A’ trip and plant transient.

Screening: The inspectors determined the performance deficiency was more than minor because it adversely affected the Equipment Performance attribute of the Initiating Events cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, by not documenting an adverse sparking condition in a CARD, appropriate action to resolve the issue was not taken and resulted in a manual recirculation pump ‘A’ trip and plant transient.

Significance: The inspectors assessed the significance of the finding using IMC 0609, Appendix A, “The Significance Determination Process (SDP) For Findings At-Power.” The inspectors answered “no” to the transient initiator screening question in Exhibit 1 since the finding did not cause a reactor trip and a loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. Therefore, this finding screened as of very low safety significance (Green).

Cross-Cutting Aspect: The finding had a cross-cutting aspect in the Conservative Bias component of the Human Performance cross-cutting area, which states that the licensee will use decision making-practices that emphasize prudent choices over those that are simply allowable. A proposed action is determined to be safe in order to proceed, rather than unsafe in order to stop. Specifically, control room operators independently rationalized away the identified motor-generator set sparking as a non-issue prior to informing the shift manager or maintenance personnel and no action was taken to address the issue. [H.14]

Enforcement: The inspectors did not identify a violation of regulatory requirements associated with this finding since the reactor recirculation motor-generator is not a safety related system. Therefore, 10 CFR 50, Appendix B does not apply to this system.

The disposition of this finding along with the observation in Section 71152 below closes URI 05000341/2017004–01.

71111.12—Maintenance Effectiveness

Inadequate Preventative Maintenance in Residual Heat Removal Service Water System Outlet Flow Control Valves Results in Lower Bonnet (Backseat) Bushing Failure			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000341/2018002–02 Closed	[P.2] – Problem Identification and Resolution – Evaluation	71111.12 – Maintenance Effectiveness
<p>A self-revealed Green finding and associated NCV of 10 CFR Part 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings” were identified for the licensee’s failure to ensure activities affecting quality were prescribed in a manner consistent with the circumstances to the RHRSW. Specifically, preventative maintenance procedure M–681 failed to establish an appropriate interval and guidance for periodic valve internals inspections on the Division 2 RHRSW system outlet flow control valve to prevent significant degradation from galvanic corrosion given known internal and external operating experience.</p>			
<p><u>Description:</u></p> <p>As discussed in Section 1R12.1 of Inspection Report 05000341/2017004 (ADAMS Accession Number ML18036A012), the Division 2 RHRSW system was started on October 23, 2017 to support routine addition of biocide to the Division 2 RHR reservoir (ultimate heat sink) as a preventative measure to minimize raw water system fouling, which typically entailed running both Division 2 RHRSW pumps for approximately 12 hours. Approximately 20 minutes after system startup, the control room received an overhead annunciator alarm for “reactor building south west quad leakage to floor drain sump high” along with indication that the reactor building south west quad sump pumps were running. A non-licensed operator was dispatched to the field to investigate the alarms and identified that the Division 2 RHRSW outlet flow control valve (E1150F068B), located in the Division 2 RHR heat exchanger room in the reactor building, had a significant packing leak calculated to be approximately 16 gallons per minute. The leakage did not impact any other plant equipment in the local area and was captured by the Division 2 RHR heat exchanger room floor drains, which discharged into the reactor building south west quad room sump. Control room operators subsequently shutdown the Division 2 RHRSW pumps to stop the packing leak and declared the Division 2 RHRSW system inoperable.</p> <p>The licensee formed an emergent issues team to further investigate the issue. Following valve disassembly and inspection, the licensee identified the valve lower bonnet (backseat) bushing no longer had sufficient thread engagement to remain in place and that the valve packing had been ejected from the valve stuffing box. A temporary modification was implemented to install a new backseat bushing welded directly to the valve bonnet. The system was subsequently returned to service on October 27, 2017.</p> <p>The licensee completed a root cause analysis in CARD 17–28611. The direct cause of the Division 2 RHRSW outlet flow control valve packing leak was determined to be the valve bonnet carbon steel threads corroded to the point of no longer functioning as an adequate mechanical connection. This resulted in the backseat bushing detaching from the valve bonnet allowing the packing to be ejected. The root cause was determined to be previous operating experience resolution for galvanic corrosion for valves in the safety-related service water systems was less than adequate. This resulted in a failure to recognize the</p>			

vulnerability of galvanic corrosion on passive valve components and a missed opportunity to prevent future corrosion degradation on these valves. Contributing causes identified by the licensee consisted of (1) RHRSW system operation produces significant valve vibration and periodic wetting and then drying conditions promoting a corrosive environment and (2) high levels of ionic impurities, as measured by chloride concentration, in RHRSW accelerate galvanic corrosion.

In 2010, the Division 2 RHRSW outlet flow control valve did not indicate fully open after routine startup of the system for biocide treatment despite normal flow rates. The Division 2 RHRSW flow control valve was identified to have internal mechanical degradation including a partially unthreaded backseat bushing which was attributed to routine startup vibration and cavitation (CARDS 10-23821 and 10-29933). As a corrective action, in March 2011 the licensee developed preventative maintenance procedure M-680 and M-681 were developed by March 17, 2011 to inspect and repair the internals of both Division 1 and Division 2 RHRSW outlet flow control valves on a ten year periodicity, respectively.

In 2012, a component design basis inspection self-assessment recommended a review of material composition of components exposed to safety related service water based on internal and external operating experience regarding William Powell check valve and gate valve failures. The licensee developed recommendations and analysis under CARD 12-24869 on the internal material composition for all valves exposed to the corrosive/electrolytic water from the ultimate heat sink within the safety related service water systems to determine the susceptibility to galvanic corrosion. All globe valves, including the RHRSW outlet flow control valves, were excluded based on valve design due to low likelihood of failure. Residual Heat Removal Service Water (RHRSW) was reviewed again in 2015 under CARD 15-28194 due to various issues with safety related service water equipment. Globe valves were, again, excluded from this review.

On September 28, 2017, the licensee performed internal repairs on a partial stem-to-disc separation on the Division 2 RHRSW outlet flow control valve detected during performance monitoring following the anti-rotation key failure discussed in Section 71152 of this report. The licensee noted and repaired a broken backseat bushing tack weld was noted during the maintenance activity and subsequently repaired. The cause of the broken tack welds was not thoroughly evaluated until the backseat bushing failed on October 23, 2017.

The inspectors concluded that the preventative maintenance procedures established in 2011 failed to establish an appropriate internal and guidance for periodic valve internals inspections on the RHRSW system outlet flow control valves to prevent significant degradation from galvanic corrosion given known internal and external operating experience. The circumstances are such that the RHRSW outlet flow control valves are routinely wetted and dried with water from the ultimate heat sink and that water consists of dissimilar metals provided an environment for galvanic corrosion widely known and discussed by both the industry and NRC through operating experience.

Corrective Actions: The Division 2 RHRSW outlet flow control valve backseat bushing was repaired. Additionally, preventative maintenance procedures were revised to specifically inspect the backseat bushing for degradation.

Corrective Action Reference: CARD 17-28611

Performance Assessment:

Performance Deficiency: The inspectors determined that the licensee's failure to ensure that activities affecting quality were prescribed in a manner consistent with the circumstances to the RHRSW system was a performance deficiency. Specifically, the licensee failed to establish an appropriate interval and guidance for periodic valve internals inspections on the Division 2 RHRSW system outlet flow control valve per preventative maintenance procedure M-681 to prevent significant degradation from galvanic corrosion given known internal and external operating experience.

Screening: The inspectors determined the performance deficiency was more than minor because it adversely impacted the Equipment Performance attribute of the Mitigating Systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e. core damage). Specifically, the Division 2 RHRSW was declared inoperable and unavailable to perform repairs to a lower bonnet bushing failure.

Significance: The inspectors assessed the significance of the finding using IMC 0609 Appendix A, "The Significance Determination Process (SDP) For Findings At-Power" and answered "No" to all four mitigating structures, systems, components and functionality screening questions in Exhibit 2. The inspectors determined this finding was of very low safety significance (Green) because: the finding did not affect the design or qualification of a mitigating structure, system or component; did not represent a loss of system and/or function; did not represent an actual loss of function of at least a single train for greater than its Technical Specification (TS) allowed outage time, or two separate safety systems out-of-service for greater than its TS allowed outage time; and did not represent an actual loss of function of one or more non-TS trains of equipment designed as high safety-significant in accordance with the licensee's maintenance rule program for greater than 24 hours.

Cross-Cutting Aspect: The finding had a cross-cutting aspect in the Evaluation component of the Problem Identification and Resolution cross-cutting area, which states that the licensee will thoroughly evaluate issues to ensure that resolutions address causes and extent of conditions commensurate with their safety significance. Specifically, a broken backseat bushing tack weld was found damaged during corrective maintenance one month prior to the backseat bushing failure in 2017 and the cause of the failure was not fully evaluated. [P.2]

Enforcement:

Violation: Title 10 CFR Part 50, Criterion V, Instructions, Procedures, Drawings states: Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

Contrary to the above, from March 17, 2011 to October 23, 2017, the licensee failed to ensure activities affecting quality were prescribed in a manner consistent with the circumstances to the RHRSW system. Specifically, the licensee failed to establish an appropriate interval and guidance for periodic valve internals inspections on the RHRSW system flow-control valves preventative maintenance procedure M-681, to prevent significant degradation from galvanic corrosion given known internal and external operating experience.

Disposition: This violation is being treated as a Non-Cited Violation, consistent with Section 2.3.2 of the Enforcement Policy.

The disposition of this finding and the associated NCV, along with observation discussed in Section 71152 and the disposition of a finding and the associated NCVs documented in Section 71153 of this report close URI 05000341/2017004-02.

71111.15—Operability Determinations and Functionality Assessments

Failure to Adequately Evaluate the Operability of EDG 11			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000341/2018002-03 Closed	[P.2] – [Evaluation]	71111.15
<p>A finding of very low safety significance and an associated non-cited violation was self-revealed for the licensee's failure to adequately evaluate the operability of a condition adverse to quality identified on EDG 11. Specifically, a lube oil leak was evaluated as having no impact to the operation of the emergency diesel generator. However, during the next surveillance run of EDG 11, the engine had to be shut down and declared inoperable due to the lube oil leak degrading during operation.</p>			
<p><u>Description:</u></p> <p>On June 1, 2018, operators identified an approximately 0.5 gallon pool of oil under the lube oil filter of EDG 11. The source of the oil was identified as a leak from the lube oil filter supply piping flange clamp and quantified as approximately 1 drop every 2 minutes. Condition Assessment Resolution Document (CARD) 18-24354 was written to document the condition. The initial operability evaluation considered only the volume of oil that was leaking comparatively to the total amount of oil available in the lube oil tank and sump. The conclusion was that the leak rate was small enough not to challenge the available quantity of oil for the EDG. No other action was required nor assigned.</p> <p>On June 4, 2018, operators performed the monthly surveillance run for EDG 11. During the run, the lube oil leak degraded into a pencil sized stream of oil. The EDG was immediately shut down and declared inoperable until repairs could be affected. The previous operability evaluation only took into consideration lube oil quantities, and did not evaluate for a potential degradation at the flange clamp due to operating system temperature and pressure changes while the system would be performing its specified safety function. Procedure MQA11-100, Operability Determination Process, required that for any structure, systems, or component (SSC) to be considered operable, the SSC must be capable of performing the specified safety functions of its design, within the required range of physical conditions, initiation times, and mission times in the current licensing basis.</p> <p>Corrective Actions: The licensee entered this issue into their corrective action program. The flange clamp was repaired; the EDG was successfully tested on June 6, 2018 and returned to an operable condition. An extent of condition was performed on the other three EDGs to ensure the integrity of the flange clamps on the lube oil system.</p> <p>Corrective Action Reference: CARD 18-24437</p>			

Performance Assessment:

Performance Deficiency: The licensee's failure to adequately evaluate the operability of EDG 11 in accordance with licensee procedure MQA11-100 that required the SSC to be assessed while it performed the specified safety functions of its design, within the required range of physical conditions, in order to be considered operable was a performance deficiency. Specifically, the licensee evaluated an oil leak in the static, stand-by condition for EDG 11, and not in its operating condition. During the next surveillance run, the oil leak degraded under operating temperature and pressure, and the EDG was shut down and declared inoperable.

Screening: The inspectors determined the performance deficiency was more than minor because it adversely affected the equipment performance attribute of the Mitigating Systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the failure to properly assess the operability of the EDG led to the EDG being declared inoperable during the next surveillance run.

Significance: The inspectors assessed the significance of the finding using IMC 0609, Appendix A, "The Significance Determination Process (SDP) For Findings At-Power", and answered "No" to all the Section A questions of Exhibit 2. Therefore, this performance deficiency screened as Green.

Cross-Cutting Aspect: The finding had a cross-cutting aspect in the Evaluation component of the Problem Identification and Resolution cross-cutting area, which states that the licensee will thoroughly evaluate issues to ensure that resolutions address causes and extent of conditions commensurate with their safety significance. Specifically, a condition adverse to quality was not fully evaluated for potential degradation that may have called into question the operability of the EDG when called upon to fulfill the EDG's safety function. [P.2]

Enforcement:

Violation: Title 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings.

Procedure MQA11-100, Operability Determination Process, is a quality assurance conduct manual implementing procedure that the licensee uses to assess operability of SSC and support functions for compliance with Technical Specifications (TS) when a degraded, nonconforming, or unanalyzed condition is identified. Step 3.2.1 of this procedure requires, in part, that in order to be considered operable, a structure, systems, or component must be capable of performing the specified safety functions of its design, within the required range of physical conditions in the current licensing basis.

Contrary to the above, from June 1 to June 4, 2018, the licensee did not accomplish a prescribed procedure for an activity affecting quality. Specifically, the licensee did not evaluate the operability of EDG 11 in accordance with licensee procedure MQA11-100 that required the SSC to be assessed while it performed the specified safety functions of its design, within the required range of physical condition. The licensee only took into consideration lube oil quantities, and did not evaluate for a potential degradation at the flange

clamp due to operating system temperature and pressure changes while the system would be performing its specified safety function.

Disposition: This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

71152—Problem Identification and Resolution

Observation	71152 —Annual Sample Review
<p>Root Cause Evaluation and Corrective Actions Associated with Division 2 RHRSW Outlet Flow Control Valve Lower Bonnet (Backseat) Bushing Failure as Documented in CARD 17-28611.</p> <p>As discussed in Section 71111.12 of this report and Section 1R12.1 of Inspection Report 05000341/2017004 (ADAMS Accession Number ML18036A012), a root cause evaluation was performed for the bushing failure. The direct cause of the Division 2 RHRSW outlet flow control valve packing leakage was determined to be the valve bonnet carbon steel threads corroded to the point of no longer functioning as an adequate mechanical connection. This resulted in the backseat bushing detaching from the valve bonnet allowing the packing to be ejected. The root cause was determined to be previous operating experience resolution for galvanic corrosion for valves in the safety-related service water systems was less than adequate, resulting in a failure to recognize the vulnerability of galvanic corrosion on passive valve components. Contributing causes consisted of (1) RHRSW system operation produces significant valve vibration levels and periodic wetting and then drying conditions promoting a corrosive environment and (2) high levels of ionic impurities, as measured by chloride concentration, in RHRSW accelerate galvanic corrosion.</p> <p>The root cause report identified weaknesses in the area of chemistry controls such that chloride levels were very high compared to the established goals and that residual heat removal reservoir coupon monitoring was not representative of actual corrosion rates. Specifically, the coupon used for monitoring the residual heat removal reservoir was under continuously submerged conditions verse periodic wetting and drying conditions for the valve. The high levels of chloride were a result of biocide treatment and insufficient decanting of the reservoir.</p> <p>The inspectors reviewed the root cause evaluation and agreed with its conclusions. Corrective actions planned or taken include, but are not limited to: Division 2 RHRSW outlet flow control valve repairs, adding requirements to perform opportunistic inspections of service water valves that are opened for other maintenance or inspections, development of a service water valve internal inspection template with enhanced guidance, extent of condition reviews for galvanic corrosion impacts on other susceptible valves, and changes to residual heat removal reservoir chemical controls to main chlorides as low as possible.</p> <p>The inspectors also reviewed the relationships between the various Division 2 RHRSW outlet flow control valve issues discussed in Section 1R12.1 of Inspection Report 05000341/2017004 (ADAMS Accession Number ML18036A012). The inspectors determined that the valve was not subject to an over thrust condition as a result of one or a combination of irregular limit switch settings, anti-rotation key failure, broken and subsequent removal of the disc guide pin, stem-to-disc unthreading, and various broken tack welds. Additionally, the</p>	

inspectors determined the valve design was appropriate given the circumstances and consistent with industry standards.

Two findings and their associated non-cited violations were identified by the inspectors and are discussed in Section 71111.12 and 71153 of this report.

This observation, along with the disposition of the two findings and the associated NCVs in Section 71111.12 and Section 71153 of this report, close URI 05000341/2017004–02.

Observation	71152—Annual Sample Review
Root Cause Evaluation and Corrective Actions Associated with Reactor Recirculation Motor-Generator Set 'A' Brush Gear Failure as Documented in CARD 17–29439	
<p>As discussed in Section 1R11.1 of Inspection Report 05000341/2017004 (ADAMS Accession Number ML18036A012), at approximately 2:38 p.m., on November 26, 2017, while the plant was operating at 100 percent reactor thermal power, the control room unexpectedly received a recirculation system 'A' generator field ground alarm with no other abnormal indications noted in the control room. A non-licensed operator was dispatched to the reactor recirculation motor-generator room in the reactor building and immediately noted an acrid odor along with significant arcing and sparking on the generator end of reactor recirculation motor-generator set 'A'. Subsequently, at 2:56 p.m., control room operators manually tripped reactor recirculation motor-generator set 'A' and entered abnormal operating procedure 20.138.01, Reactor Recirculation Pump Trip. In accordance with the abnormal operating procedure, the control room operators promptly inserted control rods and stabilized the plant at approximately 35 percent reactor thermal power in single loop operation. The abnormal operating procedure was exited at 4:37 p.m. following completion of associated operator actions and plant stabilization.</p>	
<p>A root cause evaluation was conducted and documented in CARD 17–29439. The direct cause was determined to be that brush assembly spring tension was insufficient to overcome a carbon deposit in brush holder #7 resulting in a loss of contact between the brush and slip ring and a subsequent ground fault. The root cause was longstanding, uncorrected procedural guidance led to an inadequate organization response by operations personnel to the reactor recirculation motor-generator set 'A' degraded condition. Contributing causes were associated with; (1) failure to implement industry best practices related to reactor recirculation motor-generator set brush / holder assemblies and associated preventative maintenance strategies to mitigate overreliance on operator action; (2) degraded standards in the operations department resulted in a high tolerance for accepting observed arcing and sparking and lack of escalation of the issue to station management; (3) engineering changes associated with brush removal criteria and brush change frequency resulted in an unrecognized reduction of operation margin.</p>	
<p>The inspectors reviewed the root cause evaluation and agreed with its conclusions. The inspectors noted that although maintenance was being performed on a routine basis, the latest industry best practices were not being utilized in terms of carbon deposit cleaning methodology and frequency of slip ring cleaning. In addition, the cause of the event was exacerbated by not generating a CARD as discussed in Section 71111.11 of this report. The inspectors also noted that a similar sparking event on reactor recirculation pump motor-generator set 'A' occurred along with an automatic trip of that component in 2002, which was discussed in the 2017 root cause report. The need for enhanced operator guidance on sparking acceptance criteria was recognized but never incorporated into station procedures.</p>	

Corrective actions planned or taken by the licensee include but are not limited to: performing repairs to reactor recirculation motor-generator set 'A' brush gear, revising reactor recirculation pump motor-generator set preventative maintenance procedures to the latest industry standards to increase operational margin, revising operations procedures to a zero arc and spark tolerance for operator rounds, and providing lessons learned as a case study for future training.

This observation, along with the disposition of the finding in Section 71111.11 of this report, closes URI 05000341/2017004-01.

71153—Follow-Up of Events and Notices of Enforcement Discretion

Failure to Identify a Condition Adverse to Quality on Division 2 Residual Heat Removal Service Water Outlet Flow Control Valve			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	TBD AV 05000341/2018002-04 Open	[H.11] Human Performance – Challenge the Unknown	71153 – Followup of Events and Notices of Enforcement Discretion
A self-revealed TBD finding and an apparent violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," and TS 3.7.1 "Residual Heat Removal Service Water (RHRSW) System", were self-revealed for the licensee's failure to identify a condition adverse to quality on the Division 2 RHRSW outlet flow control valve E1150F068B. Specifically, troubleshooting and the associated post maintenance testing failed to identify and correct a failed anti-rotation key which resulted in an inoperable Division 2 RHRSW system for longer than its TS 3.7.1 allowed outage time.			
<p><u>Description:</u></p> <p>On May 5, 2017, while securing Division 2 RHRSW from routine biocide treatment of the Division 2 residual heat removal reservoir, control room operators noted abnormal indications on the Division 2 RHRSW outlet flow control valve (E1150F068B) while the system was still in operation. The valve indicated fully closed with approximately 8,500 gallons per minute of flow. The Division 2 RHRSW system was shut down and declared inoperable. Initial troubleshooting identified the limit switches were not actuating when expected during hand wheel operation of the valve. The limit switch assembly was replaced, limits were reset, and the post maintenance test was performed without the system operating (static no-flow condition). The test passed, and the valve was returned to service on May 7, 2017.</p> <p>On May 22, 2017, while placing Division 2 RHRSW in service for routine biocide treatment of the Division 2 residual heat removal reservoir, the Division 2 RHRSW outlet flow control valve failed to fully open as evidenced by the reduced flow and full open valve indication. Troubleshooting discovered the direct cause was the failure of the anti-rotation bushing stem key with the cause being high vibration resulting in failed tack welds. The licensee also concluded that previous troubleshooting on a limit switch issue, discovered while the system was in operation for routine biocide treatment on May 5, 2017, for the Division 2 RHRSW outlet flow control valve was inadequate and did not identify the failure of the anti-rotation key. As a result, the Division 2 RHRSW outlet flow control valve was returned to service on</p>			

May 7, 2017, and subsequently failed on the next on-demand stroke on May 22, 2017. Division 1 RHRSW was available throughout the event except on two occasions on May 9, 2017, and May 11, 2017, both for mechanical draft cooling tower nozzle cleaning activities.

The licensee submitted LER 05000341/2017-003-00 to report this event in accordance with 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by TS 3.7.1 and 10 CFR 50.73(a)(2)(v)(B) as a condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to remove residual heat.

The inspectors concluded that all potential failure mechanisms were not evaluated during troubleshooting on May 5, 2017 and the anti-rotation key failure was within the licensee's ability to foresee and correct based on the anti-rotation key failure most likely being the cause of the abnormal indications identified on May 5, 2017. Initial licensee troubleshooting activities did not identify a true fault mechanism and post maintenance testing was not performed under dynamic conditions which were present at the time of failure.

Corrective Actions: The failed anti-rotation key and associated tack welds were replaced and preventative maintenance procedures were updated to perform periodic anti-rotation key and associated tack weld inspections. Additionally, an evaluation was performed to assess additional training on the expectations for troubleshooting performance.

Corrective Action References: CARD 17-24236 and 17-24655

Performance Assessment:

Performance Deficiency: The licensee's failure to identify a condition adverse to quality on Division 2 RHRSW outlet flow control valve E1150F068B was a performance deficiency. Specifically, troubleshooting and the associated post maintenance testing failed to identify and correct a failed anti-rotation key, which resulted in an inoperable Division 2 RHRSW system for longer than its TS 3.7.1 allowed outage time.

Screening: The inspectors determined the performance deficiency was more than minor because it adversely affected the Equipment Performance attribute of the Mitigating Systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e. core damage). Specifically, Division 2 RHRSW was not fully capable of performing its intended safety function from May 3, 2017 (last successful run) to May 24, 2017.

Significance: The inspectors assessed the significance of the finding using IMC 0609, Appendix A, "The Significance Determination Process (SDP) For Findings At-Power", and answered "yes" to the Mitigating Systems screening question, "Does the finding represent an actual loss of function of at least a single train for greater than its Technical Specification allowed outage time?" The significance is to-be-determined pending a detailed risk evaluation.

Cross-Cutting Aspect: The finding had a cross-cutting aspect in the Challenge the Unknown component of the Human Performance cross-cutting area, which states that individuals stop when faced with uncertain conditions. Risks are evaluated and managed before proceeding. Specifically, troubleshooting quickly associated an abnormality as an indication issue without stopping and performing more thorough investigation to determine why the limit switch settings were not correct upon discovery. Static post maintenance testing following limit

switch replacement was accepted as completion of troubleshooting without challenging and understanding the true cause. [H.11]

Enforcement:

Violation: Title 10 CFR Part 50, Appendix B, Criterion XVI, states in part, that measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected.

Technical Specification 3.7.1 "Residual Heat Removal Service Water (RHRSW) System" requires, in part, that Division 1 and Division 2 RHRSW subsystems shall be operable in Modes 1, 2, and 3. Technical Specification 3.7.1 requires that if one or more required RHRSW subsystems are inoperable for reasons not associated with the RHRSW pumps for more than 7 days, action must be taken to place the unit in Mode 3 within 12 hours and Mode 4 within 36 hours.

From May 5, 2017 to May 24, 2017, a condition adverse to quality was apparently not promptly identified and corrected. Specifically, an anti-rotation key failure on the Division 2 RHRSW outlet flow control valve, a component important to safety, was not identified and corrected.

From May 5, 2017 to May 24, 2017, Division 2 RHRSW subsystem was apparently inoperable and action was apparently not taken to restore the subsystem to service in seven days or place the unit in Mode 3 within 12 hours.

Disposition: This violation is being treated as an apparent violation pending a final significance (enforcement) determination.

The disposition of this finding and the apparent violation, along with the finding and associated violation documented in Section 71111.12 and the observation discussed in Section 71152 of this report, closes URI 05000341/2017004-02.

EXIT MEETINGS AND DEBRIEFS

The inspectors confirmed that proprietary information was controlled to protect from public disclosure. No proprietary information was documented in this report.

- On April 5, 2018, the inspectors presented the radiation protection program inspection results to Mr. M. Caragher, Plant Manager, and other members of the licensee staff.
- On July 10, 2018, the inspectors presented the interim quarterly integrated inspection results to Mr. M. Caragher, and other members of the licensee staff.
- On August 3, 2018, the inspectors presented the interim quarterly integrated inspection results to Mr. K. Polson, and other members of the licensee staff.
- On August 11, 2018, the inspectors presented the final quarterly integrated inspection results to Mr. M. Caragher, and other members of the licensee staff.

DOCUMENTS REVIEWED

71111.01—Adverse Weather Protection

- CARD 17–24586; NQA – Seasonal Readiness Program Issues; 05/18/2017
- CARD 18–24235; RBCCW TCV Control Position is Inaccurate; 05/29/2018
- CARD 18–24344; SCCW Chilled Water Pumps Failed to Start; 05/31/2018
- CARD 18–24376; Center SCCW Chiller Failed to Meet Start Criteria; 06/01/2018
- MMR Appendix H; On-Line Core Damage Risk Management Guidelines; Revision 14A
- MOP01–200; Severe Weather Guidelines; Revision 0
- MWC13; Outage Nuclear Safety; Revision 17
- WO 45407084; Perform 27.000.06 Att. 3 Hot Weather System Readiness Review Checklist(s) NSSS; 11/01/2017
- WO 45407129; Perform 27.000.06 Att. 3 Hot Weather System Readiness Review Checklist(s) BOP; 11/01/2017
- WO 45407141; Perform 27.000.06 Att. 3 Hot Weather System Readiness Review Checklist(s) E/I&C; 11/01/2017
- WO 50573501; Division 2 EECW Room Cooler Vibration Over the Admin Limit; 04/27/2018

71111.04—Equipment Alignment

- Procedure 23.127; Reactor Building Closed Cooling Water/Emergency Equipment Cooling Water System; Revision 142
- Procedure 23.206; Reactor Core Isolation Cooling System; Revision 101
- Sketch 6M721–5709–1; Reactor Core Isolation Cooling System Sketch; Revision AN
- WO 46665029; Perform 24.206.01 RCIC System Pump Operability and Valve Test at 1000 Psig; 05/10/2018

71111.05AQ—Fire Protection Annual/Quarterly

- Drawing 6A721–2014; Fire Protection Evaluation, Turbine House, Second Floor Plan, Elevation 613'6"; Revision G
- Drawing 6A721–2016–01; Turbine House, Second Floor Plan, Elevation 613'6"; Revision F
- Drawing 6A721–2401; Fire Protection Evaluation, Reactor Building, Sub-Basement Plan, Elevation 540'0"; Revision L
- Drawing 6A721–2405; Fire Protection Evaluation, Reactor and Auxiliary Buildings, Second Floor Plan, Elevation 613'6"; Revision Y
- Drawing 6A721–2407; Fire Protection Evaluation, Reactor and Auxiliary Buildings, Third Floor Plan, Elevation 641'6"; Revision T
- Drawing 6A721–2407; Fire Protection Evaluation, Reactor and Auxiliary Buildings, Basement Plan, Elevation 562'0"; Revision P
- Drawing 6A721–2408; Fire Protection Evaluation, Reactor and Auxiliary Building, Fourth Floor Plan, Elevation 659'6"; Revision U
- Fire Protection Pre Plan FP–AB–2–8; Relay Room, Zone 8, Elevation 613'6"; Revision 6
- Fire Protection Pre Plan FP–AB–3–12; Control Center Complex, Zone 12 and 12A, Elevation 643'6"; Revision 5
- Fire Protection Pre Plan FP–AB–3M–13; Computer Room, Zone 13, Elevation 655'6"; Revision 5
- Fire Protection Pre Plan FP–RB–B–4d; Reactor Building Basement Southeast Corner Room, Zone 4, Elevation 562'0"; Revision 3

- Fire Protection Pre Plan FP–RB–SB–4c; Reactor Building Sub-Basement Southeast Corner Room, Zone 4, Elevation 540'0"; Revision 3
- Fire Protection Pre Plan FP–TB; Turbine Building; Revision 9

71111.06—Flood Protection Measures

- CARD 18–24957; Floor Drains Overflowed from Pumping Down Sump DO–74; 06/26/2018

71111.07—Heat Sink Performance

- CARD 17–25537; P4400B001D, EECW Division 2 Backup Heat Exchanger Required Cleaning; 06/22/2017
- CARD 18–22304; As Found Condition of Division 2 EECW Heat Exchanger P4400B001D; 03/19/2018
- CARD 18–22457; 20dpm Leak during Restoration of P44100B001D; 03/23/2018
- CARD 18–25044; Visual Inspection of EECW Piping; 06/29/2018
- WO 50386840; P4400B001D, EECW Division 2 Backup Heat Exchanger Requires Cleaning; 04/06/2018

71111.11—Licensed Operator Requalification Program and Licensed Operator Performance

- SS–OP–904–1714; Condenser Pressure Instrument / #2 HPCV/HPCI Steam Leak / Loss of 65D / Emergency Depressurization; Revision 1

71111.12—Maintenance Effectiveness

- ACE CARD 18–21798; Revision 0; Lost Closed Indication for P4400–F601B, Division 2 Emergency Equipment Cooling Water Isolation Motor Operated Valve; 04/11/2018
- CARD 18–00133; Corrosion on Equipment in Southeast Sub-Basement due to Humid Environment Caused by the Heating Steam Condensate Return Leak; 04/01/2018
- CARD 18–20121; P44K800B Division 2 EECW HX Temperature Controller VPI is not Indicating Properly; 01/07/2018
- CARD 18–20975; Rising Level in Division 2 EECW Head Tank; 02/03/2018
- CARD 18–21798; Lost Closed Indication for P4400–F601B; 03/03/2018
- CARD 18–21810; Overtorque Evaluation for P4400–F601B; 03/04/2018
- CARD 18–21933; Abnormal Noise from Actuator during Performance of WO 50060638; 03/08/2018
- CARD 18–21965; Installed Motor Pinion and Worm Shaft Gear Ratio does not Match CECO; 03/09/2018
- CARD 18–21970; Temperature Discrepancy Between Division 2 EECW Controller and Recorder; 03/09/2018
- CARD 18–22064; Tripper Fingers Set Screw Broke; 03/12/2018
- CARD 18–22471; Gear Ratio Discrepancy for P4400F606A and P4400F606B; 03/23/2018
- CARD 18–22523; Gear Ratio Discrepancy for P4400F603A; 03/26/2018
- CARD 18–22605; Division 2 EECW Initiation Left Green Reset Light Out; 03/28/2018
- CARD 18–23677; North Reactor Feed Pump Vibration Levels; 05/08/2018
- CARD 18–23954; North Reactor Feed Pump – Check Nut Findings; 05/17/2018
- CARD 18–23977; NRC Concern on Protected Equipment Barrier; 05/18/2018
- CARD 18–23984; Technical Evaluation TE–N21–14–027 Incorrect Assumptions; 05/19/2018
- CARD 18–23999; Acceptance Criteria Out of Specifications; 05/19/2018
- CARD 18–24064; Non Drive Side Journal Bearing Crush Out of Tolerance; 05/22/2018

- CARD 18-24065; Contact Indication Found on the North Reactor Feed Pump; 05/22/2018
- CARD 18-24105; Revise 35.107.004 to Define Hot-Hot Alignment; 05/23/2018
- CARD 18-24138; Coupling Alignment Out of Tolerance; 05/24/2018
- CARD 18-24944; Issues Found While Performing Mini MOV Inspection; 06/26/2018
- Drawing F-10199; Single Stage Steam Generator Feedwater Pump; Revision 11
- Drawing T4530CR; Pump Assembly
- Procedure 35.107.004; Reactor Feed Pump Maintenance; Revision 35
- Procedure 35.809.002; Horizontal Rotating Equipment Alignment; Revision 32
- Procedure 47.000.02; Mechanical Vibration Measurements for Trending; Revision 44
- System Health Report; 4th Quarter 2016 — 4th Quarter 2017
- TE-N21-14-027; North Reactor Feed Pump Turbine Clearances; Revision A
- TE-N21-18-035; North Reactor Feed Pump / Turbine Alignment Tolerances; Revision 0
- TE-U93-13-060; Removal of Shield Block Wall 71a; Revision E
- VMT3-2.0; Turbine Driven Reactor Feed Pump; Revision 0

71111.15—Operability Determinations and Functionality Assessments

- CARD 18-24354; Oil Leak from Flange Supplying EDG11 LO Filter; 06/01/2018
- CARD 18-24437; EDG11 Lube Oil Leak; 06/04/2018
- MQA11-100; Quality Assurance Conduct Manual Implementing Procedure; Revision 2
- TE-B31-18-029; Reactor Recirculation System Pump “B” Discharge Valve B3105F031B Stem Indications; Revision 0

71111.19—Post Maintenance Testing

- B31-00; Reactor Recirculation System (RRS); Revision B
- CARD 17-25134; Division 1 CCHVAC Chiller High Bearing Oil Temperature; 06/08/2017
- CARD 17-26214; Control Room Envelope Damper Access Panel Screws Missing; 07/24/2017
- CARD 17-26708; T4100B007; Division 1 CCHVAC Supply Fan Motor Vibration Trend; 08/09/2017
- CARD 18-20371; Continuing Trend – T4100B007, Division 1 CCHVAC Supply Fan Motor Vibration; 01/17/2018
- CARD 18-21062; Continuing Vibration Trend – Division 1 CCHVAC Supply Fan Motor; 02/07/2018
- CARD 18-21153; T4100B007 Vibrations Over the Shutdown Limit; 02/10/2018
- CARD 18-22122; Elevated Vibrations on Division 1 CCHVAC; 03/14/2018
- CARD 18-22268; As Found Condition of Division 1 CCHVAC Motor; 03/18/2018
- CARD 18-22760; Division 1 CCHVAC Supply Fan Vendor Vibration Analysis Results; 04/04/2018
- CARD 18-23497; Scored Stem on B3105F031B; 05/01/2018
- CARD 18-23677; North Reactor Feed Pump Vibration Levels; 05/08/2018
- CARD 18-23782; NQA – Linear Indication Found during NDE Inspection of Welds for the Division 1 CCHVAC Supply Fan; 05/11/2018
- CARD 18-23954; North Reactor Feed Pump – Check Nut Findings; 05/17/2018
- CARD 18-23977; NRC Concern on Protected Equipment Barrier; 05/18/2018
- CARD 18-23984; Technical Evaluation TE-N21-14-027 Incorrect Assumptions; 05/19/2018
- CARD 18-23999; Acceptance Criteria Out of Specifications; 05/19/2018
- CARD 18-24064; Non Drive Side Journal Bearing Crush Out of Tolerance; 05/22/2018
- CARD 18-24065; Contact Indication Found on the North Reactor Feed Pump; 05/22/2018
- CARD 18-24105; Revise 35.107.004 to Define Hot-Hot Alignment; 05/23/2018
- CARD 18-24138; Coupling Alignment Out of Tolerance; 05/24/2018

- CARD18-23130; North RRMG Set Tripped After Attempted Start; 04/17/2018
- Drawing 6M721-5702-1; Reactor Recirculation System Nuclear Boiler System; Revision Y
- Drawing 6M721-5706-2; Residual Heat Removal Division 1; Revision AB
- Drawing 6M721-6007; Lunkenheimer Recirculation Gate Valve B3105F023A & B3105F031A; Revision A
- Drawing F-10199; Single Stage Steam Generator Feedwater Pump; Revision 11
- Drawing T4530CR; Pump Assembly
- EACE 18-21062/18-22122; Continuing Vibration Trend – Division 1 CCHVAC Supply Fan Motor; Revision 0
- Fermi 2 Control Room Log; February 2018
- Procedure 24.138.02; Reactor Recirculation Pumps Valve Operability Test; Revision 40
- Procedure 35.107.004; Reactor Feed Pump Maintenance; Revision 35
- Procedure 35.809.002; Horizontal rotating Equipment Alignment; Revision 32
- Procedure 43.000.005; Visual Examination of Piping and Components (VT-2); Revision 36
- Procedure 43.000.015; Visual Examination (VT-3) of Pump and Valve Internal Surfaces; Revision 29
- Procedure 44.080.120; Off Gas Sample Chamber Radiation Monitor B Functional Test; Revision 30
- Procedure 47.000.02; Mechanical Vibration Measurements for Trending; Revision 44
- SNM-RFL-19-04; FO 18-01 Sipping Part 1; 04/23/2018
- SNM-RFL-19-04-01; Change Request SNM-RFL-19-04; 04/29/18
- SNM-RFL-19-05; FO 18-01 Confirmation Sipping; 04/22/18
- SNM-SPL-19-10; Sipping Setup; 04/21/2018
- SNM-SPL-19-11; Replacement Bundle Sipping; 04/22/2018
- System Health Report; 4th Quarter 2016 — 4th Quarter 2017
- TE-B31-18-026; Removal and Installation of Body-to-Bonnet Studs during Forced Outage 18-1; Revision B
- TE-N21-14-027; North Reactor Feed Pump Turbine Clearances; Revision A
- TE-N21-18-035; North Reactor Feed Pump / Turbine Alignment Tolerances; Revision 0
- TE-U93-13-060; Removal of Shield Block Wall 71a; Revision E
- VMT3-2.0; Turbine Driven Reactor Feed Pump; Revision 0
- WO 47498872; Control Room Envelope Degraded Pressure Boundary Tracking; 04/15/2017
- WO 48742046; T4100B007, Division 1 CCHVAC Supply Fan Motor Vibration Trend; 09/25/2017
- WO 49865342; T4100B007, Division 1 CCHVAC Supply Fan Motor Vibration Trend; 02/10/2018
- WO 50510412; Replace Stem on B3105F031A (Jet Pump Plugs); 04/27/2018
- WO 50584166; Perform Visual Inspection of RX Recirculation Valve Stems Live Loads and Packing Glands; 04/30/2018
- WO50510412; Replace Stem on B3105F031A (Jet Pump Plugs); 04/22/2018

71111.20—Refueling and Other Outage Activities

- CARD 18-23054; CARD Documenting Late NRC Notification and Potential for NRC Violation; 04/15/2018
- CARD 18-23059; Unable to Adjust Seal Purge Flow in Band; 04/16/2018
- CARD 18-23060; Reactor Recirculation Seal Purge Relief and Check Valve Leaking by; 04/16/2018
- CARD 18-23360; Transient Combustibles not Permitted by MOP11-100; 04/26/2018
- CARD 18-23380; Valve E1100F060A Division 1 LPCI Manual Isolation Valve will not Close All the Way; 04/26/2018

- CARD 18-23393; Fatigue Management Procedure Violation of MGA17 — Work Hours not Entered into FMS Prior to the Hours Being Worked; 04/27/2018
- CARD 18-23394; NQA – Approved Alternate Material Used for B3105F031A Body to Bonnet Studs and Nuts is not Traceable to Lukenheimer Valve Drawing M-6007; 04/27/2018
- CARD 18-23400; FO 18-01 NQA Identified Gaps with Foreign Material Exclusion (FME) Requirements; 04/27/2018
- CARD 18-23450; Improper Placement of Protected Equipment Barrier; 04/30/2018
- CARD 18-23577; E1100F050B Packing Leak (Steady Stream)
- CARD 18-23578; Valve Packing Leak; 05/04/2018
- CARD 18-23579; Packing Leak on E1150F009 (5 DPM); 05/04/2018
- CARD 18-23621; Gland Steam Pressure Controller not Responding When Attempting to Place in AUTO; 05/06/2018
- CARD 18-23634; Received 3D90 Turbine Stop Valve Closure Channel Trip; 05/06/2018
- CARD 18-23648; Loss of Position Indication Control Rod 42-27; 05/07/2018
- CARD 18-23653; Main Steam Line Flow Failed for Steam Lines A & D on DCS Flat Panel Display; 05/07/2018
- CARD 18-23738; NRC Concern Regarding Protected Equipment Postings in the Drywell; 05/09/2018
- CARD 18-23959; FME – Improve Drywell Close Out Methods for Housekeeping; 05/18/2018
- CARD 18-24917; Loss of CR Indication of Fuel Pool Skimmer Surge Tank Level When the IPCS is S/D due to Loss of H21P336; 06/25/2018
- Post Trip Report; Plant Process Computer System Post Trip Report; 04/14/2018
- Procedure 23.708; Fuel Pool Cooling and Cleanup System; Revision 87
- Procedure 24.137.21; Reactor Pressure Vessel System Leakage Test; Revision 37
- TE-11-18-025; FO 18-01 Decay Heat Evaluation; Revision 0

71111.22—Surveillance Testing

- CARD 18-24384; Revision 113 of 24.202.01 HPCI Pump and Valve did not Include Changes from Revision 112; 06/02/18
- MOP03; Fermi Policy on Preconditioning; Revision 40
- Procedure 24.202.01; HPCI Pump and Valve Operability Test at 1025 PSI; Revision 114
- Procedure 24.610.01; RPS – Manual Scram Functional Test; Revision 28A
- Sketch 6M721-5708-1; High Pressure Coolant Injection System; Revision AQ
- WO 46748956; Perform 24.202.01 High Pressure Coolant Injection Pump / Flow Test and Valve Stroke at 1025 PSIG; 05/24/18

71114.06—Drill Evaluation

- CARD 18-23883; RERP Drill 5/15/18 Classification Discrepancy
- Green Team 2018 Drill Package; May 5, 2018

71124.02—Occupational As Low As Reasonably Achievable Planning and Controls

- 35.710.068; Reactor Cavity / Fuel Pool Underwater Filter Unit Operating Procedure; Revision 0
- 63.000.200; ALARA Reviews; Revision 40A
- 63.000.200; ALARA Reviews; Revision 42
- 63.000.204; Outage Exposure Estimating and Tracking; Revision 1
- 63.000.206; Elevated Dose Rate Response Planning; Revision 0

- CARD 17–22362; Refuel Floor Delays Caused by Pre-Outage Work Incomplete – Tri Nuclear Pumps/Demin; 03/23/2017
- CARD 17–22613; SHROUD Tooling Change Resulted in Added Man-Hours and Dose; 03/26/2017
- Fermi 2 RF18 Post Outage Critique Report
- MRP05; ALARA/RWPs; Revision 11
- MRP05; ALARA/RWPs; Revision 12
- NPRP–18–0029; Quick-Hit Self-Assessment: Occupational ALARA Planning and Controls; 03/16/2018
- Root Cause Evaluation 17–24157; RFO 18 Exposure Goal Exceeded Actual 209.789 Rem of 135 Rem Estimate; 06/26/2017
- RWP 17–3015 and Associated ALARA Files; CRDM Exchange/Support Tasks – Drywell & RB Bullpen; Various Dates
- RWP 17–3017 and Associated ALARA Files; SRVs – Maintenance & Inspection, Including Replacement and Support Tasks – Drywell & RB Bullpen; Various Dates
- RWP 17–4002 and Associated ALARA Files; Reactor Core Alteration, Bridge Maintenance, LPRM Replacement and Support Activities; Various Dates
- RWP 17–4003 and Associated ALARA Files; RB—5 ISI/IVVI & Support Activities; Various Dates
- RWP 17–4004 and Associated ALARA Files; Reactor Reassembly & Support Activities; Various Dates

71151—Performance Indicator Verification

- Archived Operator Log; January 1, 2018 to March 31, 2018
- Archived Operator Log; July 1, 2017 to September 30, 2017
- CARD 18–24271; September 17 EDG Unavailability / Fault Exposure Correction; 05/30/2018
- Monthly EDG Performance Indicators Data Collection; April 2017 to March 2018
- Monthly HPCI Performance Indicators Data Collection; April 2017 to March 2018
- MSPI Derivation Report; MSPI Emergency AC Power Systems Unreliability Index; March 2018
- MSPI Derivation Report; MSPI High Pressure Injection System Unavailability Index; March 2018
- MSPI Derivation Report; MSPI High Pressure Injection System Unreliability Index; March 2018
- Surveillance Procedure 24.000.02; Eight Hour, Mode 1, 2, 3, Control Room, Attachment 1; 06/23/2017
- Surveillance Procedure 24.202.08; HPCI Time Response and Pump Operability Test at 1025 psi; Revision 16

71152—Problem Identification and Resolution

- CARD 10–23821; Perform Repairs to Correct Dual Indication on E1150F068B; 05/05/2010
- CARD 10–29933; Internal Damage Found on E1150F068B During Disassembly; 11/02/2010
- CARD 12–24869; 2012 CDBI Focused Self-Assessment Recommendation: Programmatic Review of the Material Composition of Components Exposed to Safety Related Service Water; 05/31/2012
- CARD 15–28194; Service Water Challenges to the Fermi Organization; 10/24/2015
- CARD 17–24236; E1150F068B Division 2 RHR SX Service Water Outlet FCV, Limit Switch/ Position Indication Failed; 05/05/2017
- CARD 17–24655; E1150F068B Division 2 RHR SX Service Water Outlet FCV Failed to Open; 05/22/2017
- CARD 17–25157; Division 2 RHRSW is Exceeding MR Performance Criteria; 06/08/2017

- CARD 17–28062; Possible Disparity in Duty Limits for E1150F068B; 09/30/2017
- CARD 17–28068; E1150F068B Disc Guide Pin Found Separated from Disc; 10/01/2017
- CARD 17–28611; E1150F068B Packing Leak; 10/23/2017
- CARD 17–28656; Two Scores Found in Valve Stem; 10/24/2017
- CARD 17–28691; Loose Back Seat Bushing with Broken Tack Welds Discovered – WO 48992230; 10/25/2017
- CARD 17–28692; Clarification to Note in WO 48774938 for Repair of E1150F068B; 10/25/2017
- CARD 17–28730; Potential Missed Opportunity — Identification of E1150F068B Backseat Bushing Failure; 10/25/2017
- CARD 17–28767; Packing Procedure Requires Complete Rewrite; 10/26/2017
- CARD 17–28859; Extend of Cause from E1150F068B Packing Failure; 10/31/2017
- CARD 17–29439; Significant Arcing in A RRMG Set Exciter Brushes; 11/26/2017
- CARD 18–20537; Perform Learning Opportunity Assessment on the E1150F068B Issues; 01/22/2018
- Chemistry Specifications CHS–AUX–12; Service Water; Revision 33 and 34
- Drawing 5M721–6223; 24" — 150# Powell Globe Valve with Limitorque Operator; Revision D
- MES52; GL 89–13 Safety-Related Service Water Monitoring Program; Revisions 6, 7, 8, and 9
- MMA02; Maintenance Program; Revision 10
- MOP01; Conduct of Operations; Revision 27
- MQA11; Quality Assurance Conduct Manual; Chapter 11 – Condition Assessment Resolution Document; Revision 43A
- Procedure 24.205.06; Division 2 RHRSW Pump and Valve Operability Test; Revision 50
- RHRSW System Health Status Reports; 3rd –4th Quarter 2016 and 1st –4th Quarter 2017
- WO 31261619; Perform Repairs to Correct Dual Indication on E1150F068B; 10/27/2010

71153—Follow-Up of Events and Notices of Enforcement Discretion

- CARD 17–24236; E1150F068B Division 2 RHR HX Service Water Outlet FCV, Limit Switch/Position Indication Failed; 05/05/2017
- CARD 17–24236–01; Complete MRFF Review; 05/09/2017
- CARD 17–24655; E1150F068B Division 2 RHR HX Service Water Outlet FCV Failed to Open; 05/22/2017
- CARD 18–23042; Offgas Radiation Monitor 'A' Indication Erratic After SCRAM; 04/15/2018
- CARD 18–23053; Operations CLO – NRC Report Following Loss of 64 Transformer Required Revision to Include Missed Information; 04/15/2018
- CARD 18–23054; CARD Documenting Late NRC Notification and Potential for NRC Violation; 04/15/2018
- CARD 18–23057; Bus 11 Relay Trip Flags As-Found Discrepancies; 04/15/2018
- CARD 18–23058; Relay Setting Sheet Inconsistencies for Bus 11 Overcurrent Relays; 04/16/2018
- CARD 18–23411; 13.2 KV Bus 11 Switchgear Enclosure Has a Roof Leak; 04/28/2018
- CARD 18–23416; Level 1 CARD 18–23026 Extent of Condition Inspection WO Request; 04/28/2018
- CARD 18–23754; Missing Bolts; 05/10/2018
- Drawing 6SD721–2500–01; One Line Diagram Plant 4160V and 480V System Service; Revision BO
- E11–XX; Residual Heat Removal Service Water System Design Basis Document; Revision D
- LER 2018–001–00; Secondary Containment Pressure Exceeded Technical Specification Due to Reactor Building HVAC System Manipulation
- MMA11; Post Maintenance Testing Guidelines; Revision 23

- Procedure 20.000.21; Reactor SCRAM; Revision 67
- Procedure 20.107.01; Loss of Feedwater or Feedwater Control; Revision 29
- Procedure 20.300.120kV; Loss of 120kV; Revision 17
- Procedure 23.208; RHR Complex Service Water Systems; Revision 111A
- Procedure 24.205.06; Division 2 RHRSW Pump and Valve Operability Test; Revision 50
- Technical Evaluation TE-E11-17-051; Past Functionality Review for Degraded Division 2 RHRSW Flow; Revision 0
- WO 47651250; Troubleshoot/ Repair Improper Valve Indication at E1150F068B; 05/06/2017