UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
2443 WARRENVILLE RD. SUITE 210
LISLE, IL 60532-4352

November 10, 2016

Mr. Paul Fessler
Chief Nuclear Officer
DTE Energy Company
Fermi 2 - 210 NOC
6400 North Dixie Highway
Newport, MI 48166

SUBJECT: FERMI NUCLEAR POWER PLANT, UNIT 2 - NRC COMPONENT DESIGN BASES INSPECTION; INSPECTION REPORT 05000341/2016007

Dear Mr. Fessler:

On September 28, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed a Component Design Bases Inspection inspection at your Fermi Nuclear Power Plant, Unit 2. The enclosed report documents the results of this inspection, which were discussed on September 28, 2016, with Mr. Larry Peterson, and other members of your staff.

Based on the results of this inspection, 16 NRC-identified findings of very-low safety significance were identified. The findings involved violations of NRC requirements. However, because of their very-low safety significance, and because the issues were entered into your Corrective Action Program, the NRC is treating the issues as Non-Cited Violations in accordance with Section 2.3.2 of the NRC Enforcement Policy.

If you contest the subject or severity to any of these Non-Cited-Violations, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, Region III; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Fermi Nuclear Power Plant, Unit 2. In addition, if you disagree with any of these cross-cutting aspects assigned to any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region III, and the NRC Resident Inspector at Fermi Nuclear Power Plant, Unit 2.

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

However, the material enclosed herewith contains Security-Related Information in accordance with 10 CFR 2.390(d)(1) and its disclosure to unauthorized individuals could present a security vulnerability. Therefore, the material in the enclosure will not be made available electronically for public inspection in the NRC Public Document Room or from the PARS component of NRC's ADAMS. If you choose to provide a response and Security-Related Information is necessary to provide an acceptable response, please mark your entire response "Security-Related Information–Withhold from public disclosure under 10 CFR 2.390" in accordance with 10 CFR 2.390(d)(1) and follow the instructions for withholding in 10 CFR 2.390(b)(1). In accordance with 10 CFR 2.390(b)(1)(ii), the NRC is waiving the affidavit requirements for your response.

Sincerely,

/RA/

Mark Jeffers, Chief
Engineering Branch 2
Division of Reactor Safety

Docket No. 50-341
License No. NPF-43

Enclosure:
Inspection Report 05000341/2016007

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No:	50–341
License No:	NPF–43
Report No:	05000341/2016007
Licensee:	DTE Energy Company
Facility:	Fermi Nuclear Power Plant, Unit 2
Location:	Newport, MI
Dates:	August 1 - September 28, 2016
Inspectors:	N. Féliz Adorno, Senior Reactor Inspector, Lead B. Jose, Senior Reactor Inspector, Electrical J. Benjamin, Senior Reactor Inspector, Mechanical N. Valos, Senior Reactor Analyst, Operations Inspector (first onsite week) R. Baker, Operations Engineer, Operations Inspector (last two onsite weeks) G. Nicely, Electrical Contractor G. Gardner, Mechanical Contractor
Observers:	V. Petrella, Reactor Inspector E. Fernandez, Reactor Inspector
Approved by:	M. Jeffers, Chief Engineering Branch 2 Division of Reactor Safety

Enclosure

SUMMARY

Inspection Report 05000341/2016007, 08/01/2016 – 09/28/2016; Fermi Nuclear Power Plant, Unit 2; Component Design Bases Inspection.

The inspection was a 3-week onsite baseline inspection that focused on the design of components. The inspection was conducted by four regional engineering and operations inspectors and 2 consultants. The inspection team identified 16 Green findings. These findings were considered Non-Cited Violations (NCVs) of U.S. Nuclear Regulatory Commission (NRC) regulations. The significance of inspection findings was indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," dated April 29, 2015. Cross-cutting aspects were determined using IMC 0310, "Aspects Within the Cross-Cutting Areas," dated December 4, 2014. All violations of NRC requirements were dispositioned in accordance with the NRC's Enforcement Policy, dated August 1, 2016. The NRC's program for overseeing the safe operation of commercial nuclear power reactors was described in NUREG-1649, "Reactor Oversight Process," Revision 5, dated February 2014.

NRC-Identified and Self-Revealed Findings

Cornerstone: Mitigating Systems

Green. The team identified a finding of very-low safety significance (Green) and an associated NCV of Title 10 of the *Code of Federal Regulations* (CFR), Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the licensee failure to establish procedures that were appropriate for addressing non-functional mechanical draft cooling tower (MDCT) fan motor brakes. Specifically, a license procedure contained instructions for addressing the impact of non-functional MDCT fan motor brakes to the ultimate heat sink operability that were inconsistent with the applicable Technical Specification requirements. The licensee captured this issue in their Corrective Action Program (CAP) as CARD 16-26762, verified that all MDCT fan brake systems were functional, revised the affected procedure to restore compliance, and issued a night order to notify control room licensed nuclear operators of the revised procedure.

The performance deficiency was determined to be more-than-minor because it was associated with the Mitigating Systems cornerstone attribute of protection against external events and affected the cornerstone objective of ensuring the availability, reliability, and capability of mitigating systems to respond to initiating events to prevent undesirable consequences. The finding screened as of very-low safety significance (Green) because it did not involve the loss or degradation of equipment or function specifically designed to mitigate a tornado event. Specifically, a historic review for the last 12 months revealed that the minimum required number of MDCT fans remained operable to mitigate the consequences of a tornado. The team did not identify a cross-cutting aspect associated with this finding because it was not confirmed to reflect current performance due to the age of the performance deficiency. Specifically, the procedure instructions for addressing MDCT fan motor brake non-functionality were developed more than 3 years ago. (Section 1R21.3.b(1))

Green. The team 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 verify the adequacy of the voltage supplied to the transformer #64 load tap changer. Specifically, the licensee did not perform calculations to verify that the load tap changer controls and actuator would have adequate voltage to be able to reset the degraded voltage relays following a design basis accident (DBA). The licensee captured this issue in their CAP as CARD 16-26702 and performed an operability evaluation that reasonably determined the voltage would marginally be acceptable to operate the load tap changer controls and actuator.

The performance deficiency was determined to be more-than-minor because it was associated with the Mitigating Systems cornerstone attribute of design control and affected the cornerstone objective of ensuring the availability, reliability, and capability of mitigating systems to respond to initiating events to prevent undesirable consequences. The finding screened as of very-low safety significance (Green) because it did not result in the loss of operability or functionality of mitigating systems. Specifically, the licensee performed an operability evaluation that reasonably showed voltage would be marginally acceptable to operate the load tap changer controls and actuator when required during a DBA. The team determined that the associated finding had a cross-cutting aspect in the area of Problem Identification and Resolution because the licensee did not conduct a self-critical and objective assessment of its programs and practices. Specifically, the licensee reviewed the applicability of a similar violation issued to a different licensee during the 2015 Component Design Bases Inspection Self-Assessment and concluded that it did not apply to Fermi. (Section 1R21.3.b(2)) [P.6]

Green. The team 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 verify the capability to manually throttle safety-related motor-operated valves (MOVs) during a DBA. Specifically, the licensee did not verify that the protective devices would allow manually throttling safety-related MOVs during a DBA without tripping. The licensee captured this issue in their CAP as CARD 16-26763, performed a preliminary protective device evaluation to reasonably determine the maximum number of throttling cycles each MOV can incur without tripping the associated thermal overload, and incorporated these limits into an operations night order.

The performance deficiency was determined to be more-than-minor because it was associated with the Mitigating Systems cornerstone attribute of design control and affected the cornerstone objective of ensuring the availability, reliability, and capability of mitigating systems to respond to initiating events to prevent undesirable consequences. The finding screened as of very-low safety significance (Green) because it did not result in the loss of operability or functionality of mitigating systems. Specifically, the licensee performed informal analyses to evaluate the installed protective devices for the throttling MOVs and reasonably determined that tripping would not occur. The team determined that the associated finding had a cross-cutting aspect in the area of Human Performance because work groups did not communicate and coordinate their activities within and across organizational boundaries to ensure nuclear safety is maintained. Specifically, the engineers that performed the affected calculation, which was approved on December 2013, did not communicate and coordinate with operations or the MOV engineer to determine if the plant had throttling MOVs that required additional analysis. (Section 1R21.3.b(3)) [H.4]

Green. The team 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 failure to periodically test the emergency diesel generator (EDG) capacity to start and accelerate all of the sequenced loads within the applicable limits. Specifically, surveillance requirement (SR) activities did not demonstrate that all of the EDG auto-sequenced loads started and accelerated within the applicable voltage and frequency limits during start-up and recovery. In addition, the licensee did not timely evaluate the surveillance data collected for the residual heat removal pump motors. The licensee captured this issue in their CAP as CARD 16-26535 and CARD 16-26536, and performed an operability evaluation which reasonably determined the affected systems, structures, and components (SSCs) were operable but nonconforming.

The performance deficiency was determined to be more-than-minor because it was associated with the Mitigating Systems cornerstone attribute of equipment performance and affected the cornerstone objective of ensuring the availability, reliability, and capability of mitigating systems to respond to initiating events to prevent undesirable consequences. The finding screened as of very-low safety significance (Green) because it did not result in the loss of operability or functionality of mitigating systems. Specifically, the licensee evaluated the most recent data and reasonably determined that the EDGs and the affected loads were operable. The team did not identify a cross-cutting aspect associated with this finding because it was not confirmed to reflect current performance due to the age of the performance deficiency. Specifically, the associated SR procedures were established more than 3 years ago. (Section 1R21.3.b(4))

Green. The team 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's failure to leak test all Division 2 non-interruptible control air system (NIAS) boundary isolation valves. Specifically, the periodic NIAS leak testing did not account for the potential leakage of two valves used to isolate the NIAS safety-related system from the nonsafety-related interruptible control air system. The licensee captured this issue in their CAP as CARD 16-26389 and performed an operability evaluation which reasonably determined that Division 2 of NIAS remained functional.

The performance deficiency was determined to be more-than-minor because it was associated with the Mitigating Systems cornerstone attribute of equipment performance and affected the cornerstone objective of ensuring the availability, reliability, and capability of mitigating systems to respond to initiating events to prevent undesirable consequences. In addition, it was associated with the Barrier Integrity cornerstone attribute of SSC and barrier performance and affected the cornerstone objective of providing reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. The finding screened as of very-low safety significance (Green) because it did not result in the loss of operability or functionality of mitigating systems. Specifically, the licensee used available data from a recent event and reasonably determined that system out-leakage was within the design limit. In addition, with respect to the Barrier Integrity cornerstone, the finding only represented a potential degradation of the control room and standby gas ventilation systems. The team did not identify a cross-cutting aspect associated with this finding because it was not confirmed to reflect current performance due to the age of the performance deficiency. Specifically, the test procedures were established more than 3 years ago. (Section 1R21.3.b(5))

Green. The team 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 licensee's failure to ensure that the protective devices for the loads required at the beginning of a loss of coolant accident (LOCA) would not trip under degraded voltage conditions. Specifically, the licensee did not verify that the connected Class 1E loads would not be damaged or become unavailable during a LOCA concurrent with a degraded voltage condition between the degraded voltage dropout setting and the loss of voltage setting for the degraded voltage time delay of 7.3 seconds and subsequent reconnection to the EDG. The licensee captured this issue in their CAP as CARD 16-26533 and performed a preliminary evaluation that reasonably determined the protective devices would not actuate during this condition.

The performance deficiency was determined to be more-than-minor because it was associated with the Mitigating Systems cornerstone attribute of design control and affected the cornerstone objective of ensuring the availability, reliability, and capability of mitigating systems to respond to initiating events to prevent undesirable consequences. The finding screened as of very-low safety significance (Green) because it did not result in the loss of operability or functionality of mitigating systems. Specifically, the licensee performed an operability evaluation and reasonably determined that protective devices would not actuate during a degraded voltage concurrent with a LOCA. The team determined that the associated finding had a cross-cutting aspect in the area of Problem Identification and Resolution because the licensee did not conduct a self-critical and objective assessment of its programs and practices. Specifically, the licensee evaluated a similar violation issued at a different licensee during the 2016 Component Design Bases Inspection Self-Assessment and concluded that no corrective actions were required. (Section 1R21.4.b(1)) [P.6]

Green. The team identified a finding of very-low safety significance (Green) and an associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the licensee's failure to establish procedures that were appropriate to inspect containment debris. Specifically, the emergency core cooling system (ECCS) suction strainer and containment coating inspection procedures contained acceptance criteria that was inconsistent with the applicable design documents. The licensee captured this issue in their CAP as CARD 16-26128 and CARD 16-26585, and reasonably determined that the concern did not impact the affected SSCs functionality based on recent inspection results.

The performance deficiency was determined to be more-than-minor because it was associated with the procedure quality attribute of the Mitigating Systems cornerstone, and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The finding screened as of very-low safety significance (Green) because it did not result in the loss of operability or functionality of mitigating systems. Specifically, a review of recent inspection did not find a condition that reasonably challenged the applicable design analysis and all loose material identified during the inspections was removed. The team did not identify a cross-cutting aspect associated with this finding because it was not confirmed to reflect current performance due to the age of the performance deficiency. Specifically, the affected procedures were established more than 3 years ago. (Section 1R21.4.b(2))

Green. The team 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 licensee's failure to evaluate the acceptability of drywell coatings with respect to potential ECCS suction strainer blockage. Specifically, the licensee had not ensured that coating Carbo Zinc 11 would remain attached to the base metal during a DBA and the ECCS suction strainer calculations did not account for this material as a potential source of debris blockage. The licensee captured this issue in their CAP as CARD 16-26581 and reasonably determined that the affected coating system would remain adhered during a LOCA by comparing Carbo Zinc 11 installation documents against DBA test reports for this coating.

The performance deficiency was determined to be more-than-minor because it was associated with the Mitigating Systems cornerstone attribute of design control 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 it did not result in the loss of operability or functionality of mitigating systems. Specifically, the licensee compared Carbo Zinc 11 installation documents against DBA test reports for this coating and reasonably concluded that this coating system would remain adhered in the event of a LOCA. The team did not identify a cross-cutting aspect associated with this finding because it was not confirmed to reflect current performance due to the age of the performance deficiency. Specifically, the associated evaluations were performed more than 3 years ago. (Section 1R21.4.b(3))

Green. The team 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 licensee's failure to use the min-K insulation debris generation and transport factors contained in the ECCS suction strainer licensing basis. Specifically, the licensee used non-conservative min-K insulation debris generation and transport factor values. The licensee captured this issue in their CAP as CARD 16-26800 and performed an operability evaluation that reasonably determined, based on industry test data, the existing calculation had sufficient conservatism to accommodate the effects of the additional debris volume.

The performance deficiency was determined to be more-than-minor because it was associated with the Mitigating Systems cornerstone attribute of design control 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 it did not result in the loss of operability or functionality of mitigating systems. Specifically, the licensee performed an operability evaluation and reasonably determined that the existing calculation had sufficient conservatism to accommodate the effects of the additional debris volume. The team did not identify a cross-cutting aspect associated with this finding because it was not confirmed to reflect current performance due to the age of the performance deficiency. Specifically, the associated evaluations were performed more than 3 years ago. (Section 1R21.4.b(4))

Green: The team 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 licensee's failure to apply design control measures to a design change associated with NIAS accumulator capacity. Specifically, the licensee did not verify that the reduced

accumulator capacity was adequate during the entire time period that the compressor is expected to not be running, and ensure that operability limits and calibration tolerances contained in procedures were consistent with the new design. The licensee captured this issue in their CAP as CARD 16-26208, CARD 16-26561, and CARD 16-26607, and reasonably concluded that NIAS remained functional.

The performance deficiency was determined to be more-than-minor because it was associated with the Mitigating Systems cornerstone attribute of equipment performance and affected the cornerstone objective of ensuring the availability, reliability, and capability of mitigating systems to respond to initiating events to prevent undesirable consequences. In addition, it was associated with the Barrier Integrity cornerstone attribute of SSC and barrier performance and affected the cornerstone objective of providing reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. The finding screened as of very-low safety significance (Green) because it did not result in the loss of operability or functionality of mitigating systems. Specifically, the licensee performed a bounding assessment that reasonably determined that the accumulator would maintain adequate pneumatic supply. In addition, with respect to the Barrier Integrity cornerstone, the finding only represented a potential degradation of the control room and standby gas ventilation systems. The team determined that the associated finding had a cross-cutting aspect in the area of Human Performance because the licensee did not carefully guarded margins and changed them only through a systematic and rigorous process. Specifically, the licensee failed to review and identify all of the design attributes associated with NIAS system before significantly reducing the accumulator capacity design margin in February 2016. (Section 1R21.5.b(1)) [H.6]

Green. The team identified a finding of very-low safety significance (Green) and an associated NCV of 10 CFR Part 50, Appendix B, Criterion XVI, “Corrective Action,” for the licensee’s failure to identify that the ‘A’ MDCT fan motor brake system 100 psi nitrogen supply cylinder pressure did not meet the low-pressure acceptance criterion. Specifically, although the license had discovered this condition adverse to quality (CAQ), it was not captured into the CAP and was not corrected for a period of 7 consecutive days following its discovery. The licensee captured this issue in their CAP as CARD 16-26214, verified that the pressure of all MCDT fan motor brake cylinders were within limits, evaluated past operability, and performed a causal investigation.

The performance deficiency was determined to be more-than-minor because it was associated with the Mitigating Systems cornerstone attribute of protection against external events and affected the cornerstone objective of ensuring the availability, reliability, and capability of mitigating systems to respond to initiating events to prevent undesirable consequences. The finding screened as of very-low safety significance (Green) because it did not involve the loss or degradation of equipment or function specifically designed to mitigate a tornado event. Specifically, the licensee reviewed the pressure readings of the other nitrogen system supply cylinders and reasonably determined that their available pressure at the time would have compensated for the 100 psi cylinder low-pressure. The team determined that the associated finding had a cross-cutting aspect in the area of Human Performance because work groups did not communicate and coordinate their activities within and across organizational boundaries to ensure nuclear safety is maintained. Specifically, the nuclear operators and the control room licensed nuclear operators did not communicate and coordinate their activities to ensure the degraded condition was captured in the CAP. (Section 4OA2.1.b(1)) [H.4]

Green. The team identified a finding of very-low safety significance (Green) and an associated NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for the licensee's failure to identify that over-dutied 480V safety-related switchgear breakers were nonconforming to the licensing basis. Specifically, the licensee did not identify that this condition was nonconforming to the licensing basis and, as a result, did not promptly correct the CAQ. The licensee captured this issue in their CAP as CARD 16-26209 and CARD 16-26210, and performed an operability evaluation that reasonably determined the affected buses were operable but nonconforming.

The performance deficiency was determined to be more-than-minor because it was associated with the Mitigating Systems cornerstone attribute of design control and affected the cornerstone objective of ensuring the availability, reliability, and capability of mitigating systems to respond to initiating events to prevent undesirable consequences. The finding screened as of very-low safety significance (Green) because it did not result in the loss of operability or functionality of mitigating systems. Specifically, the licensee performed an operability evaluation and reasonably concluded that the associated buses remained operable. The team determined that the associated finding had a cross-cutting aspect in the area of Problem Identification and Resolution because the licensee did not thoroughly evaluate issues to ensure that resolutions address causes and extent of conditions commensurate with their safety significance. Specifically, the licensee failed to recognize that the condition was nonconforming to the licensing basis because they did not thoroughly evaluate the discovery of the over-dutied breakers and extent of condition. (Section 4OA2.1.b(2)) [P.2]

Green. The team identified a finding of very-low safety significance (Green) and an associated NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for the licensee's failure to identify that a non-conservative min-K insulation volume calculation error was nonconforming to the ECCS suction strainer licensing basis. Specifically, the licensee identified the non-conservative calculation error and captured it in the CAP as CARD 11-21153. However, the licensee did not identify any regulatory basis requiring this condition to be addressed and, as a result, closed the CARD without correcting the CAQ. The licensee captured this issue in their CAP as CARD 16-26292 and CARD 16-26800, and performed an engineering functional assessment that reasonably determined the affected SSCs remained operable.

The performance deficiency was determined to be more-than-minor because it was associated with the Mitigating Systems cornerstone attribute of equipment performance and 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 it did not result in the loss of operability or functionality of mitigating systems. Specifically, the licensee performed an operability evaluation and reasonably determined the affected SSCs remained operable. The team determined that this finding had a cross cutting aspect in the area of Human Performance because the licensee did not propose an action that was determined to be safe in order to proceed, rather than unsafe in order to stop. Specifically, the licensee determined that no regulatory basis was associated with the non-conservative error because they could not find any requirement that specifically described the physical configuration and condition addressed in CARD 11-21153 when evaluating the problem in 2015. (Section 4OA2.1.b(4)) [H.14]

Green. The team identified a finding of very-low safety significance (Green) and an associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the licensee's failure to timely identify, document, and evaluate nonconforming conditions that called the operability of one or more SSCs into question. Specifically, the licensee was not timely in capturing and evaluating ten CAQs identified during this inspection in their CAP and in accordance with their procedures, which resulted in untimely operability determinations. The licensee captured this issue in their CAP as CARD 16-26633, CARD 16-26776, CARD 16-26534, and CARD 16-26678, and completed the associated operability determinations, which reasonably determined the affected SSCs 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. The finding screened as of very-low safety significance (Green) because it did not result in the loss of operability or functionality of mitigating systems. Specifically, the licensee performed operability evaluations that reasonably determined that all of the affected SSCs remained operable. The team determined that this finding had a cross cutting aspect in the area of Human Performance because the licensee did not use a consistent, systematic approach to make decisions. Specifically, the licensee did not use the CAP's systematic process to identify CAQs and make timely and adequate prompt operability decisions. (Section 4OA2.1.b(5)) [H.13]

Cornerstone: Barrier Integrity

Green. The team 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 licensee's failure to ensure that the main steam isolation valves (MSIVs) would close within the Technical Specification time requirements and with the motive forces described in the Updated Final Safety Analysis Report. Specifically, the SR procedures did not account for the steam flow closing force, accumulator pressure variances, and containment pressure when verifying that the MSIVs will close within the SR time acceptance criteria. In addition, the licensee had not demonstrated that the MSIVs would close with air pressure and/or spring force against peak containment pressure as described in the Updated Final Safety Analysis Report. The licensee captured this issue in their CAP as CARD 16-27189 and CARD 16-26697, and performed evaluations that reasonably determined the affected MSIVs remained operable.

The performance deficiency was determined to be more-than-minor because it was associated with the Barrier Integrity cornerstone attribute of design control and affected the cornerstone objective of providing reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events. In addition, it was determined to be more-than-minor because it was associated with the Initiating Event cornerstone attribute of design control and adversely affected 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 finding screened as of very-low safety significance (Green) because it did not result in exceeding the reactor coolant system leak rate for a small LOCA or affected other systems used to mitigate a LOCA. In addition, it did not represent an actual open pathway in the physical integrity of reactor containment, containment isolation system, or heat removal components, and it did not involve an actual reduction in the function of hydrogen igniters in the reactor

containment. The team did not identify a cross-cutting aspect associated with this finding because it was not reflective of current performance. Specifically, the most significant cause for the performance issues discussed had existed for at least 3 years. (Section 1R21.3.b(6))

Green. The team identified a finding of very-low safety significance (Green) and an associated NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for the licensee's failure to identify that an inadequate minimum MSIV accumulator air pressure setpoint was CAQ. Specifically, a licensee engineering evaluation concluded that the minimum MSIV accumulator air pressure setpoint was inadequate but the condition was not captured in the CAP and, as a result, corrective actions were not implemented. The licensee captured this issue in their CAP as CARD 16-26697 and reasonably determined the MSIVs remained operable.

The performance deficiency was determined to be more-than-minor because it was associated with the Barrier Integrity cornerstone attribute of design control and affected the cornerstone objective of providing reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events. The finding screened as of very-low safety significance (Green) because the finding did not represent an actual open pathway in the physical integrity of reactor containment, containment isolation system, or heat removal components, and it did not involve an actual reduction in the function of hydrogen igniters in the reactor containment. Specifically, the finding did not result in an actual open pathway and the MSIVs do not affect the function of heat removal components and hydrogen igniters. The team did not identify a cross-cutting aspect associated with this finding because it was not confirmed to reflect current performance due to the age of the performance deficiency. Specifically, the calculation that concluded that the minimum air pressure setpoint was inadequate was performed in 1997. (Section 4OA2.1.b(3))

REPORT DETAILS

1. REACTOR SAFETY

Cornerstone: Initiating Events, Mitigating Systems, and Barrier Integrity

1R21 Component Design Bases Inspection (71111.21)

.1 Introduction

The objective of the Component Design Bases Inspection (CDBI) is to verify that design bases have been correctly implemented for the selected risk-significant components and that operating procedures and operator actions are consistent with design and licensing bases. As plants age, their design bases may be difficult to determine and an important design feature may be altered or disabled during a modification. The Probabilistic Risk Assessment (PRA) model assumes the capability of safety systems and components to perform their intended safety function successfully. This inspectable area verifies aspects of the Initiating Events, Mitigating Systems, and Barrier Integrity cornerstones for which there are no indicators to measure performance.

Specific documents reviewed during the inspection are listed in the Attachment to the report.

.2 Inspection Sample Selection Process

The team used information contained in the licensee's PRA and the Fermi Nuclear Power Plant, Unit 2, Standardized Plant Analysis Risk Model to identify one scenario to use as the basis for component selection. The scenario selected was a loss of condenser heat sink event. Based on this scenario, a number of risk-significant components were selected for the inspection. In addition, the team selected a risk-significant component with Large Early Release Frequency (LERF) implications using information contained in the licensee's PRA and the Fermi Nuclear Power Plant, Unit 2, Standardized Plant Analysis Risk Model.

The team also used additional component information such as a margin assessment in the selection process. This design margin assessment considered original design reductions caused by design modification, power uprates, or reductions due to degraded material condition. Equipment reliability issues were also considered in the selection of components for detailed review. These included items such as performance test results, significant corrective actions, repeated maintenance activities, Maintenance Rule (a)(1) status, components requiring an operability evaluation, system health reports, and U.S. Nuclear Regulatory Commission (NRC) resident inspector input of problem areas/equipment. Consideration was also given to the uniqueness and complexity of the design, operating experience, and the available defense in depth margins. A summary of the reviews performed and the specific inspection findings identified are included in the following sections of the report.

The team also identified procedures and modifications for review that were associated with the selected components. In addition, the inspectors selected operating experience issues associated with the selected components.

This inspection constituted 15 samples (11 components, 1 component with LERF implications, and 3 operating experience) as defined in Inspection Procedure 71111.21-05.

.3 Component Design

a. Inspection Scope

The team reviewed the Updated Final Safety Analysis Report (UFSAR), Technical Specification (TS), Technical Requirements Manual, design basis documents, drawings, calculations and other available design basis information, to determine the performance requirements of the selected components. The team used applicable industry standards, such as the American Society of Mechanical Engineers Code and the Institute of Electrical and Electronics Engineers Standards to evaluate acceptability of the systems design. The team also evaluated licensee actions, if any, taken in response to NRC issued operating experience, such as Bulletins, Regulatory Issue Summaries (RISs), and Information Notices. The team reviewed the selected components design to assess their capability to perform their required functions and support proper operation of the associated systems. The attributes that were needed for a component to perform its required function included process medium, energy sources, control systems, operator actions, and heat removal. The attributes that verified component condition and tested component capability were appropriate and consistent with the design bases may have included installed configuration, system operation, detailed design, system testing, equipment and environmental qualification, equipment protection, component inputs and outputs, operating experience, and component degradation.

For each of the components selected, the inspectors reviewed the maintenance history, preventive maintenance (PM) activities, system health reports, operating experience-related information, vendor manuals, electrical and mechanical drawings, operating procedures, and licensee CAP documents. Field walkdowns were conducted for all accessible components selected to assess material condition, including age-related degradation, configuration, potential vulnerability to hazards, and consistency between the as-built condition and the design. In addition, the team interviewed licensee personnel from multiple disciplines such as operations, engineering, and maintenance. Other attributes reviewed are included as part of the scope for each individual component.

The following 12 components (i.e., samples), including a component with LERF implications, were reviewed:

- Emergency Equipment Cooling Water Pump (P4400C001B): The team reviewed the following hydraulic calculations to assess the pump capability to perform its required mitigating functions: pump minimum required flow, minimum required net positive suction head, and vortexing. In addition, the team reviewed analyses associated with water hammer and other gas intrusion considerations, such as the makeup tank minimum water level setpoint and instrument design configuration. The team also reviewed the engineering evaluations associated with the Emergency Equipment Cooling Water (EECW) makeup tank and emergency water and nitrogen makeup systems to assess their capability to support the safety functions of the EECW pumps. The team also reviewed test procedures and completed tests, including pump inservice testing (IST) and emergency water and nitrogen makeup system tests, to assess the associated methodology, acceptance criteria, and test results. In addition, the team

reviewed calculations for voltage drop, ampacity, protection and coordination, motor brake horsepower requirements, and short circuit for the pump motor power supply and feeder cable.

- Mechanical Draft Cooling Tower (E1156-B001/2A/B): The team reviewed drawings and calculations associated with fan sizing, reservoir volume, fan motor brake requirements, heat transfer, and makeup requirements to assess the Mechanical Draft Cooling Tower (MDCT) capability to perform its safety functions during postulated events including a Loss of Coolant Accident (LOCA) and tornado events. The team also reviewed procedure modifications implemented in response to a mayfly infestation event. In addition, the team reviewed calculations for voltage drop, ampacity, protection and coordination, motor brake horsepower requirements, and short circuit for the motor power supply and feeder cable. The team also reviewed test procedures and recently completed surveillance tests to assess the associated methodology, acceptance criteria, and test results.

- Automatic Depressurization System Valve (B2104F013H): The team reviewed analyses related to the safety-related portion of the Automatic Depressurization System (ADS) valve pneumatic supply system, lift settings, and relief capacity to assess the ADS valve capability to operate under the most limiting conditions. In addition, the team reviewed power and control wiring diagrams to assess the control and actuation schemes. In addition, the team reviewed test procedures and recently completed surveillance tests to assess the associated methodology, acceptance criteria, and test results.

- Inboard Main Steam Isolation Valves (B2103F022A/B/C/D): The team reviewed open and closing force calculations to assess the Main Steam Isolation Valves (MSIVs) capability to function as described in the UFSAR under all bounding conditions. In addition, the team reviewed power and control wiring diagrams to assess the control and actuation schemes. The Environmental Qualification Reports were also reviewed to assess component environmental qualification. In addition, the team reviewed test procedures and recently completed surveillance tests to assess the associated methodology, acceptance criteria, and test results. This review constituted one component sample with LERF implications.

- Non-Interruptible Control Air System Isolation Valves (P5000F440/441): The team reviewed analyses related to weak link and required thrust and torque to assess the valves capability to operate under the most limiting conditions. The team also reviewed leakage testing and compared the results to the leakage values assumed in the associated non-interruptible control air system (NIAS) calculations. In addition, the team reviewed power and control wiring diagrams to assess the control and actuation schemes. The Environmental Qualification Reports were also reviewed to assess component environmental qualification.

- Non-Interruptible Control Air System Dehydration Filter Unit (P5002D013) and Aftercooler (P5002B005): The team reviewed design calculations associated with sizing of the components to assess their capability to maintain the required control air temperature, particle, and moisture levels. Additionally, the team reviewed the quality aspects of the receipt and storage of the desiccant used in the dehydration unit. In addition, the team reviewed test procedures and recently completed tests to assess the associated methodology, acceptance criteria, and test results.

- Non-Interruptible Control Air System Compressor (P5002D0002) and Receiver (P5002A002): The team reviewed the compressor and receiver sizing calculations and performance tests to assess its capability to supply enough air under all allowable configurations. Additionally the team reviewed the licensee's limiting post-accident conditions that would result in the most severe operating compressor operating conditions to ensure that the compressor would be capable of providing safety-related functions during accident conditions as well as environment conditions.

- 120 Vac Modular Power Unit # 1 (R3101S001): The team reviewed design calculations for the modular power unit sizing and voltage drop to assess the voltage supplied during design basis accident conditions to the associated safety-related loads. In addition, the team reviewed the power feed and load fuses design to assess their sizing and interrupting ratings. The team also reviewed test procedures and recently completed tests to assess the associated methodology, acceptance criteria, and test results.

- Division 1 130 Vdc Distribution Panel (2PA2-5): The team reviewed short circuit and coordination calculations and the fuses interrupting ratings to assess the coordination between the motor feed fuses, open and close control circuit fuses, and the 130 Vdc supply fuses, and to assess the interrupting ratings of the control circuit fuses and the 130 Vdc control power feed fuses. The team also reviewed voltage calculations to assess the voltage available to the medium voltage and low voltage switchgear circuit breaker open and close coils and spring charging motors. The team reviewed motor-operated valve (MOV) control logic diagrams and the distribution panel voltage drop calculation to assess the voltage available to the control circuit components under all design basis conditions. In addition, the team reviewed test procedures and recently completed tests to assess the associated methodology, acceptance criteria, and test results.

- Division 1 130/260 Volts Battery (2PA): The team reviewed calculations and analyses related to battery loads, division separation, battery sizing and capacity, electrical isolation between class 1E and non-1E, hydrogen generation, and battery room loss of ventilation. This review was performed to assess the battery capacity to support the design basis required voltage requirements of the 130/260 Vdc safety-related loads under both normal and DBA conditions. The team also reviewed a sample of completed surveillance tests, service duty discharge tests, and modified performance tests to assess the associated methodology, acceptance criteria, and test results.

- 480 Vac Motor Control Center (72-5A): The team reviewed electrical calculations for loading, load flow and voltage drop to the connected components, degraded and loss of voltage protection, short-circuit, and equipment protection and coordination to assess the motor control center capability to perform its safety-related function under all modes of plant operation.

- 480 Vac Switchgear Bus (72EC/F): The team reviewed electrical calculations for bus loading, load flow and voltage drop to the connected components, degraded and loss of voltage protection, short-circuit, and equipment protection and coordination to assess the bus capability to perform its safety-related function under all Modes of plant operation. The team also reviewed the emergency diesel generator (EDG) design feature to auto-sequence loads to assess its capacity to provide the required emergency power to the bus loads.

b. Findings

(1) Inadequate Procedure for Addressing Non-Functional Mechanical Draft Cooking Tower Fan Motor Brake System

Introduction: The team identified a finding of very-low safety significance (Green) and an associated Non-Cited Violation (NCV) of Title 10 of the *Code of Federal Regulations* (CFR) Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the licensee failure to establish procedures that were appropriate for addressing non-functional MDCT fan motor brakes. Specifically, a license procedure contained instructions for addressing the impact of non-functional MDCT fan motor brakes to the ultimate heat sink (UHS) operability that were inconsistent with applicable TS requirements.

Description: The limiting condition for operations (LCO) of TS 3.7.2, "EECW/Emergency Equipment Service Water [EESW] System and UHS," required, in part, that the UHS be operable in Modes 1, 2, and 3. The associated TS Basis stated that the operability of the UHS, a safety-related structures, systems, and components (SSC), was based, in part, on the operability of the MDCT fans. Revision 20 of the UFSAR, Section 9.2.5.2.2, "Cooling Towers," stated that, "The fans are provided with a brake system to prevent overspeed from the design-basis tornado."

On December 28, 1989, the licensee issued a letter to the NRC titled "Residual Heat Removal Service Water System Mechanical Draft Cooling Tower Fan Brakes," to inform the NRC of their determination of how inoperability of a MDCT fan motor brake should be treated. Specifically, it stated that, "Since the brakes are only required for the fan to function following being struck by a tornado, Detroit Edison [the licensee] believes operability of the fans should be tied to operability of the brakes only when the conditions exist for a tornado." The licensee assumed that the NRC agreed with their interpretation because the NRC did not respond to the letter. As a result, this interpretation was translated into procedure ODE-12, "Operations Department Expectation." Specifically, at the time of this inspection, Revision 36 of ODE-12 stated that, "A tracking LCO shall be written if the MDCT fan brakes are inoperable." It followed by stating that, "If a Tornado Watch or Warning is issued for Monroe County or the immediate surrounding area, the fan (i.e., the associated reservoir) will be declared INOPERABLE per TS 3.7.2."

However, the inspection team noted that this procedure instruction was inconsistent with TS 3.7.2 requirements and associated basis because they did do not address operability on a conditional bases other than the reactor operating Modes. In addition, the team consulted with members of the Office of Nuclear Reactor Regulations and determined that the licensee letter was not submitted for NRC review and approval, and agreed that the licensee position was inconsistent with TS 3.7.2. The licensee did not find any other NRC correspondence regarding this subject. The team was particularly concerned because ODE-12 allowed MDCT fan motor brakes to be non-functional without implementing the applicable TS required actions until weather conditions exist for a tornado, which is the event that the brakes are required to mitigate.

The licensee captured the inspectors concerns in their CAP as CARD 16-26762. As an immediate corrective action, the licensee verified that all MDCT fan brake systems were operational, revised ODE-12 to restore compliance, and issued a night order to notify control room licensed nuclear operators of the revised ODE-12 requirements. In addition, the licensee completed a review of MDCT fan brake data for the last 3 years for potential reportable conditions and found 6 unanalyzed conditions involving

non-functional MDCT fan motor brakes affecting the operability of 1 UHS division at the same time that at least another safety-related SSC was inoperable in the redundant safety division. These discoveries resulted in NRC Event Notifications 52202 and 52214, pursuant 10 CFR 50.72, "Immediate notification requirements for operating nuclear power reactors." Additional proposed corrective actions at the time of this inspection included developing a strategy to respond to future motor fan brake functionality issues and evaluating potential plant modifications to prevent frequent recurring functionality issues involving the motor fan brakes.

Analysis: The team determine that the failure to establish a procedure that was appropriate for addressing non-functional MDCT motor brakes was contrary to 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," and was a performance deficiency. The performance deficiency was determined to be more-than-minor because it was associated with the Mitigating Systems cornerstone attribute of protection against external events and affected the cornerstone objective of ensuring the availability, reliability, and capability of mitigating systems to respond to initiating events to prevent undesirable consequences. Specifically, the inadequate procedure allowed a condition that adversely affected the UHS operability to exist without addressing TS implications, such as timely implementing the applicable TS required actions.

The team determined the finding could be evaluated using the Significance Determination Process (SDP) in accordance with Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings," issued on June 19, 2012. Because the finding impacted the Mitigating Systems cornerstone, the team screened the finding through IMC 0609 Appendix A, "The Significance Determination Process for Findings At-Power," issued on June 19, 2012, using Exhibit 2, "Mitigating Systems Screening Questions." The finding screened as of very-low safety significance (Green) because it did not involve the loss or degradation of equipment or function specifically designed to mitigate a tornado event. Specifically, as discussed in the Description part above, a historic review for the last 12 months revealed that the minimum required number of MDCT fans remained operable to mitigate the consequences of a tornado.

The team did not identify a cross-cutting aspect associated with this finding because it was not confirmed to reflect current performance due to the age of the performance deficiency. Specifically, the procedure instructions for addressing MDCT fan motor brake non-functionality were developed more than 3 years ago.

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality be prescribed by documented instructions or procedures of a type appropriate to the circumstances and be accomplished in accordance with these procedures. The licensee established Revision 36 of ODE-12 as the implementing procedure for providing standard guidance and expectations for preparing and implementing LCOs, an activity affecting quality.

Section 6 of ODE-12 stated, "A tracking LCO shall be written if the MDCT fan brakes are inoperable." It followed by stating that, "If a Tornado Watch or Warning is issued for Monroe County or the immediate surrounding area, the fan (i.e., the associated reservoir) will be declared inoperable per TS 3.7.2." The TS LCO 3.7.2 stated that in Modes 1, 2, and 3, "Two EECW/EESW subsystems and UHS shall be operable." The associated TS Bases stated that the operability of the UHS is based, in part, on the operability of the fans.

Contrary to the above, as of August 25, 2016, the licensee failed to have procedures of a type appropriate to implement TS LCO 3.7.2 when addressing the discovery of functionality issues associated with the MDCT fan motor brakes. Specifically, ODE-12 contained instructions that were based on an incorrect interpretation of TS requirements. As a result, the impact of non-functional MDCT fan motor brakes to TS LCO 3.7.2 was only addressed during imminent tornado conditions as opposed to anytime during Modes 1, 2, and 3.

As an immediate corrective action, the licensee restored compliance by revising Procedure ODE-12 and issuing a night order alerting operators of the change. Thus, the team determined this find did not represent an immediate safety concern.

Because this violation was of very-low safety significance and was entered into the licensee's CAP as CARD 16-26762, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. (NCV 05000341/2016007-01, Inadequate Procedure for Addressing Non-Functional MDCT Fan Motor Brake System)

(2) Failure to Verify the Adequacy of the Voltage Supplied to Transformer #64 Load Tap Changer

Introduction: The team 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 verify the adequacy of the voltage supplied to the transformer #64 load tap changer. Specifically, the licensee did not perform calculations to verify that the load tap changer controls and actuator would have adequate voltage to be able to reset the degraded voltage relays following a DBA.

Description: The licensee performed Revision C of Calculation DC-6447, "Auxiliary Power System Analysis," to evaluate the performance of the alternating current (AC) electrical auxiliary power distribution system. This calculation determined that the recovery voltage would be slightly below the degraded voltage relay reset value. Specifically, it determined that the recovery voltage would require at least one tap change from the load tap changer to reset the degraded voltage relay to prevent interruption from offsite power and reconnection to the EDGs.

However, the team noted that the licensee did not verify that the load tap changer controls and actuator would have adequate voltage to operate after all the auto-started loads have started to be able to reset the degraded voltage relays following a DBA. In addition, the minimum operating voltage necessary to operate the load tap changer controls and actuator was not specified in vendor documents. The team was concerned because the licensee had not ensured the load tap changer would be able to reset the degraded voltage relays following a DBA.

The licensee captured the team concerns in their CAP as CARD 16-26702. The immediate corrective action was to perform an operability evaluation that reasonably determined the voltage would marginally be acceptable to operate the load tap changer controls and actuator. The proposed corrective action to restore compliance at the time of this inspection was to revise the applicable design analyses.

Analysis: The team determined that the failure to verify the adequacy of the voltage supplied to transformer #64 load tap changer was contrary to 10 CFR Part 50, Appendix B, Criterion III, "Design Control," and was a performance deficiency. The performance deficiency was determined to be more-than-minor because it was

associated with the Mitigating Systems cornerstone attribute of design control and affected the cornerstone objective of ensuring the availability, reliability, and capability of mitigating systems to respond to initiating events to prevent undesirable consequences. Specifically, the failure to verify the adequacy of the voltage supplied to transformer #64 load tap changer did not ensure that it would be capable of resetting the degraded voltage relays following a DBA to ensure that the transformer safety-related loads would be available to perform their mitigating functions.

The team determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings," issued on June 19, 2012. Because the finding impacted the Mitigating Systems and Barrier Integrity cornerstones, the team screened the finding through IMC 0609 Appendix A, "The Significance Determination Process for Findings At-Power," issued on June 19, 2012, using Exhibit 2, "Mitigating Systems Screening Questions." The finding screened as of very-low safety significance (Green) because it did not result in the loss of operability or functionality of mitigating systems. Specifically, the licensee performed an operability evaluation that reasonably showed that the voltage would be marginally acceptable to operate the load tap changer controls and actuator when required during a DBA.

The team determined that the associated finding had a cross-cutting aspect in the area of Problem Identification and Resolution because the licensee did not conduct a self-critical and objective assessment of its programs and practices. Specifically, the licensee reviewed the applicability of a similar violation issued to a different licensee during the 2015 CDBI Self-Assessment and concluded that it did not apply to Fermi. [P.6]

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," states, in part, that measures shall be established for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program.

Contrary to the above, as of August 24, 2016, the licensee failed to verify the adequacy of design associated with the safety-related transformer 64 load tap changes. Specifically, the licensee did not verify the adequacy of the voltage supplied to the transformer #64 load tap changer so that it would be capable of resetting the degraded voltage relays following a DBA.

At the time of this inspection, the licensee was still evaluating its planned corrective actions. However, the team determined that the continued non-compliance did not present an immediate safety concern because, as discussed in the Description part above, the licensee reasonably determined the affected SSCs remained operable.

Because this violation was of very-low safety significance and was entered into the licensee's CAP as CARD 16-26702, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. (NCV 05000341/2016007-02, Failure to Verify the Adequacy of the Voltage Supplied to Transformer #64 Load Tap Changer)

(3) Failure to Verify the Ability to Manually Throttle Safety-Related Motor-Operated Valves during a Design Basis Accident

Introduction: The team 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 verify the capability to manually throttle safety-related MOVs during a DBA. Specifically, the licensee did not verify that the protective devices would allow manually throttling safety-related MOVs during a DBA without tripping.

Description: The licensee performed Revision B of Calculation DC-6348 Vol. 1, "QL1 MOV Thermal Overload Heater Sizing," to evaluate thermal overload (TOL) relay and heater size combinations for the various sizes and types of safety-related and nonsafety-related MOVs. However, it stated, "TOL heater sizing for throttling MOVs is not within the scope of this calculation." It further stated, "The generic TOL heater sizing performed in this calculation is based on a methodology that is limited only to MOVs used in non-throttling applications." It also stated, "TOL heater sizing for MOVs used in throttling applications requires additional considerations due to wide variations in the MOV duty cycle and multiple occurrences of MOV motor inrush."

However, the team noted that Calculation DC-6348 evaluated the following MOVs that required throttling following a DBA using the methodology limited only to non-throttling applications: residual heat removal (RHR) heat exchange bypass MOV (i.e., E1150F048A/B), RHR recirculation outboard MOV (i.e., E1150F017A/B), core spray inboard isolation MOV (i.e., E2150F005A/B), and recirculation pump isolation MOV (i.e., B3105F031A/B). The team was concerned that the protective devices associated with these MOVs would potentially trip during a DBA because the licensee sized their associated TOL heaters for only one cycle (i.e., one open-and-close operation), the associated operating procedures did not specify a cycle limit, and operator training had shown these valves would likely be cycled multiple times following a DBA.

The licensee captured the teams concerns in their CAP as CARD 16-26763. The immediate corrective actions were to perform a preliminary protective device evaluation to reasonably determine the maximum number of throttling cycles each MOV can incur without tripping the associated TOL and incorporate these limits into an operations night order. The proposed corrective actions to restore compliance at the time of this inspection included developing a formal calculation to support the valve throttling analysis, updating applicable procedures as necessary, and considering changing TOLs to an alarm function instead of a trip function.

Analysis: The team determined that the failure to verify the capability to manually throttle safety-related MOVs during a DBA is contrary to 10 CFR Part 50, Appendix B, Criterion III, "Design Control," and was a performance deficiency. The performance deficiency was determined to be more than minor because it was associated with the Mitigating Systems cornerstone attribute of design control and affected the cornerstone objective of ensuring the availability, reliability, and capability of mitigating systems to respond to initiating events to prevent undesirable consequences. Specifically, the failure to verify the adequacy of the protective device design and provide guidance or restrictions to operations did not ensure that the safety-related MOVs would be available to throttle the associated mitigating system flows during a DBA.

The team determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings" issued on June 19, 2012. Because the finding impacted the Mitigating Systems and Barrier Integrity cornerstones, the team screened the finding through IMC 0609 Appendix A, "The Significance Determination Process for Findings At Power," issued on June 19, 2012, using Exhibit 2, "Mitigating Systems Screening Questions." The finding screened as of very low safety significance (Green) because it did not result in the loss of operability or functionality of mitigating systems. Specifically, the licensee reasonably determined the maximum number of throttling cycles each MOV can incur without tripping the associated TOL via a preliminary analysis, the expected number of throttling cycles based on operator training experience, and reasonably concluded that tripping would have been unlikely.

The team determined that the associated finding had a cross-cutting aspect in the area of Human Performance because work groups did not communicate and coordinate their activities within and across organizational boundaries to ensure nuclear safety is maintained. Specifically, the engineers that performed Calculation DC-6348, which was approved on December 2013, did not communicate and coordinate with operations or the MOV engineer to determine if the plant had throttling MOVs that required additional analysis. [H.4]

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," states, in part, that measures shall be established for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program.

Contrary to the above, as of August 30, 2016, the licensee failed to verify the adequacy of design associated with the safety-related MOVs with TOL and/or heaters used in throttling applications. Specifically, the licensee failed to verify the capability to manually throttle safety-related MOVs following a DBA without tripping the protective devices.

At the time of this inspection, the licensee was still evaluating its planned corrective actions. However, the team determined that the noncompliance did not present an immediate safety concern because the licensee issued a standing night order to limit the number of MOV operations during a period of time to prevent tripping of the protective devices.

Because this violation was of very-low safety significance and was entered into the licensee's CAP as CARD 16-26763, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. (NCV 05000341/2016007-03, Failure to Verify the Ability to Manually Throttle Safety-Related MOVs during a DBA)

(4) Failure to Periodically Test the Emergency Diesel Generator Capability to Start and Accelerate All of the Sequenced Loads Within the Applicable Limits

Introduction: The team 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 failure to periodically test the EDG capacity to start and accelerate all of the sequenced loads within the applicable limits. Specifically, Surveillance Requirement (SR) activities did not demonstrate that all of the EDG auto-sequenced loads started and accelerated within the applicable voltage and frequency limits during start-up and recovery. In addition, the licensee did not timely evaluate the surveillance data collected for the RHR pump motors.

Description: Appendix A.1.108 of the UFSAR, Revision 20, "Regulatory Guide 1.108 (August 1977, Revision 1), "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants," stated that, "The Fermi 2 EDG design and preoperational and periodic testing meet the intent of this Regulatory Guide except where the Technical Specifications surveillance requirements differ." Position C.2.a.2 of this Regulatory Guide (RG), which UFSAR A.1.108 did not take an exception from, stated that testing of diesel generator units during the Plant Pre-Operational Test Program and at least once every 18 months should demonstrate proper operation for design-accident-loading-sequence to design-load requirements and verify that voltage and frequency are maintained within required limits. The licensee used position C.4 of RG 1.9, Revision 2, "Selection, Design, and Qualification of Diesel Generator Units Used as Standby Electric Power Systems at Nuclear Power Plants," to establish voltage and frequency limits with exceptions. Specifically, UFSAR A.1.9, "Regulatory Guide 1.9," stated, in part, that preoperational test results showed that all loading frequencies, with the exception of the RHR pumps, were within the recovery times allowed by the RG. Position C.4 of RG 1.9 stated, in part, that, "…at no time during the loading sequence should the frequency and voltage decrease to less than 95% of nominal and 75% of nominal respectively." It also stated that, "Frequency should be restored to within 2% of nominal, and voltage should be restored to within 10% of nominal within 60% of each load-sequence time interval." The UFSAR provided further relevant descriptions is Sections 8.3.1.1.8.1, "Standby AC Power System Description," and 8.3.1.2.2.2, "Compliance with Design Criteria."

However, the team noted the following deficiencies related to the EDG periodic testing:

- The licensee was not periodically testing the EDGs capacity to start and accelerate all of the sequenced loads within the applicable RG 1.9 limits. Specifically, SR 3.8.1.17 implementing procedures (i.e., Revisions 43, 47, 47, and 43 of Procedures 24.307.01/02/03/04, respectively, "Emergency Diesel Generator 11/12/13/14 Offsite Power and Emergency equipment Cooling Water [ECCS] Start with Loss of Offsite Power Test") only required evaluation of the test data associated with the RHR pump motor. However, this evaluation did not represent the EDGs capacity to start and accelerate the rest of the sequenced loads because the RG 1.9 voltage and frequency limits exception only applied to the RHR pump motor. As a result, the licensee did not recognize that EDGs 12 and 14 did not meet the RG 1.9 voltage requirements during the start of the core spray pump motors for, at least, the last 3 years.
- The SR 3.8.1.17 implementing procedures and system monitoring plan allowed analyzing the RHR pump motor test data against the applicable limits after considering the SR as satisfactorily accomplished. As a result, the RHR pump motor data collected during the last outage, which occurred 7 months prior to this inspection, had not been evaluated as of the timeframe of this inspection. Also, the RHR pump motor data collected 2 outages ago was evaluated 7 months after approving the completion of the SR as satisfactorily.

The licensee captured the team concerns in their CAP as CARD 16-26535 and CARD 16-26536. The immediate corrective action was to perform an operability evaluation which reasonably determined that EDGs 12 and 14 were operable but nonconforming, in part, because the affected SSCs inspection and maintenance records showed that voltage transients have not resulted in degradation and the as-found transient duration was reasonably expected to have a minimal impact on SSC

performance during the transient. The proposed plan to restore compliance at the time of this inspection included evaluating the other sequenced loading and revising the necessary surveillance procedures and system monitoring plan.

Analysis: The team determined that the failure to periodically test the EDG capacity to start and accelerate all of the sequenced loads within the applicable limits was contrary to 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," and was a performance deficiency. The performance deficiency was determined to be more than minor because it was associated with the Mitigating Systems cornerstone attribute of equipment performance and affected the cornerstone objective of ensuring the availability, reliability, and capability of mitigating systems to respond to initiating events to prevent undesirable consequences. Specifically, the failure to periodically test the EDG capacity to start and accelerate all of the sequenced loads within the applicable limits did not ensure operability of the affected SSCs. Further, this performance deficiency resulted in considering SR 3.8.1.17 as satisfactorily accomplished without analyzing the data collected during, at least, the last 2 surveillances and resulted in the failure to recognize that EDGs 12 and 14 did not meet the RG 1.9 voltage requirements during the start of the core spray pump motors for, at least, the last 3 years.

The team determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings," issued on June 19, 2012. Because the finding impacted the Mitigating Systems and Barrier Integrity cornerstones, the team screened the finding through IMC 0609 Appendix A, "The Significance Determination Process for Findings At-Power," issued on June 19, 2012, using Exhibit 2, "Mitigating Systems Screening Questions." The finding screened as of very low safety significance (Green) because it did not result in the loss of operability or functionality of mitigating systems. Specifically, as discussed in the Description part above, the licensee evaluated the most recent data and reasonably determined that the EDGs and the affected loads were operable.

The team did not identify a cross-cutting aspect associated with this finding because it was not confirmed to reflect current performance due to the age of the performance deficiency. Specifically, the associated SR procedures were established more than 3 years ago.

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion XI, Test Control, requires, in part, that a test program be established to assure that all testing required to demonstrate that SSC will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents. It also stated that test results shall be documented and evaluated to assure that test requirements have been satisfied.

Contrary to the above, as of August 17, 2016, the licensee failed to assure that testing required to demonstrate that the EDGs would perform satisfactorily in service was identified and performed in accordance with written test procedures which incorporated the requirements and acceptance limits contained in applicable design documents, as evidenced by the following examples:

- The licensee did not established a testing program to demonstrate that the EDGs could start and accelerate their sequenced loads other than the RHR pump motors within the applicable acceptance limits; and

- Procedures 24.307.01/02/03/04 and the associated system monitoring plan did not evaluate the RHR pump motor test results to assure that test requirements were satisfied before considering the test satisfactorily completed.

At the time of this inspection, the licensee was still evaluating its planned corrective actions. However, the team determined that the continued noncompliance did not present an immediate safety concern because the licensee reasonably determined the affected SSC remained operable, as discussed in the Description part above.

Because this violation was of very-low safety significance and was entered into the licensee's CAP as CARDs 16-26535 and 16-26536, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. (NCV 05000341/2016007-04, Failure to Periodically Test the EDG Capability to Start and Accelerate All of the Sequenced Loads Within the Applicable Limits)

(5) Failure to Leak Test All Division 2 Non-Interruptible Control Air System Boundary Isolation Valves

Introduction: The team 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's failure to leak test all division 2 NIAS boundary isolation valves. Specifically, the periodic NIAS leak testing did not account for the potential leakage of two valves used to isolate the NIAS safety-related system from the nonsafety-related interruptible control air system.

Description: Revision 20 of UFSAR 9.3.1, "Compressed Air Systems," stated, "The control air compressors, aftercoolers, dryers, and receiver tanks are provided to supply air to some of the engineered safety feature (ESF) equipment in the plant when the normal supply of control air is not available." It also stated, "Because the non-interruptible portion of the control air system [NIAS] provides control air to ESF equipment, it is classified as a safety-related system." Examples of supported ESF equipment included standby gas treatment, EECW, control center air conditioning, and high pressure coolant injection systems.

The licensee performed Revision H of Calculation DC-4931 Vol. I, "Non-Interruptible Control Air System Calculations," to review the adequacy of the NIAS system design. This calculation evaluated, in part, the NIAS receiver capability to supply adequate pneumatic pressure during the early stage of a loss of off-site power (LOOP) when the EDGs have not yet restored power to the NIAS compressors. This evaluation assumed, in part, that the NIAS isolation valves were closed to isolate the NIAS boundary from the interruptible control air system. In addition, it assumed a combined maximum out-leakage value for the NIAS isolation valves, which was intended to be periodically verified via Test Procedures 24.129.04, "Control Air Valve Operability/Position Indication Verification/Isolation Integrity Test," Revision 24, and 24.129.05, "Division 2 NIAS Leakage/Usage – Compressor Performance Test," Revision 9.

However, the team noted that Test Procedures 24.129.04 and 24.129.05 were not leak testing all division 2 NIAS boundary isolation valves. Specifically, these tests did not establish a differential pressure across valves P5000F403 and P5000F284. In addition, Part 5 of Fermi 2 IST Program, "IST Valve Scope Table," Revision 0, categorized P5000F403 as Category B, which is assigned to those valves for which seat leakage in the closed position is inconsequential for fulfillment of the required function. The team was concerned because the licensee was not verifying a critical assumption of the NIAS system design review and, thus, the adequacy of the design was not ensured.

The licensee captured the team concerns in their CAP as CARD 16-26389. The immediate corrective action was to evaluate NIAS division 2 functionality by reviewing recent test results and data from a recent event (i.e., September 2015) that resulted in interruptible control air system isolation and depressurization. This review reasonably determined that division 2 of NIAS leakage was within design limits and, thus, the system train remained functional. The proposed corrective actions to restore compliance at the time of this inspection included plant modifications to facilitate future leakage test and updating all necessary design documentation.

Analysis: The team determined that the failure to leak test all division 2 NIAS boundary isolation valves was contrary to 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," and was a performance deficiency. The performance deficiency was determined to be more-than-minor because it was associated with the Mitigating Systems cornerstone attribute of equipment performance and affected the cornerstone objective of ensuring the availability, reliability, and capability of mitigating systems to respond to initiating events to prevent undesirable consequences. In addition, it was associated with the Barrier Integrity cornerstone attribute of SSC and barrier performance and affected the cornerstone objective of providing reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. Specifically, the failure to verify that the system leakage of division 2 of NIAS is within the applicable design analysis limits did not ensure that it will be capable of providing adequate control air to its supported ESF equipment. The Division 2 of NIAS supported mitigating and barrier systems.

The team determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings," issued on June 19, 2012. Because the finding impacted the Mitigating Systems and Barrier Integrity cornerstones, the team screened the finding through IMC 0609 Appendix A, "The Significance Determination Process for Findings At-Power," issued on June 19, 2012, using Exhibit 2, "Mitigating Systems Screening Questions," and Exhibit 3, "Barrier Integrity Screening Questions. The finding screened as of very-low safety significance (Green) because it did not result in the loss of operability or functionality of mitigating systems. Specifically, the licensee used available data from a recent event and reasonably determined that system out-leakage was within the design limit. In addition, with respect to the Barrier Integrity cornerstone, the finding only represented a potential degradation of the control room and standby gas ventilation systems.

The team did not identify a cross-cutting aspect associated with this finding because it was not confirmed to reflect current performance due to the age of the performance deficiency. Specifically, the test procedures were established more than 3 years ago.

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," requires, in part, that a test program be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents.

Contrary to the above, as of August 12, 2016, the licensee failed to assure that testing required to demonstrate that the NIAS Division 2 system would perform satisfactorily in service was identified and performed in accordance with written test procedures which incorporated the requirements and acceptance limits contained in applicable design documents. Specifically, Test Procedures 24.129.04 and 24.129.05 did not demonstrate that the overall safety-related NIAS Division 2 system leakage was within the leakage limit contained in the system design documents.

At the time of this inspection, the licensee was still evaluating its planned corrective actions. However, the team determined that the continued noncompliance did not present an immediate safety concern because the licensee reasonably determined that overall NIAS Division 2 leakage was within the design limits.

Because this violation was of very low safety significance and was entered into the licensee's CAP as CARD 16-26389, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. (NCV 05000341/2016007-05, Failure to Leak Test All Division 2 NIAS Boundary Isolation Valves)

(6) Failure to Ensure that the Main Steam Isolation Valves Would Close Within the Technical Specification Required Timeframe and as Described in the Updated Final Safety Analysis Report

Introduction: The team 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 licensee's failure to ensure that the MSIVs would close within the TS time requirements and with the motive forces described in the UFSAR. Specifically, the SR procedures did not account for the steam flow closing force, accumulator pressure variances, and containment pressure when verifying that the MSIVs will close within the SR time acceptance criteria. In addition, the licensee had not demonstrated that the MSIVs would close with air pressure and/or spring force against peak containment pressure as described in the UFSAR.

Description: The TS SR 3.6.1.3.7 required periodically verifying that each MSIV isolation time was within 3 to 5 seconds to demonstrate MSIV operability, in part, in Modes 1, 2, and 3. The associated TS Basis stated, "The minimum stroke time ensures that isolation does not result in a pressure spike more rapid than assumed in the transient analyses." The maximum stroke time protected the 10.5 second value assumed in the main steam line break accident analysis described in Revision 18 of UFSAR 3.6.2.2.1.2.2, "Pressurization and Environmental Analysis," which ensured that the calculated radiological consequences of the events remained within the 10 CFR Part 100 and 10 CFR Part 50.67 limits. The licensee implemented this SR in Modes 4 or 5 through Procedure 24.137.03, "Main Steam Line Valve Operability Test," Revision 39. However, the team noted the following deficiencies related to the SR procedure:

- The test did not account for the steam flow closing force. Specifically, this test was performed in Modes 4 or 5 without steam flowing through the tested MSIV. However, during limiting design basis conditions, steam would flow over the valve seat increasing the closing force applied to the valve and, consequently, shortening its closure time. The team was concerned because the SR procedure acceptance criteria would accept an MSIV closure of 3 seconds during test conditions and this may result in an MSIV closure of less than 3 seconds during accident conditions resulting in a pressure spike more rapid than assumed in the transient analyses.

- The procedure did not account for the MSIV accumulator air pressure variability. Specifically, while accumulator pressure was allowed to vary, the SR procedure did not consider the pressure during testing to ensure test results would bound the allowed pneumatic pressure band. The team was concerned because accumulator pressure values that are higher and lower than the test accumulator pressure value would result in faster and slower valve closure times, respectively, which had the potential to invalidate the test results.

- The procedure did not account for accident containment pressure. Specifically, when the inboard MSIVs have a shut demand, the under-piston area is vented to containment and the over-piston area is supplied with accumulator pressure. However, the procedure did not consider that the predicted post-LOCA maximum containment pressure was approximately 50 psig higher than the test containment pressure. The team was concerned because the over-piston relative pressure assisting valve closure could be significantly less during some accident conditions than during testing.

The licensee captured the team concerns in their CAP as CARD 16-27189. The immediate corrective action was to perform operability evaluation EFA-B21-16-005, which reasonably concluded that the influence of all possible differences between operating and testing conditions would not adversely affect the most recent test results. Therefore, the licensee concluded that the MSIVs were operable. At the time of this inspection, the licensee was still developing a plan to restore compliance.

In addition to the issues discussed above, the team identified that the licensee had failed to demonstrate that under limiting design basis conditions, the MSIVs would shut with the motive forces described in the UFSAR. Specifically, Revision 20 of UFSAR 5.5.5, "Main Steam Line Isolation Valves," stated, "The MSIVs shall use local stored energy (compressed air and/or springs) to close at least one isolation valve in each steam pipeline…" In addition, Revision 20 of UFSAR 7.3.2.2.6, "Isolation Valve Closing Devices," stated "Gas pressure, acting alone, and the force exerted by the spring, acting alone, are each capable of independently closing the valve." It also stated, "The isolation valves inside the primary containment (inboard) are designed to close under either pneumatic pressure or spring force with the vented side of the piston operator at the containment peak pressure." However,

- Revision 7 of Calculation DC 0469 Vol. 1, "Essential Accumulators for Class I Valves (MSIVs, ADS SRVs, LLS SRVs)," concluded that the minimum MSIV accumulator pressure setpoint was inadequate to close the MSIV with gas pressure alone. The team was concerned because the MSIVs were not assured to close with air as described in the UFSAR to protect the public from

radionuclide releases caused by accidents or events. Because the licensee did not capture this condition when it was originally discovered in the CAP and implemented corrective actions, this technical issue was also associated with the performance deficiency discussed in Section 4OA2.1.c(3) of this Inspection Report.

- The licensee had not demonstrated, such as by calculation or testing, that the inboard MSIVs were capable of closing with spring force acting alone while the vented side of the piston operator was subjected to peak containment pressure as described in the UFSAR. As a result of the team's questions, the licensee performed a basic force balance assuming a containment pressure of 50 psig and determined that the MSIV spring force acting alone would not be able to close the inboard MSIVs. Specifically, the licensee determined that approximately 22.5 psig of pneumatic pressure in the accumulator would be needed to assist the spring force in closing the MSIVs. Again, the team was concerned because the MSIVs were not assured to close with spring force as described in the UFSAR.

The licensee captured these concerns in their CAP as CARD 16-26697. As an immediate corrective action, the licensee performed an evaluation that reasonably concluded the MSIVs remained operable because pneumatic, spring, and steam flow force would be available to closure the MSIVs within the specified TS time. At the time of this inspection, the licensee was still developing a plan to restore compliance.

Analysis: The team determined that the failure to ensure that the MSIVs would close within the TS time requirements and as described in the UFSAR was a performance deficiency and was contrary to 10 CFR Part 50, Appendix B, Criterion III, "Design Control". The performance deficiency was determined to be more-than-minor because it was associated with the Initiating Event cornerstone attribute of design control and adversely affected 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. Specifically, the licensee had to perform additional analysis to ensure that the MSIVs fastest isolation time would not result in a pressure spike more rapid than assumed in the transient analyses. In addition, it was determined to be more-than-minor because it was associated with the Barrier Integrity cornerstone attribute of design control and affected the cornerstone objective of providing reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events. Specifically, the failure to ensure that the MSIVs would close within the TS time requirements and as described in the UFSAR did not provide reasonably assurance the MSIVs would function consistent with the applicable safety analyses to ensure that the calculated radiological consequences of the events remain within the 10 CFR Part 100 and 10 CFR 50.67 limits.

The team determined that the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," dated April 29, 2015, and Attachment 0609.04, "Initial Characterization of Findings," dated June 19, 2012. Because this finding was associated with the Initiating Event and the Barrier Integrity cornerstones, the team screened the finding through IMC 0609 Appendix A, "The Significance Determination Process for Findings At-Power," using both Exhibit 1, "Initiating Events Screening Questions", and Exhibit 3, "Barrier Integrity Screening

Questions." The finding screened as of very low safety significance (Green) because it did not result in exceeding the reactor coolant system leak rate for a small LOCA or affected other systems used to mitigate a LOCA. In addition, it did not represent an actual open pathway in the physical integrity of reactor containment, containment isolation system, or heat removal components, and it did not involve an actual reduction in the function of hydrogen igniters in the reactor containment.

The team did not identify a cross-cutting aspect associated with this finding because it was not reflective of current performance. Specifically, the most significant cause for the performance issues discussed had existed for at least 3 years.

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," states, in part, that measures shall be established for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program. The licensee established SR Procedure 24.137.03 to periodically verify that each MSIV isolation time was within 3 to 5 seconds to demonstrate MSIV operability and consistency with UFSAR-described analyses. In addition, Revision 20 of UFSAR 7.3.2.2.6 stated, "Gas pressure, acting alone, and the force exerted by the spring, acting alone, are each capable of independently closing the valve." It also stated, "The isolation valves inside the primary containment (inboard) are designed to close under either pneumatic pressure or spring force with the vented side of the piston operator at the containment peak pressure."

Contrary to the above, as of September 9, 2016, the licensee failed to verify the adequacy of the MSIVs design as evidenced by the following examples:

- SR Procedure 24.137.03 did not demonstrate the MSIVs safety function to close within 3 to 5 seconds because it failed to account for consequential differences between the operating and testing conditions; and

- The licensee failed to demonstrate that gas pressure, acting alone, and the force exerted by the spring, acting alone, were each capable of independently closing the MSIVs and, in the case of the inboard MSIVs, with the vented side of the piston operator at the containment peak pressure as described in the UFSAR.

The licensee is still evaluating its planned corrective actions. However, the team determined that the continued noncompliance did not present an immediate safety concern because the licensee reasonable determined that the MSIVs were operable, as discussed in the Description part above.

Because this violation was of very low safety significance and was entered into the licensee's CAP as CARDs 16-26697 and 16-27189, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. (NCV 05000341/2016007-06, Failure to Ensure that the MSIVs Would Close Within the TS Required Timeframe and as Described in the UFSAR)

.4 Operating Experience

a. Inspection Scope

The team reviewed three operating experience issues (i.e., samples) to assess the licensee evaluation and resolution of NRC generic concerns. The operating experience issues listed below were reviewed as part of this inspection:

- Information Notice 2012-06, "Ineffective Use of Vendor Technical Recommendations;"
- RIS 2011-12, "Adequacy of Station Electrical Distribution System Voltages," Revision 1; and
- Bulletin 96-03, "Potential Plugging of Emergency Core Cooling Suction Strainers by Debris in Boiling-Water Reactors."

b. Findings

(1) Failure to Ensure that Protective Devices for the Loads Required at the Beginning of a Loss of Coolant Accident Would Not Trip Under Degraded Voltage Conditions

Introduction: The team 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 licensee's failure to ensure that the protective devices for the loads required at the beginning of a LOCA would not trip under degraded voltage conditions. Specifically, the licensee did not verify that the connected Class 1E loads would not be damaged or become unavailable during a LOCA concurrent with a degraded voltage condition between the degraded voltage dropout setting and the loss of voltage setting for the degraded voltage time delay of 7.3 seconds and subsequent reconnection to the EDG.

Description: Section 8.2.2.5.3 of the UFSAR, Revision 19, "Response to Degraded Grid Condition," stated that, "The time delay for the actuation of the degraded grid undervoltage relay has been selected to be as short as possible, without encountering spurious trips from motor starting." It also stated that, "A second, shorter time delay exists for the actuation of the degraded grid undervoltage relay with a concurrent LOCA." It followed by stating that, "This second time delay was established to support Branch Technical Position PSB1 Position B.1.b.1." NRC Branch Technical Position PSB-1, "Adequacy of Station Electrical Distribution System Voltages," dated July 1981, Position B.1.b.1, stated, in part, "In addition to the undervoltage scheme provided to detect loss of offsite power at the Class 1E buses, a second level of undervoltage protection with time delay should also be provided to protect the Class 1E equipment…" This was consistent with Revision 1 of NRC RIS 2011-12, "Adequacy of Station Electric Distribution System Voltages," which stated, "The time delay chosen should be optimized to ensure that permanently connected Class 1E loads are not damaged under sustained degraded voltage conditions (such as a sustained degraded voltage below the DVR [degraded voltage relays] voltage setting(s) for the duration of the time delay setting)."

The licensee performed Revision C of Calculation DC-6447, "Auxiliary Power System Analysis," to, in part, evaluate the AC electrical auxiliary power distribution system response to a degraded grid condition. However, the team noted that it failed to verify

that connected Class 1E loads would not be damaged or become unavailable during a DBA concurrent with a degraded voltage condition between the degraded voltage dropout setting and the loss of voltage setting for the degraded voltage time delay of 7.3 seconds and subsequent reconnection to the EDG. Specifically, the protective device and TOL relay designs of safety-related loads that would be either running or required to start during an DBA had not been evaluated to ensure they would remain closed prior to and after the transfer to the EDG source for a degraded grid condition coincident with a DBA. In addition, the control power circuits for the Class 1E accident-initiated safety-related motors were not evaluated. As a result, the licensee did not ensure that the associated control circuit fuse sizing provided adequate protection without needless interruption if the motor starters have insufficient voltage to pick-up during the degraded voltage timeout period.

The licensee captured the inspectors concerns in their CAP as CARD 16-26533. The immediate corrective action was to perform a preliminary evaluation of the critical MOVs and motors that operate during the first 7.3 seconds of a LOCA and reasonably determined that protective devices would not actuate during this condition. In addition, the licensee initiated an action to develop a plan to restore compliance.

Analysis: The team determined that the failure to ensure that the protective devices for the loads required at the beginning of a LOCA would not trip under degraded voltage conditions was contrary to 10 CFR Part 50, Appendix B, Criterion III, "Design Control," and was a performance deficiency. The performance deficiency was determined to be more-than-minor because it was associated with the Mitigating Systems cornerstone attribute of design control and affected the cornerstone objective of ensuring the availability, reliability, and capability of mitigating systems to respond to initiating events to prevent undesirable consequences. Specifically, the failure to ensure that the protective devices for the loads required at the beginning of a LOCA would not trip under degraded voltage conditions did not ensure that these loads would be available to perform their mitigating functions.

The team determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings," issued on June 19, 2012. Because the finding impacted the Mitigating Systems cornerstone, the team screened the finding through IMC 0609 Appendix A, "The Significance Determination Process for Findings At-Power," issued on June 19, 2012, using Exhibit 2, "Mitigating Systems Screening Questions." The finding screened as of very-low safety significance (Green) because it did not result in the loss of operability or functionality of mitigating systems. Specifically, the licensee performed an operability evaluation and reasonably determined that protective devices would not actuate during a degraded voltage concurrent with a LOCA.

The team determined that the associated finding had a cross-cutting aspect in the area of Problem Identification and Resolution because the licensee did not conduct a self-critical and objective assessment of its programs and practices. Specifically, the licensee evaluated a similar violation issued at a different licensee during the 2016 CDBI Self-Assessment and concluded that no corrective actions were required. [P.6]

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," states, in part, that measures shall be established for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program.

Contrary to the above, as of August 17, 2016, the licensee failed to verify the adequacy of design associated with the safety-related protective devices for the loads required at the beginning of a LOCA. Specifically, the licensee did not verify that the protective devices would not trip during tripping these devices under degraded voltage conditions, which would render the affected loads nonfunctional.

At the time of this inspection, the licensee was still evaluating its planned corrective actions. However, the team determined that the continued noncompliance did not present an immediate safety concern because the licensee reasonably determined the affected SSCs remained operable, as discussed in the Description part above.

Because this violation was of very-low safety significance and was entered into the licensee's CAP as CARD 16-26533, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. (NCV 05000341/2016007-07, Failure to Ensure that Protective Devices for the Loads Required at the Beginning of a LOCA Would Not Trip Under Degraded Voltage Conditions)

(2) Inadequate Containment Debris Inspections Acceptance Criteria

Introduction: The team identified a finding of very-low safety significance (Green) and an associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the licensee's failure to establish procedures that were appropriate to inspect containment debris. Specifically, the ECCS suction strainer and containment coating inspection procedures contained acceptance criteria that was inconsistent with the applicable design documents.

Description: On May 6, 1996, the NRC issued Bulletin 96-03, "Potential Plugging of Emergency Core Cooling Suction Strainers by Debris in Boiling-Water Reactors," to request addressees, in part, to implement appropriate procedural measures and plant modifications to minimize the potential for clogging of ECCS suction strainers by debris generated during a LOCA and to provide a response describing these actions. The licensee provided their initial response in letter to the NRC titled "Detroit Edison 180-Day Response for NRC Bulletin 96-03," dated November 1, 1996. It stated, "As described in the 30-day response to NRC Bulletin 95-02 (Reference 5), Fermi 2 committed to visually inspecting the suppression pool strainers during each refueling outage and having a process in place to determine when suppression pool cleaning is needed." It also stated, "It should be noted that the present process of determining whether suppression pool cleaning is required is based on factors in addition to strainer performance, such as periodic torus coating inspections and repair." The licensee provided their final response in letter to the NRC titled "Detroit Edison's 30-Day Report for Confirming Completion of NRC Bulletin 96-03 Requested Actions," dated November 13, 1998. This response stated, in part, that, "Detroit Edison [the licensee] implemented appropriate procedural measures for ensuring adequate cleaning of the suppression pool and operability of the strainer;…"

However, the team noted the following examples of nonconservative acceptance criteria contained in procedures intended to ensure adequate cleaning of the suppression pool and operability of the strainers:

- PM Events T242 and T232, “Inspection of Div. 1/2 Torus Suction Strainers,” contained a nonconservative acceptance criterion for strainer surface area blockage. Specifically, these procedures, which were intended to inspect the suction strainers, stated, “If any strainer is found with greater than an estimated 25% surface area coverage (debris accumulation) then evaluate the potential impact of suppression pool cleanliness on continued operability of the pumps during the next cycle.” However, the applicable calculations (i.e., DC-0230 Vol. 1, “Hydraulic Calculations for the Core Spray System,” Revision K, and DC-0367 Vol. 1, “Hydraulic Calculations for the RHR System,” Revision Q) did not account for pre-loaded debris. The team was concerned because the procedures would allow an unanalyzed strainer loading condition. The licensee captured this concern in the CAP as CARD 16-26128.

- Procedure 43.000.019, “Primary Containment Inspection,” Revision 7, contained nonconservative acceptance criteria for containment coating flaking and peeling. Specifically, this procedure was established, in part, to detect degraded coatings that may fail during a DBA and be transported to the ECCS suction strainers. The acceptance criteria contained in Enclosure A allowed flaking standard No. 6 or smaller as specified in ASTM D772, “Standard Method of Evaluating Degree of Flaking (Scaling) of Exterior Paints,” and peeling that did not indicate degradation of the base metal and/or allow moisture to collect. However, containment coatings considered DBA qualified/acceptable (i.e., those assumed to remain attached to the base metal during a DBA) were DBA tested in accordance with the 1972 revision of ANSI 101.2, “Protective Coatings (Paints) for Light Water Nuclear Reactor Containment Facilities,” which did not permit flaking or peeling. The team was concerned because the procedure allowed degraded coatings that may represent an unanalyzed strainer debris source. The licensee captured this concern in the CAP as CARD 16-26585.

The licensee also captured both concerns in their CAP as CARD 16-26947. As an immediate corrective action, the licensee assessed the immediate safety impact of these concerns by reviewing recent inspection results and comparing them against appropriate acceptance criteria. The licensee reasonably determined that the concerns did not impact the affected SSCs functionality. The proposed corrective actions to restore compliance at the time of this inspection was to revise the affected procedures.

Analysis: The team determined that the failure to establish procedures that were appropriate to inspect containment debris was contrary to 10 CFR Part 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” and was a performance deficiency. The performance deficiency was determined to be more-than-minor because it was associated with the procedure quality attribute of the Mitigating Systems cornerstone, and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, this failure did not ensure that the ECCS suction strainers would be capable of providing an adequate water source to their ECCS pumps because the affected procedures would allowed debris conditions that were not bounded by the associated design analysis and qualification documents.

The team determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings," issued on June 19, 2012. Because the finding impacted the Mitigating Systems cornerstone, the inspectors screened the finding through IMC 0609 Appendix A, "The Significance Determination Process for Findings At-Power," issued on June 19, 2012, using Exhibit 2, "Mitigating Systems Screening Questions." The finding screened as of very-low safety significance (Green) because it did not result in the loss of operability or functionality of mitigating systems. Specifically, as discussed in the Description part above, a review of recent inspection did not find a condition that reasonably challenged the applicable design analysis. In addition, all loose material identified during the inspections was removed.

The team did not identify a cross-cutting aspect associated with this finding because it was not confirmed to reflect current performance due to the age of the performance deficiency. Specifically, the affected procedures were established more than 3 years ago.

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

Contrary to the above, as of August 19, 2016, the licensee failed to include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished for the two safety-related instructions or procedures.

- Containment Coatings: PM Events T232 and T242 failed to include an as-found strainer inspection acceptance criterion that was not contained in the associated design documents.

- ECCS Suction Strainers: Procedure 43.000.019 contained as-found coating inspection acceptance criteria for flaking and peeling that were inconsistent with the applicable coating DBA qualification documents and, thus, did not address the potential for coating debris generation and transport to the strainers.

At the time of this inspection, the licensee was still evaluating its planned corrective actions. However, the team determined that the continued noncompliance did not present an immediate safety concern because the licensee reasonably determined the affected SSCs remained operable, as discussed in the Description part above.

Because this violation was of very-low safety significance and was entered into the licensee's CAP as CARD 16-26585, CARD 16-26128, and CARD 16-26947, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. (NCV 05000341/2016007-08, Inadequate Containment Debris Inspections Acceptance Criteria)

(3) Failure to Evaluate the Acceptability of Drywell Coatings with Respect to Potential Emergency Core Cooling System Suction Strainer Blockage

Introduction: The team 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 licensee's failure to evaluate the acceptability of drywell coatings with respect to potential ECCS suction strainer blockage. Specifically, the licensee had not ensured that Carbo Zinc 11 would remain attached to the base metal during a DBA and the ECCS suction strainer calculations did not account for this material as a potential source of debris blockage.

Description: In June 1985, the licensee performed Revision 4 of DECO-12-2191, "Evaluation of Containment Coatings for Fermi 2," to evaluate primary containment coatings in response to, in part, comments expressed by the NRC on the amount of unqualified coatings. It stated that, "Even though a specific effort was made to document the CZ-11 [Carbo Zinc 11] application in accordance with the Fermi 2 QA Manual, a current inspection of the existing documentation reveals deficiencies when gauged against current criteria." It also stated, "These deficiencies in documentation, however, do not adversely affect the primary function of corrosion protection. However, with respect to ECCS suction strainer blockage concerns, it stated, "For the purpose of this assessment, however, the CZ-11 [Carbo Zinc 11] coatings are evaluated as unqualified coatings." It further concluded that this coating system would fail during a LOCA in particles of a size less than 20 microns and, thus, would not clog the strainers.

On May 6, 1996, the NRC issued Bulletin 96-03, "Potential Plugging of Emergency Core Cooling Suction Strainers by Debris in Boiling-Water Reactors," to request addressees, in part, to implement appropriate plant modifications to minimize the potential for clogging of ECCS suction strainers by debris generated during a LOCA and to provide a response describing these actions. The licensee provided their responses in letters to the NRC titled "Detroit Edison 180-Day Response for NRC Bulletin 96-03," dated November 1, 1996, and "Detroit Edison's 30-Day Report for Confirming Completion of NRC Bulleting 96-03 Requested Actions," dated November 13, 1998. These letters described, in part, the large passive ECCS strainers replacement designed using the final version of the Boiling Water Reactor Owners' Group (BWROG) Utility Resolution Guidance document (URG). The NRC endorsed the URG with exceptions in "Safety Evaluation for NEDO-32686, Rev. 0, "Utility Resolution Guidance Document for ECCS Suction Strainer Blockage," dated August 20, 1998.

On July 14, 1998, the NRC issued Generic Letter 98-04, "Potential for Degradation of the Emergency Core Cooling System and the Containment Spray System after a Loss-of-Coolant Accident Because of Construction and Protective Coating Deficiencies and Foreign Material in Containment," to, in part, alert the addressees to the problems associated with the material condition of Service Level 1 protective coatings inside the containment. The Generic Letter defined Service Level 1 coatings as those used in areas where coating failure could adversely affect the operation of post-accident fluid systems and, thereby, impair safe shutdown. The Generic Letter also requested information to evaluate the addressees' programs for ensuring that Service Level 1 protective coatings inside containment do not detach from their substrate during a LOCA and interfere with the operation of the ECCS and the safety-related containment spray system. The licensee provided their initial response in letter to the NRC titled "Detroit Edison's 120 Day Response to Generic Letter No. 98-04," dated November 11, 1998. It

stated that, “Fermi 2 has a licensing basis requirement to track the amount of unqualified coatings inside the containment (Ref. UFSAR Table 6.2-8, “Primary and Secondary Containments Surface Coating Schedule”) and for assessing the impact of potential coating debris on the operation of safety-related SSCs during a postulated design basis LOCA.” It also stated that, “In response to NRC Bulletin 96-03, large passive replacement ECCS strainers were installed at Fermi 2 in September 1998.” In addition, it stated “The design input to the ECCS strainer calculations for the amount of unqualified coatings, qualified coatings in steam/water jet zone of influence, and degraded qualified coatings in the containment (as identified from periodic visual inspections) is documented in the new ECCS strainer hydraulic calculations.”

The team noted that, as of the time of this inspection, the licensee had not ensured that Carbo Zinc 11 coatings would not detach from its substrate during a LOCA and interfere with the operation of the ECCS and the safety-related containment spray system. Specifically, the URG determined, in part, that particles affect strainer head loss when combined with fibrous debris. However, the licensee’s post-Bulletin 96-03 and post-Generic Letter 98-04 documentation did not revisit the DECO-12-2191 position that coating particles of a size less than 20 microns would not clog the strainers. The team was particularly concerned because Revision 19 of UFSAR Table 6.2-8 indicated that 15,841 pounds of unqualified Carbo Zinc 11 coatings were installed in the drywell. However, calculation 0000-0155-4058, “Detroit Edison Energy Company Enrico Fermi Nuclear Plant ECCS Strainer Head Loss Evaluation Study,” Revision 0, which documented the new ECCS strainer head loss evaluations, only assumed 161 pounds of unqualified coatings.

The licensee captured the team concerns in their CAP as CARD 16-26581. As an immediate corrective action, the licensee reasonably determined that the affected coating system would remain adhered during a LOCA by comparing Carbo Zinc 11 installation documents against DBA test reports for this coating. The proposed corrective action to restore compliance at the time of this inspection was to formally document the acceptability of Carbo Zinc 11 in design basis documents and supporting design analyses.

Analysis: The team determined that the failure to evaluate the acceptability of drywell coatings with respect to potential ECCS suction strainer blockage was contrary to 10 CFR Part 50, Appendix B, Criterion III, “Design Control,” and was a performance deficiency. The performance deficiency was determined to be more-than-minor because it was associated with the Mitigating Systems cornerstone attribute of design control and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the design analyses did not ensure the ECCS capability to provide their mitigating function because they did not ensure that Carbo Zinc 11 coatings would not clog the ECCS suction strainers during a DBA. The amount of Carbo Zing 11 installed within primary containment was approximately 98 times larger than the amount of coating debris assumed by the applicable design basis analysis and this coating system had not been DBA qualified.

The team determined the finding could be evaluated using the SDP in accordance with IMC 0609, “Significance Determination Process,” Attachment 0609.04, “Initial Characterization of Findings,” issued on June 19, 2012. Because the finding impacted the Mitigating Systems cornerstone, the inspectors screened the finding through IMC 0609

Appendix A, “The Significance Determination Process for Findings At-Power,” issued on June 19, 2012, using Exhibit 2, “Mitigating Systems Screening Questions.” The finding screened as of very-low safety significance (Green) because it did not result in the loss of operability or functionality of mitigating systems. Specifically, the licensee compared Carbo Zinc 11 installation documents against DBA test reports for this coating and reasonably concluded that this coating system would remain adhered in the event of a LOCA.

The team did not identify a cross-cutting aspect associated with this finding because it was not confirmed to reflect current performance due to the age of the performance deficiency. Specifically, the associated evaluations were performed more than 3 years ago.

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion III, “Design Control,” requires, in part, that the licensee provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program.

Contrary to the above, from the time the ECCS strainers were installed to August 10, 2016, the licensee failed to verify the adequacy of design of the ECCS with respect to clogging and associated peeling of Carbo Zinc 11 coating during a LOCA. Specifically, the licensee did not evaluate the Carbo Zinc 11 performance in the presence of fibrous debris to determine if it would have adverse effects on the reliable performance of the ECCS under LOCA conditions.

At the time of this inspection, the licensee was still evaluating its planned corrective actions. However, the team determined that the continued noncompliance did not present an immediate safety concern because the licensee reasonably determined that the affected coating system would remain adhered during a LOCA, as discussed in the Description part above.

Because this violation was of very-low safety significance and was entered into the licensee’s CAP as CARD 16-26581, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. (NCV 05000341/2016007-09, Failure to Evaluate the Acceptability of Drywell Coatings with Respect to Potential ECCS Suction Strainer Blockage)

(4) No-Conservative Emergency Core Cooling System Suction Strainer Min-K Combined Generation and Transport Factors

Introduction: The team 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 licensee’s failure to use the min-K insulation debris generation and transport factors contained in the ECCS suction strainer licensing basis. Specifically, the licensee used non-conservative min-K insulation debris generation and transport factor values.

Description: On May 6, 1996, the NRC issued Bulletin 96-03, "Potential Plugging of Emergency Core Cooling Suction Strainers by Debris in Boiling-Water Reactors," to request addressees, in part, to implement appropriate plant modifications to minimize the potential for clogging of ECCS suction strainers by debris generated during a LOCA and to provide a response describing these actions. The licensee provided their responses in letters to the NRC titled "Detroit Edison 180-Day Response for NRC Bulletin 96-03," dated November 1, 1996, and "Detroit Edison's 30-Day Report for Confirming Completion of NRC Bulleting 96-03 Requested Actions," dated November 13, 1998. These letters described, in part, the large passive ECCS strainers replacement designed using the final version of the BWROG URG. The NRC endorsed the URG with exceptions in "Safety Evaluation for NEDO-32686, Rev. 0, "Utility Resolution Guidance Document for ECCS Suction Strainer Blockage," dated August 20, 1998.

Section 3.2.3.2 of the URG, "Transport Considerations – Piping Insulation," stated, "The BWROG has established a conservative approach to determine the amount of debris originating in the drywell which is transported to the suppression pool as a result of a LOCA." It also stated, "For ease of use in the evaluation of strainer head loss, the debris generation and transport factors have been combined, as shown in Table 5 for saturated steam breaks and Table 6 for saturated water breaks." Both tables indicated that the combined debris generation and transport factor value for min-K insulations was 1.0. The NRC safety evaluation for the URG endorsed this approach. However, the team noted that calculation DC-5979 Vol. I, "Estimation of Debris Sources for ECCS Suction Strainers," Revision 0, used a combined min-K insulation generation and transport factor value of 0.24. The calculation discussed an NRC public presentation as the basis for this value. However, at the time of this inspection, the licensee was unable to locate this reference or provide an alternative technical justification. In addition, the team noted that the URG as endorsed by the NRC was the applicable licensing basis. Thus, the team was concerned because the ECCS suction strainer hydraulic calculations did not account for the head loss effects of 76 percent of the min-K insulation located within the pipe break zone of influence.

The licensee captured the team concerns in their CAP as CARD 16-26800. As an immediate corrective action, the licensee performed an operability evaluation and reasonably determined that, based on industry test data, the existing calculation had sufficient conservatism to accommodate the effects of the additional debris volume. The proposed corrective action to restore compliance at the time of this inspection was to revise design analyses, remove excess insulation material, or change their licensing basis.

Analysis: The team determined that the failure to use the min-K insulation debris generation and transport factors contained in the ECCS suction strainer licensing basis was contrary to 10 CFR Part 50, Appendix B, Criterion III, "Design Control," and was a performance deficiency. The performance deficiency was determined to be more-than-minor because it was associated with the Mitigating Systems cornerstone attribute of design control and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the design calculations did not ensure the ECCS capability to provide their mitigating function because they did not evaluate all of the potential debris volume that could be generated and transported to the suction strainers. The min-K insulation debris volume was underestimated by 76 percent.

The team determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings," issued on June 19, 2012. Because the finding impacted the Mitigating Systems cornerstone, the inspectors screened the finding through IMC 0609 Appendix A, "The Significance Determination Process for Findings At-Power," issued on June 19, 2012, using Exhibit 2, "Mitigating Systems Screening Questions." The finding screened as of very-low safety significance (Green) because it did not result in the loss of operability or functionality of mitigating systems. Specifically, as discussed in the Description part above, the licensee performed an operability evaluation and reasonably determined that the existing calculation had sufficient conservatism to accommodate the effects of the additional debris volume.

The team did not identify a cross-cutting aspect associated with this finding because it was not confirmed to reflect current performance due to the age of the performance deficiency. Specifically, the associated evaluations were performed more than 3 years ago.

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires, in part, that the licensee provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program.

Contrary to the above, as of August 26, 2016, the licensee failed to verify the adequacy of design associated with the min-K insulation and transport factor values used with the safety-related ECCS strainers. Specifically, the licensee did not verify that the ECCS suction strainers surface area would not be significantly blocked because the applicable design calculations used non-conservative min-K insulation debris generation and transport factor values and, as a result, not all of the min-K insulation debris that could transport to the ECCS suction strainers was accounted for in the ECCS suction strainer debris loading.

At the time of this inspection, the licensee was still evaluating its planned corrective actions. However, the team determined that the continued noncompliance did not present an immediate safety concern because the licensee reasonably determined that the ECCS suction strainers remained operable, as discussed in the Description part above.

Because this violation was of very-low safety significance and was entered into the licensee's CAP as CARD 16-26800, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. (NCV 05000341/2016007-10, Non-Conservative ECCS Suction Strainer Min-K Combined Generation and Transport Factors)

.5 Modifications

a. Inspection Scope

The team reviewed one permanent plant modification related to selected risk-significant components to verify that the design bases, licensing bases, and performance capability of the components had not been degraded through modifications. The modification listed below was reviewed as part of this inspection effort:

- TSR-37387, “Update BCDDs and the UFSAR to Remove Statement that the Control Air Receiver Tanks to have 10 Minute of Reserve Air Capacity and Restate the Amount of Reserve Air Capacity of Receiver Tanks,” Revision 0.

b. Findings

(1) Failure to Apply Design Control Measures to a Design Change Associated with Non-Interruptible Control Air System Accumulator Capability

Introduction: The team 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 licensee’s failure to apply design control measures to a design change associated with NIAS accumulator capacity. Specifically, the licensee did not verify that the reduced accumulator capacity was adequate during the entire time period that the compressor is expected to not be running, and ensure that operability limits and calibration tolerances contained in procedures were consistent with the new design.

Description: Revision 20 of UFSAR 9.3.1, “Compressed Air Systems,” stated “The control air compressors, aftercoolers, dryers, and receiver tanks are provided to supply air to some of the ESF equipment in the plant when the normal supply of control air is not available.” It also stated “Because the non-interruptible portion of the control air system [NIAS] provides control air to ESF equipment, it is classified as a safety-related system.” Examples of supported ESF equipment included standby gas treatment, EECW, control center air conditioning, and high pressure coolant injection systems.

On February 22, 2016, the licensee completed Revision H of Calculation DC-4931 Vol. 1, “Non-Interruptible Control Air System Calculations.” This major revision reduced the NIAS receiver capacity to supply essential air users with adequate air pressure during a LOOP from 10 minutes to 1 minute. The basis for this change was that the 1-minute period bounded the maximum time frame the NIAS compressors could be without power during a LOOP. Specifically, Revision 16 of UFSAR Table 8.3-5, “EDG Loading Sequence: LOCA and LOOP,” stated that the NIAS compressors would automatically load to the EDGs in no more than 48 seconds after the beginning of a LOOP. Thus, the licensee believed the assumed 1-minute period provided margin. In addition, the revised calculation assumed an initial NIAS receiver pressure of 85 psig when evaluating the system capability to maintain the operability pressure limit of 75 psig assuming the maximum allowable system leakage and air usage. The 85 psig value was also selected because it was the NIAS compressor automatic starting set point and the 75 psig value also served as the automatic closure setpoint for the NIAS isolation valves. These valves also closed automatically upon a loss of power.

However, the team noted the following examples of the licensee’s failure to apply design control measures to this design change:

- The licensee failed to consider the NIAS compressor start time delay. This time delay relay allowed the compressors to spin up from rest before they were connected to the pressurized NIAS system and had a maximum acceptable performance tolerance of 16.5 seconds. The team was concerned because this time delay exceeded the new design limit by 7.5 percent. The licensee captured this concern in the CAP as CARD 16-26208.

- The licensee failed to consider a degraded voltage event, which was more limiting than a LOOP. Specifically, Class 1E buses had a degraded voltage time delay of 46.2 and 22.47 seconds for Divisions 1 and 2, respectively, according to TS 3.3.8.1, "LOP Instrumentation." The team was concerned because this time delay exceeded the new design limit by as much as 57 percent. The licensee captured this concern in the CAP as CARD 16-26561.

- The licensee failed to revise applicable procedures to include the revised initial NIAS receiver pressure of 85 psig. For example, in Revision 106 of Operating Procedure 23.129, "Station and Control Air System", stated "If receiver pressure is allowed to drop below 75 psig the division of NIAS is considered inoperable." A similar instruction was contained in at least another NIAS procedure reviewed by the team (i.e., test procedure 24.129.04, "Control Air Valve Operability/ Position Indication Verification/Isolation Integrity Test", Revision 44). The team was concerned because the procedures did not ensure the 75 psig operability limit would be met during a LOOP or degraded voltage event unless they maintain the analytical initial condition of 85 psig. The licensee captured this concern in the CAP as CARD 16-26607.

- The licensee failed to account for the maximum tolerance of the compressor automatic start and valve isolation instrument setpoints. Specifically, Revision 0 of calibration procedures P50N482A/B, "Control Air Division 1/2 Auxiliary Building South Control Air Compressor P5002D001/2 Pressure Switch," included the nominal setpoint values of 85 psig and 75 psig, and a maximum tolerance of +/- 1.74 psig. The team was concerned because the instrument calibration would allow system automatic actions to occur under non-bounding conditions. The licensee captured this concern in the CAP as CARD 16-26607.

Overall, the team was concerned because these multiple deficiencies resulted in inconsistencies among the NIAS system design review, NIAS compressor design, interfacing system designs, operating procedures, and instrument calibration, which do not ensure NIAS would be capable of providing the required pneumatic pressure to the supported ESF equipment. The licensee's immediate corrective action was to evaluate the impact of each concern to the NIAS functionality individually and in aggregate. The licensee reasonably concluded that NIAS remained functional by crediting other conservatism and confirming that sufficient system pressure was maintained during the last year. In addition, the licensee established a night order in the control room to maintain NIAS pressure consistent with the design initial conditions. The proposed corrective actions to restore compliance at the time of this inspection included revising the affected design analyses and procedures.

Analysis: The team determined the failure to apply design control measures to a design change associated with NIAS accumulator capacity was contrary to 10 CFR Part 50, Appendix B, Criterion III, "Design Control," and was a performance deficiency. The performance deficiency was determined to be more-than-minor because it was associated with the Mitigating Systems cornerstone attribute of equipment performance and affected the cornerstone objective of ensuring the availability, reliability, and capability of mitigating systems to respond to initiating events to prevent undesirable consequences. In addition, it was associated with the Barrier Integrity cornerstone attribute of SSC and barrier performance and affected the cornerstone objective of providing reasonable assurance that physical design barriers protect the public from

radionuclide releases caused by accidents or events. Specifically, this failure resulted inconsistencies among the NIAS system design review, NIAS compressor design, interfacing system designs, operating procedures, and instrument calibration, which did not ensure it would be capable of providing the required pneumatic pressure to the supported mitigating and barrier ESF equipment.

The team determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings," issued on June 19, 2012. Because the finding impacted the Mitigating Systems and Barrier Integrity cornerstones, the team screened the finding through IMC 0609 Appendix A, "The Significance Determination Process for Findings At-Power," issued on June 19, 2012, using Exhibit 2, "Mitigating Systems Screening Questions," and Exhibit 3, "Barrier Integrity Screening Questions. The finding screened as of very-low safety significance (Green) because it did not result in the loss of operability or functionality of mitigating systems. Specifically, as discussed in the Description part above, the licensee performed a bounding assessment that reasonably determined that the accumulator would maintain adequate pneumatic supply. In addition, with respect to the Barrier Integrity cornerstone, the finding only represented a potential degradation of the control room and standby gas ventilation systems

The team determined that the associated finding had a cross-cutting aspect in the area of human performance because the licensee did not carefully guarded margins and changed them only through a systematic and rigorous process. Specifically, the licensee failed to review and identify all of the design attributes associated with NIAS system before significantly reducing the accumulator capacity design margin. [H.6]

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," states, in part, that design changes, including field changes, be subjected to design control measures commensurate with those applied to the original design.

Contrary to the above, on February 22, 2016, the licensee performed a design change associated with the safety-related NIAS accumulators and failed to subject it to design control measures commensurate with those applied to the original design. Specifically, when verifying the adequacy of the new NIAS accumulator capacity, the licensee did not consider the NIAS compressor start time delay, verify consistency between design calculation assumptions and procedure instructions, consider the limiting scenario, and account for instrument tolerance.

At the time of this inspection, the licensee was still evaluating its planned corrective actions. However, the team determined that the continued noncompliance did not present an immediate safety concern because the licensee reasonably determined that overall NIAS functionality was maintained, as discussed in the Description part above.

Because this violation was of very low safety significance and was entered into the licensee's CAP as CARD 16-26208, CARD 16-26561, and CARD 16-26607, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. (05000341/2016007-11, Failure to Apply Design Control Measures to a Design Change Associated with NIAS Accumulator Capability)

.6 Operating Procedure Accident Scenarios

a. Inspection Scope

The team performed a detailed reviewed of the procedures listed below. The procedures were compared to UFSAR, design assumptions, and training materials to assure for constancy. The following operating procedures were reviewed in detail:

- 20.129.01, “Loss of Station and/or Control Air,” Revision 33;
- 20.000.25, “Failed Safety Relief Valve,” Revision 25;
- 20.127.01, “Loss of Reactor Building Closed Cooling Water System,” Revision 31;
- 29.100.01 Sheet 2, “Primary Containment Control,” Revision 14;
- 23.208 Enclosure B, “RHR Complex Service Water Systems RHRSW Manual Operation (H11-P601 & H11-P602),” Revision 108; and
- 23.320 Enclosure B, “Balance of Plant Auxiliary Electrical Distribution System Manual Operation of Load Tap Changer (Transformers 64, 66, and 68),” Revision 63.

For the procedures listed, time critical operator actions were reviewed for reasonableness. This review included observation of licensed operator crews actions during the performance of a loss of station air scenario on the station simulator to assess operator knowledge level, procedure quality, availability of special equipment where required, and capability to perform time critical operator actions within the required time. In addition, the team evaluated operations interfaces with other departments. The following operator actions were reviewed:

- time critical operator actions to initiate containment cooling (torus cooling) within 20 minutes of the LOCA, by placing the MDCT and RHR service water in operation;
- operator actions to manually start the south reactor building closed cooling water pump, when the north reactor building closed cooling water pump tripped and the standby reactor building closed cooling water pump failed to start; the operators were also required to shift the drywell cooling loads to EECW;
- operator actions to mitigate a stuck open safety relief valve, which included the actions to remove the fuses to the failed/energized solenoid valve; and
- operator actions to start the non-operating station air compressor when the running station air compressor tripped and the standby compressor failed to automatically start.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems

.1 Review of Items Entered Into the Corrective Action Program

a. Inspection Scope

The team reviewed a sample of problems identified by the licensee associated with the selected components and that were entered into the CAP. In addition, the team reviewed a sample of CAP documents for the last 3 years resulting from degraded conditions. The team reviewed these issues to assess the licensee's threshold for identifying issues and the effectiveness of corrective actions related to design issues. In addition, corrective action documents written on issues identified during the inspection were reviewed to assess the incorporation of the problem into the CAP. The specific corrective action documents sampled and reviewed by the team are listed in the attachment to this report.

The team also selected three issues identified during previous CDBIs to assess the associated licensee's evaluation and resolution. The following issues were reviewed:

- NCV 2012007-03, "Failure to Identify EDG's Neutral Grounding Resistor Exceeded its Design Value;"
- NCV 2013008-04, "Untimely Resolution of Non-Conservative Battery Technical Specification;" and
- NCV 2013008-05, "Battery Testing Not in Conformance with Design Standard."

b. Findings

(1) Failure to Identify an Out-of-Specification Pressure Reading on the Nitrogen Supply to the "A" Mechanical Draft Cooling Tower Fan Motor Brake System

Introduction: The team identified a finding of very-low safety significance (Green) and an associated NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for the licensee's failure to identify that the 'A' MDCT fan motor brake system 100 psi nitrogen supply cylinder pressure did not meet the low-pressure acceptance criterion. Specifically, although the license had discovered this Condition Adverse to Quality (CAQ), it was not captured into the CAP and was not corrected for a period of 7 consecutive days following its discovery.

Description: Revision 20 of the UFSAR, Section 9.2.5.2.2, "Cooling Towers," stated that "The fans are provided with a brake system to prevent overspeed from the design-basis tornado." The MDCT fan motor bake systems are pneumatically operated by a 3-nitrogen cylinder system consisting of a 45 psig, a 100 psig, and a 2,000 psig cylinders. Revision 108 of Procedure 23.208, "RHR Complex Service Water Systems," Step 3.3.1 instructed the licensee, in part, to refer to the applicable TS if any cylinder pressure was outside their applicable limits contained in the procedure. The applicable TS for this condition was TS 3.7.2, "EECW/EESW System and UHS," which required, in part, that the UHS be operable in Modes 1, 2, and 3. The associated TS Basis stated that the operability of the UHS, a safety-related SSC, was based, in part, on the operability of the MDCT fans.

The inspection team noted that the daily log readings for the 'A' MDCT fan motor brake cylinders showed that the 100 psig cylinder pressure ranged from 84 to 85 psig between February 19 and February 25, 2016. This pressure range was below the 90 psig lower limit contained in Procedure 23.208 for this cylinder. However, the licensee did not captured this condition into their CAP following its seven repeated discoveries. As a result, the team determined that the licensee failed to identify this CAQ and, consequently, the CAQ was not promptly corrected.

The licensee captured the team concern in their CAP as CARD 16-26214. As an immediate corrective action, the licensee verified that the pressure of all MCDT fan motor brake cylinders were within limits. Additionally, the licensee evaluated past operability and reasonably concluded that, when accounting for the as-found pressures of the three cylinders, the overall system pneumatic supply available was sufficient to support the operability of the UHS.

The licensee also completed an investigation of the circumstances leading to the concern. This investigation determined that, during the February 19 daily operator round, a nuclear operator discovered a significant reduction in pressure of the 'A' MDCT fan motor brake 2,000 psig cylinder. The nuclear operator immediately reported this observation to the control room licensed nuclear operator, who took responsibility to capture the condition in the CAP. The nuclear operator then resumed the daily round, discovered the out-of-specification reading on the 100 psig cylinder, and immediately reported this condition to the control room licensed nuclear operator. The control room licensed nuclear operator wrote CARD 16-21626 for the significant drop in pressure for the 2000 psig cylinder and did not include the condition of the 100 psig cylinder. However, the nuclear operator updated the logs crediting this CARD to address the 100 psig cylinder condition. In addition, the control room licensed nuclear operator missed the 100 psig cylinder condition while reviewing and approving the logs at the end of the shift. The nuclear operators and control room licensed nuclear operators involved with the subsequent discoveries of the condition did not identify the CAQ because the logs stated that the control room was already informed and a CARD was already generated.

Analysis: The team determined the failure to identify that the 'A' MDCT fan motor brake system 100 psi nitrogen supply cylinder pressure did not meet the low pressure acceptance criterion was contrary to 10 CFR Part 50, Appendix B, Criterion XVI "Corrective Action," and a performance deficiency. The performance deficiency was determined to be more-than-minor because it was associated with the Mitigating Systems cornerstone attribute of protection against external events and affected the cornerstone objective of ensuring the availability, reliability, and capability of mitigating systems to respond to initiating events to prevent undesirable consequences. Specifically, the failure to identify that the 'A' MDCT fan motor brake 100 psi cylinder pressure did not meet the low-pressure limit did not ensure that the 'A' MDCT fan motor was available and capable of mitigating the consequences of a tornado for 7 days.

The team determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings," issued on June 19, 2012. Because the finding impacted the Mitigating Systems cornerstone, the team screened the finding through IMC 0609 Appendix A, "The Significance Determination Process for Findings At-Power," issued on June 19, 2012, using Exhibit 2, "Mitigating Systems Screening Questions." The finding

screened as of very-low safety significance (Green) because it did not involve the loss or degradation of equipment or function specifically designed to mitigate a tornado event. Specifically, the licensee reviewed the pressure readings of the other nitrogen system supply cylinders and reasonably determined that their available pressure at the time would have compensated for the 100 psi cylinder low pressure.

The team determined that the associated finding had a cross-cutting aspect in the area of Human Performance because work groups did not communicate and coordinate their activities within and across organizational boundaries to ensure nuclear safety is maintained. Specifically, the nuclear operators and the control room licensed nuclear operators did not communicate and coordinate their activities to ensure the degraded condition was captured in the CAP. [H.4]

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly corrected.

Contrary to the above, from February 19, 2016, to February 25, 2016, the licensee failed to correct a CAQ. Specifically, the licensee did not correct the repeated discovery of a condition that potentially challenged the operability of the UHS, a safety-related SSC, into their CAP.

As an immediate corrective action, the licensee confirmed that the pressure of all nitrogen bottles associated with the MCDT fan motor brakes were within limits. Thus, the team determined that this finding did not represent an immediate safety concern.

Because this violation was of very-low safety significance and was entered into the licensee's CAP as CARD 16-26214, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. (NCV 05000341/2016007-12, Failure to Identify an Out-of-Specification Pressure Reading on the Nitrogen Supply to the "A" MDCT Fan Motor Brake System)

(2) Failure to Identify a Condition Adverse to Quality Associated with Over-Dutied 480V Safety-Related Switchgear Breakers

Introduction: The team identified a finding of very-low safety significance (Green) and an associated NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for the licensee's failure to identify that over-dutied 480V safety-related switchgear breakers were nonconforming to the licensing basis. Specifically, the licensee did not identify that this condition was nonconforming to the licensing basis and, as a result, did not promptly correct the CAQ.

Description: On July 11, 2013, the licensee discovered that buses 72C, 72E, and 72F had safety-related feeder breakers that were over-dutied when performing Revision C of calculation DC-6447, "Auxiliary Power System Analysis," and captured this discovery in the CAP as CARD 13-24861. On July 9, 2015, the licensee created CARD 15-24758 to assess the impact review performed by CARD 13-24861.

However, the team noted that the licensee had not corrected or established a reasonable plan to correct this condition because the licensee did not identify that it was nonconforming to the licensing basis. Specifically, the over-dutied condition of the

breakers feeding safety-related loads did not assure they would interrupt fault currents beyond their ratings as described in the UFSAR. Revision 20 of UFSAR 8.3.1.1.1, "Power Supply Feeders," stated, "The calculated phase short circuit current for all feeders is always below the interrupting capacity of the breakers." Thus, this CAQ had the potential to result in the operation of the bus breaker in response to an individual faulted safety-related load as opposed to the feeder breaker, which would lead to a loss of an entire safety bus as a result of a single failure. The team was concerned because this CAQ had the potential to allow a single failure to cascade in multiple consequential failures.

In addition, the licensee's evaluation of the issue did not identify that several safety-related breakers feeding nonsafety-related loads (i.e., breakers used as 1E to non-1E isolation devices) were also over-dutied. Similarly, the over-dutied condition of these breakers did not assure they would interrupt fault currents beyond their ratings as described in the UFSAR. Revision 18 of UFSAR 3.12.4, "Comparison with RG 1.75," stated "Balance-of-plant loads that are fed from Class 1E buses use breakers as a separation device." It further stated, "These breakers are fully qualified Class 1E devices." In addition, it stated, "The breakers have full fault protection, but are not opened on a LOCA signal." The team was concerned because this CAQ had also the potential to result in the loss of an entire safety bus in response to a faulted nonsafety-related load.

The licensee captured the team concerns in their CAP as CARD 16-26209 and CARD 16-26210. As an immediate corrective action, the licensee performed operability evaluations that reasonably determined the affected buses were operable but nonconforming, in part, by reducing the magnitude of the short circuit below the breaker interrupting rating by crediting cable impedance. In addition, the licensee initiated an action to develop a plan to restore compliance.

Analysis: The team determined that the failure to identify that over-dutied 480V safety-related switchgear breakers were nonconforming to the licensing basis was contrary to 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," and was a performance deficiency. The performance deficiency was determined to be more-than-minor because it was associated with the Mitigating Systems cornerstone attribute of design control and affected the cornerstone objective of ensuring the availability, reliability, and capability of mitigating systems to respond to initiating events to prevent undesirable consequences. Specifically, the failure to identify that over-dutied 480V safety-related switchgear breakers were nonconforming to the licensing basis resulted in the failure to correct the CAQ, which did not ensure the breakers would interrupt fault currents beyond their ratings. The inability to interrupt fault currents did not ensure the availability and capability of their associated safety-related buses to supply power to the nonfaulted mitigating loads following an initiating event.

The team determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings," issued on June 19, 2012. Because the finding impacted the Mitigating Systems and Barrier Integrity cornerstones, the team screened the finding through IMC 0609 Appendix A, "The Significance Determination Process for Findings At-Power," issued on June 19, 2012, using Exhibit 2, "Mitigating Systems Screening Questions." The finding screened as of very-low safety significance (Green) because it did not result in the loss of operability or functionality of mitigating systems. Specifically, the licensee performed operability evaluations and reasonably concluded that the associated buses remained operable, as discussed in the Description part above.

The team determined that the associated finding had a cross-cutting aspect in the area of Problem Identification and Resolution because the licensee did not thoroughly evaluate issues to ensure that resolutions address causes and extent of conditions commensurate with their safety significance. Specifically, the licensee failed to recognize that the condition was nonconforming to the licensing basis because they did not thoroughly evaluate the discovery of the over-dutied breakers and extent of condition. [P.2]

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," states, in part, that measures shall be established to assure that CAQs, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformance, are promptly identified and corrected.

Contrary to the above, from July 11, 2013, to at least August 2, 2016, the licensee failed to correct a CAQ associated with over-duties safety-related circuit breakers. Specifically, on July 11, 2013, the licensee identified that some 480V breakers on safety buses 72C, 72E, and 72F were over-dutied and captured this condition in their CAP as CARD 13-24861. However, the licensee did not identify all of the affected breakers and failed to identify that this condition was nonconforming to the licensing basis. As a result, as of August 2, 2016, the CAQ had not being corrected.

At the time of this inspection, the licensee was still evaluating its planned corrective actions. However, the team determined that the continued noncompliance did not represent an immediate safety concern because the licensee reasonably determined the affected SSCs remained operable, as discussed in the Description part above.

Because this violation was of very-low safety significance and was entered into the licensee's CAP as CARD 16-26209 and CARD 16-26210, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. (NCV 05000341/2016007-13, Failure to Identify a CAQ Associated with Over-Dutied 480V Safety-Related Switchgear Breakers)

(3) Failure to Identify that an Inadequate Minimum Main Steam Isolation Valves Accumulator Air Pressure Setpoint Was Condition Adverse to Quality

Introduction: The team identified a finding of very-low safety significance (Green) and an associated NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for the licensee's failure to identify that an inadequate minimum MSIV accumulator air pressure setpoint was CAQ. Specifically, a licensee engineering evaluation concluded that the minimum MSIV accumulator air pressure setpoint was inadequate but the condition was not captured in the CAP and, as a result, corrective actions were not implemented.

Description: On April 17, 1997, the licensee performed Revision F of Calculation DC-0469 Vol. 1, "Essential Accumulators for Class I Valves (MSIVs, ADS-SRVs, LLS-SRVs)," to evaluate, in part, the MSIV accumulator low-pressure setpoint. Accumulator pressure was credited by the licensing basis to close the MSIVs without spring force. For example, Revision 20 of UFSAR 5.5.5, "Main Steam Line Isolation Valves," stated, "The MSIVs shall use local stored energy (compressed air and/or springs) to close at least one isolation valve in each steam pipeline…"

The team noted that Calculation DC-0469 Vol. 1 concluded that the MSIV accumulator low-pressure setpoint of 75 psig was not acceptable to close the MSIV without spring force during a large break LOCA. However, the licensee was unable to find a CARD documenting their discovery of this condition and confirmed that the MSIV accumulator low-pressure setpoint at the time of this inspection was still 75 psig. Thus, the team was concerned because the MSIVs were not assured to close with air as described in the licensing basis to protect the public from radionuclide releases caused by accidents or events. The team was also concerned because the condition was discovered by and documented in a calculation that was prepared, reviewed, and approved by three individuals using the Quality Assurance Program, and still the condition was not identified in the CAP and resolved. The underlying technical issue is also associated with the performance deficiency discussed in Section 1R21.3.b(6) of this Inspection Report.

The licensee captured the team concerns in their CAP as CARD 16-26697. As an immediate corrective action, the licensee verified the MSIVs would close with a combination of spring and pneumatic force, and confirmed that the MSIV TS function to close was independent of the closure force. The proposed plan to restore compliance at the time of this inspection was to either change the design bases as described in the UFSAR or revise the minimum allowable pressure.

Analysis: The team determined that the failure to identify that the inadequate minimum MSIV accumulator air pressure setpoint was a CAQ was contrary to 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," and was a performance deficiency. The performance deficiency was determined to be more-than-minor because it was associated with the Barrier Integrity cornerstone attribute of design control and affected the cornerstone objective of providing reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events. Specifically, the failure to identify that the inadequate minimum MSIV accumulator air pressure setpoint was a CAQ resulted in the failure to correct the CAQ, which did not assure the MSIVs would close with air as described in the UFSAR to protect the public from radionuclide releases caused by accidents or events.

The team determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings," issued on June 19, 2012. Because the finding impacted the Barrier Integrity cornerstone, the team screened the finding through IMC 0609 Appendix A, "The Significance Determination Process for Findings At-Power," issued on June 19, 2012, using Exhibit 3, "Barrier Integrity Screening Questions." The finding screened as of very-low safety significance (Green) because the finding did not represent an actual open pathway in the physical integrity of reactor containment, containment isolation system, or heat removal components, and it did not involve an actual reduction in the function of hydrogen igniters in the reactor containment. Specifically, the finding did not result in an actual open pathway and the MSIVs do not affect the function of heat removal components and hydrogen igniters.

The team did not identify a cross-cutting aspect associated with this finding because it was not confirmed to reflect current performance due to the age of the performance deficiency. Specifically, the calculation that concluded that the minimum air pressure setpoint was inadequate was performed on 1997.

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," states, in part, that measures shall be established to assure that CAQs, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformance, are promptly identified and corrected.

Contrary to the above, from April 17, 1997, to at least August 16, 2016, the licensee failed to correct a CAQ associated with MSIV air pressure system setpoint. Specifically, on April 17, 1997, the licensee recognized that the minimum air pressure system setpoint was insufficient to close the MSIVs without spring force. However, the licensee did not identify that this condition was a CAQ and, as a result, did not capture it in the CAP and correct it.

At the time of this inspection, the licensee was still evaluating its planned corrective actions. However, the team determined that the continued non-compliance did not present an immediate safety concern because the licensee reasonably determined the MSIVs remained operable, as discussed in the Description part above.

Because this violation was of very-low safety significance and was entered into the licensee's CAP as CARD 16-26697, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. (NCV 05000341/2016007-14, Failure to Identify that an Inadequate Minimum MSIV Accumulator Air Pressure Setpoint Was CAQ)

(4) Failure to Identify that a Non-Conservative Min-K Insulation Volume Calculation Error Was Nonconforming to the Emergency Core Cooling System Suction Strainer Licensing Basis

Introduction: The team identified a finding of very-low safety significance (Green) and an associated NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for the licensee's failure to identify that a non-conservative min-K insulation volume calculation error was nonconforming to the ECCS suction strainer licensing basis. Specifically, the licensee identified the non-conservative calculation error and captured it in the CAP as CARD 11-21153. However, the licensee did not identify any regulatory basis requiring this condition to be addressed and, as a result, closed the CARD without correcting the CAQ.

Description: On May 6, 1996, the NRC issued Bulletin 96-03, "Potential Plugging of Emergency Core Cooling Suction Strainers by Debris in Boiling-Water Reactors," to request addressees, in part, to implement appropriate plant modifications to minimize the potential for clogging of ECCS suction strainers by debris generated during a LOCA and to provide a response describing these actions. The licensee provided their initial response in letter to the NRC titled "Detroit Edison 180-Day Response for NRC Bulletin 96-03," dated November 1, 1996. It stated, "Fermi 2 plans to utilize the final version of the BWROG URG as the means of satisfying the recommendations of Regulatory Guide 1.82, Revision 2." Revision 20 of UFSAR A.1.82, "Regulatory Guide 1.82 (May, 1996, Revision 2), Water Sources for Long Term Recirculation Cooling Following a Loss-of-Coolant Accident," stated, "In their closure of the Fermi response to Bulletin 96-03, the NRC expressed their understanding that the design of the Fermi OSD [optimized stacked-disk] strainers was performed in accordance with the method provided in NEDO-32686, BWROG Utility Resolution Guidance." The NRC endorsed the URG with exceptions in "Safety Evaluation for NEDO-32686, Rev. 0, 'Utility Resolution Guidance Document for ECCS Suction Strainer Blockage,'" dated August 20, 1998.

On February 1, 2011, the licensee discovered that Calculation DC-5979 Vol. I, "Estimation of Debris Sources for ECCS Suction Strainers," Revision 0, underestimated the min-K insulation volume of main steam line A within penetration X-7A. Specifically, it incorrectly used an insulation length of 18 inches as opposed to 157 inches. This discovery was captured in the CAP as CARD 11-21153. However, no immediate corrective actions were implemented based on an interpretation of Section 3.2.1.1 of the URG, "Pipe Break Locations." Specifically, the licensee determined that postulated breaks inside containment penetrations could be excluded if the stresses at the penetration boundaries were determined to satisfy break exclusion criteria in NRC Branch Technical Position MEB 3-1. The stresses of the affected line portion met the criteria. In addition, one of the long term corrective actions was to review design and licensing basis documents to confirm this interpretation. On December 8, 2015, the CARD was closed and the closure summary stated "The existing design basis and documentation review determines that Fermi is not required to postulate brakes within containment penetrations as stated: No regulatory basis could be identified that specifically requires that a break within the containment penetration be considered for debris generation."

However, the team noted that the URG use of MEB 3-1 for selection of break locations to be evaluated for debris generation was not approved by the NRC. Specifically, Section 7.0, "Overall Conclusions and Recommendations," of the NRC safety evaluation for the URG stated, "Licensees should evaluate a sufficient number of breaks to ensure that the most limiting breaks are analyzed." It also stated, "Possible locations of the breaks should include pipe sections or welds in the area of the drywell where the highest density of fibrous insulation is installed." In addition, it clarified that "Breaks analyzed in support of strainer sizing should meet the requirements of 10 CFR 50.46 and, therefore, should not be limited to breaks analyzed for compliance with GDC 4 (i.e., MEB 3-1 break analysis)." After consultation with cognizant members of Office of Nuclear Reactor Regulation, the team confirmed that if the break in the penetration provided a limiting amount of debris then it needed to be evaluated for debris generation. The team was concerned because the strainer design reviews only evaluated 10.4 pounds of min-K as opposed to 260 pounds, which presented a condition that reasonably questioned the capability of the strainers to perform their function.

The licensee captured the team concerns in their CAP as CARD 16-26292 and CARD 16-26800. As an immediate corrective action, the licensee performed an engineering functional assessment that reasonably determined the affected SSCs remained operable using available historical debris head loss testing. The proposed corrective action to restore compliance at the time of this inspection was to establish a basis for accepting the existing min-K, obtain NRC approval to exclude containment penetration breaks, or remove the min-K material.

Analysis: The team determined that the failure to identify that a non-conservative min-K insulation volume calculation error was nonconforming to the ECCS suction strainer licensing basis was contrary to 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," and was a performance deficiency. The performance deficiency was determined to be more-than-minor because it was associated with the Mitigating Systems cornerstone attribute of equipment performance and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the design analyses did not ensure the ECCS capability to provide their mitigating function because they failed to account for the most limiting insulation debris volume that could clog the ECCS suction strainers during a DBA.

The team determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings," issued on June 19, 2012. Because the finding impacted the Mitigating Systems cornerstone, the inspectors screened the finding through IMC 0609 Appendix A, "The Significance Determination Process for Findings At-Power," issued on June 19, 2012, using Exhibit 2, "Mitigating Systems Screening Questions." The finding screened as of very-low safety significance (Green) because it did not result in the loss of operability or functionality of mitigating systems. Specifically, the licensee performed an operability evaluation and reasonably determined the affected SSCs remained operable, as discussed in the Description part above.

The team determined that this finding had a cross cutting aspect in the area of Human Performance because the licensee did not propose an action that was determined to be safe in order to proceed, rather than unsafe in order to stop. Specifically, the licensee determined that no regulatory basis was associated with the non-conservative error because they could not find any requirement that specifically described the physical configuration and condition addressed in the CARD when evaluating the problem in 2015. [H.14]

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," states, in part, that measures shall be established to assure that CAQs, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformance, are promptly identified and corrected.

Contrary to the above, from February 1, 2011, to at least August 10, 2016, the licensee failed to correct a CAQ. Specifically, on February 1, 2011, the licensee discovered that calculation DC-5979 Vol I underestimated min-K debris volume generation and captured this condition in their CAP as CARD 11-21153. However, the licensee did not identify that this condition was nonconforming to the ECCS suction strainer licensing basis and, as a result, closed CARD 11-21153 on December 8, 2015, without correcting this CAQ.

At the time of this inspection, the licensee was still evaluating its planned corrective actions. However, the team determined that the continued noncompliance did not present an immediate safety concern because the licensee reasonably determined the affected SSCs remained operable, as discussed in the Description part above.

Because this violation was of very-low safety significance and was entered into the licensee's CAP as CARD 16-26292 and CARD 16-26800, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. (NCV 05000341/2016007-15, Failure to Identify that a Non-Conservative Min-K Insulation Volume Calculation Error Was Nonconforming to the ECCS Suction Strainer Licensing Basis)

(5) Failure to Timely Identify, Document, and Evaluate Conditions that Challenge Operability

Introduction: The team identified a finding of very-low safety significance (Green) and an associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the licensee's failure timely identify, document, and evaluate nonconforming conditions that called the operability of one or more SSCs into question.

Specifically, the licensee was not timely in capturing and evaluating ten CAQs identified during this inspection in their CAP and in accordance with their procedures, which resulted in untimely operability determinations.

Description: The team noted that eight CARDs were untimely issued during this inspection and the associated CAQs reported to the operations shift manager. The team was concerned because this resulted in untimely evaluation of the operability impacts of the associated CAQs. The following list enumerates the CARDs, the approximate amount of days that the CARDs were issued after the associated CAQs were identified, and the sections of this report that discuss the details of the associated CAQs:

- CARD 16-26210, 4 days, Section 4OA2.1.b(2);
- CARD 16-26209, 4 days, Section 4OA2.1.b(2);
- CARD 16-26535, 7 days, Section 1R21.3.b(4);
- CARD 16-26702, 7 days, Section 1R21.3.b(2);
- CARD 16-26607, 3 days, Section 1R21.5.b(1);
- CARD 16-26389, 8 days, Section 1R21.3.b(5);
- CARD 16-26581, 7 days, Section 1R21.4.b(3); and
- CARD 16-26697, 8 days, Section 1R21.3.b(6).

In addition, the operations shift manager did not promptly consider the concerns contained in the following four CARDs, as the operability assessments were delayed by approximately the specified amount of days after the CARDs were issued:

- CARD 16-26702, 1.5 days;
- CARD 16-26533, 4 days, Section 1R21.4.b(1);
- CARD 16-26607, 4 days; and
- CARD 16-26389, 2 days.

Note that three of these CARDs were also examples of untimely CARDs described in the preceding paragraph. For example, CARD 16-26389 was issued approximately 8 days after the CAQ was identified and its operability evaluation performed approximately 2 days after the CARD was issued. Thus, the operability evaluation was performed approximately 10 days after the CAQ was identified. In addition, CARD 16-26208 and CARD 16-26607 documented CAQs that impacted the same design margin, as discussed in Section 1R21.5.b(1) of this report. However, their prompt operability determinations did not consider the aggregate effects of the described CAQs until prompted by the inspection team.

Also, the team noted that five of the untimely CARDs were initiated after engineering staff performed informal engineering functional assessments, which were documented in the description of the CARDs. This activity contributed to the immediate operability determination delay. These CARDS were CARD 16-26210, CARD 16-26209, CARD 16-26702, CARD 16-26389, and CARD 16-26581.

Lastly, the immediate operability assessment of CARD 16-26210 did not consider the effects of the CAQ consequential failure. Specifically, the assessment determined that the CAQ would result in a loss of additional TS equipment on a given train. However, the operability impact of this consequential failure was not evaluated. As a result of the team questions, the licensee revised the evaluation and reasonably demonstrated the CAQ would not result in the loss of operability of the affected TS equipment.

Although defining the exact times that the CAQs were identified may be impractical due to the complexity of the issues involved, the number of examples and their approximate delay times reasonably demonstrated a deficient performance. In addition, the team noted that the licensee associated efforts transitioned from problem identification to problem resolution prior to capturing the problems in the CAP and performing the associated immediate operability evaluations. Overall, the team was concerned because the licensee routinely captured CAQs in their CAP and evaluated their operability impact on TS equipment in an untimely and incomplete manner. The licensee captured the team concerns in their CAP as CARD 16-26633, CARD 16-26776, CARD 16-26534, and CARD 16-26678. The proposed corrective action to restore compliance at the time of this inspection was to perform an apparent cause evaluation to evaluate these occurrences and to identify and correct any organizational issues that may be causing these behaviors.

Analysis: The team determined that the failure to timely identify, document, and evaluate nonconforming conditions that called the operability of one or more SSCs into question was contrary to 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," and was a performance deficiency. 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 licensee's routine failure to timely identify, document, and evaluate nonconforming conditions that called the operability of one or more SSCs into question would have the potential to lead to a situation where an inoperable condition is not promptly recognized and resolved. This finding was associated with the Mitigating Systems cornerstone.

The team determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Initial Characterization of Findings," issued on June 19, 2012. Because the finding impacted the Mitigating Systems cornerstone, the inspectors screened the finding through IMC 0609 Appendix A, "The Significance Determination Process for Findings At-Power," issued on June 19, 2012, using Exhibit 2, "Mitigating Systems Screening Questions." The finding screened as of very-low safety significance (Green) because it did not result in the loss of operability or functionality of mitigating systems. Specifically, the licensee performed operability evaluations that reasonably determined that all of the affected SSCs remained operable, as discussed in the associated report section referenced in the Description part above.

The team determined that this finding had a cross cutting aspect in the area of Human Performance because the licensee did not use a consistent, systematic approach to make decisions. Specifically, the licensee did not use the CAP systematic process to support making timely and adequate prompt operability decisions. [H.13]

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality be prescribed by documented procedures of a type appropriate to the circumstances and be accomplished in accordance with these procedures. The licensee established Revision 41A of MQA11, "Condition Assessment Resolution Document," as the implementing procedure for, in part, the process for the timely identification, documentation, and evaluation of CAQs, an activity affecting quality. In addition, the licensee established Revision 17 of MES27, "Verification of System Operability," as the implementing procedure for prompt determinations of operability of safety-related SSCs

included in TSs, also an activity affecting quality. The licensee established Revision 26 of MGA03, "Procedure Use and Adherence," as the implementing procedure for use of and adherence to procedures, also an activity affecting quality. Section 15 of Enclosure D to MGA03 stated that the term *should* denotes an expected action unless there is a justifiable reason not to perform the action and that concurrence to not perform the expected action requires concurrence from the work group supervisor or above and must be documented.

Contrary to the above, during the timeframe of this inspection, the licensee failed to follow procedures MQA11, MES27, and MGA03, as evidenced by the following examples:

- Step 3.1.1 of MQA11 stated, in part, that all personnel are responsible for timely and effective identification of conditions and that conditions should be reported within the same shift the problem is identified. Step 3.1.1 of MES27 stated that, "When a condition is discovered that calls into question that a 'specified safety function' of SSCs required to be operable by TSs may not be met, then an operability determination should be made to determine if the SCC 'specified safety function' is met." Step 3.1.1.5 of MES27 stated that, "Determination of Operability is the responsibility of the Operations Shift Manager." It also stated that, "When a question arises, an item can continue to be classified as operable if there is a 'reasonable expectation' that the system will continue to be operable." This step also stated that "An EFA [engineering functional assessment] may be assigned by the Operations Shift Manager to confirm an immediate operability determination." Step 3.2.2 of MES27 stated that, "…if mounting evidence shows that the basis for a determination of operable is undermined, this information is to be immediately presented to the operations shift manager and documented on a CARD."

  Contrary to these procedural steps, the licensee did not timely identify, document on a CARD, and/or report to the operations shift manager the identification of eight CAQs. In addition, the licensee performed informal engineering functionality assessments for five of these CAQs before the associated CARDs were issued and reviewed by the operations shift manager for immediate operability. The licensee did not document a justification and supervisory concurrence for these deviations of MQA11 and MES27 as required by MGA03.

- Procedure MES27, Enclosure A, section 2.0, stated, "Qualification concerns, whether they are a lack of required quality or loss of quality because of degradation, can and should be promptly considered to determine the effect of the concern on the operability of the system." Enclosure C stated, "An SSC is considered 'not fully qualified,' i.e., degraded or non-conforming, when it does not conform to all aspects of its CLB [current licensing basis], including all applicable codes and standards, design criteria, safety analyses assumptions and specifications, and licensing commitments."

  Contrary to this, the qualification concerns documented in five CARDs were not promptly considered after the issuance of these CARDs to determine the effect of the concerns on the operability of the affected systems. In addition, the immediate operability assessments of another two CARDs did not promptly consider the aggregate operability effect of the described CAQs. The licensee

did not document a justification and supervisory concurrence for these deviations of MES27 as required by MGA03.

- Step 5.2.1.2 of MQA11 required, in part, the shift manager to perform a prompt operability assessment in accordance with MES27 if the issue represents a nonconforming condition of SSCs. Enclosure A of MES27, Section 5.3, stated, "Where a consequential failure (i.e., considering the degraded or nonconforming condition) would cause the loss of a specified safety function or functions needed for limiting or mitigating the effects of the event, the affected SSC is inoperable because it cannot perform all of its specified safety functions."

  Contrary to this, the operations shift manager did not perform a prompt operability assessment in accordance with MES27. Specifically, CARD 16-26210 stated that the CAQ would result in a loss of additional TS equipment on a given train. However, this consequential failure was not evaluated as required by MES27, Enclosure A, section 5.3.

At the time of this inspection, the licensee was still evaluating its planned corrective actions. However, the team determined that the continued noncompliance did not present an immediate safety concern because the licensee reasonably determined the affected SSCs remained operable, as discussed in the associated report section referenced in the Description part above.

Because this violation was of very-low safety significance and was entered into the licensee's CAP as CARD 16-26633, CARD 16-26776, CARD 16-26534, and CARD 16-26678, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. (NCV 05000341/2016007-16, Failure to Timely Identify, Document, and Evaluate Conditions that Challenge Operability)

4OA6 Management Meeting(s)

.1 Interim Meeting Summary

On September 2, 2016, the team presented the preliminary inspection results to Mr. P. Fessler and other members of the licensee staff. The licensee acknowledged the issues presented. The team confirmed that several documents reviewed were

considered proprietary and were handled in accordance with the NRC policy related to proprietary information. The team had outstanding questions that required additional review and a follow-up exit meeting.

.2 Exit Meeting Summary

On September 28, 2016, the team presented the final inspection results to Mr. L. Peterson, and other members of the licensee staff. The licensee acknowledged the issues presented. Again, the team asked the licensee whether any materials examined during the inspection should be considered proprietary. Several documents reviewed by the inspectors were considered proprietary information and were either returned to the licensee or handled in accordance with NRC policy on proprietary information.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

P. Fessler, Senior Vice President and Chief Nuclear Officer
K. Polson, Site Vice President
M. Caragher, Director of Nuclear Production (Plant Manager)
L. Peterson, Director – Nuclear Engineering
S. Maglio, Manager – Licensing
K. Hullum-Lawson, Manager – Plant Support Engineering
R. Sloan, Principal Engineer - PSE Mechanical/Civil
S. Ward, Senior Engineer – Licensing

U.S. Nuclear Regulatory Commission

M. Jeffers, Chief, Engineering Branch 2
N. Féliz Adorno, Senior Reactor Inspector

LIST OF ITEMS OPENED AND CLOSED

Opened and Closed

05000341/2016007-01	NCV	Inadequate Procedure for Addressing Non-Functional MDCT Fan Motor Brake System (Section 1R21.3.b(1))
05000341/2016007-02	NCV	Failure to Verify the Adequacy of the Voltage Supplied to Transformer #64 Load Tap Changer (Section 1R21.3.b(2))
05000341/2016007-03	NCV	Failure to Verify the Ability to Manually Throttle Safety-Related MOVs during a DBA (Section 1R21.3.b(3))
05000341/2016007-04	NCV	Failure to Periodically Test the EDG Capability to Start and Accelerate All of the Sequenced Loads Within the Applicable Limits (Section 1R21.3.b(4))
05000341/2016007-05	NCV	Failure to Leak Test All Division 2 NIAS Boundary Isolation Valves (Section 1R21.3.b(5))
05000341/2016007-06	NCV	Failure to Ensure that the MSIVs Would Close Within the TS Required Timeframe and as Described in the UFSAR (Section 1R21.3.b(6))
05000341/2016007-07	NCV	Failure to Ensure that Protective Devices for the Loads Required at the Beginning of a LOCA Would Not Trip Under Degraded Voltage Conditions (Section 1R21.4.b(1))

05000341/2016007-08	NCV	Inadequate Containment Debris Inspections Acceptance Criteria (Section 1R21.4.b(2))
05000341/2016007-09	NCV	Failure to Evaluate the Acceptability of Drywell Coatings with Respect to Potential ECCS Suction Strainer Blockage (Section 1R21.4.b(3))
05000341/2016007-10	NCV	Non Conservative ECCS Suction Strainer Min-K Combined Generation and Transport Factors (Section 1R21.4.b(4))
05000341/2016007-11	NCV	Failure to Apply Design Control Measures to a Design Change Associated with NIAS Accumulator Capability (Section 1R21.5.b(1))
05000341/2016007-12	NCV	Failure to Identify an Out-of-Specification Pressure Reading on the Nitrogen Supply to the “A” MDCT Fan Motor Brake System (Section 4OA2.1.b(1))
05000341/2016007-13	NCV	Failure to Identify a CAQ Associated with Over-Dutied 480V Safety-Related Switchgear Breakers (Section 4OA2.1.b(2))
05000341/2016007-14	NCV	Failure to Identify that an Inadequate Minimum MSIV Accumulator Air Pressure Setpoint Was CAQ (Section 4OA2.1.b(3))
05000341/2016007-15	NCV	Failure to Identify that a Non-Conservative Min-K Insulation Volume Calculation Error Was Nonconforming to the ECCS Suction Strainer Licensing Basis (Section 4OA2.1.b(4))
05000341/2016007-16	NCV	Failure to Timely Identify, Document, and Evaluate Conditions that Challenge Operability (Section 4OA2.1.b(5))

LIST OF DOCUMENTS REVIEWED

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

CALCULATIONS

Number	Description or Title	Revision
DC-5979 Vol. I	Estimation of Debris Sources for ECCS Suction Strainers	0
0000-0155-4058	Detroit Edison Energy (DTE) Company Enrico Fermi Nuclear Plant (Fermi) ECCS Strainer Head Loss Evaluation Study Final Letter Report Transmittal	0
DC-0230 Vol. I	Hydraulic Calculations for the Core Spray System	K
DC-0367 Vol. I	Hydraulic Calculations for the RHR System	Q
DC-0559 Vol. I	Volume of Reservoir - RHR Complex	D
DC-0469 Vol. I	Essential Accumulators for Class I Valves (MSIVs. ADS-SRVs. LLS-SRVs)	F
DC-2849	Primary Pneumatic Supply System	B
DC-6286 Vol. I	EECW HX Performance Requirements With Plugging	A
90073.01	Calculation of Mechanical Draft Cooling Water Fan Brake Nitrogen Supply	2
DC-0182 Vol. I	RHRSW Mechanical Draft Cooling Towers – Post LOCA Analysis of UHS	G
DC-6480 Vol. I	130/260V DC System Analysis	B
021-014-AW1	DC MOV Thrust Calculation by MPR Associates	8
DC-6083	Torque/Thrust Calculation for Safety Related non GL 89-10/96-05 MOVs	F
DC-5147 Vol. I	Hydrogen Evolution in the Divisional Battery Rooms	1
DC-6482 Vol. I	130/260 Vdc and 24/48 Vdc Protective Device Coordination	A
DC-6447	Auxiliary Power System Analysis	C
DC-6475	Setpoint & Coordination for 13.2KV, 4.16KV, and 480V	A
DC-6348	QL1 MOV Thermal Overload Heater Sizing	B
DC-6476	Misc SR AC Protection & Coordination	0
DC-6496	120VAC CCVD Calc for QA1 Div 2	A
DC-6397	Calc of SR GL89-10/96-05 AC MOV Motor Terminal Voltages	B
DC-0919	Undervoltage Relay Setpoints	H
DC-0469	Essential Accumulators for Class 1 Valves (MSIVs, ADS-SRVs, LLS-SRVs)	F
DC-5952	Design Basis System Parameters for AOVs B2103F022A, B2103F022B, B2103F022C, B2103F022D, B2103F028A, B2103F028B, B2103F028C and B2103F028D	A
DC-5991	AOV Stem Force Requirements and Actuator Capacity for B2103F022A	A
DE-M-010	PIS NOS B2103F022A, B, C, D & B2103F028A, B, C, D Weak Link Analysis	0

CALCULATIONS

Number	Description or Title	Revision
20.300.SBO	Loss of Offsite and Onsite Power	22
DC-5806 Vol I	Division I EECW Component Heat Loads and Flow Rate	B
DC-4931 Vol I	Non-Interruptible Control Air System Calculation	H

CORRECTIVE ACTION DOCUMENTS GENERATED DUE TO THE INSPECTION

Number	Description or Title	Date
16-26104	Wrong ID Number/Barcode on DLR Label	08/02/16
16-26128	PM Events T232 and T242 ECCS Suction Strainer As-Found Inspection Criteria Non-Conservative	08/03/16
16-26131	Discrepancy with Description of Drain Location Between Drawing M-N-2053 / Plant Configuration and Procedure 23.208	08/03/16
16-26146	NIAS Aftercooler Compressor Cooling Water Temperature Lower Than Vendor Recommendation	08/03/16
16-26149	Revise TSB B3.3.8.1 Background Description to Clarify Time Delay in Degraded Voltage Relay	08/03/16
16-26196	UFSAR Section 9.2.5.2.5 Description Enhancement	08/05/16
16-26201	UFSAR Changes	08/05/16
16-26202	Revisions to DC-6447	08/05/16
16-26208	DC-4931 VOL I Does Not Address Compressor Loading Time Delay	08/05/16
16-26209	Overdutied 1E to Non-1E Isolation Breakers on Buses 72C, 72E, and 72F	08/05/16
16-26210	Overdutied Safety Related Breakers	08/05/16
16-26214	MDCT A Fan Brake Nitrogen Pressure Low	08/05/16
16-26279	2009 Work Order Contains Clerical/Transcription Error	08/09/16
16-26292	CARD 11-21153 Closed With Incomplete Corrective Action	08/10/16
16-26376	Documentation Issue (Procedure 23.208) for MDCT Fan Brake 100 psi Cylinder Upper Limit	08/12/16
16-26377	Documentation Issue (Calculation 9007301) for MDCT Fan Brake 100 psi Cylinder Upper Limit	08/12/16
16-26385	Inadequate Maintenance Strategies for ESF Fan Coil Units	08/12/16
16-26387	MOV Starting Torque Degradation Due to Methodology in DC-6447 Vol. I	08/12/16
16-26389	NRC Identified Issue P5000F403 and P5000F284 NIAS Boundary Valves Are Not Leak Tested with a Differential Pressure	08/12/16
16-26396	Documentation Issue in UFSAR MOV Thermal Overloads Drift Tolerance	08/12/16
16-26533	Non-Conformance to Licensing Bases for Evaluation of Degraded Voltage	08/17/16
16-26534	Quality of Some CARD Documentation Needs Improvement	08/17/16
16-26535	Potential Discrepancies with EDG LOP/LOCA Acceptance Criteria and R3000 System Monitoring Plan	08/17/16

CORRECTIVE ACTION DOCUMENTS GENERATED DUE TO THE INSPECTION

Number	Description or Title	Date
16-26536	EDG12 and EDG14 LOP/LOCA Minimum Voltage Values Do Not Meet Regulatory Guide 1.9 Criteria	08/17/16
16-26547	Discrepancies Identified in MSIV Weak Link Calculation	08/18/16
16-26561	DC-4931 Vol I Does Not Address Degraded Voltage for Time to Load Compressor	08/18/16
16-26581	Document the Basis for Acceptability of CZ11 Coating in Analysis of Strainer Debris Loading	08/18/16
16-26585	Add Clarification to 43.000.019 Coating Acceptance Criteria	08/19/16
16-26601	Procedure 24.137.02 References Incorrect Calculation Revision	08/19/16
16-26607	DC-4931 Vol I, Rev H Evaluates NIAS P=85 psig for LOOP	08/19/16
16-26633	NRC Concern for Operability Determination Justifications and Timeliness	08/22/16
16-26668	Minimum Voltage Testing of Breaker Spring Charger Motors	08/23/16
16-26672	Investigate to Determine if a CARD Was Initiated During a Failed PMT Event During WO37545465	08/23/16
16-26676	UFSAR Coating Description Needs Update	08/23/16
16-26678	CARD Timeliness and Condition Description Quality	08/23/16
16-26697	MSIV Calc. DC-0469 Discrepancy with UFSAR 5.5.5.1.e	08/24/16
16-26702	SS64 LTC Voltage Requirements During a Degraded Grid Conditions	08/24/16
16-26729	Concerns with Periodic Testing of MCC Installed Motor-Starter Contactors	08/24/16
16-26762	Inadequate Interpretation of TS Related to MDCT Fan Brake System	08/25/16
16-26763	Lack of Procedural Guidance for MOV Throttling to Ensure that TOLs Are Not Tripped	08/25/16
16-26776	Electrical Calculation Implementation Concerns	08/26/16
16-26800	Inappropriate Disposition of Penetration Min-K Debris Generation	08/26/16
16-26947	NRC Identified Potential Violation on Containment Debris Acceptance Criteria	08/31/16
16-26955	Additional Instances of Unanalyzed Conditions Related to MDCT Fan Brake System	08/31/16
16-27189	MSIV TS SR 3.6.1.3.7 Not Correlated to Plant Safety Analysis	09/09/16

CORRECTIVE ACTION DOCUMENTS REVIEWED DURING THE INSPECTION

Number	Description or Title	Date
15-24755	2015 CDBI Self-Assessment Deficiency – EDG Fuel Oil Storage Tank Vent Stack Corrosion	07/09/15
13-25322	2013 CDBI CARD: Performance of 2010 47.205.01 of Division 1 RHR Heat Exchanger Thermal Performance Surveillance Not Per 47.205.01	07/30/13

CORRECTIVE ACTION DOCUMENTS REVIEWED DURING THE INSPECTION

Number	Description or Title	Date
09-22315	Debris Found on ECCS Suction Strainers During Inspection PM	04/05/09
15-28408	Degraded Coatings Identified in the Torus	10/29/15
15-28410	Degraded Coatings Identified Inside the Torus	10/29/15
12-28374	Blistered Protective Coating on the Torus Wetted Region	10/10/12
11-21153	Errors in DC-5979 VOL I	02/01/11
12-23392	Trend CARD: Div 2 ECCS Suction Strainer Inspection Findings	04/17/12
03-12086	Potential Inadequate 50.59 for EDP-29805 (EECW Heat Exchanger Replacement)	05/29/03
04-24254	Higher Than Expected Pressure Drops In Division 1 & 2 EESW	09/16/04
10-25138	EESW side of Div. 1 EECW "A" Heat Exchanger DP is high	06/19/10
16-24762	2016 CDBI QHSA Deficiency – UFSAR UHS Analysis Description	06/10/16
16-25221	Cracks in MDCT B&D Fan Blades at coupling hub	06/28/16
16-23853	NRC Question: Inter-Cell Connection for Cell 32 to Cell 33 Resistance did not Meet Acceptance Criteria.	05/10/16
15-26738	License Amendment No. 0199 – Implementation Issues	09/22/15
15-30095	Intercell Resistance Greater than 38 Micro-Ohms	12/17/15
16-24104	2016 CDBI QHSA Recommendation: Effects of Elevated Battery Room Temperature on Battery Service Life	05/18/16
16-21654	Division 1, 130/260 VDC Battery Banks 2A-1 and 2A-2 Deficiencies	02/19/16
16-23134	Division I Battery Declared Inoperable due to Installed Individual Cell Charger while in Equalize Charge	04/15/16
13-27098	Determine How Temporary Power is to be Provided to Permanent Plant Equipment Prior to RF16)	10/04/13
16-23324	MPU #1 PM requires a Temp Mod in RF-18	04/21/16
13-25428	2013 CDBI Untimely Resolution of Non-Conservative Tech Spec for Battery Intercell Resistance	08/02/13
13-25426	2013 CDBI TS SR 3.8.4.8 Potentially Inadequate	08/02/13
13-25403	2013 CDBI DC-6480 Vol. 1, Rev. A Battery 2B-1 Low Capacity Margin Impact on Design Function	08/01/13
12-20624	NRC 2012 Mod/50.59 Inspection: DC-5373 Vol. 1, EDG's Neutral Grounding Resistor Calculation Issues	01/25/12
13-24841	EDG SS Voltage and Frequency Tech Spec Ranges	07/10/13
07-24145	Enhancement to EDP Monitoring of V and F Dips/Recovery	07/25/07
06-20542	NRC Generic Letter 2006-02	02/02/06
12-20295	Applicability of NRC RIS 2011-12 R1	01/12/12
12-26376	Applicability of NRC IN 2012-06	07/30/12
10-21733	DC-0919 LTC and Motor Starting	02/25/10
10-20748	Canceled Calc DC-5264 may have to be re-initiated	01/28/10
10-21791	Voltage drop limits not used to assess 120KV offsite power	02/26/10
10-21792	EDP 35621 Backfit Mod Issue	02/26/10

CORRECTIVE ACTION DOCUMENTS REVIEWED DURING THE INSPECTION

Number	Description or Title	Date
13-24861	Short Circuit Issues in DC-6447	07/11/13
15-24758	Inadequate Impact Review for SR Bus Breaker Design	07/09/15
12-24034	EDG 14 Voltage Response during LOP/LOCA Test	05/01/12
07-24144	UFSAR Inconsistencies regarding RG 1.9 compliance	07/25/07
15-26713	“A” MSIV Failed its LLRT	09/22/15
15-26714	“B” MSIV Failed its LLRT	09/22/15
15-26746	MSL C Local Leakage Rate Testing (LLRT) Exceeded its Repair Guideline	09/22/15
15-26747	MSL D Local Leakage Rate Testing (LLRT) Exceeded its Repair Guideline	09/22/15
15-28745	“A” MSIV line leakage exceeded repair guideline	11/07/15
16-24154	AOV Program MES44 Deficiency Weak link - Four (4) T4600 AOVs	05/19/16
15-28283	P5000F440 Unable to be Opened Remotely	10/26/15
15-29887	Issues with Torus DW Vent Procedures	12/11/15
15-29892	Crit 2 PM (P504/4) is Past Second Half of Grace	12/11/15
15-21132	Calc DC 4931 Damper Min Air Pressure Calc Margin Issue	02/12/15
15-27221	NIAS Inlet Valve- Valve Cage As Found with fracture	10/03/15
15-27736	Received 7D52 Div 2 Control Air System Trouble For After Cooler Temperature High	10/13/15
15-26136	Division 2 NIAS Safety System Outage Exceeded Scheduled Duration By 10.35 Hours	08/31/15
15-26712	Negative Number Recorded For Air Leakage Acceptance Criteria	09/21/15
15-25976	Div. 2 South CAC Aftercooler Inspection Results during August 2015 NIAS SSO	08/26/15
15-23110	Temp Power RM Q312TP	04/30/15
14-28278	Determine if the NIAS Pressure Should Be Returned To 100 Psig	10/22/14
13-25144	Re-evaluate Response to NIAS NRC Concern CARD 08-27672	07/22/13
14-23181	7D51 - Div 1 NIAS Dryer DP High	04/07/14
12-22871	Higher Friction than Expected in AOV	04/06/12
13-21468	Spurious Div 1 Control Air Dryer Trouble alarms	02/27/13
12-27261	S. CAC Aftercooler Division 2 Inspection Results during August 2012 SSO	06/31/12
12-22639	Design Calc. DC-5989 Does Not Bound The Conditions Found After Diagnostic Testing	04/03/12
11-27420	Safety-Related AOV Actuators Procurement Process Break-Down Between Fermi2 & Vendor	08/05/11
11-30139	Audit Recommendation Evaluate Control Air OOS Hour Performance Criteria	11/11/11
11-26773	Conflict in PM Events	07/15/11
11-21224	Required Testing for Critical PMs are Plant Cold Surveillances	02/02/11
10-23155	AOV Margin Issue at Low NIAS Air Pressure	04/14/10

CORRECTIVE ACTION DOCUMENTS REVIEWED DURING THE INSPECTION

Number	Description or Title	Date
10-30765	NRC Issue: Standby Liquid Control Tank Seismic Design	11/17/10
12-21314	NRC Information Notice, Seismic Conditions-Principally Issues Involving Tanks-Document Applicability	02/17/12

DRAWINGS

Number	Description or Title	Revision
6M721-2002	Main and Reheat Steam System	BS
6M721-2089	Nuclear Boiling System	BI
6M721-3445	Nitrogen Inerting and Supply System	AP
6M721-3445-1	Nitrogen Inerting and Supply System	P
6M721-5007	Primary Containment Pneumatic Supply System	Z
6M721-2053	RHR Service Water System Division 2 RHR Complex	AH
6M721-2052	RHR Service Water System Division 1 RHR Complex	AE
6M721-5444	Emergency Equipment Cooling Water Division 1	BX
6M721-5357	Emergency Equipment Cooling Water Division 2	BR
5C721N-6000	RHR Cooling Tower Cross Section and Key Plan Sheet 1	0
5C721N-6003	RHR Cooling Tower Eliminator 1nstallation Detail Sheet 4	0
6C721-2303	RHR Complex Framing Section 4-4	AB
6M721-2220	Floor & Equipment Drains, Reactor & Auxiliary Buildings	U
6SD721-2522-12B	Interconnection Diagram, 260V D.C. MCC 2PB-1	H
6I721-2221-05	HPCI System Pump Discharge Isolation Valves E4150F006 & F007	AD
6I721-2095-17	Schematic Diagram Inboard MSIVs	V
6I721-2093-01	Wiring Diagram for Locally Mounted Instruments for MSIVs	U
6SD721-2530-10	One Line Diagram, 130/260 Vdc Division 1 Battery Distribution	AM
6SD721-2530-01	One Line Diagram, 120 Vac Instrument & Control Power Feeders Divisions 1 & 2	AA
6SD721-2531-24	Wiring Diagram, Modular Power Unit # 1	G
6I721-2095-05	Schematic Diagram ADS System	R
6I721-2451-08	Schematic Diagram, Control Air Isolation Valves P5000F402 & F440	O
6SD721-2500-01	One Line Diagram Plant 4160V & 480V System	BH
6SD721-2500-08	One Line Drawing 4160V Diesel Gen Buses	S
6SD721-2510-01	One Line Diagram 480V ESS Bus 72B, 72C, 72E & 72F	AQ
6SD721-2510-05	One Line Diagram 480V Diesel Gen Buses 72EA-72ED	O
53D721-2512-15A	Front El 480V MCC 72E-5A	AK
6M721-5856	ISI Classification Boundary Drawing Primary Containment Pneumatic Supply System ISI-T49-1	L
6M721	Diagram Interruptible and Non-Interruptible Control Air System	AG
6M721-2015	Diagram Station and Control Air	CJ
6M721-5730-3	Non-Interruptible Control Air System Division I & II Functional Operating Sketch	AJ

10 CFR 50.59 DOCUMENTS (SCREENINGS/SAFETY EVALUATIONS)

Number	Description or Title	Date
03-0527	EECW Spare Heat Exchanger Modification - Phases I & 2/ EECW Low Differential Press Setpoint Change	05/24/05
13-0036	Update Design Documents to Show Manual Bypass Valve P5000F1041C as Normally Open	01/24/14

MISCELLANEOUS

Number	Description or Title	Date/Revision
Design Specification 3071-405	Vendor/OEM Application of Service Level I Coatings on Components to be Installed in the Drywell	A
Design Specification 3071-360	Interior Protective Coating Suppression Chamber - Reactor Building	E
DECO-12-2191	Evaluation of Containment Coatings	4
B2100/B2104	System Health Report - Nuclear Boiler (including Main Steam Isolation Valve Leakage Control)	Q1-2016
DBD P44-00	Design Basis Document EECW System	F
E1156	System Health Report- RHR Mechanical Draft Cooling Towers	Q1-2016
LCO 2007-0251	MDCT Fan A 100 psig cylinder pressure is at 200 psig (max allowed is 140 psig)	06/04/07
LCO 2016-0147	MDCT Fan A Brake Nitrogen Pressure Low	04/06/16
LCO 2016-0148	MDCT Fan C Brake Nitrogen Pressure Low	04/06/16
MES52	Fermi 2 Engineering Support Conduct Manual GL 89-13 Safety-Related Service Water Monitoring Program	6
NRC-89-0210	Residual Heat Removal Service Water System Mechanical Draft Cooling Tower Fan Brakes	12/28/89
P4400	EECW System	Q1-2016
SE 99-0009	EECW Heat Exchanger Replacement	0
DC-3219, Vol. 1	Fermi 2 Class 1E Equipment Qualification Review System: B21, 3rd MSIVs (N1100f607-10) and Feed Water Valves N21F539A&B	E
3071-128-EJ	Electrical Engineering Standard Class 1E, 1M and BOP Equipment Fusing Requirements	HP
VMB11-19	Vendor Manual for Stearn’s 87000 Series Electric Disc Brakes	0
TE-R32-16-011	Technical Evaluation for the Use of a Single Cell Charger on Division 1 Battery 2PA	A
Temp Mod 13-0022	Provide Temporary 120Vac Power to the MPU1 "DIV1" (R3101S001) Distribution Cabinets during RF16	0
EQ1-EF2-220	Environmental Qualification Report for MSIV Components	G
VMC1-373	Vendor Manual for the MPU’s Voltage Regulator	0
EQ1-EF2-155	Qualification Evaluation Report for Target Rock 3-Way Solenoid Valves	D

MISCELLANEOUS

Number	Description or Title	Date/Revision
VMR1-59	Vendor Manual Type K600S Breakers	G
VME5-7.1	Vendor Manual ITE 5600 Series MCCs	E
VME8-11	Vendor Manual GE Inductrol Type AIRT Voltage Regulator	B
NRC-06-0013	Fermi 2 60 Day Response to GL 2006-02	04/03/06
NRC-07-2003	Response to RAI Request for GL2006-02	01/26/07
LCR 08-050-UFS	Admendment to Revise Degraded Voltage Function to reflect modification TAC ME1477	10/20/10
LCR 08-052-TSB	Degraded Voltage Backfit Modification	10/23/10
B21.00-0	Nuclear Boiler System (Specification 22A2919 Rev. 7)	7
B995070100	Relief Valve Test Data Sheet	10/07/07
B996060100	Relief Valve Test Data Sheet	03/31/06
B997030100	Relief Valve Test Data Sheet	04/03/03
B997130100	Relief Valve Test Data Sheet	04/05/12
B996150100	Relief Valve Test Data Sheet	10/09/15
B998150100	Relief Valve Test Data Sheet	10/09/15
B2100/B2104	Nuclear Boiler (Including Main Steam Isolation Valve Leakage Control)	Q1-2016
0945	eCARD Vaulting Report	02/11/15
21A9257	General Requirements For Main Steam Isolation Valves	4
B998060100	Relief Valve Test Data Sheet	05/31/06
	Safety Data Sheet for Desiccant Activated Alumina	05/19/15
P50N403B-SS	Instrument Calibration Specification Sheet for P50R800B	12/16/08
P50N403A-SS	Instrument Calibration Specification Sheet for P50R800A	12/16/08
WG-001	Fermi Writers Guide	18

MODIFICATIONS

Number	Description or Title	Date/Revision
EDP-30530	EECW Div. land Div. I Back-up Plate & Frame Heat Exchanger On-Line Installation	A
EDP-29805	EECW Heat Exchanger Replacement	0
EDP 33703	EECW pump and motor replacements	02/27/07
EDP 33878	EECW pump area cooler coil and piping change	11/18/06
TSR-37387	Update BCDDs and the UFSAR to Remove Statement that the Control Air (CA) Receiver Tanks to have 10 Minute of Reserve Air Capacity and Restate the Amount of Reserve Air Capacity of CA Receiver Tanks	0
TSR-36510	Revise AOV Torque Calculations	0

OPERABILITY EVALUATIONS

Number	Description or Title	Date
EFA-R14-16-002	Analysis of Insufficiently Rated 480VAC Switchgear Breakers	08/11/16
EFA-R14-16-003	Analysis of Insufficiently Rated 480VAC Switchgear Breakers supplied from ESF Buses 72C, 72E, and 72F	08/21/16

OPERABILITY EVALUATIONS

Number	Description or Title	Date
EFA-E11-16-004	Impact of Additional Containment Penetration Min-K on ECCS Suction Strainer Design	09/01/16
EFA-B21-16-005	MSIV Closure Time with Off Normal Pneumatic Supply Pressure and Accident Conditions	09/15/16

PROCEDURES

Number	Description or Title	Revision
MES46	ASME Section XI Containment Inservice Inspection Program	4
43.000.019	Primary Containment Inspection	7
WP-2	Underwater Desludging of Immersion Areas in Radiologically Contaminated Environments	3
QCP-10-2	Underwater Coating Repair	3
QCP-10-1	Underwater Coating Inspection	3
ODE-12	Operations Department Expectation	36
ODE-12	Operations Department Expectation	37
20.000.01	Acts of Nature	49
20.127.01	Loss of Reactor Building Closed Cooling Water System	31
23.127	Reactor Building Closed Cooling Water/Emergency Equipment Cooling Water System	140
23.208	RHR Complex Service Water	108
27.322	Mayfly Infestation Preparation Plan	14
35.205.002	RHR Cooling Tower Fan, Emergency Blade Replacement	26
73.000.05	RHR Service Water Treatments	4
24.000.02	Modes 1, 2, 3, 4 Shiftly, Daily and Weekly Surveillances	145
24.000.03	Mode 5 Shiftly, Daily and Weekly Surveillances	78
24.129.04	Control Air Valve Operability/Position Indication Verification/Isolation Integrity Test	24
23.321	Operation of Engineered Safety Features Auxiliary Electrical Distribution System	54
23.308	Operation of 120 Vac Instrument and Control Power System	73
20.300.Offsite	Procedure for Loss of Offsite Power	12
42.000.02	Thermal Overload Relay Calibration	37
35.306.018	Spectrum Technology MCC Load Compartment	12
23.137	Nuclear Boiler System	49
24.129.06	Division 2 NIAS Check Valve P5000-F219B Leakage/Test	2
ARP 17D43	Rail Airlock Outer Door Seal Press Low	8
ARP 8D24	Rail Airlock Inner Door Seal Press Low	6
ARP 7D72	Motor Tripped	12
ARP 7D69	Station Air Compressor Auto Start	7
ARP 7D67	NIAS/IAS Intertie Auto Close By-Passed	9
ARP 7D61	Station Air Compressor Trouble	8
ARP 7D60	RHR Complex Control Air Pressure Low	8
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24.302.13	Logic System Functional Testing of Div 1 NIAS Isolation Valve Upon a Loss of Off-Site Power	8
44.020.001	NSSS – Division 1, Logic System Functional Test	43
24.307.01	Emergency Diesel Generator 11 – Loss of Offsite Power and ECCS Start with Loss of Offsite Power Test	43
P50N482B	Control Air Division 2 Auxiliary Building South Control Air Compressor P5002D002 Pressure Switch	0
P50N482A	Control Air Division 1 Auxiliary Building South Control Air Compressor P5002D001 Pressure Switch	0
27.129.05	Division 2 NIAS Leakage/Usage – Compressor Performance Test	9
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20.129.01	Abnormal Operating Procedure – Loss of Air	33
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20.000.21	Reactor Scram	65
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23.129	Station and Control Air System	107
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23.208	RHR Complex Service Water Systems	108
23.320	Balance of Plant Auxiliary Electrical Distribution System	63
24.307.05	Diesel Generator Service Water Valve Lineup Verification	26
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27.129.01	Division 1 Control Air Compressor Auto Start Test	19
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SURVEILLANCES (COMPLETED)

Number	Description or Title	Date/Revision
24.137.02	MSIV/ADS and LLS SRV Accumulator Check Valve Test	11/11/15
24.208.03	Division 2 EESW and EECW Makeup Pump and Valve Operability Test	04/01/16
24.208.03	Division 2 EESW and EECW Makeup Pump and Valve Operability Test	06/29/16
24.137.11	Safety Relief Valve Operability	05/04/12
24.207.08	Division 1 EECW Pump and Valve Operability Test	02/12/16
24.207.08	Division 2 EECW Pump and Valve Operability Test	04/10/16
24.205.10	DIV 2 RHR Cooling Tower Fan Operability and RHRSW Valve Line-up Verification	06/28/16
43.137.001	Main Steam Safety Relief Valve Setpoint Test	12/03/15
24.207.06	Div. 1 EECW/EESW Actuation Functional Test,	10/30/15
38150084	Compressor Performance Test	03/15/14
38144648	Perform Partial 27.129.05	03/13/14
31841198	Perform 27.129.05 Div 2 NIAS Leakage/Usage Compressor Performance Test	03/11/14
35696999	Perform 27.129.05 Div 2 NIAS Leakage Section 5.5 Only	12/08/12
43.000.020	Relief Valve Test Data Sheet P5000F223B	10/26/07
43.000.020	Relief Valve Test Data Sheet P5000F223A	10/26/07
43.000.020	Relief Valve Test Data Sheet P5000F223A	10/20/15
34232839	Perform 24.129.04 SEC-5.1, 5.3, 5.4 Div 2 NIAS Integrity	08/27/13
43305356	Perform 27.129.02 Div 2 Control Air Compressor Auto Start	05/25/16
38578897	Perform 27.129.02 Div 2 Control Air Compressor Auto Start	02/27/16
42281608	Perform 27.129.01 Div 1 Control Air Compressor Auto Start	05/19/16
38574730	Perform 27.129.01 Div 1 Control Air Compressor Auto Start	02/06/16
37337504	Perform 24.302.14 Logic Functional Test of Div 2 NIAS Valve Isolation	02/23/15
34225388	Perform 24.302.14 Logic Functional Test of Div 2 NIAS Valve Isolation	08/26/13
37245665	Perform 24.302.13 Logic Functional Test of Div 1 NIAS Valve Isolation	20/11/15
34156340	Perform 24.302.13 Logic Functional Test of Div 1 NIAS Valve Isolation	08/12/13
SOE 95-014	NIAS Division II Air Compressor-Inlet Outlet Temperature Data Collection	06/11/95
A882060100	Perform Valve Actuator Overhaul and AOV Diagnostic Test	03/13/14

TRAINING DOCUMENTS

Number	Description or Title	Date/Revision
	Operations Training Nuclear Boiler System	20

TRAINING DOCUMENTS

Number	Description or Title	Date/Revision
	Operations Training Residual Heat Removal Service Water	17
ST-OP-315-0067-001	Operations Training Reactor Building Closed Cooling Water	22
ST-OP-315-0071-001	Compressed Air Systems	25

WORK DOCUMENTS

Number	Description or Title	Date/Revision
WO32797278	Inspection Of Div. 2 Torus Suction Strainers (RHR, CS, HPCI)	04/13/12
WO37491505	Desludge, Inspect, Repair-Torus Coatings Below Water Level	02/16/14
WO34379073	Perform 43.000.019 Inside Torus/Inside Drywell/Outside DW Inspection	03/14/14
WO31843129	Perform 43.000.019 Inside Torus/Inside Drywell/Outside DW Inspection	04/24/12
WO37545774	Perform 43.000.019 Inside Torus/Inside Drywell/Outside DW Inspection	11/13/15
WO25975596	Desludge, Inspect, Repair Torus Coating Below Water Level	04/27/09
WO31804338	Inspection Div.1 Torus Suction Strainers (RHR, CS, RCIC)	04/10/12
WO31804324	Inspection Div.2 Torus Suction Strainers (RHR, CS, RCIC)	04/25/12
WO29492835	Replace Electrolytic Capacitors in Div 1 RHRSW MDCT Fan “A” Brake Controller	12/13/11
WO28409909	Replace Electrolytic Capacitors in Div 2 RHRSW MDCT Fan “B” Brake Controller	04/04/11
WO44972809	“A” MDCT Fan Braking Nitrogen Pressure abnormally changing following Surveillance Run	04/06/16
WO44972802	D1 RHR MDCT Fan C braking N2 bottle pressure is low	04/06/16
WO45008401	Perform Single Cell Charging on Division 1 Battery Cells	04/28/16
WO35898315	Perform 42.309.05, Div. 1, 5 Year 130/260 Vdc Battery Check	10/30/15
WO38115948	Perform 44.210.059; ECCS/ADS/MDS Div. 1 SRV Solenoid Functional Test	11/16/15
WO32470632	Replace MSIV Control Air Manifold Per NE-6.6-EQMS.078	03/17/14
WO34357679	Perform 24.137.03 SEC-5.1 & 5.3 MSIV Fail Safe Test	03/14/14
WO25982367	Clean/Inspect/Test 120 Vac MPU # 1	11/19/10
WO38556006	EECW Breaker 72F-3B Test	06/23/16
WO37545314	Perform 24.307.04 for EDG 14 ECCS start with LOOP	10/28/15
R586070100	Inspect and Test 480V Bus 72EC	03/21/09
R989150100	Inspect and Test 480V SWGR 72F	03/12/12
V133960729	Periodic Maintenance EDG 14 Supply Breaker 14ED	11/30/05
WO38157218	Perform 24.137.03 Section 5.2	11/10/15
WO37250047	Perform 24.137.03 Sec-5.2 &5.4 MSIV Cold Shutbown Stroke Time/Logic Func.	03/14/14

WORK DOCUMENTS

Number	Description or Title	Date/Revision
WO42286348	Perform 24.000.05 Monthly Continuity Light and Channel Check Test	04/24/16
WO37545465	Perform 24.137.02 Sec-5.1 Thru 5.4 In-Board MSIV Accumulator Check Valve Test	11/09/15
WO29637351	Perform 24.137.02 Sec – 5.1 Thru 5.4 In-Board MSIV Accumulator Check Valve Test	11/13/10
WO38352384	Replace the MSIV Hydraulic Actuator	11/11/15
WO44275075	Check Valve Drop Test. For MSIV “A” INBD Only	11/10/15
WO34357815	Perform 24.137.02 Sec-5.1 Thru 5.4 In-Board MSIV Accumulator Check Valve Test	03/13/14
WO31859198	Perform 24.137.02 Sec-5.1 Thru 5.4 In-Board MSIV Accumulator Check Valve Test	04/21/12
WO34357679	Perform 24.137.03 Sec-5.1 & 5.3 MSIV Fail Safe Test/Position Indication	03/14/14
WO31859167	Perform 24.137.03 Sec-5.1 & 5.3 MSIV Fail Safe Test/Position Indication	04/22/12
WO37250047	Perform 24.137.03 Sec-5.2 & 5.4 MSIV Cold Shutdown Stroke Time/Logic Func.	03/14/14
WO37545751	Perform 24.137.03 Sections 5.1	11/10/15
WO38038729	*Contingency* OUTBD B MSIV Leakage beyond Repairable Guideline.	11/23/15
WO43981192	A MSIV Failed its LLRT	11/22/15
WO43981156	MSL D Local Leakage Rate Testing (LLRT) Exceeded its Repair Guideline	11/22/15
WO43981152	MSL C Local Leakage Rate Testing (LLRT) Exceeded its Repair Guideline	11/22/15
WO42286346	Perform 24.000.05 Monthly Continuity Light and Channel Check Test	03/20/16
WO38575730	Perform 24.000.05 Monthly Continuity Light and Channel Check Test	02/22/16
WO38151284	16-26389Perform 24.129.05 Div I NIAS Check Valve P5000F219A Leakage Test	10/16/15
WO44108948	Perform 27.129.05 Div 2 NIAS Leakage/Usage-Compressor Performance Test	10/10/15
WO42305311	Obtain Sample of South Control Air Compressor Crankcase Oil	05/25/16
WO42305914	Perform Quarterly Dew Point Check on Control Air South Dryer	05/26/16
WO38579190	Perform Quarterly Dew Point Check on Control Air South Dryer	02/25/16
WO32546279	Clean Inside Surface of Aftercooler Shell	08/28/12
WO31708593	Control Air South Dryer Replace Prefilter/Afterfilter	08/26/14
WO32448344	Check Belts, and Sample the Oil in the Compressor – Div 2 Control Air Compressor	08/27/13
WO35331757	Replace Desiccant in Div 2 NIAS Dryer	08/27/14

WORK DOCUMENTS

Number	Description or Title	Date/Revision
WO31536850	Calibrate Division 2 NIAS Oil and Air Pressure Switches	02/07/12
WO32166734	Calibrate Division 1 (North) Control Air Compressor Pressure Switches	08/14/12
WO36093928	Calibrate Division 2 NIAS Pressure Switches	02/24/15
WO37665345	Calibrate Division 1 NIAS Pressure Switches	02/18/15
WO42305356	Perform 27.129.02 Div 2 (South) Control Air Compressor Auto Start	05/25/16
WO42692319	Perform 27.129.01 Div 1 (North) Control Air Compressor Auto Start	08/11/16

LIST OF ACRONYMS USED

AC	Alternating Current
ADAMS	Agencywide Document Access Management System
BWROG	Boiling Water Reactor Owner's Group
CAP	Corrective Action Program
CAQ	Condition Adverse to Quality
CDBI	Component Design Bases Inspection
CFR	Code of Federal Regulations
DBA	Design Basis Accident
ECCS	Emergency Core Cooling System
EDG	Emergency Diesel Generator
EECW	Emergency Equipment Cooling Water
EESW	Emergency Equipment Service Water
ESF	Engineered Safety Feature
IMC	Inspection Manual Chapter
IST	Inservice Testing
LCO	Limiting Condition for Operation
LERF	Large Early Release Frequency
LOCA	Loss of Coolant Accident
LOOP	Loss of Off-site Power
MDCT	Mechanical Draft Cooling Tower
MOV	Motor-Operated Valve
MSIV	Main Steam Isolation Valve
NCV	Non-Cited Violation
NIAS	Non-Interruptible Control Air System
NRC	U.S. Nuclear Regulatory Commission
PARS	Publicly Available Records System
PM	Preventive Maintenance
PRA	Probabilistic Risk Assessment
RG	Regulatory Guide
RHR	Residual Heat Removal
RIS	Regulatory Issue Summary
SDP	Significance Determination Process
SR	Surveillance Requirement
SSC	Systems, Structures, and Components
TOL	Thermal Overload
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
UHS	Ultimate Heat Sink
URG	Utility Resolution Guidance

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Sincerely,

/RA/

Mark Jeffers, Chief
Engineering Branch 2
Division of Reactor Safety

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