UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

July 10, 2018

Mr. Keith J. Polson
Senior Vice President
and Chief Nuclear Officer
DTE Electric Company
Fermi 2 - 260 TAC
6400 North Dixie Highway
Newport, MI 48166

SUBJECT: FERMI, UNIT 2 - REPORT FOR THE AUDIT OF LICENSEE RESPONSES TO INTERIM STAFF EVALUATIONS OPEN ITEMS RELATED TO NRC ORDER EA-13-109 TO MODIFY LICENSES WITH REGARD TO RELIABLE HARDENED CONTAINMENT VENTS CAPABLE OF OPERATION UNDER SEVERE ACCIDENT CONDITIONS (CAC NO. MF4362; EPID L-2014-JLD-0048)

Dear Mr. Polson:

On June 6, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13143A334), the U.S. Nuclear Regulatory Commission (NRC) issued Order EA-13-109, "Order to Modify Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions," to all Boiling-Water Reactor licensees with Mark I and Mark II primary containments. The order requirements are provided in Attachment 2 to the order and are divided into two parts to allow for a phased approach to implementation. The order required licensees to submit for review overall integrated plans (OIPs) that describe how compliance with the requirements for both phases of Order EA-13-109 will be achieved.

By letter dated June 30, 2014 (ADAMS Accession No. ML14182A203), DTE Electric Company (the licensee) submitted its Phase 1 OIP for Fermi, Unit 2 (Fermi). By letters dated December 18, 2014, June 11, 2015, December 23, 2015 (which included the combined Phase 1 and Phase 2 OIP), June 20, 2016, December 9, 2016, June 27, 2017, and December 14, 2017 (ADAMS Accession Nos. ML14352A174, ML15162A729, ML15357A289), ML16172A209, ML16344A252, ML17178A343, and ML17348A784, respectively), the licensee submitted its 6-month updates to the OIP. The NRC staff reviewed the information provided by the licensee and issued interim staff evaluations (ISEs) for Phase 1 and Phase 2 of Order EA-13-109 for Fermi by letters dated April 1, 2015 (ADAMS Accession No. ML15077A574), and August 30, 2016 (ADAMS Accession No. ML16231A443), respectively. When developing the ISEs, the staff identified open items where additional information was still needed to complete its review.

The NRC staff is using the audit process described in letters dated May 27, 2014 (ADAMS Accession No. ML14126A545), and August 10, 2017 (ADAMS Accession No. ML17220A328), to gain a better understanding of licensee activities being performed for compliance with the order. As part of the audit process, the staff reviewed the licensee's closeout of the ISE open items. The NRC staff conducted a teleconference with the licensee on June 14, 2018. The enclosed audit report provides a summary of that aspect of the audit.

If you have any questions, please contact me at (301) 415-1025 or by e-mail at Rajender.Auluck@nrc.gov.

Sincerely,

R Auluck

Rajender Auluck, Senior Project Manager
Beyond-Design-Basis Engineering Branch
Division of Licensing Projects
Office of Nuclear Reactor Regulation

Docket No. 50-341

Enclosure:
Audit report

cc w/encl: Distribution via Listserv

UNITED STATES
NUCLEAR REGULATORY COMMISSION
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AUDIT REPORT BY THE OFFICE OF NUCLEAR REACTOR REGULATION

AUDIT OF LICENSEE RESPONSES TO INTERIM STAFF EVALUATIONS OPEN ITEMS RELATED TO ORDER EA-13-109 MODIFYING LICENSES WITH REGARD TO RELIABLE HARDENED CONTAINMENT VENTS CAPABLE OF OPERATION UNDER SEVERE ACCIDENT CONDITIONS

DTE ELECTRIC COMPANY

FERMI, UNIT 2

DOCKET NO. 50-341

BACKGROUND

On June 6, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13143A334), the U.S. Nuclear Regulatory Commission (NRC) issued Order EA-13-109, "Order to Modify Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions," to all Boiling-Water Reactor (BWR) licensees with Mark I and Mark II primary containments. The order requirements are divided into two parts to allow for a phased approach to implementation.

Phase 1 of Order EA-13-109 requires license holders of BWRs with Mark I and Mark II primary containments to design and install a Hardened Containment Vent System (HCVS), using a vent path from the containment wetwell to remove decay heat, vent the containment atmosphere (including steam, hydrogen, carbon monoxide, non-condensable gases, aerosols, and fission products), and control containment pressure within acceptable limits. The HCVS shall be designed for those accident conditions (before and after core damage) for which containment venting is relied upon to reduce the probability of containment failure, including accident sequences that result in the loss of active containment heat removal capability or extended loss of alternating current (ac) power (ELAP). The order required all applicable licensees, by June 30, 2014, to submit to the Commission for review an overall integrated plan (OIP) that describes how compliance with the Phase 1 requirements described in Order EA-13-109 Attachment 2 will be achieved.

Phase 2 of Order EA-13-109 requires license holders of BWRs with Mark I and Mark II primary containments to design and install a system that provides venting capability from the containment drywell under severe accident conditions, or, alternatively, to develop and implement a reliable containment venting strategy that makes it unlikely that a licensee would need to vent from the containment drywell during severe accident conditions. The order required all applicable licensees, by December 31, 2015, to submit to the Commission for

review an OIP that describes how compliance with the Phase 2 requirements described in Order EA-13-109 Attachment 2 will be achieved.

By letter dated June 30, 2014 (ADAMS Accession No. ML14182A203), DTE Electric Company (DTE, the licensee) submitted its Phase 1 OIP for Fermi, Unit 2 (Fermi). By letters dated December 18, 2014, June 11, 2015, December 23, 2015 (which included the combined Phase 1 and Phase 2 OIP), June 20, 2016, December 9, 2016, June 27, 2017, and December 14, 2017 (ADAMS Accession Nos. ML14352A174, ML15162A729, ML15357A289), ML16172A209, ML16344A252, ML17178A343, and ML17348A784, respectively), the licensee submitted its 6-month updates to the OIP, as required by the order.

The NRC staff reviewed the information provided by the licensee and issued interim staff evaluations (ISEs) for Phase 1 and Phase 2 of Order EA-13-109 for Fermi by letters dated April 1, 2015 (ADAMS Accession No. ML15077A574), and August 30, 2016 (ADAMS Accession No. ML16231A443), respectively. When developing the ISEs, the staff identified open items where additional information was still needed to complete its review.

The NRC staff is using the audit process in accordance with the letters dated May 27, 2014 (ADAMS Accession No. ML14126A545), and August 10, 2017 (ADAMS Accession No. ML17220A328), to gain a better understanding of licensee activities as they come into compliance with the order. The staff reviews submitted information, licensee documents (via ePortals), and preliminary Overall Program Documents (OPDs)/OIPs, while identifying areas where additional information is needed. As part of this process, the staff reviewed the licensee closeout of the ISE open items.

AUDIT SUMMARY

As part of the audit, the NRC staff conducted a teleconference with the licensee on June 14, 2018. The purpose of this audit teleconference was to continue the audit review and provide the NRC staff the opportunity to engage with the licensee regarding the closure of open items from the ISEs. As part of the preparation for the audit call, the staff reviewed the information and/or references noted in the OIP updates to ensure that closure of ISE open items and the HCVS design are consistent with the guidance provided in Nuclear Energy Institute (NEI) 13-02, Revision 1, other related documents (e.g. white papers (ADAMS Accession Nos. ML14126A374, ML14358A040, ML15040A038 and ML15240A072, respectively) and frequently asked questions (FAQs), (ADAMS Accession No. ML15271A148)) that were developed and reviewed as part of overall guidance development. The NRC staff audit members are listed in Table 1. Table 2 is a list of documents reviewed by the staff. Table 3 provides the status of the ISE open item closeout for Fermi. The open items are taken from the Phase 1 and Phase 2 ISEs issued on April 1, 2015, and August 30, 2016, respectively.

FOLLOW UP ACTIVITY

The staff continues to audit the licensee's information as it becomes available. The staff will issue further audit reports for Fermi, as appropriate.

Following the licensee's declarations of order compliance, the licensee will provide a final integrated plan (FIP) that describes how the order requirements are met. The NRC staff will evaluate the FIP, the resulting site-specific OPDs, as appropriate, and other licensee documents, prior to making a safety determination regarding order compliance.

CONCLUSION

This audit report documents the staff's understanding of the licensee's closeout of the ISE open items, based on the documents discussed above. The staff notes that several of these documents are still preliminary, and all documents are subject to change in accordance with the licensee's design process. In summary, the staff has no further questions on how the licensee has addressed the ISE open items, based on the preliminary information, but notes that some open items are designated by the staff to be open or pending as described in Table 3 below. The status of the NRC staff's review of these open items may change as additional information is provided to the staff, or if the licensee changes its plans as part of final implementation. Changes in the NRC staff review will be communicated in the ongoing audit process.

Attachments:
1. Table 1 – NRC Staff Audit and Teleconference Participants
2. Table 2 – Audit Documents Reviewed
3. Table 3 – ISE Open Item Status Table

Table 1 - NRC Staff Audit and Teleconference Participants

Title	Team Member	Organization
Team Lead/Sr. Project Manager	Rajender Auluck	NRR/DLP
Project Manager Support/Technical Support – Containment / Ventilation	Brian Lee	NRR/DLP
Technical Support – Containment / Ventilation	Bruce Heida	NRR/DLP
Technical Support – Electrical	Kerby Scales	NRR/DLP
Technical Support – Balance of Plant	Garry Armstrong	NRR/DLP
Technical Support – I&C	Steve Wyman	NRR/DLP
Technical Support – Dose	John Parillo	NRR/DRA

Table 2 – Audit Documents Reviewed

TMII-15-0008 – Fukushima Project – FLEX Validation Process (FVP) Group B Results
Calculation DC-6645, "HCVS [Hardened Containment Venting System] Radiological Assessment," Revision 0
Calculation DC-6639, "Loss of HVAC – Room Environmental Analysis in Support of Hardened Vent," Revision 0
Calculation DC-6646, "Torus Hardened Vent Sizing Analysis and Dynamic Analysis," Revision 0
Calculation DC-6668, "Torus Capacity to Absorb Decay Heat Generated During First 3 Hours After Shutdown," Revision 0
Engineering Design Package (EDP) 37115, "Hardened Vent Partial EOC Close-out, Tubing Re-route for T46P410 to CAC Room, Secondary Containment Breach Evaluation, PMT for Nitrogen Tubing, Changes for Field Interferences, and Corrections to Document Deficiencies," Revision 0
Calculation DC-6636, "Hardened Containment Vent System Bottle Sizing," Revision 0
Calculation DC-6584, "FLEX DC Calculations," Revision A
ECR 37115-15, Hardened Vent EOC Close Out and Issuance of Supporting Documentation," Revision 0
Performance Evaluation Procedure 47.000.94, "Local Leakage Rate Testing for Hardened Vent"
Calculation DC-5938, "Design Basis System Parameters for AOVs T4600F400, T4600F401, T4600F402, T4600F411, T4600F412," Revision C
Calculation DC-5951, "AOV Design Basis Parameters – T4600F407, T4600F420 & T4600F421," Revision A
Calculation DC-6170, "Design Basis System Parameters for AOV T4600F406 and T4600F410," Revision C
Calculation DC-5937, "Design Basis System Parameters for AOVs P500F402, P5000F403, P5000F440, P5000F441," Revision 0
Calculation DC-5989, "AOV Stem Force Requirements and Actuator Capability Calculation for P5000F402, P5000F440, P5000F441, G1100F003, and G1100F019," Revision C
Calculation DC-6292, "AOV Stem Force Requirements Vs. Actuator Thrust Capability for T4600F406," Revision 0
Calculation 2206C, "Torque Requirements for T4600F-400, -401, -402, -412, -420, -421 Butterfly AOVs, and P43F402 Ball AOV at Fermi 2," Revision 3
Calculation 2406C, "Fermi KVAP Calculation: SGTS from Air Inlet Refueling Area Isolation Valve T4600F410," Revision 3
Calculation 2744C, "Fermi KVAP Calculation: SGTS from Reactor Building Exhaust System Isolation Vavle T4600F407," Revision 3
Calculation 3612C, "Fermi KVAP Calculation: SGTS Supression Chamber Purge Isolation Valve T4600F400," Revision 3
Calculation 3613C, "Fermi KVAP Calculation: SGTS Suppression Chamber Purge Isolation Valve T4600F401," Revision 3
Calculation 3590C, "Fermi KVAP Calculation: Division II Outboard Torus Hardened Vent Secondary Containment Isolation Valve T4600F421," Revision 3

Fermi 2
Vent Order Interim Staff Evaluation Open Items:

Table 3 - ISE Open Item Status Table

ISE Open Item Number Requested Action	Licensee Response – Information provided in 6 month updates and on the ePortal	NRC Staff Close-out notes	Safety Evaluation (SE) status Closed; Pending; Open (need additional information from licensee)
Phase 1 ISE OI 1 Make available for NRC staff audit documentation confirming that all load stripping will be accomplished within 1 hour and 15 minutes of event initiation and will occur at locations not impacted by a radiological event.	Complete. Validation of times needed for load stripping is contained in the FLEX Validation Program results that are documented in TMII-15-0008, which is posted on the e-portal.	The NRC staff reviewed the information provided in the 6-month updates and on the ePortal. Through its validation process, the licensee confirmed that all load stripping can be accomplished within an appropriate time and without any impact due to radiological conditions. No follow-up questions.	Closed [Staff evaluation to be included in SE Section 3.1.2.6]
Phase 1 ISE OI 2 Make available for NRC staff audit an evaluation of Section 3.2.1 temperature and radiological conditions to ensure that operating personnel can safely access and operate controls and support equipment.	Complete. The evaluation of temperature conditions is contained in DC-6639 and the evaluation of radiological conditions is contained in DC- 6645. These design calculations have been posted on the e-portal.	The NRC staff reviewed the information provided in the 6-month updates and on the ePortal. The main control center (MCC) is located in the Division 2 Switchgear Room on the third floor of the auxilliary building. Calculation DC-6639, "Loss of HVAC – Room Environmental Analysis in Support of Hardened Vent," Revision 0 indicates the Switchgear Room will reach 146 degrees Farenheit (°F) with doors closed and 143°F with doors	Closed [Staff evaluation to be included in SE Sections 3.1.1.2 and 3.1.1.3]

		open. The main control room (MCR, alternate control station) will reach 114°F (105°F ambient). Operations have the option to start reactor building heating ventilation and air conditioning (RBHVAC) to mitigate these higher temperatures per procedure 29.FSG.Toolbox - RBHVAC Local Operations and 29.FSG.Toolbox Ventilation and Building Heat Control, if needed. Based on the Operations Toolbox mitigating actions, the MCC and MCR temperatures will be monitored and controlled to ensure that the room temperature remain within the personnel habitability and equipment design limits. Calculation DC-6645, "HCVS [Hardened Containment Venting System] Radiological Assessment," Revision 0 was performed to determine the integrated radiation dose due to HCVS operation. The NRC staff reviewed this calculation and determined that the licensee used conservative assumptions and followed the guidance outlined in NEI 13-02 Revision 1 and HCVS-WP-02 Revision 0. Based on the expected integrated whole body dose equivalent in the MCC and MCR and the expected integrated whole body dose equivalent for expected actions during the	

		sustained operating period, the NRC staff believes that the order requirements are met. Based on the these evaluations, the temperature and radiological conditions should not inhibit operator actions needed to initiate and operate the HCVS during an ELAP with severe accident conditions. No follow-up questions.	
Phase 1 ISE OI 3 Make available for NRC staff audit analyses demonstrating that HCVS has the capacity to vent the steam/energy equivalent of one percent of licensed/rated thermal power (unless a lower value is justified), and that the suppression pool and the HCVS together are able to absorb and reject decay heat, such that following a reactor shutdown from full power containment pressure is restored and then maintained below the primary containment design pressure and the primary containment pressure limit.	Complete. HCVS vent capacity evaluation is contained in DC-6646, Torus Hardened Vent Sizing Analysis and Dynamic Analysis. Suppression pool heat capacity is contained in DC-6668. These design calculations have been posted on the e-portal.	The NRC staff reviewed the information provided in the 6-month updates and on the ePortal. Calculation DC-6646, "Torus Hardened Vent Sizing Analysis and Dynamic Analysis," Revision 0 is based on a torus pressure of 48 per square inch gauge (psig) based on the primary containment pressure limit (PCPL). The HCVS capacity is calculated to be 131,640 lbm/hr with 1% computational margin. The steam energy equlivent to 1% licensed power of 3478.6 MWt [megawatt thermal] with 1% margin applied is 131,484 lbm/hr. No follow-up questions.	Closed [Staff evaluation to be included in SE Section 3.1.2.1]
Phase 1 ISE OI 4 Make available for NRC staff audit the descriptions of local conditions (temperature, radiation and humidity)	Complete. The evaluation of HCVS components capability during ELAP and severe accident conditions was performed by review of vendor test reports and plant	The NRC staff reviewed the information provided in the 6-month updates and on the ePortal.	Closed [Staff evaluation to be included in SE Section 3.1.1.4]

anticipated during extended loss of alternating current (ac) power (ELAP) and severe accident for the components (valves, instrumentation, sensors, transmitters, indicators, electronics, control devices, etc.) required for HCVS venting including confirmation that the components are capable of performing their functions during ELAP and severe accident conditions.	design basis environmental qualification material in comparison to local conditions determined by the design calculations discussed in the response to Phase 1 ISE Item 2 above. Results of these comparisons are documented in DC-6639 and DC-6645 for areas containing new components. DC-6639 and DC-6645 have been posted on the e-portal.	DC-6639 and DC-6645 discusses the environmental conditions during an accident at the locations containing instrumentation and control (I&C) components. The staff's review indicated that the environmental qualifications meet the order requirements. No follow-up questions.	
Phase 1 ISE OI 5 Make available for NRC staff audit documentation of the HCVS nitrogen pneumatic system design including sizing and location.	Complete. The HCVS pneumatic design and location is included in Engineering Design Package (EDP) 37115, Reliable Severe Accident Capable Containment Wetwell Venting System Modification for NRC Order EA-13-109, for all the pneumatic tubing runs to the valves and for T46P410/P411. The sizing is included in DC-6636, Hardened Containment Vent System Bottle Sizing. The requested information will be provided on the e-portal.	The NRC staff reviewed the information provided in the 6-month updates and on the ePortal. Engineering Design Package (EDP) 37115 and Calculation DC-6636, "Hardened Containment Vent System Bottle Sizing," Revision 0, evaluates the HCVS pneumatic system design. The licensee determined through its evaluation that 3 nitrogen bottles, rated at 2400 psig each, will be sufficient to supply nitrogen for cycling valves of the HCVS system for 7 days. The NRC staff also reviewed the pneumatic tubing run for the HCVS system in EDP 37115. No follow-up questions.	Closed [Staff evaluation to be included in SE Section 3.1.2.6]
Phase 1 ISE OI 6 Make available for NRC staff audit the final sizing evaluation	Complete.	The NRC staff reviewed the information provided in the 6-month updates and on the ePortal.	Closed

for HCVS batteries/Battery charger including incorporation into FLEX DG loading calculation.	The sizing evaluation for the HCVS battery is included in DC-6584, "FLEX DC Calculations," Revision A. The requested information has been provided on the e-portal.	The licensee stated that all electrical power required for operation of HCVS components is provided by the 130/260 VDC battery/battery charger. The battery sizing requirements (in DC-6584) confirmed that the HCVS batteries have a minimum capacity capable of providing power for 24 hours without recharging, and therefore is adequate. The licensee provided calculation DC-6583, "FLEX AC Calculations," Revision 0, which discusses re-powering of the HCVS battery charger using a FLEX diesel generator (DG). No follow-up questions.	[Staff evaluation to be included in SE Section 3.1.2.6]
Phase 1 ISE OI 7 Make available tor NRC staff audit documentation that demonstrates adequate communication between the remote HCVS operation locations and HCVS decision makers during ELAP and severe accident conditions.	Complete. The primary method of communications will be via satellite phone per 29.FSG.06. Adequate communication is provided by face to face communication for commencement of venting per 29.FSG.13 (HCVS prior to 24 hours) and by face to face continuous communication for HCVS Operation from the Main Control Room (MCR) after 24 hours.	The NRC staff reviewed the information provided in the 6-month updates and on the ePortal. The communication methods are the same as accepted in Order EA-12-049. No follow-up questions.	Closed [Staff evaluation to be included in SE Section 3.1.1.1]
Phase 1 ISE OI 8 Provide a description of the final design of HCVS to address hydrogen detonation and deflagration.	Complete. The plant is using the guidance from NEI 13- 02 and white paper HCVS-WP-03, Hydrogen/Carbon Monoxide Control Measures, Rev 1. Fermi 2 is using the	The NRC staff reviewed the information provided in the 6-month updates and on the ePortal.	Closed [Staff evaluation to be included in SE Section 3.1.2.11]

	check valve option. Check Valve testing and design is per EDP 37115 with evaluation of leakage in EDP 37115.B103. The requested information has been provided on the e-portal.	EDP-37115 describes that the HCVS design will include a check valve to support the HCVS in preventing hydrogen detonation. The check valve testing and design is per EDP-37115 with evaluation of leakage in EDP 37115.B103. The licensee's design is consistent with Option 5 of the NRC-endorsed white paper HCVS-WP-03. No follow-up questions.	
Phase 1 ISE OI 9 Provide a description of the strategies for hydrogen control that minimizes the potential for hydrogen gas migration and ingress into the reactor building or other buildings.	Complete. By use of the HCVS in conjunction with the EPG/SAGs [Emergency Procedure Guideline/Severe Accident Guidelines], the containment will be maintained below pressure limits (with the exception that short excursions may occur and are acceptable). Maintaining containment within failure limits will minimize containment leakage to secondary containment; therefore, minimizing the potential for hydrogen gas migration and ingress outside of containment and the HCVS piping. Valves that directly connect to the Reactor Building air space (T4600F407/F410) have been leak tested per 47.000.94, Local Leakage Rate Testing for Hardened Vent. In addition, cross flow is addressed in Phase 1 ISE Item 10 for leakage between HCVS and Standby Gas Treatment System.	The NRC staff reviewed the information provided in the 6-month updates and on the ePortal. Maintaining containment within failure limits will minimize containment leakage to secondary containment; therefore, minimizing the potential for hydrogen gas migration and ingress outside of containment and the HCVS piping. In addition, hydrogen gas migration and ingress into the Reactor Building is minimized through leak-tight valves per 10 CFR 50 Appendix J or new procedure 47.000.94 to ensure proper leak tight integrity. The staff's review of the proposed system indicates that the licensee's design appears to minimize the potential for hydrogen gas migration and	Closed [Staff evaluation to be included in SE Section 3.1.2.12]

	Fermi 2 utilizes leak tight valves as a strategy for hydrogen control to minimize hydrogen gas migration and ingress into the Reactor Building per NEI 13-02 Sections 4.1.4.1.2, 4.1.4.1.5, 4.1.4.1.8 (testing). All applicable valves have been tested per 10 CFR 50 [Title 10 of the *Code of Federal Regulations*] Appendix J or new procedure 47.000.94 to ensure proper leak tight integrity. Test results have been posted on the e-portal.	ingress into the reactor building or other buildings. No follow-up questions.	
Phase 1 ISE OI 10 Make available for NRC staff review design details to ensure the potential for cross flow between HCVS and Standby Gas Treatment System (SGTS) is minimized.	Complete. The expected differential pressure is within the scope of containment design for compliance with GL 89-16. HCVS and SGTS cross flow is minimized by use of the auto close on loss of Non-Interruptible Air Supply (NIAS)/ 120 VAC to T4600F408/ F409 valves between HCVS pipe and SGTS. Additionally, both the T4600F408/ F409 valves were tested under 47.000.94 procedure for leak tight integrity. Test results have been posted on the e-portal.	The NRC staff reviewed the information provided in the 6-month updates and on the ePortal. Valves providing potential cross flow between HCVS and other connected systems are tested for leak tight integrity on an established schedule per 10 CFR 50 Appendix J or new procedure 47.000.94 to ensure proper leak tight integrity. The staff's review of the proposed system indicates that the licensee's design appears to minimize the potential cross flow between HCVS and SGTS. No follow-up questions.	Closed [Staff evaluation to be included in SE Section 3.1.2.3]
Phase 1 ISE OI 11 Provide a justification for deviating from the instrumentation seismic qualification guidance specified in Nuclear Energy Institute (NEI) 13- 02,	Complete. The Fermi 2 existing design basis instrument seismic qualification standard is IEEE [Institute of Electrical and Electronics Engineers] 344-1975. Fermi 2 Design Basis for Containment	The NRC staff reviewed the information provided in the 6-month updates and on the ePortal. Since the existing design basis instrument seismic qualification standard is IEEE 344-1975, the	Closed [Staff evaluation to be included in SE Section 3.1.2.8]

endorsed, in part, by JLD-ISG-2013-02 as an acceptable means for implementing applicable requirements of Order EA-13-109.	Isolation Valves (CIVs) (T4600F400, T4600F401, T4803F602, T4600F402, T4600F411) is IEEE 344-1975 based on original design. Upgrading to IEEE 344-2004 for these components (valves, AC solenoids, limit switches) is not required by Order EA-13-109 as design basis for CIVs is exempted. Non CIV valves using existing hardware for Operation (T4600F407, T4600F408, T4600F409, T4600F410, T4600F420, T4600F421) that are design basis valves (QA-1) installed prior to 2004 would similarly not require upgrade to IEEE 344-2004. Design basis instruments (Drywell Pressure, Torus Pressure, Torus Level) were also installed prior to 2004 and thus would not require upgrade to IEEE 344-2004. New DC solenoids for HCVS (for T4600F407, T4600F410, T4600F420, T4600F421) were upgraded to IEEE 344-2004 as were new instrumentation (HCVS Radiation Monitor, HCVS Thermal monitor). New operating shuttles for T4600F400/T4600F401 have no electrical parts and thus IEEE 344 does not apply.	existing CIVs, AC solenoids, limit switches, the non-CIVs using existing hardware and design basis instruments are not required by Order EA-13-109 to be upgraded to IEEE 344-2004. New DC solenoids for HCVS have been upgraded to IEEE 344-2004 as well as new instrumentation (HCVS Radiation Monitor, HCVS Thermal monitor). No follow-up questions.	
Phase 1 ISE OI 12 Make available for NRC staff audit descriptions of all instrumentation and controls (existing and planned) necessary to implement this order including qualification methods.	Complete. The instrumentation planned and existing is listed in the OIP (Reference 8.3). The selected qualification methods for the instruments is defined in EDP-37115 Index Item 004 Section 5.14 (I&C Scope) and 5.32 where environmental	The NRC staff reviewed the information provided in the 6-month updates and on the ePortal. The existing plant instuments required for HCVS (i.e. wetwell level instruments and drywell	Closed [Staff evaluation to be included in SE Section 3.1.2.8]

	qualification (EQ) program impact was defined. The requested information has been posted on the e-portal.	pressure instruments) meet the requirements of RG 1.97. EDP-37115 discusses the qualifications for new HCVS I&C components. The NRC staff's review indicated that the qualification met the order requirements. No follow-up questions.	
Phase 1 ISE OI 13 Make available for NRC staff to audit, an evaluation verifying the existing containment isolation valves, relied upon for the HCVS, will open under the maximum expected differential pressure during severe accident wetwell venting.	Complete. The expected differential pressure is within the scope of containment design for compliance with GL 89-16. This evaluation is contained in EDP 37115 Index Item 004 Section 5.12 (Valves) and evaluated under DC-5938 Vol I, DC-5951 Vol I, DC-6170 Vol I, DC-5937 Vol I, DC-5989 Vol I, DC-6292, and Thrust Torque Calculations 2206C, 2406C, 2744C, 3612C, 3613C, 3590C. The requested Design Calculations and Thrust Torque Calculations have been posted on the eportal.	The NRC staff reviewed the information provided in the 6-month updates and on the ePortal. Calculation C2206C, "Torque Requirements for T4600F-400, -401, -402, -420,-421 Butterfly AOVs and P43402 Ball AOV at Fermi 2," Revision 3, evaluated the torque-thrust of the associated valves. T4600F-400 and T4600F-401 are the inboard and outboard PCIVs respectively. The analysis indicates the valves have a negative margin in the opening direction (-66% for F400 and -29% for F401) with air-operated valve (AOV) supply air pressure of 75 psig. F420 has a 256.4% opening margin and F421 has a 413.4% opening margin at 75 psig actuator air pressure. DTE developed new calculations addressing opening capabilities using higher actuator supply air pressure. Calculation 3612C was reviewed for T4600F-400. The	Closed [Staff evaluation to be included in SE Section 3.2.1]

		opening margin was determined to be 443% with 94 psig actuator pressure, 64% with 92 psig air, and 36% with 84 psig actuator air. Calculation 3613C revaluated T4600F401. The analysis determined the opening margin is 458.4% with 94 psig air, 76.4% with 92 psig air, and 38.3 with 84 psig actuator air pressure. Per ECR-37115-9, Index Item #B092 (page 134), the nitrogen regulator, supplying back-up air to the actuators, is set at 98 ±5 psig. Relief valve is set at 125 psig. DC-6636 indicates T4600F400 will operate with an air pressure as low as 80 psig. [Based on the torque calculations, 80 psig may be low. In response to a NRC staff follow-up question during the June 14th audit call, the licensee indicated for beyond-design-basis external event conditions, Scenario 3 of Kalsi Calculation 3612C is applicable and the minimum air pressure for T4600F400 is 92 psig. The pressure used for sizing the volumetric capacity of the nitrogen bottles was based on a downstream pressure of 125 psig. No follow-up questions.	

Phase 2 ISE OI 1 Licensee to demonstrate that containment failure as a result of overpressure can be prevented without a drywell vent during severe accident conditions.	Response to be documented in a future update.	The NRC staff reviewed the information provided in the 6-month updates and on the ePortal. The NRC staff reviewed report "Fermi 2 ELAP Mitigating Strategies – MAAP5.04 Assessments" Page 59, Section 4.2.9, SBO/9: "Station Blackout w/500 gpm [gallons per minute] injection by SAWA at 8 hours and SAWM at 4 hours." (12 hours into the event) that the HCVS will not become blocked by the water level. After 120 hours there is over 10 feet of freeboard between the torus water level and the HCVS inlet. No follow-up questions.	Closed [Staff evaluation to be included in SE Sections 4.1 and 4.2]
Phase 2 ISE 2 Licensee to provide the site-specific MAAP [Modular Accident Anaylsis Program] evaluation that demonstrates Severe Accident Water Addition (SAWA) / Severe Accident Water Management (SAWM) can be maintained for greater than 7 days.	Response to be documented in a future update.	The NRC staff reviewed the information provided in the 6-month updates and on the ePortal. The NRC staff reviewed report "Fermi 2 ELAP Mitigating Strategies – MAAP5.04 Assessments." Section 4.2.9 demonstrated that starting SAWA at 500 gpm at 8 hours followed by SAWM at 100 gpm after 4 hours (12 hours into the event) that the HCVS will not become blocked by the water level. After 120 hours there is over 10 feet of freeboard between the torus water level and the HCVS inlet.	Closed [Staff evaluation to be included in SE Sections 4.1 and 4.2]

		No follow-up questions.	
Phase 2 ISE 3 Licensee to demonstrate that there is adequate communication between Main Control Room and the SAWM control location during severe accident conditions.	Response to be documented in a future update.	The NRC staff reviewed the information provided in the 6-month updates and on the ePortal. The communication methods are the same as accepted in Order EA-12-049. No follow-up questions.	Closed [Staff evaluation to be included in SE Section 4.1]
Phase 2 ISE OI 4 Licensee to demonstrate the SAWM flow instrumentation qualification for the expected environmental conditions.	Response to be documented in a future update.	The NRC staff reviewed the information provided in the 6-month updates and on the ePortal. Since the licensee has not yet determined the flow meter to be used, no information on the qualification for the expected environmental conditions could be provided to the NRC staff. This item will stay open until the licensee provides the NRC staff more information which determines the accuracy of the flow meter and the environmental qualifications related to the performance of the flow meter in order to meet the intent of Order EA-13-109. No follow-up questions.	Open [Staff evaluation to be included in SE Sections 4.1.1.3 and 4.2.1.3]

SUBJECT: FERMI, UNIT 2 - REPORT FOR THE AUDIT OF LICENSEE RESPONSES TO INTERIM STAFF EVALUATIONS OPEN ITEMS RELATED TO NRC ORDER EA-13-109 TO MODIFY LICENSES WITH REGARD TO RELIABLE HARDENED CONTAINMENT VENTS CAPABLE OF OPERATION UNDER SEVERE ACCIDENT CONDITIONS (CAC NO. MF4362; EPID L-2014-JLD-0048) DATED July 10, 2018

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