The Detroit Edison Company
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DTE Energy
Detroit Edison

10 CFR 52.79

July 9, 2010
NRC3-10-0029

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

References:
1) Fermi 3
Docket No. 52-033
2) Letter from Jack M. Davis (Detroit Edison) to USNRC, "Detroit Edison Company Response to NRC Request for Additional Information Letter No. 3," dated March 25, 2009
3) Letter from Peter W. Smith (Detroit Edison) to USNRC, "Detroit Edison Company Response to NRC Request for Additional Information Letters No. 18 and Supplemental Response to Letter No. 15," dated January 29, 2010
4) Letter from Jerry Hale (USNRC) to Jack M. Davis (Detroit Edison), "Request for Additional Information Letter No. 34 Related to the SRP Section 16 for the Fermi 3 Combined License Application," dated June 2, 2010

Subject: Detroit Edison Company Confirmatory and Supplemental Responses to NRC Requests for Additional Information (RAIs) 08.03.02-1; 08.02-17; 09.02.01-1; 09.02.01-3; and 09.02.01-4; and Response to RAI Letter No. 34

In Reference 2, Detroit Edison submitted a response to NRC Request for Additional Information (RAI) No. 08.03.02-1. In a subsequent teleconference with the NRC staff, the staff requested Detroit Edison to provide a confirmatory response regarding Station Blackout rule compliance. Attachment 1 to this letter provides the confirmatory response to RAI No. 08.03.02-1.

In Reference 3, Detroit Edison submitted responses to RAI No. 08.02-17; 09.02.01-1; 09.02.01-3; and 09.02.01-4. In subsequent teleconferences with the NRC staff, the staff requested Detroit Edison to provide supplemental responses with regard to the underground cable testing program (08.02-17) and the design of the Plant Service Water System (RAIs 09.02.01-1; 09.02.01-3; and 09.02.01-4). Attachments 2 through 5 provide supplemental responses to these RAIs.

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In Reference 4, the NRC requested additional information to support the review of the Fermi 3 Technical Specifications and Bases. The response to this RAI is provided in Attachment 6 of this letter.

Information contained in these responses will be incorporated into a future COLA submission as described in the respective RAI responses.

If you have any questions, or need additional information, please contact me at (313) 235-3341.

I state under penalty of perjury that the foregoing is true and correct. Executed on the 9th day of July 2010.

Sincerely,

Peter W. Smith, Director
Nuclear Development – Licensing & Engineering
Detroit Edison Company

Attachments:
1) Confirmatory Response to RAI Letter No. 3 (Question No. 08.03.02-1)
2) Supplemental Response to RAI Letter No. 18 (Question No. 08.02-17)
3) Supplemental Response to RAI Letter No. 18 (Question No. 09.02.01-1)
4) Supplemental Response to RAI Letter No. 18 (Question No. 09.02.01-3)
5) Supplemental Response to RAI Letter No. 18 (Question No. 09.02.01-4)
6) Response to RAI Letter No. 34 (Question No. 16-1)

cc: Adrian Muniz, NRC Fermi 3 Project Manager
Jerry Hale, NRC Fermi 3 Project Manager
Bruce Olson, NRC Fermi 3 Environmental Project Manager
Fermi 2 Resident Inspector
NRC Region III Regional Administrator
NRC Region II Regional Administrator
Supervisor, Electric Operators, Michigan Public Service Commission
Michigan Department of Environmental Quality
Radiological Protection and Medical Waste Section

Attachment 1
NRC3-10-0029

Confirmatory Response to RAI Letter No. 3
(eRAI Tracking No. 2169)

RAI Question No. 08.03.02-1

NRC RAI 08.03.02-1

FSAR Section 8.3.2.1.1, with NAPS SUP 8.3-2, states that training and procedures to mitigate an SBO event are implemented in accordance with Sections 13.2 and 13.5. According to NUMARC 87-00, endorsed by Regulatory Guide (RG) 1.155 and referenced by SRP 8.4, the SBO response procedures include (1) Station Blackout Response Guidelines, (2) AC Power Restoration, and (3) Severe Weather Guidelines. Please confirm that the training and procedures addressed in Section 8.3.2.1.1 include these three topics.

Confirmatory Response

The training and procedures addressed in Section 8.3.2.1.1 will include the three topics listed in the RAI. Training of licensed and non-licensed plant personnel and plant procedures are discussed in the COLA FSAR Sections 13.2 and 13.5 respectively, however, these discussions do not specifically address Station Blackout (SBO) events. In general, training is described in the FSAR in sufficient detail to assure plant staff receives adequate training for responding to all plant events, both normal and abnormal, and such training would encompass an SBO event. The FSAR will be revised to indicate that procedures will include (1) station blackout response guidelines, (2) AC power restoration, and (3) severe weather guidelines, as recommended by NUMARC 87-00.

Previously Proposed COLA Revision

FSAR Section 8.3.2.1.1 will be revised to match the previous COLA Revision submitted to the NRC. The second bullet stating "Either of the station diesel generators" should have been replaced by the first bullet stating "Any of the standby or ancillary diesel generators," but was incorrectly incorporated into COLA Revision 2. The attached COLA revision indicates this change.

Previously Proposed Markup of Detroit Edison COLA
(following 1 page)

The following markup represents how Detroit Edison intends to reflect this RAI response in the next appropriate update of the Fermi 3 COLA. However, the same COLA content may be impacted by revisions to the ESBWR DCD, responses to other COLA RAI's, other COLA changes, plant design changes, editorial or typographical corrections, etc. As a result, the final COLA content that appears in a future submittal may be different than presented here.

8.3 Onsite Power Systems

This section of the referenced DCD is incorporated by reference with the following departures and/or supplements.

8.3.2.1.1 Safety-Related Station Batteries and Battery Chargers

Replace the fourth paragraph of this section with the following.

EF3 COL8.3.4-1-A

In Divisions 1, 2, 3, and 4, the two 250 volt safety-related batteries per division are sized together so that their total rated capacity will exceed the required battery capacity per division for 72-hour station blackout conditions. The DC system minimum battery terminal voltage at the end of the discharge period is 210 VDC (1.75 volts per cell). The maximum equalizing charge voltage for safety-related batteries is specified by the battery vendor and is as allowed by the voltage rating of the connected loads (UPS inverters). The UPS inverters are designed to supply 120 VAC power with DC input less than the minimum discharge voltage (210 VDC) and greater than the maximum equalizing charge voltage. The safety-related battery float voltage and maximum equalizing charge voltage values are included in Table 8.3-4R.

Add the following paragraph at the end of this section.

EF3 SUP 8.3-2

Training and procedures to mitigate an SBO event are implemented in accordance with Section 13.2 and 13.5, . As recommended by NUMARC 87-00 (Reference 8.3-201), SBO event mitigation procedures address SBO response (e.g., restoration of onsite standby power sources), AC power restoration (e.g., coordination with transmission system load dispatcher), and severe weather guidance (e.g., identification of sitespecific actions to prepare for the onset of severe weather such as an impending tornado), as applicable.The ESBWR is a passive design and does not rely on offsite or onsite AC sources of power for at least 72 hours after an SBO event, as described in DCD Section 15.5.5, Station Blackout. In addition, there are no nearby large power sources, such as a gas turbine or black start fossil fuel plant, that can directly connect to the station to mitigate the SBO event. Restoration from an SBO event will be contingent upon power being made available from any one of the following sources:

- Any of the standby or ancillary diesel generators
- ~~Either of the station diesel generators~~ Delete Bullet

Attachment 2
NRC3-10-0029

Supplemental Response to RAI Letter No. 18
(eRAI Tracking No. 3868 Revision 1)

RAI Question No. 08.02-17

NRC RAI 08.02-17

In RAI 08.02-07, the staff requested that the applicant describe how low voltage power, control, and instrumentation cables that are expected to be partially or continuously submerged in manholes, trenches, and duct banks are specified and qualified. The staff also asked the applicant to provide the design features and/or in-situ monitoring programs that will be implemented to avoid or arrest the degradation of cable insulation from the effects of moisture. Include cables traversing the switchyard, as well as those from the switchyard to the EF3 unit.

In their response to the RAI, the applicant stated that periodic monitoring of cable insulation for underground medium voltage cable will be conducted to detect potential cable insulation degradation from moisture intrusion. The applicant also stated that medium voltage cables will be monitored in a manner similar to that described in the Fermi 2 Electrical Cable Monitoring Program based on the recommendations of the EPRI Cable Task Force. Experience from this program will be used to establish testing frequencies and to specify testing methods for medium voltage underground cables at Fermi 3. The NRC reviewed the Fermi 2 Electrical Cable Monitoring Program in conjunction with Detroit Edison' response to Generic Letter (GL) 2007-01 and found that the Fermi 2 response adequately addressed the concern in GL 2007-01 for power cables within the scope of 10 CFR 50.65. Regarding low voltage power, control or instrumentation cables in underground circuits, the applicant stated that they believed that a testing program was not necessary.

The staff's review of Detroit Edison response to Generic Letter (GL) 2007-01 found that the three failed cables they identified at Fermi 2 were low voltage (480VAC and 260 VDC) cables. Additionally, the staff noted that, for Fermi 2, Detroit Edison committed to inspecting, testing, and monitoring of all power cables, not the medium voltage cables only. Therefore, based on the operating experience with low voltage underground cables and the earlier commitment with Fermi 2, indicate why a program for inspecting, testing and monitoring low voltage underground power cables is not required for Fermi 3.

NOTE: This is a supplemental to the original RAI# 2168 that was issued in RAI Letter #6, ML091890740

Supplemental Response

This response supersedes in its entirety the response previously provided in RAI 08.02-17, (Detroit Edison Letter NRC3-10-0001, dated January 29, 2010 (ML100331450))

Detroit Edison's supplemental response is consistent with the response which Southern Nuclear Operation Company (SNC) submitted to the NRC on May 6, 2010 (ML101340016). In this response, SNC stated that the following information would be added to the Vogtle Units 3 and 4 COLA:

> "Condition monitoring of underground or inaccessible cables is incorporated into the maintenance rule program. The cable condition monitoring program incorporates lessons learned from industry operating experience, addresses regulatory guidance, and utilizes information from detailed design and procurement documents to determine the

> appropriate inspections, tests and monitoring criteria for underground and inaccessible cables within the scope of the maintenance rule (i.e., 10 CFR 50.65). The program takes into consideration Generic Letter 2007-01."

Detroit Edison is committing to an underground cable monitoring program, regardless of voltage, that is based on the appropriate industry operating experience guidance (e.g., NRC Generic Letter 2007-01, NUREG/CR-7000 and recently released Draft Regulatory Guide DG-1240). This program will be considered part of the 10 CFR 50.65 Maintenance Rule (MR) program. The MR program will be implemented in accordance with FSAR Section 13.4. A review of detailed design and procurement information will determine the appropriate inspections, tests, and monitoring frequency to support MR implementation.

A description of this aspect of the maintenance rule program will be added to FSAR Section 17.6 as shown in the attached markups. Additionally, DCD Revision 7 COL Applicant Item 8.3.4-2-A, which is related to underground cable inspection, is being addressed along with several editorial corrections.

Proposed COLA Revision

See attached proposed COLA Revision for COLA Part 2, FSAR Table 1.10-20, FSAR Sections 8.2.1.2.1, 8.3 and 17.6.4.

Proposed Markup of Detroit Edison COLA
(following 7 pages)

The following markup represents how Detroit Edison intends to reflect this RAI response in the next appropriate update of the Fermi 3 COLA. However, the same COLA content may be impacted by revisions to the ESBWR DCD, responses to other COLA RAI's, other COLA changes, plant design changes, editorial or typographical corrections, etc. As a result, the final COLA content that appears in a future submittal may be different than presented here.

Table 1.10-201 Summary of FSAR Sections Where DCD COL Items Are Addressed (Sheet 3 of 7) [EF3 SUP 1.10-1]

Item No.	Subject/Description of Item	FSAR Section
5.2-2-A	Leak Detection Monitoring	5.2.4 and 5.2.5.9
5.2-3-A	Preservice and Inserice Inspection NDE Accessibility Plan Description	5.2.4 and 5.2.4.2
5.3-2-A	Materials and Surveillance Capsule	5.3.1.8
6.4-1-A	CRHA Procedures and Training	6.4.4
6.4-2-A	Toxic Gas Analysis	6.4.5
6.6-1-A	PSI/ISI Program Description	6.6
6.6-2-A	PSI/ISI NDE Accessibility Plan Description	6.6.2
8.2.4-1-A	Transmission System Description	8.2.1.1
8.2.4-2-A	Switchyard Description	8.2.1.2.1
8.2.4-3-A	Normal Preferred Power	8.2.1.2
8.2.4-4-A	Alternate Preferred Power	8.2.1.2
8.2.4-5-A	Protective Relaying	8.2.1.2.2
8.2.4-6-A	Switchyard DC Power	8.2.1.2.1
8.2.4-7-A	Switchyard AC Power	8.2.1.2.1
8.2.4-8-A	Switchyard Transformer Protection	8.2.1.2.1
8.2.4-9-A	Stability and Reliability of the Offsite Transmission Power Systems	8.2.2.1
8.2.4-10-A	Interface Requirements	8.2.2.1
Insert #1 8.3.4-1-A	Safety-Related Battery Float and Equalizing Voltage Values	8.3.2.1.1
8A.2.3-1-A	Cathodic Protection System	8A.2.1
9.1-4-A	Fuel Handling Operations	9.1.4.13 and 9.1.4.19
9.1-5-A	Handling of Heavy Loads	9.1.5.6, 9.1.5.8, and 9.1.5.9
9.2.1-1-A	Material Selection	9.2.1.2
9.2.5-1-A	Post Seven day Makeup to Ultimate Heat Sink (UHS)	9.2.5
9.3.2-1-A	Post-Accident Sampling Program	9.3.2.2
9.3.9-1-A	Implementation of Hydrogen Water Chemistry	9.3.9
9.3.9-2-A	Hydrogen and Oxygen Storage and Supply	9.3.9.2
9.3.10-1-A	Oxygen Storage Facility	9.3.10.2
9.3.11-1-A	Determine Need for Zinc Injection System	9.3.11.2
9.3.11-2-A	Provide System Description for Zinc Injection System	9.3.11.4
9.5.1-1-A	Secondary Firewater Storage Source	9.5.1.4
9.5.1-2-A	Secondary Firewater Capacity	9.5.1.4

Delete Text

Periodic monitoring of cable insulation for underground ~~medium-voltage~~ cable will be conducted ~~to detect~~ potential cable degradation from ~~moisture~~ intrusion. This program is based upon the recommendations of the EPRI Cable Task Force and establishes preventive maintenance activities for periodic inspection and testing of cables and cable vaults associated with systems within the scope of 10 CFR 50.65.

Fermi 3 switchyard lightning protection system is designed in accordance with IEEE Standard 998-1996 (R2002), "IEEE Guide for Direct Lightning Stroke Shielding of Substations," using the Rolling Sphere Method. Periodic monitoring, maintenance and testing of the switchyard lightning protection system includes the following activities:

- Lightning surge arresters are thermally scanned using infrared technology annually
- Lightning surge arresters are power factor tested during bus inspections and/or relay control scheme testing on a 10 year cycle

The 345 kV switchyard for Fermi 3 does not require any transformers for Fermi 3. Therefore, Fermi 3 switchyard transformer protection is not required.

The anticipated capacity and electrical characteristics for switchyard equipment are as follows:

Breakers	Max Design (kV)	Rated Current (A)	Interrupting Current at Max kV
345 kV	379.5	3250	63 kA

Transmission Lines	Rated Current at 86°F
345 kV	2940 A

Bus Work	Rated Current
345 kV	3660 A

EF3 COL 8.2.4-5-A

8.2.1.2.2 Protective Relaying

The 345 kV transmission lines are protected with redundant high-speed communications-assisted relay schemes and include automatic breaker reclosing. The 345 kV switchyard buses have redundant differential protection using separate and independent current and control circuits. Normal and alternate preferred power conductors located between the Fermi 3 UATs and RATs and the 345 kV switchyard buses are protected by dual high-speed current differential schemes.

Insert #2

- Restoration of any one of the three 345 kV transmission lines described in Section 8.2.

8.3.4 COL Information

8.3.4-1-A Safety Related Battery float and Equalizing Voltage Values

Insert #3

EF3 COL 8.3.4-1-A This COL item is addressed in Subsection 8.3.2.1.1.

Table 8.3-4R Safety-Related DC and UPS Nominal Component Data [EF3 COL 8.3.4-1-A]

a. Batteries Two 250 VDC batteries per division, (two parallel strings of 120 lead acid cells per string and 240 cells per battery) 6000 Ah. per battery, 12,000 Ah per division (8 hour rate to 1.75 V/cell @77°F) and qualified to a 72 hour duty cycle.
b. Charger AC input -480 V AC, 3-phase, 60 Hz DC output -250 VDC, 500 A continuous -float voltage @77°F-267.6 VDC at the battery terminals -maximum equalizing charge voltage @77°F -288 VDC at the battery terminals
c. Uninterruptible Power Supply (UPS) i) Inverter -40 kVA with 250 VDC input and 120 V AC, 60 Hz output -AC output voltage regulation of±1 % steady state -output frequency variation within ±0.1 % of nominal 60 Hz -total harmonic distortion <5%

Notes:

(1) See DCD Figures 8.1-3 and 8.1-4 for the configurations of the safety-related DC and UPS systems.

This Table is being removed from this current location to the next page.

~~8.35~~ 8.3.5 References

8.3-201 Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors, NUMARC87-00, Revision 1, August 1991

Insert #1

8.3.4-2-A	Identification and Monitoring of Underground or Inaccessible Power and Control Cables to the PSWS and DG Fuel Oil Transfer System Equipment That Have Accident Mitigating Functions	8.3.3.2

Insert #2

8.3.3.2 **Cables and Raceways**

EF3 COL 8.3.4-2-A **[START COM 8.3-001]** The COL Applicant will verify that owner yard scope site specific underground or inaccessible power and control cable runs to the PSWS and DG Fuel Oil Transfer System that have accident mitigating functions and are susceptible to protracted exposure to wetted environments or submergence as a result of tidal, seasonal, or weather event water intrusion are adequately identified and monitored for appropriate corrective actions under the Maintenance Rule (MR) program described in Section 17.6.4. **[END COM 8.3-001]**.

Insert #3

8.3.4-2-A **Identification and Monitoring of Underground or Inaccessible Power and Control Cables to the PSWS and DG Fuel Oil Transfer System Equipment That Have Accident Mitigating Functions.**

EF3 COL 8.3.4-2-A This COL item is address in Subsection 8.3.3.2.

procedures necessary to review and accept the B&V developed COLA products.

The third phase commences with submittal of the Fermi 3 COLA. At this point, the ND QAPD is superseded by the Fermi 3 QAPD submitted as part of the COLA (FSAR Chapter 17, Appendix 17AA). B&V remains the COLA contractor for Detroit Edison and continues to perform delegated quality functions. Detroit Edison retains responsibility via processes and programs necessary to implement the Fermi 3 QAPD, including procurement control and verification of the effectiveness of B&V's 10 CFR 50 Appendix B/NQA-1 QA program. All COLA activities through anticipated COL issuance will be completed in accordance with the Fermi 3 QAPD, this includes delegating responsibilities as described in Part II, Section 2 of the Fermi 3 QAPD.

EF3 COL 17.2-1-A
EF3 COL 17.2-2-A

QA applied to activities to adapt the design to specific plant implementation, construction, and operations is addressed in the Detroit Edison Fermi 3 QAPD (Appendix 17AA). The QAPD is based on NEI 06-014A (Reference 17.5-201).

The implementation milestones for the Operational Quality Assurance Program are provided in Section 13.4

17.5.1 References

17.5-201 Nuclear Energy Institute, "Quality Assurance Program Description." NEI 06-14A.

STD COL 17.4-1-H

17.6 Maintenance Rule Program

NEI 07-02, "Generic FSAR Template Guidance for Maintenance Rule Program Description for Plants Licensed Under 10 CFR Part 52," (Reference 17.6-7) is incorporated by reference with the following supplemental information:

STD SUP 17.6-1

The text of the template provided in NEI 07-02 is generically numbered as "17.X." When the template is incorporated by reference into this section, numbering is changed from "17.X" to "17.6."

STD SUP 17.6-3

17.6.1.1. Maintenance Rule Scoping per 10 CFR 50.65(b)

In Paragraph 17.6.1.1.b, replace "(DRAP - see FSAR Section 17.Y)" with the following.

(See Section 17.4)

17.6.3 Maintenance Rule Program Relationship with Reliability Assurance Activities

Replace with the following.

STD SUP 17.6-2

Reliability during the operations phase is assured through the implementation of operational programs, i.e., the MR program (Section 17.6), the Quality Assurance Program (Section 17.5), the Inservice Inspection Program (Subsection 5.2.4, Section 6.6, and DCD Section 3.8.1.7.3), and the Inservice Testing Program (Subsection 3.9.6, and Section 3.9.3.7.1(3)e), as well as the Technical Specifications Surveillance Requirements (Chapter 16), and maintenance programs.

Insert New Text Here (#5)

17.6.6 References

17.6-7 Nuclear Energy Institute, "Generic FSAR Template Guidance for Maintenance Rule Program Description for Plants Licensed Under 10 CFR Part 52," NEI 07-02.

Insert #5

	17.6.4 Maintenance Rule Program Relationship with Industry Operating Experience Activities
STD SUP 17.6-4	Condition monitoring of underground or inaccessible cables is incorporated into the maintenance rule program. The cable condition monitoring program incorporates lessons learned from industry operating experience (e.g., GL 2007-01, NUREG/CR-7000), addresses regulatory guidance, and utilizes information from detailed design and procurement documents to determine the appropriate inspections, tests and monitoring criteria for underground and inaccessible cables within the scope of the maintenance rule (10 CFR 50.65).

Attachment 3
NRC3-10-0029

Supplemental Response to RAI Letter No. 18
(eRAI Tracking No. 3900 Revision 1)

RAI Question No. 09.02.01-1

NRC RAI 09.02.01-1

Tier 1 of the ESBWR DCD Revision 6, Section 4.1, specifies as a COL interface requirement that the plant-specific Plant Service Water System (PSWS) be capable of removing 2.02x 10^7 MJ (1 .92x10^{10} BTU) over a period of seven days without active makeup and must ensure that PSWS have sufficient available net positive suction head at the pump suction (NPSH).

Part 10 of the Fermi-3 COL application, Section 2.4.2, proposes the Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) specifying a cooling tower basin water inventory requirement as a way of demonstrating that the heat removal capability specified by the DCD has been satisfied. While the water inventory is an important factor that must be addressed by the ITAAC, the staff found the water inventory alone is not sufficient to demonstrate that the cooling towers are capable of dissipating the specified heat load. The capability of cooling towers to dissipate heat is dependent upon a number of "other factors" that should be taken into consideration, such as cooling tower design attributes; the capability to satisfy the PSWS pump minimum NPSH requirements (Question 09.02.01-2) for the most limiting cooling tower basin water level, temperature, and flow conditions; the maximum allowed PSWS water supply temperature; and the most limiting meteorological assumptions that pertain to the site. The capability analyses for the cooling tower need take these factors into consideration (including margin for expected degradation and operating flexibility), and confirmatory testing are usually necessary in order to adequately demonstrate that cooling tower performance satisfies the specified heat removal requirement. In addition, the extent and basis for using the combined normal power heat sink (NPHS) and auxiliary heat sink (AHS) cooling tower basin inventories for Trains A and B need to be addressed.

The applicant is requested to address the above "other factors" such that the specified cooling tower performance capability is adequately demonstrated for both defense-indepth and regulatory treatment of non-safety systems (RTNSS) functions, and the Final Safety Analysis Report (FSAR) and ITAAC need to be revised accordingly to describe the plant licensing basis in this regard.

Supplemental Response

The following supplemental response is being provided to supply the NRC with a correction to the minimum heat duty for each cooling tower within the Plant Service Water System. The correct minimum heat duty for each cooling tower (2.85 x 10^8 BTU/hr instead of 2.98 x 10^8 BTU/hr) is now contained in the first paragraph of the response. No other portion of the response has changed, nor have any of the previously provided COLA mark-ups been revised due to the above change.

The capability of the PSWS cooling towers is based on the typical design attributes associated with the design of nonsafety-related cooling systems utilizing cooling towers. The minimum heat duty for each tower is 2.85 x 10^8 BTU/hr and the design uses ambient wet bulb temperature (73°F), approach temperature (15°F), and cold water (supply) temperature of 88°F. The system's normal loads are from the RCCWS and TCCWS and the system is designed as a nonsafety-related system to perform a cooldown assuming a Loss of Preferred Power (LOPP) and single train operation. Initial testing of the system includes performance testing of the cooling towers

for conformance with design heat loads and water flows. This information is incorporated by reference from the DCD in FSAR Section 9.2.1, with necessary supplements.

During a postulated event where PSWS functions as a RTNSS Criterion C (Low Regulatory Oversight) System, the normal makeup water to the cooling towers is not qualified as a RTNSS function and is considered to be unavailable. The cooling tower basin must have a sufficient volume of water to allow the tower to perform its cooling function without active makeup. The DCD Tier 1 Interface Requirement and ITAAC specify the heat to be removed over seven days to allow a calculation of the amount of water that is needed to support this cooling function without active makeup. The heat load from the components and systems requiring cooling during the seven days indicated by the interface requirement is much less than the design minimum heat duty of each PSWS cooling tower. This reduced load is used to analyze the water loss from the system due to evaporation and drift. The ITAAC in COLA Part 10, Table 2.4-1, will be revised to reflect the interface requirements in DCD Tier 1, Section 4.1, Revision 6 to show the following:

1. A revised design commitment and acceptance criteria that confirms the volume of water in the PSWS heat sink is sufficient to remove 2.02×10^7 MJ (1.92×10^{10} BTU) over a period of seven days without active makeup.

2. A new design commitment and acceptance criteria that confirms there is sufficient available net positive suction head at the PSWS pump suction location for the lowest probable water level of the heat sink.

Additionally, COLA ITAAC 2.4.2 will be revised to reflect the latest text in DCD Tier 1, Interface Requirement 4.1, Plant Service Water System, Revision 6.

Therefore, the ITAAC in COLA Part 10, Table 2.4 -1 meets the intent of the PSWS interface requirement stated in DCD Tier 1, Section 4.1. This ITAAC, in combination with the design and testing requirements described in the FSAR, adequately demonstrates PSWS performance for both defense-in-depth and RTNSS functions as a Criterion C, Low Regulatory Oversight, Maintenance Rule support system.

Regarding the use of the Normal Power Heat Sink (NPHS) and Auxiliary Heat Sink (AHS) cooling tower basin inventories, only the AHS inventory is used to meet the ITAAC. The NPHS is only used during normal power operation, and during the postulated event, active makeup from the NPHS is unavailable.

Proposed COLA Revision

None. The previously provided mark-ups are not affected by the value correction to the minimum heat duty for each tower.

Attachment 4
NRC3-10-0029

Supplemental Response to RAI Letter No. 18
(eRAI Tracking No. 3900 Revision 1)

RAI Question No. 09.02.01-3

NRC RAI 09.02.01-3

In response to COL Information Item 9.2.1-1-A, "Material Selection," the applicant proposes to use fiberglass reinforced polyester pipe (FRPP) in locations where the Plant Service Water System (PSWS) pipe is buried to preclude long-term corrosion. The review criteria specified by the SRP relative to pipe failure is based on the use of metal pipe. In order to assure that the use of nonmetallic pipe will not adversely impact safety-related structures, systems, and components (SSCs) or those that satisfy the RTNSS criteria, the following additional information needs to be reflected in the applicable sections of the FSAR and plant-specific ITAAC as appropriate:

a) *The criteria and limitations for using FRPP.*

b) *An evaluation of the impact of using FRPP on PSWS reliability and availability assumptions, especially during seismic events and water hammer transients that can occur.*

c) *Describe how operating experience, where as buried fiberglass materials have been utilized in a similar application such as water service with similar piping size, pressure and temperatures, will be addressed in the selection of the buried fiberglass materials.*

d) *Describe if ASME B3 1.1 "Non-mandatory Appendix III, Rules for Non-metallic Piping and Piping Lines with Nonmetals," will be utilized for the fiberglass design and installation. In addition, describe any material standard/classification, for example American Society for Testing and Materials or American Water Works Association that better defines the piping and fitting standards to be utilized.*

e) *Describe the quality assurance requirement in the RTNSS environment, and provide details of the buried fiberglass application including the following:*

- *piping size, wall thickness, and piping lengths*
- *design and operating pressure and temperature*
- *location with respect to high traffic areas and if it will be necessary to sleeve the fiberglass for protection*
- *material handling and storage, installation, qualification and testing*
- *programs for the piping and fittings related to installation personnel*
- *in-service inspection and accessibility*
- *details of initial cyclic pressure testing plus hold times*
- *information to support FRP seismic design acceptability as seismic category NS for RTNSS piping applications.*

Supplemental Response

After additional review, Detroit Edison has elected not to pursue the use of fiberglass reinforced polyester piping for the Plant Service Water System (PSWS). Alternatively, Detroit Edison has selected carbon steel that meets ASTM standards for underground piping in the PSWS. This is consistent with the material used for above ground PSWS piping. The use of carbon steel meeting ASTM standards is consistent with the requirements for PSWS outlined in ESBWR DCD Revision 7, Table 3.2-1, indicating that PSWS is Quality Group D, and ESBWR DCD Revision 7, Table 3.2-3,

states that Quality Group D piping to be designed to ASME B31.1. The underground portion of the carbon steel piping will have corrosion protection consistent with ASME B31.1, Power Piping Code, Nonmandatory Appendix IV, Corrosion Control for ASME B31.1 Power Piping Systems. Buried sections of the PSWS piping will be provided with waterproof protective coating and cathodic protection to control external corrosion.

Proposed COLA Revision

See attached proposed COLA revision for FSAR Section 9.2.1.2.

Proposed Markup of Detroit Edison COLA
(following 3 pages)

The following markup represents how Detroit Edison intends to reflect this RAI response in the next appropriate update of the Fermi 3 COLA. However, the same COLA content may be impacted by revisions to the ESBWR DCD, responses to other COLA RAI's, other COLA changes, plant design changes, editorial or typographical corrections, etc. As a result, the final COLA content that appears in a future submittal may be different than presented here.

9.1.6 COL Information

9.1-4-A Fuel Handling Operations

STD COL 9.1-4-A This COL item is addressed in Subsection 9.1.4.13 and Subsection 9.1.4.19.

9.1-5-A Handling of Heavy Loads

STD COL 9.1-5-A This COL item is addressed in Subsection 9.1.5.6, Subsection 9.1.5.8, and Subsection 9.1.5.9.

9.2 Water Systems

9.2.1 Plant Service Water System

This section of the referenced DCD is incorporated by reference with the following departures and/or supplements.

9.2.1.2 System Description

Summary Description

Replace the Summary Description with the following information.

EF3 CDI The Plant Service Water System (PSWS) rejects heat from nonsafety-related RCCWS and TCCWS heat exchangers to the environment. The source of cooling water to the PSWS is from either the normal power heat sink (NPHS) or the auxiliary heat sink (AHS). A natural draft cooling tower is utilized for the NPHS and mechanical draft cooling towers are utilized for the AHS with a crosstie line to permit routing of the plant service water to either heat sink. Table 9.2-201 provides information on the PSWS cooling tower design characteristics.

EF3 CDI A simplified diagram of the PSWS is shown in Figure 9.2-205.

Detailed System Description

EF3 COL 9.2.1-1-A Delete the first sentence of the fifth paragraph.

Replace the eighth sentence in the sixth paragraph with the following.

EF3 COL 9.2.1-1-A PSWS basin water is treated for biofouling, scaling, and suspended matter with biocides, anti-scalants, and dispersants, respectively. In

addition, the anti-scalants and/or dispersants contain corrosion inhibitors as appropriate. This water treatment regime mitigates the long-term effects of fouling and corrosion within the PSWS.

Add Insert #4 here

~~PSWS materials are compatible with the PSWS water treatment regime. Based on the selected regime, carbon steel that meets ASTM standards is used as the pipe material for above-grade portions of the PSWS.~~

~~Fiberglass pressure pipe that meets the requirements of ASME B31.1, Power Piping Code, Nonmandatory Appendix III, Rules for Nonmetallic Piping and Piping Lined with Nonmetals, including applicable ASTM and AWWA standards, is used for below-grade piping. Fiberglass pressure pipe is not susceptible to internal corrosion from the chemically treated water or to external corrosion from ground contact.~~

Analysis of routine PSWS basin grab samples will detect RCCWS leakage, which may contain low levels of radioactivity, into the PSWS. This provides the action required by NRC Inspection and Enforcement Bulletin No. 80-10.

Replace the eighth paragraph with the following information.

EF3 CDI

Fermi 3 design heat loads are shown in DCD Table 9.2-1.The PSWS component design characteristics are shown in Table 9.2-201.

Delete the last paragraph.

Operation

Add the following text to the end of the second paragraph of this section.

During normal power operation, PSWS flow is directed to either the NPHS cooling tower or the AHS cooling towers where heat removed from the RCCWS and TCCWS is rejected. When PSWS uses the NPHS, the NPHS basin provides makeup to the AHS basin. When PSWS uses the AHS, makeup to the AHS basin is provided from the Station Water System (SWS).

9.2.1.6 **COL Information**

9.2.1-1-A **Material Selection**

EF3 COL 9.2.1-1-A

This COL item is addressed in Subsection 9.2.1.2.

Insert #4

PSWS materials are compatible with the PSWS water treatment regime. Based on the selected regime, carbon steel that meets ASTM standards is used as the pipe material for above-grade and below-grade portions of the PSWS. A corrosion protection system consistent with the guidance contained in ASME B31.1, Power Piping Code, Nonmandatory Appendix IV, Corrosion Control for ASME B31.1 Power Piping Systems is provided for the surfaces of buried piping systems. The buried sections of the piping are provided with waterproof protective coating and cathodic protection to control external corrosion.

Attachment 5
NRC3-10-0029

Supplemental Response to RAI Letter No. 18
(eRAI Tracking No.3900 Revision 1)

RAI Question No. 09.02.01-4

NRC RAI 09.02.01-4

DCD Tier 2 COL Information Item 9.2.1-1-A, "Material Selection," indicates that the applicant needs to specify plant-specific Plant Service Water System (PSWS) material selections based on water quality analysis in order to preclude long-term corrosion and fouling. In Fermi-3 FSAR EF3 COL 9.2.1-1-A, the applicant in response to this COL Information Item only addressed material selection for buried piping but did not provide material specifications for any other parts of the PSWS, including those for the cooling towers [normal power heat sink (NPHS)/auxiliary heat sink (AHS) and related components. Additional information is needed to specify and explain the material selections that pertain to the rest of the PSWS.

Supplemental Response

The response to COL Item 9.2.1-1-A in FSAR Section 9.2.1.2 states that appropriate chemical treatment is added to the PSWS basin to preclude long-term corrosion and fouling of the PSWS based on site water quality analysis. This statement applies to all PSWS components, not just buried piping. Material selection for PSWS components will take into consideration PSWS water quality, a viable water treatment option to meet nutrient discharge limits for Lake Erie, economic considerations, and DCD-related RTNSS criteria.

Water used for the PSWS system is from Lake Erie. The water quality of Lake Erie has been evaluated and results are provided in COLA Part 3, Environmental Report (ER), Subsection 2.3.3. Based on these evaluations, the water treatment system and associated chemical additives for the PSWS are described in ER, Subsection 3.3.2.1.

PSWS basin water is treated for biofouling, scaling, and suspended matter with biocides, anti-scalants, and dispersants, respectively. In addition, the anti-scalants and/or dispersants contain corrosion inhibitors, as appropriate. As stated in the supplemental text added to the end of the second paragraph under "Operation" in DCD Section 9.2.1.2, the makeup water for the PSWS basin is dependant on the cooling tower being used for heat rejection. Because of the interconnection between the PSWS Auxiliary Heat Sink (AHS) and Normal Power Heat Sink (NPHS), the chemical injection is expected to be performed by the circulating water chemical feed system. This system is described in FSAR Section 10.4.5.2.2.1; "CIRC Chemical Injection." Using the circulating water chemical feed system allows for consistent water quality between the AHS basin and NPHS basin. This water treatment regime mitigates the long-term effects of fouling and corrosion within the PSWS.

Carbon steel that meets ASTM standards is used as the pipe material for above and below grade portions of the PSWS. The underground portion of the carbon steel piping shall have a corrosion protection system consistent with the guidance contained in ASME B31.1, Power Piping Code, Nonmandatory Appendix IV, "Corrosion Control" for ASME B31.1, "Power Piping Systems."

Buried sections of the PSWS piping are provided with waterproof protective coating and cathodic protection to control external corrosion. Based on the selected water treatment regime, more corrosion resistant materials and valve hard seats are not needed.

Proposed COLA Revision

None; proposed COLA revision associated with the use of carbon steel for the below grade piping is provided in the supplemental response to RAI 09.02.01-3 in Attachment 4.

Attachment 6
NRC3-10-0029

Response to RAI Letter No. 34
(eRAI Tracking No.4763)

RAI Question No. 16-1

NRC RAI 16-1

In ESBWR DCD Revision 6 the Generic Technical Specifications (GTS) and Bases include a bracketed technical specification 3.3.3.2 that addressed Post-Accident Monitoring (PAM) Instrumentation designated as Type A. GTS 5.6.5 included bracketed reporting requirements when required by Condition C of LCO 3.3.3.2 for applicants incorporating PAM instrumentation. The applicant did not take this option in the Fermi Unit 3 (EF3) COL application, Revision 2, which incorporates DCD Revision 6, and removed the bracketed information, thus eliminating TS 3.3.3.2 and 5.6.5 from the plant-specific TS and Bases for 3.3.3.2.

However, DCD Revision 7 deleted this bracketed option from the GTS, removed COL Item 3.3.3.2-1 and 5.6.5-1 from Table 16.0-1-A , "COL – Applicant Open Items," of the DCD, and made GTS 3.3.3.2 applicable to Post-Accident Monitoring (PAM) Instrumentation designated as Type A, B, and C. The staff request the applicant address this DCD Revision 7 change either by incorporating by reference DCD Revision 7, GTS 3.3.3.2, 5.5.14, and 5.6.5 and Bases or by creating and justifying a departure.

Response

Detroit Edison will incorporate by reference the ESBWR Design Control Document, Revision 7, Generic Technical Specifications 3.3.3.2, 5.5.14 and 5.6.5 and the associated Bases as described in GEH letter MFN 09-665, "Response to Portion of NRC Request for Additional Information Letter No. 367 Related to ESBWR Design Certification Application – Technical Specifications – RAI Number 16.2-190," dated October 27, 2009.

Proposed COLA Revision

The Fermi 3 Technical Specifications and associated Bases will be revised upon incorporation of DCD Revision 7.