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DTE Energy

10 CFR 52.79

April 18, 2013
NRC3-13-0013

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

References:
1) Fermi 3
Docket No. 52-033
2) Letter from Tekia Govan (USNRC) to Peter W. Smith (DTE Electric), "Request for Additional Information Letter No. 84 Related to Chapters 01.05 for the Fermi 3 Combined License Application," dated March 19, 2013
3) Letter from Jerry Hale (USNRC) to Jack M. Davis (Detroit Edison), "Request for Additional Information Letter No. 77 Related to Chapter 1.05 for the Fermi 3 Combined License Application," dated May 12, 2012
4) Letter from Peter W. Smith (Detroit Edison) to USNRC, "Detroit Edison Company Response to NRC Request for Additional Information Letter No. 77," NRC3-12-0018, dated June 18, 2012

Subject: DTE Electric Company Response to NRC Request for Additional Information Letter No. 84

In Reference 2, the NRC requested additional information to support the review of certain portions of the Fermi 3 Combined License Application (COLA). The Requests for Additional Information (RAIs) in Reference 2 are related to mitigating beyond-design-basis external events and reliable spent fuel pool instrumentation. Attachments 1 and 2 provide responses to the RAIs in RAI Letter No. 84.

Additionally, in Reference 3, the NRC requested additional information (RAI 01.05-2) regarding Fukushima Near-Term Task Force Recommendation 9.3. A response to Reference 3 was provided in Reference 4. The staff has requested that the proposed license condition that was included in Reference 4 be revised. As such, Attachment 3 provides a supplemental response to RAI 01.05-2.

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

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NRO

I state under penalty of perjury that the foregoing is true and correct. Executed on the 18th day of April 2013.

Sincerely,

Peter W. Smith, Director
Nuclear Development – Licensing and Engineering
DTE Electric Company

Attachments:
1) Response to RAI Letter No. 84 (Question No. 01.05-5)
2) Response to RAI Letter No. 84 (Question No. 01.05-6)
3) Supplemental Response to RAI Letter No. 77 (Question No. 01.05-2)

cc: Adrian Muniz, NRC Fermi 3 Project Manager
Tekia Govan, NRC Fermi 3 Project Manager
Michael Eudy, NRC Fermi 3 Project Manager (w/o attachments)
Bruce Olson, NRC Fermi 3 Environmental Project Manager (w/o attachments)
Fermi 2 Resident Inspector (w/o attachments)
NRC Region III Regional Administrator (w/o attachments)
NRC Region II Regional Administrator (w/o attachments)
Supervisor, Electric Operators, Michigan Public Service Commission (w/o attachments)
Michigan Department of Natural Resources and Environment
Radiological Protection Section (w/o attachments)

Attachment 1
NRC3-13-0013
(5 pages)

Response to RAI Letter No. 84
(eRAI Tracking No. 7046)

RAI Question No. 01.05-5

NRC RAI 01.05-5

Three-Phase Approach for Mitigating Beyond-Design-Basis External Events

For operating plants the NRC issued order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events. The order included a requirement to implement a three-phase approach that enables mitigation assuming loss of all AC power for an indefinite period. The first phase (initial phase) requires the use of installed equipment and resources to maintain or restore core cooling, containment, and spent fuel pool cooling. The second phase (transition phase) requires providing sufficient, portable, equipment and consumables to maintain or restore these functions on site until they can be accomplished with resources brought from off site. The third phase (final phase) allows for offsite assistance.

The new requirements were put into place to provide greater assurance that the plant could cope with the challenges posed by beyond-design-basis external events by incorporating into the plant design and operation greater mitigation capabilities consistent with the overall defense-in-depth philosophy.

1. *Describe how the initial and transition phase mitigation is accomplished for Fermi 3. Include a discussion of how installed equipment and resources are used for core, containment, and spent fuel cooling to provide Fermi 3 the ability to cope without power until offsite resources and assistance are available (final phase).*

2. *Define the site-specific FLEX capabilities, identify what type of FLEX equipment will be used and when it will be required. Also discuss the connection points incorporated in the Fermi 3 design that will allow for use of the FLEX equipment.*

3. *Revise the FSAR to provide a summary of how Fermi 3 accomplishes core, containment, and spent fuel cooling prior to availability of offsite assistance without any AC power or makeup to the UHS (Initial and transition phase), and how Fermi 3 will maintain core, containment, and spent fuel cooling for an indefinite period of time (final phase).*

Response

DTE Electric Company previously responded to questions related to mitigation strategies for beyond-design-basis external events in RAI 01.05-3. DTE Electric Company provided responses and supplemental responses to RAI 01.05-3 in letters NRC3-12-0024, dated August 24, 2012 (ML12240A184); NRC3-13-0002, dated January 25, 2013 (ML13028A402); and NRC3-13-0008, dated February 19, 2013 (ML13051A657). The initial response to RAI 01.05-3 (provided in NRC3-12-0024) included a proposed license condition, which has been incorporated into the most recent revision of the COLA in Part 10, Subsection 3.8.2. The license condition, as shown in Part 10, Revision 4, Subsection 3.8.2, was subsequently revised by markups provided with NRC3-13-0002 and NRC3-13-0008.

Discussion

For the ESBWR, the underlying strategies for coping with extended loss of AC power events involve a three-phase approach as follows:

I. Initial Phase: Initial coping is implemented through installed plant equipment, without any AC power or makeup to the ultimate heat sink (i.e., safety-related Isolation Condenser System [ICS] and Passive Containment Cooling System [PCCS] pools or Gravity-Driven Cooling System [GDCS]). For the ESBWR, this phase is covered by the existing licensing basis (i.e., 72-hr period for passive systems performance for core, containment, and spent fuel storage pools cooling).

II. Transition Phase: Following the 72-hr passive system coping time, support is required to continue passive system cooling and makeup to the Isolation Condenser/Passive Containment Cooling System (IC/PCCS) pools and spent fuel storage pools. This support is provided by installed plant ancillary equipment. The installed ancillary equipment is designed with the capacity to support passive system cooling from 3 to 7 days.

III. Final Phase: In order to extend the passive system cooling and IC/PCCS pools and spent fuel storage pools cooling time to beyond 7 days (to an indefinite time), some offsite assistance is required. Specifically, for the ESBWR design, diesel fuel for the ancillary diesel generator or diesel fire pump must be replenished. Also, as described below, mitigation strategies including procedures, guidance, training, and acquisition, staging, or installation of equipment needed for the strategies to maintain core, containment, and spent fuel storage pools cooling for an extended period of time will be fully implemented prior to initial fuel load.

<u>Item 1 – Initial and Transition Phase Mitigation</u>

1. *Describe how the initial and transition phase mitigation is accomplished for Fermi 3. Include a discussion of how installed equipment and resources are used for core, containment, and spent fuel cooling to provide Fermi 3 the ability to cope without power until offsite resources and assistance are available (final phase).*

<u>Initial Phase Mitigation:</u> The first phase (initial phase) requires the use of installed equipment and resources to maintain or restore core cooling, containment, and spent fuel pool cooling.

In the initial phase of a loss of AC power (station blackout [SBO]), which is considered to be a loss of all offsite power sources with a concurrent loss of the onsite standby diesel generators, the ESBWR passive safety features provide a significant coping period. Section 15.5.5 and Section 19A.2.2 of the ESBWR Design Control Document (DCD), which are incorporated by reference into the Fermi 3 FSAR, provide a performance evaluation for station blackout and show conformance to the requirements of 10 CFR 50.63 as it relates to maintaining core cooling, inventory control, and containment heat removal. The analysis in DCD, Tier 2, Section 15.5.5, demonstrates that reactor water level is maintained above the top of active fuel by operation of the ICS, a safety-related system. Because the ICS removes the reactor decay heat to the IC/PCCS pools that are outside of the containment, the containment and suppression pool pressures and temperatures are maintained within their design limits. Therefore, the integrity of the containment is maintained. As described in DCD Section 15.2.2.9, during refueling mode, GDCS is available to ensure extended core cooling and inventory control for at least 72 hours.

As described in the ESBWR DCD, Section 9.1.3.2, which is incorporated by reference into the Fermi 3 FSAR, during a loss of spent fuel pool and buffer pool cooling, cooling of the spent fuel pool and buffer pool is accomplished by allowing the water in the pools to heat and boil. There is sufficient water in each pool to ensure adequate fuel cooling for 72 hours.

Transition Phase Mitigation: The second phase (transition phase) requires providing sufficient, portable, equipment and consumables to maintain or restore these functions on site until they can be accomplished with resources brought from off site.

The RAI specifically relates to an extended SBO, which is not a design-basis event but is a "special event" evaluated in Section 15.5.5 of the ESBWR DCD for conformance to the requirements of 10 CFR 50.63. However, as described in the DCD, Section 19A.2.2 (Station Blackout Assessment) and Section 15.2.2.9 (Loss of Shutdown Cooling Function of RWCU/SDC), which are incorporated by reference into the Fermi 3 FSAR, the ESBWR is designed such that installed safety-related passive systems are able to perform all safety functions for 72 hours without the need for active systems or operator actions in all modes. DCD Section 19A.3.1, which is incorporated by reference into the Fermi 3 FSAR, describes the post 72-hr actions and credits use of installed regulatory treatment of non-safety systems (RTNSS) equipment. This includes the core, containment, and spent fuel cooling safety functions.

After 72 hours, nonsafety-related systems are used to replenish the passive systems or to perform these safety functions directly. As described in the DCD, Sections 9.1.3 and 19A.3.1, after 72 hours, makeup water can be provided through installed safety-related connections to the Fire Protection System (FPS) or spent fuel storage pool. Between 72 hours and seven days, the resources for performing these safety functions are available onsite.

After seven days, commodities can be replaced or replenished from offsite sources (specifically, diesel fuel for the ancillary diesel generators). Each safety function is sustained to ensure that reactor, spent fuel pools, and containment conditions are stable and the condition of the plant can be monitored. RTNSS structures, systems, and components (SSCs) that are required to perform safety functions after 72 hours have augmented design requirements that provide reasonable assurance they will function when needed. Requirements include designing to appropriate seismic design standards and protecting from high winds and flooding hazards. DCD Section 19A.3.1 includes detailed discussion of each of the safety functions discussed above regarding post 72-hr actions.

Item 2 – FLEX Capabilities

2. *Define the site-specific FLEX capabilities, identify what type of FLEX equipment will be used and when it will be required. Also discuss the connection points incorporated in the Fermi 3 design that will allow for use of the FLEX equipment.*

Indefinite operation of the passive cooling systems requires, at a minimum, offsite support for diesel fuel. External connection points are installed to allow for refilling the diesel fuel oil tank, which supplies fuel for the ancillary diesel generators and diesel fire pump. The FPS is designed to provide makeup for reactor water inventory control, IC/PCCS pool level control, and spent fuel pool makeup through installed, safety-related connections to the Fuel and Auxiliary Pool Cooling System (FAPCS), as explained in Table 19.1-1 of the ESBWR DCD.

In addition, for implementing DCD COL Information Item 9.2.5-1-A (DCD Section 9.2.5.1), FSAR Subsection 9.2.5 contains a commitment (COM 9.2-001) for Standard COL Information Item 9.2.5-1-A, "Post Seven day Makeup to UHS," to develop procedures that identify and prioritize available makeup sources seven days after an accident, and instructions for establishing necessary connections, in accordance with the procedure development milestone in FSAR Section 13.5.

Finally, the license condition in Part 10, Subsection 3.8.2, specifies that mitigation strategies including procedures, guidance, training, and acquisition, staging, or installation of equipment needed for the strategies to maintain core, containment, and spent fuel storage pools cooling for an extended period of time will be fully implemented prior to initial fuel load.

Item 3 – FSAR Updates

3. *Revise the FSAR to provide a summary of how Fermi 3 accomplishes core, containment, and spent fuel cooling prior to availability of offsite assistance without any AC power or makeup to the UHS (Initial and transition phase), and how Fermi 3 will maintain core, containment, and spent fuel cooling for an indefinite period of time (final phase).*

The Fermi 3 FSAR incorporates the applicable sections of the ESBWR DCD that address the approach for mitigation strategies for beyond-design-basis events, specifically Sections 9.1.3, 15.5.5, 19A.2.2, and 19A.3, and addresses COL Information Item 9.2.5-1-A in FSAR Section 9.2.5. Therefore, no FSAR revisions are necessary. The Fermi 3 license condition in Part 10, Subsection 3.8.2, addresses implementation of actions associated with mitigation strategies for beyond-design-basis external events and will address Fermi 3 specific FLEX strategies and capabilities and identify the type, use, and treatment of portable equipment.

Proposed COLA Revision

None.

Attachment 2
NRC3-13-0013
(9 pages)

Response to RAI Letter No. 84
(eRAI Tracking No. 7051)

RAI Question No. 01.05-6

NRC RAI 01.05-6

For operating plants the NRC issued order EA-12-051, "Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation" (ML12054A679). The order included a requirement to provide safety enhancements in the form of reliable spent fuel pool instrumentation for beyond-design-basis external events. On August 29, 2012 the staff published Interim Staff Guidance JLD-ISG-2012-03, "Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation." This ISG endorses, with exceptions, the methodologies described in the industry guidance document, Nuclear Energy Institute (NEI) 12-02, Industry Guidance for Compliance with NRC Order EA-12-051, "To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation" (NEI 12-02), Revision 1 dated August, 2012.

In response to the staff's RAI 1.5-4, the applicant proposed to create a license condition to address the instruments requirements that were not explicitly addressed by the ESBWR DCD. The staff determined that compliance with Order EA-12-051 must be addressed in greater detail prior to licensing to determine how each of the Order's instrument requirements are addressed or not addressed by the existing ESBWR DCD information, and to propose changes to the FERMI COL FSAR that address the required instrument design information that is not explicitly addressed in the ESBWR DCD.

Therefore, the staff requests the applicant to:

a. *Provide a description of how the SFP level instruments design information provided in the ESBWR DCD addresses or does not address the design criteria requirements described in Order EA-12-051, for reliable instrumentation able to withstand design-basis natural phenomena and monitor spent fuel pool water level, and*

b. *Provide a description, including proposed FSAR changes, explaining how the FERMI COL FSAR will address the design criteria requirements for SFP instrumentation described in Order EA-12-051, for reliable instrumentation able to withstand design-basis natural phenomena and monitor spent fuel pool water level, that were not completely addressed by the ESBWR DCD design information.*

Response

DTE Electric Company previously responded to questions related to reliable spent fuel pool (SFP) instrumentation in RAI 01.05-4. DTE Electric Company provided responses and supplemental responses to RAI 01.05-4 in letters NRC3-12-0024, dated August 24, 2012 (ML12240A184); NRC3-13-0002, dated January 25, 2013 (ML13028A402); and NRC3-13-0008, dated February 19, 2013 (ML13051A657). The initial response (provided in NRC3-12-0024) to RAI 01.05-4 included a proposed license condition, which has been incorporated into the most recent revision of the COLA in Part 10, Subsection 3.8.3. The license condition, as shown in Part 10, Revision 4, Subsection 3.8.3, was subsequently revised by markups provided with NRC3-13-0002 and NRC3-13-0008.

a. *Provide a description of how the SFP level instruments design information provided in the ESBWR DCD addresses or does not address the design criteria requirements described in Order EA-12-051, for reliable instrumentation able to withstand design-basis natural phenomena and monitor spent fuel pool water level, and*

For compliance with Order EA-12-051 criteria, the ESBWR design is required to provide reliable indication of the water level in spent fuel storage pools capable of supporting identification of the following pool water level conditions by trained personnel: (1) level that is adequate to support operation of the normal fuel pool cooling system, (2) level that is adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck, and (3) level where fuel remains covered and actions to implement make-up water addition should no longer be deferred.

The design criteria for the SFP level instrumentation set forth in EA-12-051 is further considered in NRC and industry guidance. Specifically NRC Interim Staff Guidance JLD-ISG-12-03, "Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation," dated August 29, 2012, endorses NEI 12-02, "Industry Guidance for Compliance with NRC Order EA-12-051, 'To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation,'" Revision 1, dated August 24, 2012. Below is a description of the ESBWR SFPs and design features, followed by an evaluation of the ESBWR design features against the design criteria requirements delineated in NRC Order EA-12-051.

ESBWR Spent Fuel Pools Design Features

The ESBWR Design Control Document (DCD), Section 9.1.2, explains the design basis for storage of spent fuel. There are two separate areas for storage of spent fuel assemblies: (1) a separate deep pit area in the buffer pool in the Reactor Building; and (2) the Spent Fuel Pool in the Fuel Building.

As described in the ESBWR DCD, Section 9.1.3, which is incorporated by reference into the Fermi 3 FSAR, safety-related level instrumentation is provided in the SFP and buffer pool to detect a low water level that would indicate a loss of decay heat removal ability in accordance with NRC regulatory requirements in 10 CFR Part 50 Appendix A, General Design Criterion 63. The SFP and buffer pool each have two wide-range safety-related level transmitters that transmit signals to the Main Control Room. These signals are used for collapsed water level indication and to initiate high/low-level alarms, both locally and in the Main Control Room. At a minimum, alarm set points are included at the top of the active fuel, an adequate shielding level (3.05 m [10 ft] above top of active fuel), and an elevation just below normal water level to give operators advanced notice of a loss of inventory but with sufficient margin to allow for 72 hours of pool boiling. The SFP and Isolation Condenser/Passive Containment Cooling System (IC/PCCS) pools contain backup nonsafety-related level indicators that can be operated using portable onsite power supplies to indicate when the pools have been replenished to their normal water level.

The ESBWR DCD, Section 7.5.5, which is incorporated by reference into the Fermi 3 FSAR, describes the spent fuel pool level instrumentation and buffer pool level instrumentation as follows:

> *Spent Fuel Pool:* The FAPCS [Fuel and Auxiliary Pool Cooling System] provides the spent fuel pool with safety-related instruments that monitor water level. ... The level instruments for the spent fuel pool are classified as safety-related components because they provide necessary information to the operator for performing the safety-related function of refilling the spent fuel pool following an accident.

Buffer Pool: The FAPCS provides the buffer pool with safety-related instruments that monitor water level. Each instrument generates low water level signals when the water level reading decreases below its setpoint. Each low-level signal initiates an alarm in the Main Control Room. The level instruments for the buffer pool are classified as safety-related components because they provide necessary information to the operator for refilling the buffer pool following an accident.

ESBWR DCD, Section 9.1.2.4, describes the pool design and explains the water levels of the spent fuel pools. The SFP and buffer pool are reinforced concrete structures with a stainless steel liner designed to meet Seismic Category I requirements. The bottoms of the pool gates are at least 3.05 m (10 ft) above the top of active fuel to provide adequate shielding and cooling (in the unlikely event that the buffer pool would inadvertently drain due to an open pool gate). Pool fill lines enter the pool above the safe shielding water level and overflow weirs are located above normal water level. Redundant anti-siphoning provisions are included on pool circulation lines to preclude a pipe break from siphoning the water from the pool and jeopardizing the safe water level of 10.26 m (33.7 ft) above the top of the irradiated fuel assemblies which ensures adequate inventory for loss of active fuel pool cooling and shielding.

NEI 12-02, Figure 1, shows three level indications for water in the storage pools that are considered critical levels that must be monitored for compliance with the intent of EA-12-051, and identifies the level instrumentation range and accuracy for each level.

Level 1 – level that is adequate to support operation of the normal fuel pool cooling system – For this wide-range water level, the instrumentation should have a minimum of 1 foot monitoring capability (i.e., instrument accuracy). ESBWR DCD, Tier 1, Table 2.6.2-2, "ITAAC for the Fuel and Auxiliary Pool Cooling System," Item 9, specifies a minimum instrument accuracy of ± 300 mm (1 ft) for the spent fuel pool and buffer pool instruments for pool level over the range from normal water level to the top of active fuel.

Level 2 – level that is adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck – For this water level from the top of the spent fuel rack level to 10 feet above, the instrumentation should have a minimum of 3.5 foot monitoring capability(i.e., instrument accuracy). In the ESBWR, the instrumentation that covers this range has a minimum instrument accuracy of ± 300 mm (1 ft). This level range and accuracy indicates water level above the top of active fuel to ensure sufficient water is available to provide adequate radiation shielding for personnel in the area.

Level 3 – level where fuel remains covered and actions to implement make-up water addition should no longer be deferred – Level 3 is defined as the highest point in any fuel rack in order to provide the maximum range of information to operators, decision makers, and emergency response personnel. In the ESBWR, the instrumentation that covers this level has a minimum instrument accuracy of ± 300 mm (1 ft).

Note that for the ESBWR design, Level 2 and Level 3 are effectively the same.

Discussion on Elements of NRC Order EA-12-051

Instrumentation Design Features Table

The spent fuel pool level instrumentation shall include the following design features in accordance with Order EA-12-051	ESBWR Design Features
1.1 Instruments: The instrumentation shall consist of a permanent, fixed primary instrument channel and a backup instrument channel. The backup instrument channel may be fixed or portable. Portable instruments shall have capabilities that enhance the ability of trained personnel to monitor spent fuel pool water level under conditions that restrict direct personnel access to the pool, such as partial structural damage, high radiation levels, or heat and humidity from a boiling pool.	As noted above and described in the ESBWR DCD, Section 9.1.3, the Spent Fuel Pool and buffer pool each have two wide-range safety-related level transmitters that transmit signals to the Main Control Room. These signals are used for collapsed water level indication and to initiate high/low-level alarms, both locally and in the Main Control Room. ESBWR DCD, Section 7.5.5.3.1, indicates that the safety-related Pool Monitoring instrumentation design conforms to IEEE Std. 603. Conformance information is found in Sections 7.1.6.6.1.1 through 7.1.6.6.1.27.
1.2 Arrangement: The spent fuel pool level instrument channels shall be arranged in a manner that provides reasonable protection of the level indication function against missiles that may result from damage to the structure over the spent fuel pool. This protection may be provided by locating the primary instrument channel and fixed portions of the backup instrument channel, if applicable, to maintain instrument channel separation within the spent fuel pool area, and to utilize inherent shielding from missiles provided by existing recesses and corners in the spent fuel pool structure.	ESBWR DCD, Section 7.5.5.3.2, indicates that the spent fuel pool and buffer pool instrumentation meets the separation criteria set forth in 10 CFR Part 50, Appendix A, General Design Criterion 24, *Separation of protection and control system*. This separation ensures that failure of any single control system component or channel, or failure or removal from service of any single protection system component or channel which is common to the control and protection systems leaves intact a system satisfying all reliability, redundancy, and independence requirements of the protection system. ESBWR DCD, Section 7.5.5, indicates that the safety-related Pool Monitoring instrumentation is designed to satisfy the requirements of IEEE Std. 603, as endorsed by RG 1.153. This includes requirements for physical separation of channels to avoid common mode failure due to a missile. ESBWR DCD, Section 3.8.4.1.1, indicates that the Reactor Building, which houses the buffer pool, is a Seismic Category I structure. ESBWR DCD, Section 3.8.4.1.3, describes the Fuel Building, which houses the spent fuel pool facilities and their supporting system and HVAC equipment. The Fuel Building is a Seismic Category I structure except for the penthouse that houses HVAC equipment. The penthouse is a Seismic Category II structure. ESBWR DCD, Section 3.5, describes the missile assessment for the ESBWR. Seismic Category I

The spent fuel pool level instrumentation shall include the following design features in accordance with Order EA-12-051	ESBWR Design Features
	structures are analyzed and designed to be protected against a wide spectrum of missiles. For example, failure of certain rotating or pressurized components of equipment is considered to be of sufficiently high probability and to presumably lead to generation of missiles. However, the generation of missiles from other equipment is considered to be of low enough probability and is dismissed from further consideration. Tornado-generated missiles and missiles resulting from activities particular to the site are also discussed in this section. The missile protection criteria to which the plant has been designed consider Criterion 4 of 10 CFR 50 Appendix A, General Design Criteria for Nuclear Power Plants.
1.3 Mounting: Installed instrument channel equipment within the spent fuel pool shall be mounted to retain its design configuration during and following the maximum seismic ground motion considered in the design of the spent fuel pool structure.	ESBWR DCD, Section 7.5.5.3.2, indicates that the spent fuel pool and buffer pool instrumentation meets the design criteria set forth in 10 CFR Part 50, Appendix A, General Design *Criterion 2 - Design bases for protection against natural phenomena*. ESBWR DCD, Section 7.5.5.3.3, indicates that the pool instrumentation is seismically qualified and this includes the equipment mounting configuration. ESBWR DCD, Section 3.8.4.1.1, indicates that the Reactor Building, which houses the buffer pool, is a Seismic Category I structure. ESBWR DCD, Section 3.8.4.1.3, describes the Fuel Building, which houses the spent fuel pool facilities and their supporting system and HVAC equipment. The Fuel Building is a Seismic Category I structure except for the penthouse that houses HVAC equipment. The penthouse is a Seismic Category II structure.
1.4 Qualification: The level instrument channels shall be reliable at temperature, humidity and radiation levels consistent with the spent fuel pool water at saturation conditions for an extended period. This reliability shall be established through the use of an augmented quality assurance process (e.g. a process similar to that applied to the site fire protection program).	As noted above and described in the ESBWR DCD, Section 9.1.3, the Spent Fuel Pool and buffer pool each have two wide-range safety-related level transmitters. ESBWR DCD, Section 7.5.5.3.3, indicates that the pool instrumentation is subject to environmental qualification and post-accident monitoring criteria. ESBWR DCD, Sections 7.5.5.3.1 and 7.5.5.3.2, indicate that the pool instrumentation system conforms to quality standards for safety-related equipment.
1.5 Independence: The primary instrument channel shall be independent of the backup instrument channel.	ESBWR DCD, Section 7.5.5.3.2, indicates that the spent fuel pool and buffer pool instrumentation meets the separation criteria set forth in 10 CFR Part 50, Appendix A, General Design Criterion 24, *Separation of protection and control system*. This separation ensures that failure of any single control

The spent fuel pool level instrumentation shall include the following design features in accordance with Order EA-12-051	ESBWR Design Features
	system component or channel, or failure or removal from service of any single protection system component or channel which is common to the control and protection systems leaves intact a system satisfying all reliability, redundancy, and independence requirements of the protection system.
1.6 Power Supplies: Permanently installed instrumentation channels shall each be powered by a separate power supply. Permanently installed and portable instrumentation channels shall provide for power connections from sources independent of the plant ac and dc power distribution systems, such as portable generators or replaceable batteries. Onsite generators used as an alternate power source and replaceable batteries used for instrument channel power shall have sufficient capacity to maintain the level indication function until offsite resource availability is reasonably assured.	ESBWR DCD, Section 7.5.5.3.2, indicates that the spent fuel pool and buffer pool instrumentation meets the separation criteria set forth in 10 CFR Part 50, Appendix A, General Design Criterion 24, *Separation of protection and control system*. This separation ensures that failure of any single control system component or channel, or failure or removal from service of any single protection system component or channel which is common to the control and protection systems leaves intact a system satisfying all reliability, redundancy, and independence requirements of the protection system. In order to "maintain the level indication function until offsite resource availability is reasonably assured", the safety-related primary and backup instrumentation channels are controlled by the Safety-Related Distributed Control and Information System (Q-DCIS). As explained in ESBWR DCD, Section 7.1.2, the divisional Q-DCIS components are powered by redundant, independent, and separated uninterruptible power supplies (UPSs) dedicated to their division with battery backup (per division) for at least 72 hours. After 72 hours, the Q-DCIS can operate continuously on power from the ancillary diesel generators until off-site power is restored. Therefore, the Q-DCIS does not rely on independent AC or DC power distribution systems in order to function for an extended time period, and power connections to independent power sources are not considered to be required.
1.7 Accuracy: The instrument channels shall maintain their designed accuracy following a power interruption or change in power source without recalibration.	As explained in ESBWR DCD, Section 7.5, the safety-related portions of the Pool Monitoring Instrumentation are part of a group of instruments/equipment collectively called the Q-DCIS. As explained in ESBWR DCD, Section 7.1.2, the divisional Q-DCIS components are powered by redundant, independent, and separated UPSs dedicated to their division with battery backup (per division) for at least 72 hours. After 72 hours, the Q-DCIS can operate continuously on power from diesel generators or from off-site power. The Q-DCIS provides self-

The spent fuel pool level instrumentation shall include the following design features in accordance with Order EA-12-051	ESBWR Design Features
	diagnostics that monitor communication, power, and processors to the replaceable card, module, or chassis level. Process diagnostics include system alarms and the capability to identify sensor failures. Process and self-diagnostic system alarms are provided to the Main Control Room. In addition, the ESBWR is designed to maintain continuity of power to the various safety related components and can switch between available power sources without interruption. In the unlikely event that power to Q-DCIS instrumentation is lost and returned, other than a short transient until power stabilizes, the instruments will return to power with their original accuracy; the safety-related power supplies shall be specified to avoid electrical transients when they are (re)powered.
1.8 Testing: The instrument channel design shall provide for routine testing and calibration.	ESBWR DCD, Section 9.1.3.4, Testing and Inspection Requirements, indicates that the FAPCS is designed to permit surveillance testing and in-service inspection of its safety-related components and components required to perform the post-accident recovery functions, in accordance with GDC 45 and ASME BPVC Section XI. In addition, Fermi 3 Technical Specifications (COLA Part 4), Section 3.7.5, includes periodic surveillance of the fuel pools water level during movement of irradiated fuel assemblies in the associated fuel storage pool or when irradiated fuel assemblies are stored in the associated fuel storage pool.
1.9 Display. Trained personnel shall be able to monitor the spent fuel pool water level from the control room, alternate shutdown panel, or other appropriate and accessible location. The display shall provide on-demand or continuous indication of spent fuel pool water level.	As noted above and described in the ESBWR DCD, Section 9.1.3, the spent fuel pool and buffer pool each have two wide-range safety-related level transmitters that transmit signals to the Main Control Room. These signals are used for on-demand or continuous collapsed water level indication and to initiate high/low-level alarms, both locally and in the Main Control Room.

b. *Provide a description, including proposed FSAR changes, explaining how the FERMI COL FSAR will address the design criteria requirements for SFP instrumentation described in Order EA-12-051, for reliable instrumentation able to withstand design-basis natural phenomena and monitor spent fuel pool water level, that were not completely addressed by the ESBWR DCD design information.*

As described in detail for each element of Order EA-12-051, the Fermi 3 licensing basis for the ESBWR design addresses the requirements of the Order. For the ESBWR DCD sections referenced in this response, the Fermi 3 FSAR incorporates by reference the provisions of those sections. Where the Fermi 3 FSAR or other parts of the COLA describe how elements are addressed, the applicable sections are referenced. Because the provisions are already addressed by the Fermi 3 licensing basis, no FSAR changes are proposed for the ESBWR design features.

For the program features in Order EA-12-051, the Fermi 3 FSAR addresses certain related aspects of the program elements, as shown in the table below. For programmatic elements that relate to portable equipment, the license condition provided in Subsection 3.8.3 of Part 10 applies.

Program Features Table

The spent fuel pool instrumentation shall be maintained available and reliable through appropriate development and implementation of the following programs in accordance with Order EA-12-051	Fermi 3 Program Features in FSAR
2.1 Training: Personnel shall be trained in the use and the provision of alternate power to the primary and backup instrument channels.	The Fermi 3 COLA includes a description of the training programs for operators and emergency response actions in FSAR Section 13.2. License Condition 3.5.1 provides a schedule for implementing an operator training program. This training program development will determine elements of the required training, including training for implementing job functions associated with spent fuel storage pool level monitoring and actions for mitigation strategies.
2.2 Procedures: Procedures shall be established and maintained for the testing, calibration, and use of the primary and backup spent fuel pool instrument channels.	FSAR Section 13.5 describes the development of procedures under the Plant Operating Procedures Development Plan. This element of the Order is addressed through this Plant Operating Procedures Development Plan.
2.3 Testing and Calibration: Processes shall be established and maintained for scheduling and implementing necessary testing and calibration of the primary and backup spent fuel pool level instrument channels to maintain the instrument channels at the design accuracy.	FSAR Section 13.5 describes the development of procedures under the Plant Operating Procedures Development Plan. This element of the Order is addressed through this Plant Operating Procedures Development Plan.

Proposed COLA Revision

None.

Attachment 3
NRC3-13-0013
(4 pages)

Supplemental Response to RAI Letter No. 77
(eRAI Tracking No. 6446)

RAI Question No. 01.05-2

NRC RAI 01.05-2

The NRC staff has been directed by the Commission to implement the Fukushima Near-Term Task Force recommendations contained in SECY-12-0025, "Proposed Orders and Requests for Information in Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Tsunami" dated February 17, 2012. Request For Information Pursuant To Title 10 Of The Code of Federal Regulations 50.54(F) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident (ADAMS Accession No. ML12073A348) for all power reactor licensees and holders of construction permits in active or deferred status requires additional information specific to Recommendation 9.3, "Emergency Preparedness: Communications." The NRC staff requests that you assess the communications systems and equipment used during an emergency event as described in Enclosure 5 of this request for information (ADAMS Accession No. ML12056A051), including any proposals for changes to your current application.

In order to minimize delays to the current licensing schedule, we request that you respond within 60-days of receipt of this RAI or provide a schedule for your response within 30-days.

Supplemental Response

DTE Electric Company initially responded to RAI 01.05-2 in letter NRC3-12-0023, dated July 13, 2012 (ML12199A150). The initial response to RAI 01.05-2 provided a proposed license condition to address provisions that shall be taken to enhance emergency preparedness related to communications per Recommendation 9.3 provided in the March 12, 2012, letter (ML12053A340) to licensees and construction permit holders.

The NRC staff has requested that the phrase "or other NRC approved guidance in effect six months prior to completion of the assessment" be removed from the proposed license condition. COLA Markups that incorporate the requested change are provided with this response. The proposed license condition in the COLA, Part 10, Subsection 3.8.1, is revised to read:

> The applicant is proposing the following license condition related to communications:
>
> At least two (2) years prior to scheduled initial fuel load, the licensee shall have performed an assessment of on-site and offsite communications systems and equipment required during an emergency event to ensure communications capabilities can be maintained during prolonged station blackout conditions. The communications capability assessment will be performed in accordance with NEI 12-01, "Guidance for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities," Revision 0.
>
> At least one hundred eighty (180) days prior to scheduled initial fuel load, the licensee shall complete implementation of corrective actions identified in the communications capability assessment described above, including any related emergency plan and implementing procedure changes and associated training.

Proposed COLA Markups

Part 10, Subsection 3.8.1, is revised as shown on the attached markup.

Markup of Fermi 3 COLA
(following 1 page)

The following markup represents how DTE Electric intends to reflect this RAI response in the next submittal of the Fermi 3 COLA. However, the same COLA content may be impacted by responses to other COLA RAIs, 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.

3.8.1 Emergency Planning Actions

The applicant is proposing the following license condition related to staffing:

At least two (2) years prior to scheduled initial fuel load, the licensee shall have performed an assessment of the onsite and augmented staffing capability to satisfy the regulatory requirements for response to a multi-unit event. The staffing assessment will be performed in accordance with NEI 12-01, "Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities," Revision 0, or other NRC endorsed guidance in effect six months prior to commencement of the assessment.

At least two (2) years prior to scheduled initial fuel load, the licensee shall revise the Fermi 3 Emergency Plan to include the following:

- Incorporation of corrective actions identified in the staffing assessment described above.
- Identification of how the augmented staff will be notified given degraded communications capabilities.

The applicant is proposing the following license condition related to communications:

At least two (2) years prior to scheduled initial fuel load, the licensee shall have performed an assessment of on-site and offsite communications systems and equipment required during an emergency event to ensure communications capabilities can be maintained during prolonged station blackout conditions. The communications capability assessment will be performed in accordance with NEI 12-01, "Guidance for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities," Revision 0~~, or other NRC approved guidance in effect six months prior to completion of the assessment~~.

At least one hundred eighty (180) days prior to scheduled initial fuel load, the licensee shall complete implementation of corrective actions identified in the communications capability assessment described above, including any related emergency plan and implementing procedure changes and associated training.