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**DTE Energy**



10 CFR 2.202

February 28, 2013  
NRC-13-0006

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

- References:
- 1) Fermi 2  
NRC Docket No. 50-341  
NRC License No. NPF-43
  - 2) NRC Order EA-12-051, "Issuance of Order to Modify Licenses with Regard to Requirements for Reliable Spent Fuel Pool Instrumentation," dated March 12, 2012
  - 3) NRC Interim Staff Guidance JLD-ISG-2012-03, "Compliance with Order EA-12-051, Order Modifying Licenses with Regard to Requirements for Reliable Spent Fuel Pool Instrumentation," Revision 0, dated August 29, 2012
  - 4) 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
  - 5) DTE Electric letter, NRC-12-0063, "Detroit Edison's Initial Status Report in Response to March 12, 2012 Commission Order Modifying Licenses With Regard to Requirements for Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051)," dated October 19, 2012
- Subject: DTE Electric Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051)

On March 12, 2012, the Nuclear Regulatory Commission ("NRC" or "Commission") issued an order (Reference 2) to DTE Electric Company\* (DTE). Reference 2 was immediately effective and directed DTE to have a reliable indication of water level in

\* Previously The Detroit Edison Company

associated spent fuel storage pools. Specific requirements are provided in Attachment 2 of Reference 2. Reference 2 requires submission of an Overall Integrated Plan by February 28, 2013.

The interim staff guidance (ISG) (Reference 3) issued on August 29, 2012 endorses industry guidance document NEI 12-02 Revision 1 (Reference 4) with some clarifications and exceptions. Reference 4 provides direction regarding the content of the Overall Integrated Plan.

The purpose of this letter is to provide the Overall Integrated Plan pursuant to Section IV, Condition C.1, of Reference 2. This letter also confirms that DTE has received Reference 3 and has developed an Overall Integrated Plan for the purpose of providing a reliable indication of the water level in associated spent fuel pools as described in Attachment 2 of Reference 2.

Reference 5 provided DTE's initial status report regarding reliable spent fuel pool instrumentation for Fermi 2, as required by Reference 2.

Reference 4 Appendix A-2 contains the specific reporting requirements for the Overall Integrated Plan. The enclosed Fermi 2 Overall Integrated Plan is consistent with the requirements in Appendix A-2 of Reference 4.

This letter contains no new regulatory commitments.


Should you have any questions or require additional information, please contact Mr. Kirk R. Snyder, Manager, Industry Interface at (734) 586-5020.

Sincerely,

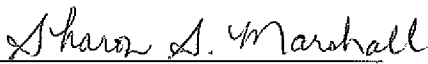


cc: Director, Office of Nuclear Reactor Regulation  
NRC Project Manager  
NRC Resident Office  
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Mr. Robert J. Fretz, Jr., NRR/JLD/PMB, NRC  
Mr. Robert L. Dennig, NRR/DSS/SCVB, NRC  
Supervisor, Electric Operators,  
Michigan Public Service Commission

I, J. Todd Conner, do hereby affirm that the foregoing statements are based on facts and circumstances which are true and accurate to the best of my knowledge and belief.

  
\_\_\_\_\_  
J. Todd Conner  
Site Vice President, Nuclear Generation

On this 28<sup>th</sup> day of February, 2013 before me personally appeared J. Todd Conner, being first duly sworn and says that he executed the foregoing as his free act and deed.

  
\_\_\_\_\_  
Notary Public

SHARON S. MARSHALL  
NOTARY PUBLIC, STATE OF MI  
COUNTY OF MONROE  
MY COMMISSION EXPIRES Jun 14, 2013  
ACTING IN COUNTY OF *Monroe*

**Enclosure to  
NRC-13-0006**

**Fermi 2 NRC Docket No. 50-341  
Operating License No. NPF-43**

**Overall Integrated Plan  
for Fermi 2 Nuclear Power Plant  
Spent Fuel Pool Instrumentation**

**Overall Integrated Plan for Fermi 2 Nuclear Power Plant -  
Spent Fuel Pool Instrumentation**

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## **Overall Integrated Plan for Fermi 2 Nuclear Power Plant - Spent Fuel Pool Instrumentation**

### **1.0 Applicability:**

This integrated plan applies to Fermi 2 Nuclear Power Plant.

### **2.0 Schedule:**

The installation of reliable spent fuel pool level instrumentation for the spent fuel pool associated with Fermi 2 Nuclear Power Plant is scheduled for completion prior to startup from refueling outage 17 currently scheduled in the Fall of 2015.

### **3.0 Identification of Spent Fuel Pool Water Levels:**

Key spent fuel pool water levels are as follows:

#### **3.1 Level adequate to support operation of the normal fuel pool cooling system- Level 1**

Level 1 elevation for Fermi is 683' 6" based on the surface of the water maintained by scuppers (UFSAR section 9.1.2.2.1, Reference 9.7), which is consistent with the NEI 12-02 guidelines (Reference 9.4). The Fermi Spent Fuel Pool Instrumentation (SFPI) system Level 1 monitoring will meet or exceed the Level 1 monitoring requirement (a resolution of 1 foot) provided in the NEI 12-02, Section 2.3, Figure 1 (Reference 9.4).

#### **3.2 Level adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck – Level 2**

Level 2 elevation for Fermi is 671' 1/8", which is at 10 feet above the top of the fuel racks consistent with the NEI 12-02 guidelines (Reference 9.4). The Fermi SFPI system Level 2 monitoring will meet or exceed the Level 2 monitoring requirement (a resolution of 3.5 feet) provided in the NEI 12-02, Section 2.3, Figure 1 (Reference 9.4).

In addition to the spent fuel racks in the Spent Fuel Pool (SFP), the Fermi 2 SFP is also used to store materials that could affect radiation doses in the SFP area. Applicable plant procedures will be developed to address the stored radioactive material, the associated pool level monitoring, and personnel access requirements.

#### **3.3 Level where fuel remains covered- Level 3**

Level 3 elevation for Fermi is 661' 1/8" based on the elevation of the top of the Fermi 2 tallest fuel rack (Drawing # 2356, Reference 9.8), which is consistent with the NEI 12-02 guidelines (Reference 9.4).

## **Overall Integrated Plan for Fermi 2 Nuclear Power Plant - Spent Fuel Pool Instrumentation**

### **4.0 Instruments:**

The design of the instruments will be consistent with the guidelines of NRC JLD-ISG-2012-03 (Reference 9.3) and NEI 12-02 (Reference 9.4) as discussed below.

- 4.1 Primary (fixed) instrument channel:** The primary instrument channel level sensing components will be located in the SFP north east corner and the associated signal processor in the auxiliary building.

The Spent Fuel Pool Level Instrumentation (SFPLI) consists of a probe suspended in the SFP, a signal processor, and a coaxial cable. The probe is a fully immersible liquid level probe. The probe is suspended from the top of the SFP curb to the top of the spent fuel racks. The coax cable is connected to the top of the probe and to the signal processor. The signal processor is a panel-mount instrument housed in a stainless steel enclosure with a display screen showing SFP level numerical read out with continuous indication. The SFPLI utilizes Electric Field Perturbation (EFP) guided radar technology which is an ultra-wideband (UWB) guided radar technique utilizing Time Domain Reflectometry (TDR) electronics and specialized signal processing software. The water level will be displayed on the signal processor in the auxiliary building and on a remote display in the Fermi 2 control room.

The instrument's range provides continuous indication from 0 feet to 22 feet and encompasses Level 3 up to Level 1 (i.e. from the top of the spent fuel racks to the normal level elevation of the SFP).

- 4.2 Backup instrument channel:** The backup instrument channel will be the same as the primary instrument channel except that the level probe will be located in the SFP's northwest corner and the associated signal processor will be located in the Reactor Building. The remote display will be located next to the FLEX SFP refill station in the Reactor Building.

### **5.0 Reliability:**

Reliability of the primary and backup instrument channels will be in conformance with the guidelines of NRC JLD-ISG-2012-03 (Reference 9.3) and NEI 12-02 (Reference 9.4). Reliable level indication will be functional during all modes of operation consistent with NEI-12-02, section 4.3 (Reference 9.4).

### **6.0 Instrument Channel Design Criteria:**

Instrument channel design criteria will be consistent with the guidelines of NRC JLD-ISG-2012-03 (Reference 9.3) and NEI 12-02 (Reference 9.4) as discussed below.

## **Overall Integrated Plan for Fermi 2 Nuclear Power Plant - Spent Fuel Pool Instrumentation**

### **6.1 Arrangement:**

SFP level sensors (probes) will be installed near northwest and north east corners of the SFP to maintain separation within the spent fuel pool area. The sensors will be located as close to the corners as possible to maintain maximum separation and to provide best protection against a single missile damaging both channels. These locations will not interfere with SFP activities. The primary and backup channels' signal processors will be located in an area outside the SFP environment. The signal processors will be located in the Auxiliary Building 4<sup>th</sup> floor and the Reactor Building 3<sup>rd</sup> floor, respectively, and installed with seismic supports. The primary channel and the backup channel remote displays will be located in the Control Room and Reactor Building 2<sup>nd</sup> floor and installed with seismic supports. The locations of the instruments within the Auxiliary Building and Reactor Building are protected from external missiles.

Cabling for the primary and backup channel instruments will be routed in raceways separately and seismically mounted. Cables from the sensors in the SFP area will be in dedicated rigid steel conduits, routed in covered recess in the floor to avoid interference with fuel handling activities.

### **6.2 Mounting:**

Mounting of the primary and backup channel instruments will be seismic class I. Installed equipment will be seismically qualified to withstand the maximum seismic ground motion considered in the design of the plant area in which it is installed.

### **6.3 Qualification:**

The primary and backup instrument channels will be reliable at temperature, humidity and radiation levels consistent with the SFP water at saturation conditions for an extended period.

Instrument channel reliability will be demonstrated via an appropriate combination of design, analyses, operating experience, and/or testing of channel components for the following sets of parameters:

- Conditions in the area of instrument channel component use for all instrument components,
- Effects of shock and vibration on instrument channel components used during and following any applicable event for only installed components, and
- Seismic effects on instrument channel components used during and following a potential seismic event for only installed components.



### **Overall Integrated Plan for Fermi 2 Nuclear Power Plant - Spent Fuel Pool Instrumentation**

Augmented quality components, similar to those applied to fire protection, will be used for this project.

The temperature, humidity and radiation levels consistent with conditions in the vicinity of the SFP and the area of use considering normal operational, event, and post-event conditions for no fewer than seven days post-event or until off-site resources can be deployed by the mitigating strategies resulting from NRC Order EA-12-049 (Reference 9.2) will be addressed in the engineering design phase. Examples of post-event (beyond-design-basis) conditions that will be considered are:

- Radiological conditions for a normal refueling quantity of freshly discharged (100 hours) fuel with the SFP water level 3 as described in NRC Order EA-12-051 (Reference 9.1),
- Temperatures of 212 degrees F and 100% relative humidity environment,
- Boiling water and/or steam environment,
- A concentrated borated water environment, and
- The impact of FLEX mitigating strategies.

Components of the instrument channels will be qualified for shock and vibration using one or more of the following methods:

- Components are supplied by manufacturers using commercial quality programs with shock and vibration requirements included in the purchase specification at levels commensurate with transportation applications;
- Components have a substantial history of operational reliability in environments with significant shock and vibration loading, such as transportation applications; or
- Components are inherently resistant to shock and vibration loadings, such as cables.

Applicable components of the instrument channels are rated by the manufacturer (or otherwise tested) for seismic effects at levels commensurate with those of postulated design basis event conditions in the areas of component usage (with the exception of battery chargers and replaceable batteries). The following measures will be used to verify that the design and installation is adequate:

- Demonstration of seismic motion consistent with that of existing design basis loads at the installed location.
- Substantial history of operational reliability in environments with significant vibration, such as for transportation applications. Such a vibration design will be inclusive of the effects of seismic motion imparted to the components at the proposed locations of the plant.

## **Overall Integrated Plan for Fermi 2 Nuclear Power Plant - Spent Fuel Pool Instrumentation**

- Adequacy of seismic design and installation will be demonstrated based on the guidance in Sections 7, 8, 9, and 10 of IEEE Standard 344-2004, "IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations," (Reference 9.6) or a substantially similar industrial standard.
- Demonstration that proposed devices are substantially similar in design to models that have been previously tested for seismic effects in excess of the plant design basis at the location where the instrument is to be installed (g-levels and frequency ranges); or
- Seismic qualification using seismic motion consistent with that of existing design basis loading at the installation location.

### **6.4 Independence:**

The primary instrument channel will be independent of the backup instrument channel. The primary instrument channel sensor will be located in the north east corner of the SFP, and the associated signal processor and remote display units will be located in the Auxiliary Building. The backup instrument channel sensor will be located in the north west corner of the SFP, and the associated signal processor and remote display units will be located in the Reactor Building. Cabling for the primary channel will be routed separately from cabling for the backup channel. The power sources for the primary channel and the backup channel will be from a different local 120V AC power source.

### **6.5 Power Supplies:**

Fermi 2 instrumentation channels will each be powered by a separate Fermi 2 local 120V AC power source. Each channel will be provided with external backup power using replaceable batteries with a minimum duration/capacity of 72 hours. Each channel will automatically switch over to backup power on loss of normal power. For extended battery operation, each channel will have an "On Demand" operation feature. Backup power will be provided by Phase 2 and/or Phase 3 generators within 72 hours. FLEX power will have sufficient capacity to sustain the level indication function indefinitely consistent with FLEX implementation guide NEI 12-06 (Reference 9.5).

In addition, a manual transfer switch and an auxiliary power disconnect switch will also be installed for each instrument channel so that a portable FLEX generator can be connected, providing robustness within 72 hours on loss of normal channel power.

### **6.6 Accuracy:**

The primary and backup instrument channels will be designed to maintain their design accuracy following a power interruption or change in power source without recalibration. The accuracy of the instrument channels, including display accuracy, will be consistent with the

## **Overall Integrated Plan for Fermi 2 Nuclear Power Plant - Spent Fuel Pool Instrumentation**

guidelines of NRC JLD-ISG-2012-03 & NEI 12-02 (References 9.3 and 9.4) and determined during design phase.

### **6.7 Testing:**

The primary and backup instrument channels design will provide for routine testing and calibration consistent with the guidelines of NRC JLD-ISG-2012-03 & NEI 12-02 (References 9.3 and 9.4) and permit in-situ testing. Details will be determined during the engineering and design phase.

### **6.8 Display:**

The primary instrument channel remote display will be located in the control room. The backup instrument channel remote display will be located on the Reactor Building 2nd floor near the FLEX SFP refill station. The displays will provide continuous indication of SFP water level. In addition, the SFPI signal processors located in the Auxiliary Building and the Reactor Building will have display screens showing SFP level numerical read out with continuous indication. Trained personnel will be able to promptly monitor the SFP water level during various drain-down scenarios.

### **7.0 Instrument Channel Program Criteria:**

#### **7.1 Training:**

Systematic Approach to Training (SAT) will be used to identify the population to be trained and to determine both the initial and continuing elements of the required training. The program criteria will be consistent with the guidelines of NRC JLD-ISG-2012-03 & NEI 12-02 (References 9.3 and 9.4). Personnel will complete training prior to placing the instrumentation in service.

#### **7.2 Procedures:**

Procedures will be developed using guidelines and vendor instructions to address the maintenance, operation and abnormal response issues associated with the new SFPLI.

Procedures will also address the following situations consistent with the applicable NEI 12-02 guidelines (Reference 9.4):

- If, at the time of an event or thereafter until the unit is returned to normal service, an instrument channel ceases to function, its function will be recovered within a period of time consistent with the emergency conditions that may apply at the time.
- If, at the time of an event or thereafter until the unit is returned to normal service, an instrument channel component needs to be replaced, a commercially available component may be used even if it does not meet all of the qualifications (section 6.3 above) in order to maintain the instrument channel functionality.

### **Overall Integrated Plan for Fermi 2 Nuclear Power Plant - Spent Fuel Pool Instrumentation**

- Fermi 2 will have a strategy to ensure SFP water level addition is initiated at an appropriate time consistent with the implementation of NEI 12-06 (Reference 9.5).

#### **7.3 Testing and Calibration:**

Processes will be established and maintained consistent with the applicable NEI 12-02 guidelines (Reference 9.4) for scheduling and implementing necessary testing and calibration of the primary and backup SFP level instrument channels to maintain the instrument channels at the design accuracy. The testing and calibration of the instrumentation will be consistent with vendor recommendations or other documented bases. Calibration will be specific to the mounted instrument and the monitor.

#### **8.0 Need for Relief and Basis:**

Fermi 2 is not requesting relief from the requirements of NRC Order EA-12-051 (Reference 9.1) or the guidance in NRC JLD-ISG-2012-03 (Reference 9.3).

#### **9.0 References:**

- 9.1 NRC EA-12-051, "Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation", March 12, 2012
- 9.2 NRC EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events", March 12, 2012
- 9.3 NRC JLD-ISG-2012-03, "Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation, Revision 0", August 29, 2012
- 9.4 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, August 2012
- 9.5 NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide", Revision 0, August 2012
- 9.6 IEEE Standard 344-2004, "IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations"
- 9.7 Fermi 2 Nuclear Power Plant Updated Final Safety Analysis Report, Revision 18, dated 11/05/2012
- 9.8 Fermi Drawing Document Serial Number (DSN) #2356, Rev. 8 (Edison File # R6-405), "Racks Layout – BWR Spent Fuel Storage Racks Campaign I"

## 10. Fermi 2 Spent Fuel Pool Instrumentation – Conceptual Block Diagram

