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10 CFR 2.202

August 19, 2013  
NRC-13-0042

U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington D C 20555-0001

- References:
- 1) Fermi 2  
NRC Docket No. 50-341  
NRC License No. NPF-43
  - 2) DTE Electric Company Letter to NRC, "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)"  
NRC-13-0006, dated February 28, 2013
  - 3) 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

Subject: Response to Request for Additional Information (RAI)  
Regarding the Overall Integrated Plan in Response to  
Order EA-12-051 "Reliable Spent Fuel Pool Instrumentation"

In Reference 2, DTE Electric Company (DTE) submitted the Fermi 2 Overall Integrated Plan for implementation of the requirements of NRC Order EA-12-051 (Reference 3). In an email dated July 29, 2013 from Mr. Scott Wall of the NRC to Mr. Alan Hassoun of DTE, the NRC staff requested additional information to complete the review of the Overall Integrated Plan.

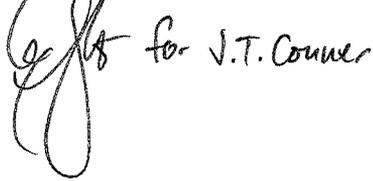
The Enclosure to this letter provides DTE's response to the RAI. The response is based on information developed to date. Additional updates resulting from ongoing development of the final design for the reliable spent fuel pool instrumentation will be provided in future six-month status reports in accordance with Reference 3.

No new commitments are being made in this submittal.

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

Sincerely,

 for J.T. Conner

Enclosure: Response to Request for Additional Information for Overall Integrated Plan in Response to Order EA-12-051 "Reliable Spent Fuel Pool Instrumentation"

cc: NRC Project Manager  
NRC Resident Office  
Reactor Projects Chief, Branch 5, Region III  
Regional Administrator, Region III  
Mr. Robert J. Fretz, Jr., NRR JLD/PMB, NRC  
Mr. Robert L. Dennig, NRR DSS/SCVB, NRC  
Supervisor, Electric Operators,  
Michigan Public Service Commission

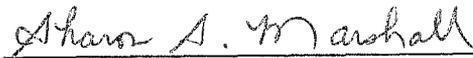
I, Kent C. Scott, do hereby affirm that the foregoing statements are based on facts and circumstances which are true and accurate to the best of my knowledge and belief.



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Kent C. Scott  
Director, Nuclear Production  
Nuclear Generation

On this 19<sup>th</sup> day of August, 2013 before me personally appeared Kent C. Scott, 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, 2018  
ACTING IN COUNTY OF *Monroe*

**Enclosure to  
NRC-13-0042**

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

**Response to Request for Additional Information**

**Overall Integrated Plan in Response to Order EA-12-051  
“Reliable Spent Fuel Pool Instrumentation”**

## Response to Request for Additional Information

### RAI-1a

Please provide the following:

- a) A clearly labeled sketch depicting the elevation view of the proposed typical mounting arrangement for the portions of instrument channel consisting of permanent measurement channel equipment (e.g., fixed level sensors and/or stilling wells, and mounting brackets). Indicate on this sketch the datum values (e.g., 661' 1/8") representing Level 1, Level 2, and Level 3 as well as the top of the fuel racks. Indicate on this sketch the portion of the level sensor measurement range that is sensitive to measurement of the fuel pool level, with respect to the Level 1, Level 2, and Level 3 datum points.

### Response

Figure 1 of this enclosure contains the information requested in RAI-1a. Instrument probe mounting details in the Spent Fuel Pool area are provided in the response to RAI-3b.

### RAI-1b

Please provide the following:

- b) A discussion regarding dose rates for stored spent fuel versus that of other material that may be stored in the pool and the potential impact on the elevation for level 2.

### Response

Level 2 (Elevation 671'-0<sup>1</sup>/<sub>8</sub>"') is established as being ten (10) feet above Level 3 (Elevation 661'-0<sup>1</sup>/<sub>8</sub>"') which is the highest point of any fuel rack seated in the SFP. This is consistent with the guidance of NEI 12-02 where ten feet of water would provide substantial radiation protection from the spent fuel stored in the fuel racks. The radiation from other materials stored in the SFP area may be less shielded if the SFP water level drops down to Level 2. The dose from both the spent fuel in the racks and that from other stored materials will be assessed in a calculation for habitability and equipment qualification as part of the design of the Spent Fuel Pool Level Instrumentation (SFPLI) system. An adjustment to the elevation designated as Level 2 may be necessary to meet the guidance of NEI 12-02.

Order EA-12-051 requires status updates at six month intervals following submittal of the Overall Integrated Plan (OIP) to delineate progress made in implementing the requirements of the Order. Additional discussion regarding dose rates for stored spent

fuel and other material in the SFP and the potential impact on the elevation for level 2 will be provided in the six month update scheduled for August 2014.

### **RAI-2**

Please provide the following:

Please provide a clearly labeled sketch or marked-up plant drawing of the plan view of the SFP area, depicting the SFP inside dimensions, the planned locations/ placement of the primary and back-up SFP level sensors, and the proposed routing of the cables that will extend from the sensors toward the location of the local electronics cabinets and read-out/display devices in the main control room or alternate accessible location.

### **Response**

Figure 2 of this enclosure contains the information requested in RAI-2.

### **RAI-3a**

Please provide the following:

- a) The design criteria that will be used to estimate the total loading on the mounting device(s), including static weight loads and dynamic loads. Describe the methodology that will be used to estimate the total loading, inclusive of design basis maximum seismic loads and the hydrodynamic loads that could result from pool sloshing or other effects that could accompany such seismic forces.

### **Response**

Figure 3 of this enclosure shows the general mounting arrangement in the SFP area. The level indicator system and sensors that will be mounted at the edge of the SFP are comprised of a level sensor probe assembly, and a mounting bracket. The level sensor probe assembly is placed in the SFP as shown in Figures 1, 2, and 3. The loading on the mounting bracket includes the static weight loads and dynamic loads of the level sensor probe assembly. The dynamic loads consist of design basis maximum seismic loads on the components, along with hydrodynamic loads produced by pool sloshing.

The total loading on the mounting bracket will be derived by combining the maximum assembly static and seismic loads with the hydrodynamic loads on the submerged portion of the level sensor probe assembly. In addition, seismic qualification testing will be performed to levels that envelop the seismic response spectra at the installed location.

### **RAI-3b**

Please provide the following:

- b) A description of the manner in which the level sensor (and stilling well, if appropriate) will be attached to the refueling floor and/or other support structures for each planned point of attachment of the probe assembly. Indicate in a schematic the portion of the level sensor that will serve as points of attachments for mechanical/mounting or electrical connections.

### **Response**

As depicted in Figures 1 and 3 of this enclosure, the level sensor probe is firmly attached to the mounting bracket at the edge of the pool. The probe assembly mounting bolts can be loosened to enable the removal of the probe for repairs, if required. The mounting bracket provides the only mechanical and electrical attachment point for the level sensor probe.

**RAI-3c**

Please provide the following:

- c) A description of the manner by which the mechanical connections will attach the level instrument to permanent SFP structures so as to support the level sensor assembly.

**Response**

The mounting bracket will be rigidly anchored to the permanent fuel pool structure using expansion anchor bolts. Further details will be provided in the six month update scheduled for August 2014.

**RAI-3d**

Please provide the following:

- d) A description of how other material stored in the SFP will not create adverse interaction with the fixed instrument location(s).

**Response**

The level sensor probes are positioned such that the spargers will not interfere with the function of the probes. The level sensor probes are also positioned such that the material stored on permanent supports on the SFP walls will not interfere with the operation of the level sensor probes. The level sensor probes length is designed such that there is no mechanical interference between the probes and the fuel racks.

#### **RAI-4a**

Please provide the following:

- a) A description of the specific method or combination of methods you intend to apply to demonstrate the reliability of the permanently installed equipment under Beyond-Design-Basis (BDB) ambient temperature, humidity, shock, vibration, and radiation conditions.

#### **Response**

##### Ambient Temperature

The postulated temperature in the SFP area that results from a boiling pool is 100°C (212°F). The level sensor probe is rated for a maximum temperature of 210°C (410°F). The signal processor will be located in an area where the temperature will not exceed the rated temperature of the electronics.

##### Humidity

The maximum humidity postulated for the SFP area is 100% relative humidity (essentially, a saturated steam environment). The electronics will be located outside of the spent fuel pool area in a location away from the steam atmosphere. The upper portion of the level sensor probe is designed to withstand 100% relative humidity. Because the level sensor probes are sealed, accumulation of condensation on the level sensor probes will not affect operation of the level indication system.

##### Shock and Vibration

A shock and vibration test report was provided by the vendor for the selected MOHR EFP-IL Guided Ultra-Wideband (UWB) Radar Tank Level Indicator (TLI) System with MOHR EFP Series Guided UWB Radar sensors. Testing was performed by the U.S. Naval Research Laboratory (NRL) to the requirements of MIL-PRF-28800F.

##### Radiation

The area above and around the pool will be subject to large amounts of radiation in the event that the fuel becomes uncovered. The only parts of the measurement channel in the pool radiation environment are the level sensor probes, which are not susceptible to the expected levels of radiation. The remote display electronics will be located in a location outside the spent fuel pool area that does not exceed the analyzed limit for the electronics.

**RAI-4b**

Please provide the following:

- b) A description of the testing and/or analyses that will be conducted to provide assurance that the equipment will perform reliably under the worst-case credible design basis loading at the location where the equipment will be mounted. Please include a discussion of this seismic reliability demonstration as it applies to a) the level sensor mounted in the SFP area, and b) any control boxes, electronics, or read-out and re-transmitting devices that will be employed to convey the level information from the level sensor to the plant operators or emergency responders.

**Response**

Seismic testing and/or analysis will be performed to the requirements of IEEE 344-2004. The equipment to be evaluated includes the level sensor probe, readout, power control panel, signal processor, and mounting brackets.

**RAI-4c**

Please provide the following:

- c) A description of the specific method or combination of methods that will be used to confirm the reliability of the permanently installed equipment during and following seismic conditions to maintain its required accuracy.

**Response**

The method to confirm the reliability of the permanently installed equipment during and following seismic conditions to maintain the required accuracy is being developed. Further details will be provided in a six-month update scheduled for August 2014.

### **RAI-5a**

Please provide the following:

- a) A description of how the two channels of the proposed level measurement system meet the requirement that the potential for a common cause event to adversely affect both channels is minimized to the extent practicable.

### **Response**

The primary and backup level sensors are physically separated by the width of the spent fuel pool as shown in Figure 2 of this enclosure. Cabling to the respective signal processors and the associated remote indicators will also be separate due to the separate locations of the backup and primary level indicators as shown in Figures 4 and 5. The primary channel signal processor and the associated remote indicator are located in the Auxiliary Building; whereas the backup channel signal processor and the associated remote indicator are located in the Reactor Building.

For separation of power to the primary and backup indicators see Figures 4 and 5 of this attachment. The proposed plans call for power to the primary and backup channels using Balance of Plant (BOP) 120 volt AC normal power. The separation of the two channel power sources is discussed in the response to RAI-5b; both power sources are independent such that no one single failure will interrupt power to both channels.

### **RAI-5b**

Please provide the following:

- b) Further information on how each level measurement system, consisting of level sensor electronics, cabling, and readout devices will be designed and installed to address independence through the application and selection of independent power sources, the use of physical and spatial separation, independence of signals sent to the location(s) of the readout devices, and the independence of the displays.

### **Response**

The level sensor probes for each channel will be installed on separate corners of the Spent Fuel Pool. The mounts for each level probe will be attached to the concrete floor of Reactor Building (RB) 5<sup>th</sup> floor spent fuel pool area, physically separated from each other (refer to Figure 2). An electronic signal is sent from the sensor electronic panels located on the Auxiliary Building (AB) 4<sup>th</sup> floor and RB 3<sup>rd</sup> floor via separate independent wiring for each channel to the readout display panels located at different locations in the RB 2<sup>nd</sup> floor and in the Main Control Room (See Figures 4 and 5). Independent power sources are addressed in the response to RAI-5a.

### **RAI-6a**

Please provide the following:

- a) A description of the electrical AC power sources and capacities for the primary and backup channels.

### **Response**

The Spent Fuel Pool (SFP) primary and backup channel instruments will be powered by 120 VAC separate Balance of Plant (BOP) power distribution panels. The Distribution Panels are classified as Seismic Category II/I. The Distribution Panels have adequate spare capacity to power the SFP instruments.

Each channel will be provided with backup power from replaceable batteries for a minimum duration of 72 hours. Backup power for each channel will be automatically switched on loss of the respective normal channel power sources.

In addition, a manual transfer switch will also be installed for each instrument channel so that a portable FLEX generator can be connected within 72 hours of a loss of normal channel power, as an additional alternative power source.

### **RAI-6b**

Please provide the following:

- b) If the level measurement channels are to be powered through a battery system (either directly or through an uninterruptible power supply (UPS)), please provide the design criteria that will be applied to size the battery in a manner that ensures, with margin, that the channel will be available to run reliably and continuously following the onset of the BDB event for the minimum duration needed, consistent with the plant mitigation strategies for the BDB external events (Order EA-12-049)

### **Response**

The battery sizing design criteria will be developed by the vendor and will be provided in the six month update scheduled for August 2014.

In accordance with vendor specification, on loss of normal 120 volt AC power, internal battery power will be available to the SFP instrumentation for 7 days. This will be verified by calculations or testing prior to installation. However, FLEX power will take over the function of the battery power within 72 hours and will continue until normal power is restored. The station batteries will not be used for this battery backup.

### **RAI-7a**

Please provide the following:

- a) An estimate of the expected instrument channel accuracy performance under both a) normal SFP level conditions (approximately Level 1 or higher) and b) at BDB conditions (i.e., radiation, temperature, humidity, post-seismic and post-shock conditions) that would be present if the SFP level were at the Level 2 and Level 3 datum points.

### **Response**

The vendor identified absolute system accuracy for the level indication system selected for use with the spent fuel pool instrumentation is approximately +/- 0.13% of span. The accuracy of the instrument channel is not expected to be significantly affected under BDB conditions (i.e., radiation, temperature, and humidity, post-seismic and post-shock conditions).

The overall instrument channel accuracy at both normal and BDB conditions will be determined during the engineering and design phase. Updated information will be provided in the six-month status update scheduled for August 2014.

### **RAI-7b**

Please provide the following

- b) A description of the methodology that will be used for determining the maximum allowed deviation from the instrument channel design accuracy that will be employed under normal operating conditions as an acceptance criterion for a calibration procedure to flag to operators and to technicians that the channel requires adjustment to within the normal condition design accuracy.

### **Response**

The calibration procedure acceptance criteria for deviation from instrument channel design accuracy will be established during the engineering and design phase following plant procedure development processes and based on the plant instrument setpoint methodology.

**RAI-8a**

Please provide the following:

- a) A description of the capability and provisions the proposed level sensing equipment will have to enable periodic testing and calibration, including how this capability enables the equipment to be tested in-situ.

Response

As provided in Reference 2, 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 and permit in-situ testing. Details are not currently available and will be determined during the engineering and design phase. Additional information will be provided in the six month update scheduled for February 2015.

**RAI-8b**

Please provide the following

- b) A description of how such testing and calibration will enable the conduct of regular channel checks of each independent channel against the other, and against any other permanently-installed SFP level instrumentation.

Response

The Primary and Backup instrument channels will have indicators that can be compared against each other. This comparison can be performed at suitable times and frequencies. The results of the comparison between the SFP LI channels can be compared with the criteria described in response to RAI-7b to determine if recalibration or troubleshooting is needed. As the specifics regarding testing, calibrating and channel checks are developed, the information will be provided in the six month update scheduled for February 2015.

**RAI-8c**

Please provide the following:

- c) A description of how calibration tests and functional checks will be performed and the frequency at which they will be conducted. Discuss how these surveillances will be incorporated into the plant program.

## **Response**

Functional checks will be performed periodically and will include visual inspection, verification of the instrument display reading, and testing of the battery backup on simulated loss of normal power. The frequency of calibration tests and the way these tests will be incorporated into current processes have not yet been determined. This information will be provided in the six month update scheduled for February 2015.

## **RAI-8d**

Please provide the following

- d) A description of what preventative maintenance tasks are required to be performed during normal operation, and the planned maximum surveillance interval that is necessary to ensure that the channels are fully conditioned to accurately and reliably perform their functions when needed.

## **Response**

Details of preventative maintenance and surveillance of the instrument channels have not been developed. Additional information will be provided in the six month update scheduled for February 2015.

**RAI-9a**

Please provide the following

- a) Since the backup display location is not in the main control room, please provide a description of the specific location for the backup display, including justification for prompt accessibility to displays including primary and alternate route evaluation, habitability at display location(s), continual resource availability for personnel responsible to promptly read displays, and provisions for communications with decision makers for the various SFP drain down scenarios and external events.

**Response**

The backup display will be located near the FLEX Spent Fuel Pool fill station on the second floor of the reactor building (RB). This arrangement conforms to the guidance in NEI 12-02 and allows for the operator controlling emergency pool filling operation to directly monitor pool level. The arrangement also increases the physical separation of indication cabling between the two channels.

Adequate operations resources are available on shift to periodically monitor the backup indication. The FLEX Fuel Pool fill station is located in an area that is accessible to plant operators both from the Auxiliary Building (AB) and an outside RB entrance. Both the AB and the RB are seismic Class 1, safety related structures and the FLEX Fuel Pool fill station, inside the RB, is a considerable distance from the SFP. Communications between the control room and the plant operators is provided by a variety of means including radios and the plant phone system.

The planning for FLEX is on-going and the resource needs to monitor the back-up channels during a beyond design bases event is being considered in this planning.

Habitability is discussed in the response to RAI-9b.

**RAI-9b**

Please provide the following:

- b) The reasons justifying why the locations selected enable the information from these instruments to be considered "promptly accessible" to various drain-down scenarios and external events.

## **Response**

As stated in the response to RAI-9a, the backup indication is located in a seismic class 1, safety related structure and is accessible from multiple paths. The area environment is expected to be mild and habitable following beyond design bases external events addressed by NRC Order-EA-12-049.

**RAI-10a**

Please provide the following:

- a) A list of the operating (both normal and abnormal response) procedures, calibration/test procedures, maintenance procedures, and inspection procedures that will be developed for use of the SFP instrumentation in a manner that addresses the order requirements.

**Response**

The standards, guidelines and/or criteria that will be utilized to develop procedures for activities associated with the SFP level instrumentation, as well as storage and installation of portable instruments, have not yet been determined. However, information from the following documents is being considered:

- INPO AP-913 and Maintenance Rule,
- RG 1.33, Quality Assurance Program Requirements (Operation), Revision 2, and
- ANSI 18.7-1976, Administrative Controls and Quality Assurance for Operational Phase of Nuclear Power Plants.

Information regarding the utilization of standards, guidelines and/or criteria to develop these procedures will be provided in the six month update scheduled for February 2015.

**RAI-10b**

Please provide the following:

- b) A brief description of the specific technical objectives to be achieved within each procedure. If your plan incorporates the use of portable spent fuel level monitoring components, please include a description of the objectives to be achieved with regard to the storage location and provisions for installation of the portable components when needed.

**Response**

This information will be provided in the six month update scheduled for February 2015.

## **RAI-11**

Please provide the following:

- a) Further information describing the maintenance and testing program the licensee will establish and implement to ensure that regular testing and calibration is performed and verified by inspection and audit to demonstrate conformance with design and system readiness requirements. Include a description of your plans for ensuring that necessary channel checks, functional tests, periodic calibration, and maintenance will be conducted for the level measurement system and its supporting equipment.
- b) A description of how the guidance in NEI 12-02 Section 4.3 regarding compensatory actions for one or both non-functioning channels will be addressed.
- c) A description of the compensatory actions to be taken in the event that one of the instrument channels cannot be restored to functional status within 90 days.

## **Response**

The maintenance and testing program as well as compensatory actions for non-functioning channels have not yet been developed. The information will be provided in the six month update scheduled for February 2015.

Figure 1:

Figure - Simplified Elevation Sketch (Not to Scale)

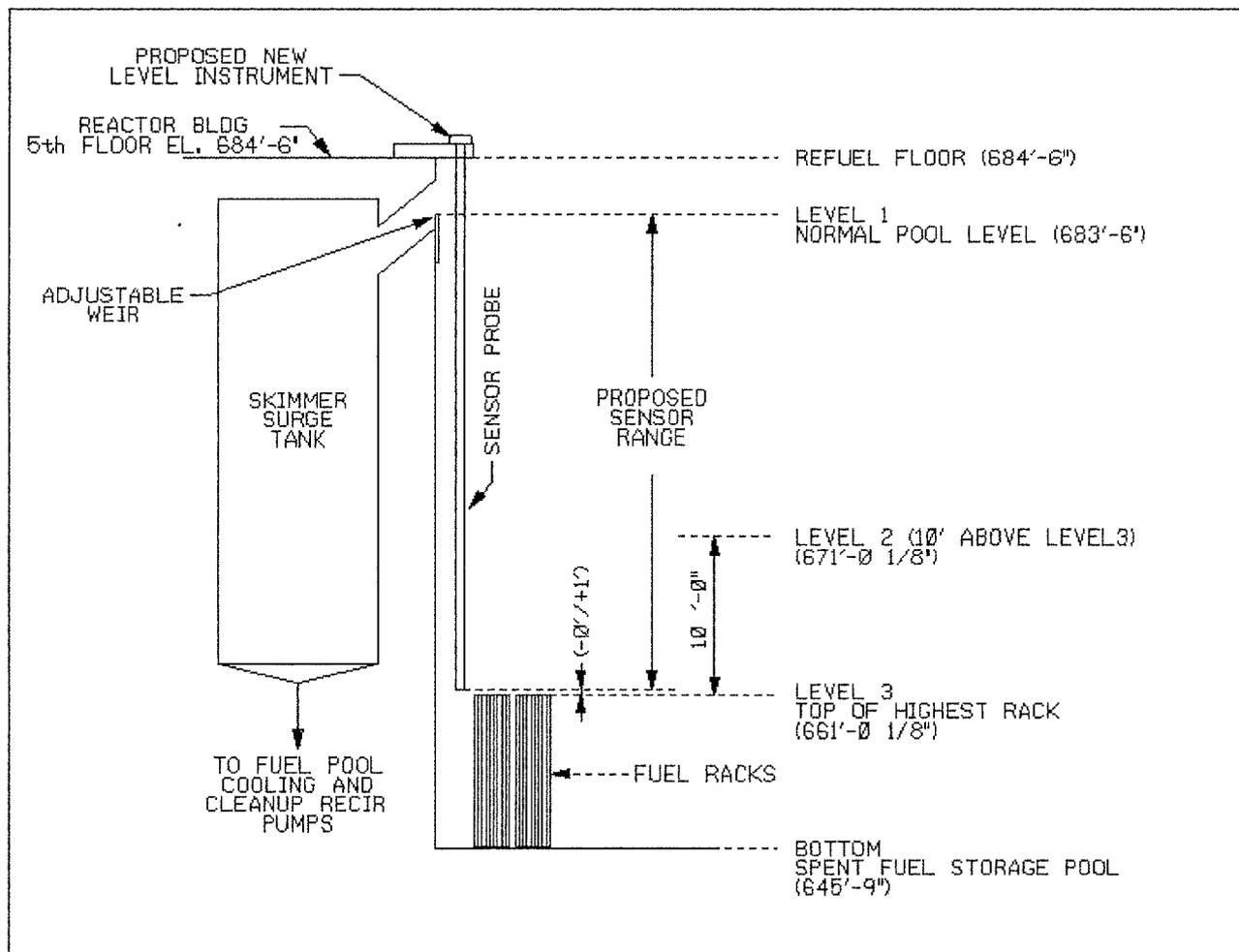


Figure 2:

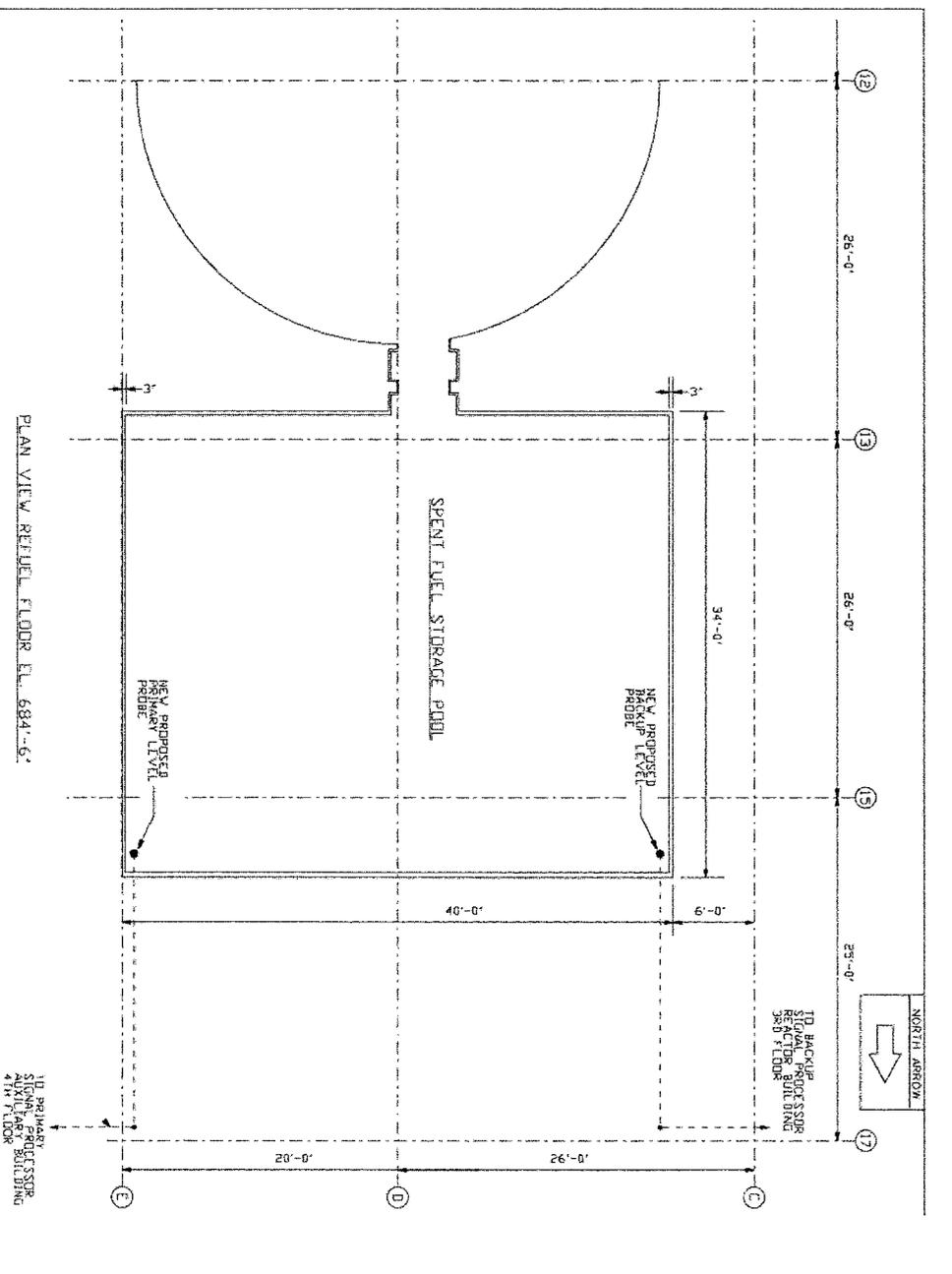


Figure 3:

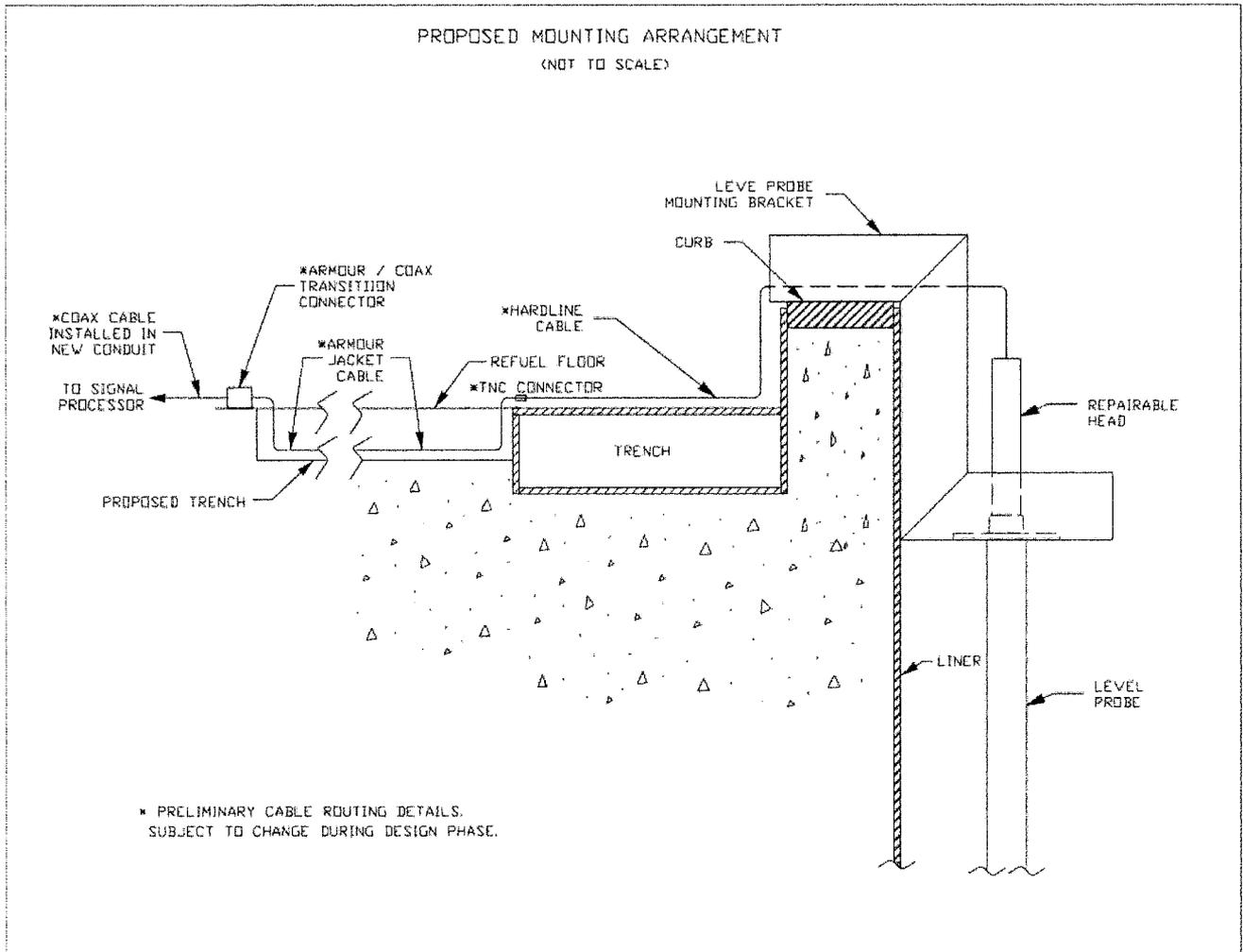


Figure 4:

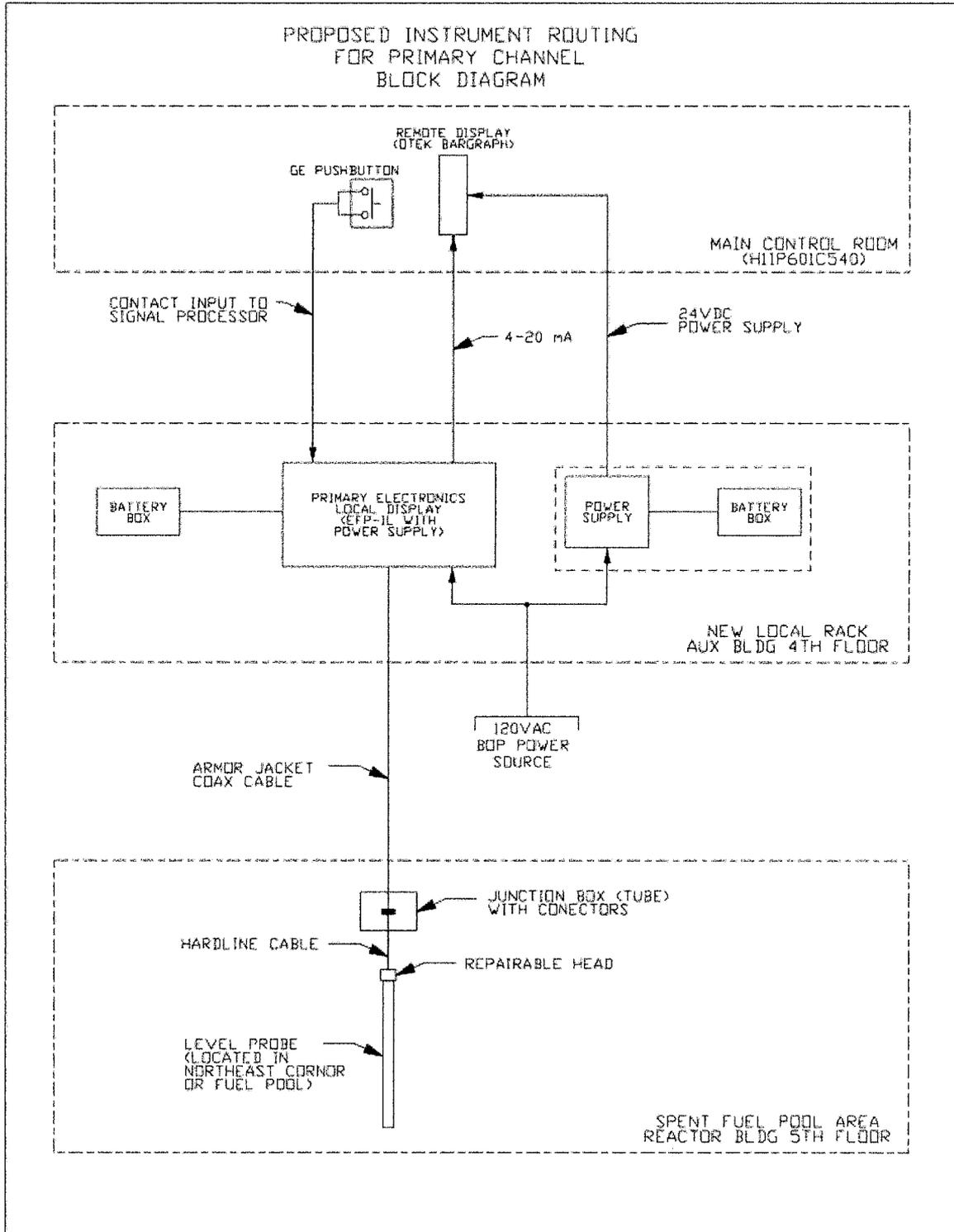


Figure 5:

