

April 28, 2011

Mr. Jack M. Davis
Senior Vice President and Chief Nuclear Officer
Detroit Edison Company
Fermi 2 – 210 NOC
6400 North Dixie Highway
Newport, MI 48166

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 55 RELATED TO
THE SRP SECTION 2.5.4 FOR THE FERMI 3 COMBINED LICENSE
APPLICATION

Dear Mr. Davis:

By letter dated September 18, 2008, Detroit Edison Company (Detroit Edison) submitted for approval a combined license application pursuant to 10 CFR Part 52. The U.S. Nuclear Regulatory Commission (NRC) staff is performing a detailed review of this application to enable the staff to reach a conclusion on the safety of the proposed application.

The NRC staff has identified that additional information is needed to continue portions of the review. The staff's request for additional information (RAI) is contained in the enclosure to this letter. To support the review schedule, you are requested to respond within 30 days of the date of this letter. If changes are needed to the safety analysis report, the staff requests that the RAI response include the proposed wording changes.

If you have any questions or comments concerning this matter, I can be reached at 301-415-8148 or by e-mail at jerry.hale@nrc.gov.

Sincerely,

/RA/

Jerry Hale, Project Manager
BWR Projects Branch
Division of New Reactor Licensing
Office of New Reactors

Docket Nos. 052-033

eRAI Tracking Nos. 5687 and 5701

Enclosure:
Request for Additional Information

Request for Additional Information No. 5687

Fermi Unit 3

Detroit Edison

Docket No. 52-033

SRP Section: 02.05.04 - Stability of Subsurface Materials and Foundations

Application Section: 2.5.4

02.05.04-37

Inform the NRC staff as to whether or not the following proposed license condition is considered appropriate to support the Fermi 3 COL:

"The applicant may not place fill material, other than concrete that meets the design, construction and testing of applicable ACI standards, underneath any Category I structure to a thickness greater than 5 feet."

Request for Additional Information No. 5701 Revision 3

SRP Section: 02.05.04 - Stability of Subsurface Materials and Foundations
Application Section: 2.5.4

02.05.04-38

In a letter to the NRC dated March 29, 2011 (NRC3-11-0010), you provided a response to RAI 02.05.04-36 to address the staff's concerns on soil property requirements associated with DCD Revisions 7 and 8. Upon review of your response, the staff requests the additional information described below. This request is in accordance with 10 CFR 100.23, and includes information necessary for the staff to follow guidance outlined in SRP Section 2.5.4 (NUREG- 0800):

1. The response proposes a formula to calculate the minimum horizontal extent of backfill adjacent to Seismic Category I structures. However, SRP Section 2.5.4.5 states that "The extent (horizontally and vertically) of all Category I excavations, fills, and slopes [should be] clearly shown on plot plans and profiles." Therefore, clearly present the horizontal and vertical extent of all Category I fills, including the boundary between different Category I fills if any, on plot plans and profiles. Please also update the Design Commitment in the ITAACs to specify the extent of Category 1 backfill adjacent to all Category I structures.
2. The response states that "To maintain the 300 m/s (1,000 ft/s) shear wave velocity near the ground surface in the side backfill for Seismic Category I structures, the near surface engineered granular backfill can be improved by adding cement to make roller-compacted concrete or a similar product." The response also states that "The improved engineered granular backfill will be designed in accordance with ACI 318 for plain concrete and ACI 207.5R for roller compacted concrete." It is therefore not clear what material (plain concrete, roller compacted concrete, or another option) will be used to construct the Seismic Category 1 backfill and how this material will meet the shear wave velocity requirement specified in Table 5.1-1, ESBWR DCD Tier1. Please specify which side backfill material will be used to surround all Seismic Category I structures, including the depths and lateral extents for each type of material. Please also update the ITAAC on shear wave velocity to clearly indicate that the measurements will be performed at finish grade, and that the acceptance criteria are to be met at finish grade and below.
3. The response states that "ACI 349 requirements for concrete exposed to sulfate-containing solutions will be implemented to select the cement type". However, ACI 349 requirements are only applicable for concrete, not roller compacted concrete (RCC) or controlled low strength material (CLSM). Even for concrete, the ACI 349 requirements to resist sulfate-containing solutions are achieved not only by selecting the proper cement type, but also by lowering the water-cement ratio and achieving higher concrete strength. Since the sulfate concentration of the site's groundwater places it into the "moderate" to "severe" sulfate exposure category based on ACI 349, please explain how the backfill on side of and underneath all Seismic Category 1 structures is designed to resist chemical attack, particularly if RCC or CLSM is selected. Also, discuss your plan to control thermal cracking of the fill materials.
4. The response indicates an "improved engineered granular backfill" could be used near the ground surface to meet the shear wave velocity requirement. Please specify which laboratory tests, field measurements, and analyses are associated with the "improved

engineered granular backfill.” If different tests are needed, please update the Inspections, Tests, and Analyses in the ITAACs to include these additional tests. Also updated the ITAACs to indicate which specific test is used to satisfy each acceptance criteria. The response also specifies use of the Modified Proctor test for granular backfill. Please discuss the minimum compaction of the Modified Proctor density for granular backfill and describe it in the FSAR.

5. The response states that the in-situ shear wave velocity measurement will be performed at a total of two locations within the Seismic Category I side backfill. Considering the complexity of the geometry around Seismic Category I structures across the site, please provide a specific evaluation to justify that additional test locations are not needed to characterize potential variations in shear wave velocity of the backfill material surrounding the Seismic Category I structures.
6. The response indicates that off-site backfill material of about 175,000 cubic yards is available from local and regional quarry sources. However, the imported sources are not identified. SRP Section 2.5.4.5 states that “The sources and quantities of backfill and borrow are identified and are shown to have been adequately investigated by borings, pits, and laboratory property and strength testing (dynamic and static) and these data are included, interpreted, and summarized.” Please specify the off-site backfill source(s) and demonstrate the adequacy of site and laboratory investigations performed as specified in SRP Section 2.5.4.5.
7. FSAR Section 2.5.4.10 assumes a surcharge pressure of 24 kPa (500 psf) due to the small- to medium-sized compaction equipment used for compaction of soil backfill behind the rigid retaining wall. If RCC is to be used, please discuss the effect on surcharge pressure due to much heavier compaction rollers and the associated impact on lateral earth pressures to the embedded walls of Seismic Category I structures.
8. In accordance with the requirements of 10 CFR 100.20(c) “Factors to be considered when evaluating sites” relating to hydrology and, 10 CFR 52.79(a) “Contents of applications; technical information in final safety analysis report” relating to hydrologic characteristics of the proposed site, please update the discussion of engineered granular fill (EGF) properties in FSAR Subsection 2.5.4 to include a provision to approximate permeability of the EGF within the horizon coincident with the existing rock fill to within the range of site specific values specified in FSAR Subsection 2.4.12 for this fill. Alternatively, please demonstrate that the magnitude of groundwater mounding relative to the surrounding fill and native soils, if any, does not exceed the DCD groundwater design basis level for the proposed EFG properties.