

PMFermiCOLPEm Resource

From: Michael K Brandon [brandonm@dteenergy.com]
Sent: Tuesday, August 14, 2012 4:04 PM
To: Muniz, Adrian; Govan, Tekia
Subject: Updated Ch 2.4 Presentation
Attachments: Section 2.4 Presentation.pdf

Tekia/Adrian

Attached is an updated version of the Ch 2.4 that should resolve your comment on elevations.

We will be providing power point versions of all slides to Christopher Brown NLT noon tomorrow.

Mike Brandon

Licensing - Manager

DTE Energy/MEP/Nuclear Development

313.235.0443

The presentation for Section 2.4 was revised to properly distinguish between plant grade and the elevation for Fermi 3 safety structures. Numerical values describing the difference between the predicted flood elevation and the plant grade were updated accordingly along with making sure that the supporting text is clear.

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"Muniz, Adrian" <Adrian.Muniz@nrc.gov>

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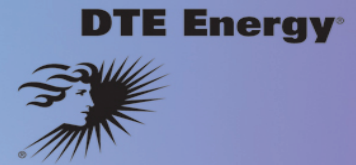
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**Fermi 3 COLA
Presentation to ACRS Subcommittee
Section 2.4**

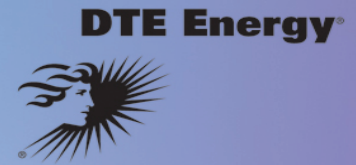
Section 2.4, Hydrology: Section Topics



Topics addressed in Section 2.4 include:

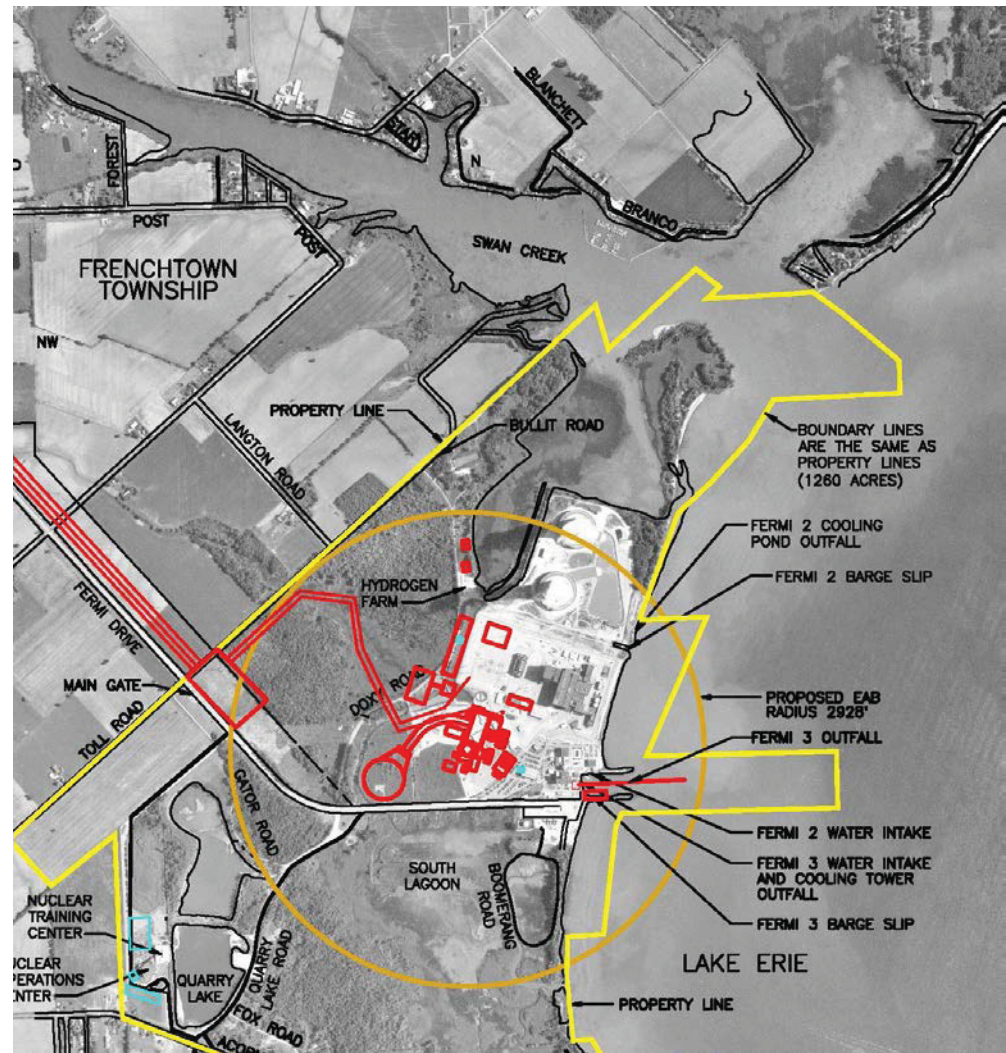
- Overview of Hydrology in Site Vicinity
- Flooding due to Local Intense Precipitation
- Flooding from Swan Creek
- Flooding from Lake Erie
- Minimum Lake Levels
- Groundwater
- Radionuclide Transport in Groundwater

Section 2.4, Hydrology: Specific Topics

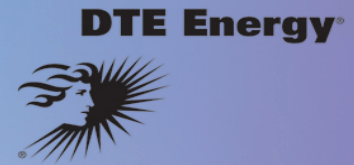


Overview of Hydrology in Site Vicinity

- Located on Western Shore of Lake Erie.
- Swan creek runs along the north edge of the site. Swan creek watershed is approximately 106 square miles.
- The western basin of Lake Erie is relatively shallow.
- Existing Fermi site grade elevation is 583 feet.
- Fermi 3 safety related and RTNSS structures are at 590.5 feet.
- Fermi 3 plant grade elevation for safety related and RTNSS structures is 590 feet.
- Maximum predicted flood level is below 590 feet.



Section 2.4, Hydrology: Specific Topics

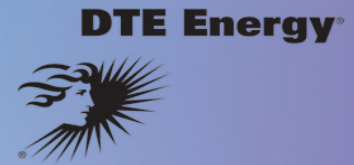


Flood Analysis Results Summary

Flood Scenario	Maximum Predicted Water Level Below Plant Grade
Local Intense Precipitation	4.1 feet
Probable Maximum Flood from Swan Creek	3.4 feet
Wind Driven Surge from Lake Erie	3.4 feet

The design flood level for safety related and RTNSS structures is a maximum water level of one foot below plant grade. Thus, there is substantial margin between design flood level and maximum predicted flood levels at the Fermi site.

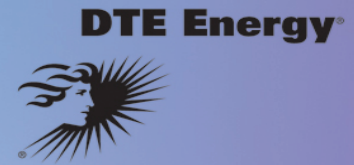
Section 2.4, Hydrology: Specific Topics



Flooding due to Local Intense Probable Maximum Precipitation (Local PMP)

- Inputs and Assumptions
 - Probable maximum precipitation rate is 5.8 inches in five minutes.
 - Snow melt is included in the analysis.
 - Drains from elevated area are assumed to be blocked.
 - Only one flow path from the elevated area is credited.
- Results and Conclusions
 - Maximum calculated water level is 4.1 ft below Fermi 3 plant grade; which is 3.1 feet below the design flood elevation for safety related and RTNSS structures.

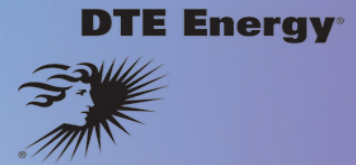
Section 2.4, Hydrology: Specific Topics



Probable Maximum Flood (PMF) due to Watershed Precipitation (Swan Creek)

- Inputs and Assumptions
 - Probable maximum precipitation rate in the watershed is used in the analysis
 - Snow melt is included in the analysis.
 - Water losses due to infiltration are not credited in the analysis.
 - Maximum water level is calculated for the case with maximum Lake Erie water level for coincident Surge (surge analysis is discussed later).
- Results and Conclusions
 - Maximum calculated water level is 3.4 ft below Fermi 3 plant grade; which is 2.4 feet below the design flood elevation for safety related and RTNSS structures.

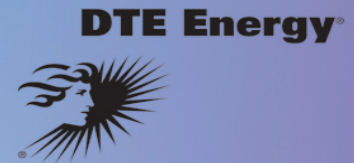
Section 2.4, Hydrology: Specific Topics



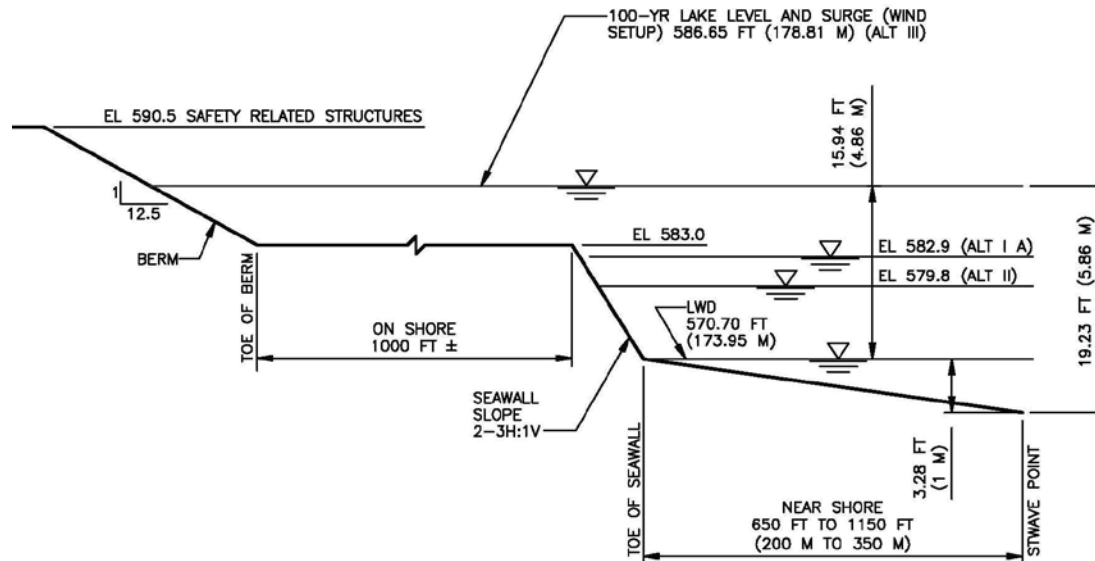
Flooding from Lake Erie (Probable Maximum Surge and Seiche)

- Inputs and Assumptions
 - 100 yr maximum lake water level (576.4 feet).
 - 100 mph wind used to calculate maximum storm surge.
 - Wave run-up considerations included in the analysis.
 - Alternatives considered per ANSI/ANS-2.8-1992, "Determining Design Basis Flooding at Power Reactor Sites," to determine flood level based on different combinations of flooding on Swan Creek, Surge and Seiche on Lake Erie, and initial lake water level.

Section 2.4, Hydrology: Specific Topics



Probable Maximum Surge and Seiche Predicted Water Levels

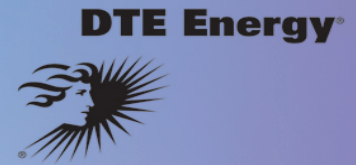


ELEVATIONS IN PLANT DATUM

Results and Conclusions

- Calculated storm surge is 10.3 ft.
- Maximum calculated water level is 3.4 ft below Fermi 3 plant grade; which is 2.4 feet below the design flood elevation for safety related and RTNSS structures.

Section 2.4, Hydrology: Specific Topics



Minimum Lake Levels

- Normal lake water level is approximately 571 feet.
- Historical low lake water level is 565.1 feet.
- Suction for the Station Water System pumps and the backup Fire Protection pumps is located to ensure that adequate submergence is provided during low water conditions.
- Ultimate Heat Sink is included within the ESBWR design.
- Ultimate Heat Sink does not rely on Lake Erie.



Section 2.4, Hydrology: Section Topics

Groundwater

Design Basis for Subsurface Hydrostatic Loadings

- The ESBWR design is based on a maximum groundwater level of 0.61 m (2 feet) below plant grade.
- Fermi 3 plant grade is 590 feet.
- Maximum historic groundwater level is 577.3 feet.
- Therefore, the DCD requirement for maximum groundwater level is satisfied.



Section 2.4, Hydrology: Section Topics

Groundwater (continued)

Groundwater Flow in Bass Islands Aquifer at Fermi 3 Site:

- Prior to development of the area west of the Fermi site, groundwater flow was to the east toward Lake Erie.
- Dewatering at quarries in Monroe County caused groundwater flow direction reversal, with flow toward the west, away from Lake Erie.
- If quarry dewatering were to cease, groundwater flow may revert back toward Lake Erie (to the east).
- Both flow directions are accounted for in the radionuclide transport analysis.



Section 2.4, Hydrology: Section Topics

Accidental Release of Liquid Effluents to Groundwater

- The ESBWR design provides features to preclude the accidental release of liquid effluents.
- The elevations of the liquid effluent tanks are below groundwater elevation. A postulated breach in the building would allow groundwater to flow into the building in lieu of effluents exiting the building.



Section 2.4, Hydrology: Section Topics

Accidental Release of Liquid Effluents to Groundwater (continued)

Analysis of accidental release to groundwater assume:

- As previously described, two possible flow paths are considered in the analysis.
- Minimum distances from source to the postulated receptor.
- Entire contents of the tank are assumed to be released.
- Analysis uses conservative values for hydraulic conductivity, gradient, effective porosity and distribution coefficients (K_d values).



Section 2.4, Hydrology: Section Topics

Accidental Release of Liquid Effluents to Groundwater (continued)

Analysis results – predicted radionuclide concentrations at either receptor are less than the limits in 10 CFR 20.

- Concentration of each radionuclide is less than associated limit in 10 CFR 20.
- Sum of the ratios (predicted concentration vs. 10 CFR 20 limit) for all radionuclides in the mixture is less than unity.



Section 2.4, Hydrology: Section Topics

Groundwater Monitoring

- The monitoring program will adhere to guidance outlined in the following documents:
 - NUREG/CR-6948 “Integrated Ground-Water Monitoring Strategy for NRC-Licensed facilities and Sites: Logic, Strategic Approach and Discussion.”
 - NEI 08-08A “Generic FSAR Template Guidance for Life Cycle Minimization of Contamination.”
- The groundwater monitoring program will make use of existing wells to the extent practicable.
- The groundwater monitoring program will be implemented both during construction and during operation.