

PMFermiCOLPEm Resource

From: Hale, Jerry
Sent: Thursday, June 14, 2012 11:32 AM
To: Jaworsky, Mari Johanna; Robillard, David L; 'mkeeganj@comcast.net'
Cc: Muniz, Adrian; FermiCOL Resource
Subject: Power Point Slides for the Fermi Public Meeting on 6-14-12
Attachments: Fermi 3 RAI 01 05-1 RAI Presentation.pdf

The attached pdf contains the Fermi 3 presentation for the public meeting scheduled for 6/14/2012, 1:00 – 4:00 pm. These slides will be available later in ADAMS.

Jerry Hale
Project Manager
U.S. Nuclear Regulatory Commission
Office of New Reactors
(301) 415-8148

Hearing Identifier: Fermi_COL_Public
Email Number: 969

Mail Envelope Properties (E3D0DF334F617344BE38EB00C881B1B392BE5A03FD)

Subject: Power Point Slides for the Fermi Public Meeting on 6-14-12
Sent Date: 6/14/2012 11:32:00 AM
Received Date: 6/14/2012 11:32:05 AM
From: Hale, Jerry

Created By: Jerry.Hale@nrc.gov

Recipients:

"Muniz, Adrian" <Adrian.Muniz@nrc.gov>
Tracking Status: None
"FermiCOL Resource" <FermiCOL.Resource@nrc.gov>
Tracking Status: None
"Jaworsky, Mari Johanna" <Mari.Jaworsky@duke-energy.com>
Tracking Status: None
"Robillard, David L" <David.Robillard@pseg.com>
Tracking Status: None
"mkeeganj@comcast.net" <mkeeganj@comcast.net>
Tracking Status: None

Post Office: HQCLSTR01.nrc.gov

Files	Size	Date & Time
MESSAGE	289	6/14/2012 11:32:05 AM
Fermi 3 RAI 01 05-1 RAI Presentation.pdf		1497376

Options

Priority: Standard
Return Notification: No
Reply Requested: Yes
Sensitivity: Normal
Expiration Date:
Recipients Received:

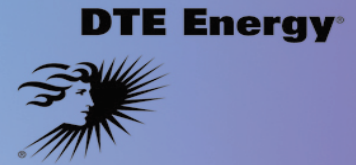
DTE Energy®



**Fermi 3 Fukushima RAI 01.05-1
Seismic Updates**

June 14, 2012

Introductions



Detroit Edison

- Peter Smith
- Michael Brandon
- Ryan Pratt
- Souzan Hanna

Black & Veatch

- Brandon Gomer
- Ed Meyer (By Phone)

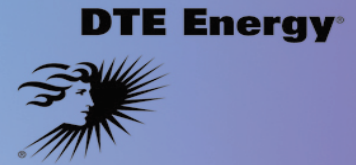
GE-Hitachi

- Patricia Campbell
- Walter (Skip) Schmitsch (By Phone)

AMEC

- Bob Youngs (By Phone)

Agenda

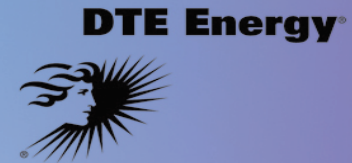


- RAI 01.05-1
- Response Approach
- Evolving State-of-the-Practice
- Fermi 3 FSAR
- Fermi 3 Site Response Results
- ESBWR Seismic Design Basis
- Fermi 3 Site-Specific SSI Results
- Perspective on Potential Impacts
- Perspective on Industry Timeline, Risks, and Resources
- Response Schedule and Relationship to NRC Safety Review
- Conclusions

a.) Evaluate the potential impacts of the newly released CEUS-SSC model, with potential local and regional refinements as identified in the CEUS-SSC model, on the seismic hazard curves and the site-specific ground motion response spectra (GMRS)/foundation input response spectra (FIRS). For re-calculation of the PSHA, please follow either the cumulative absolute velocity (CAV) filter or minimum magnitude specifications outlined in Attachment 1 to Seismic Enclosure 1 of the March 12, 2012 letter " 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." (ML12053A340).

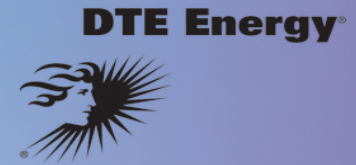
b.) Modify the site-specific GMRS and FIRS if you determine changes are necessary given the evaluation performed in part a) above.

Response Approach



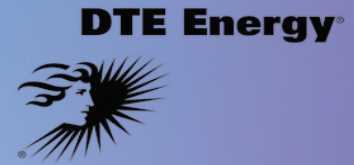
- Provide a quantitative comparison of the rock hazard based on the Central and Eastern United States (CEUS) Seismic Source Characterization (SSC) model to the Fermi 3 Final Safety Analysis Report (FSAR)
- Provide a quantitative comparison of the Ground Motion Response Spectra (GMRS) and Foundation Input Response Spectra (FIRS) in FSAR Subsection 2.5.2 to the GMRS and FIRS developed using the CEUS SSC model and revised Cumulative Absolute Velocity (CAV) filter
- Evaluate the comparisons of the GMRS and FIRS to show the Fermi 3 FSAR is adequate
- Propose a license condition or ITAAC for confirmation that the GMRS and FIRS used for the Fermi 3 FSAR remain valid after issuance of the NGA-East ground motion characterization model

Evolving State-of-the-Practice



- CEUS SSC Model (NUREG-2115)
 - Completed in December 2011 (Report issued January 27, 2012)
 - Replaces the EPRI-SOG (1986) and LLNL (1989) seismic source characterization models for the CEUS
 - NUREG-2115 does not include any demonstration sites applicable to the Fermi site
- Ground Motion Models
 - EPRI ground motion models (2004/2006)
 - Ongoing review of modified EPRI ground motion models (2004/2006): scheduled completion in early 2013
 - Ongoing NGA-East project: scheduled completion in 2014/2015

Evolving State-of-the-Practice (Continued)



Chapter 8 Demonstration Hazard Calculations

- As part of the CEUS SSC report, none of the demonstration hazard calculation test sites were located near the Fermi 3 site
- The impact of the CEUS SSC model on the Fermi 3 seismic hazard is not known

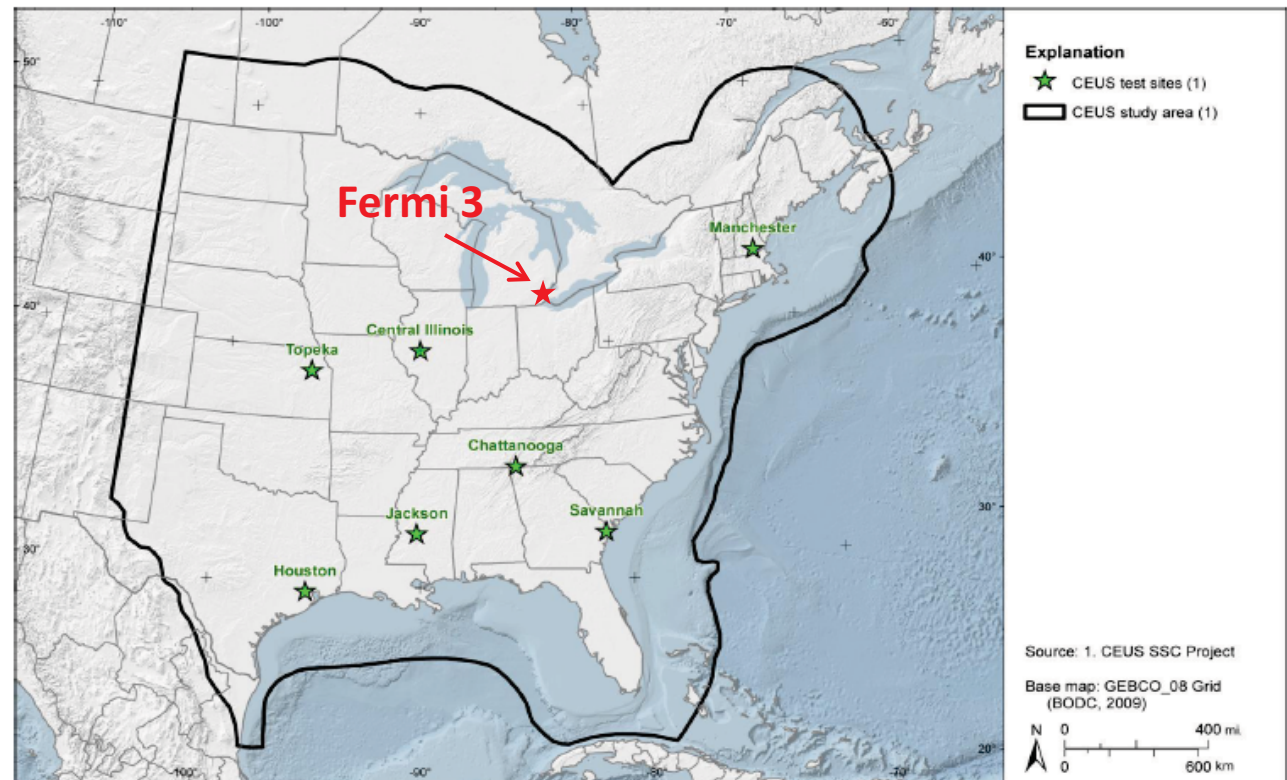
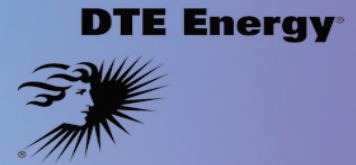


Figure 8.1-1
Map showing the study area and seven test sites for the CEUS SSC Project

CEUS SSC Figure 8.1-1

Evolving State-of-the-Practice (Continued)



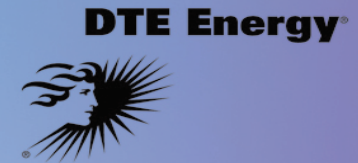
- RG 1.208, “A Performance-Based Approach to Define the Site-Specific Earthquake Ground Motion”
 - Recommends the use of the CAV filter
- RAI 01.05-1 specifies the use of a more conservative CAV filter for the re-calculation of the Probabilistic Seismic Hazard Analysis (PSHA), i.e., the CAV filter is applied to moment magnitudes (**M**) less than or equal to 5.5

Fermi 3 FSAR



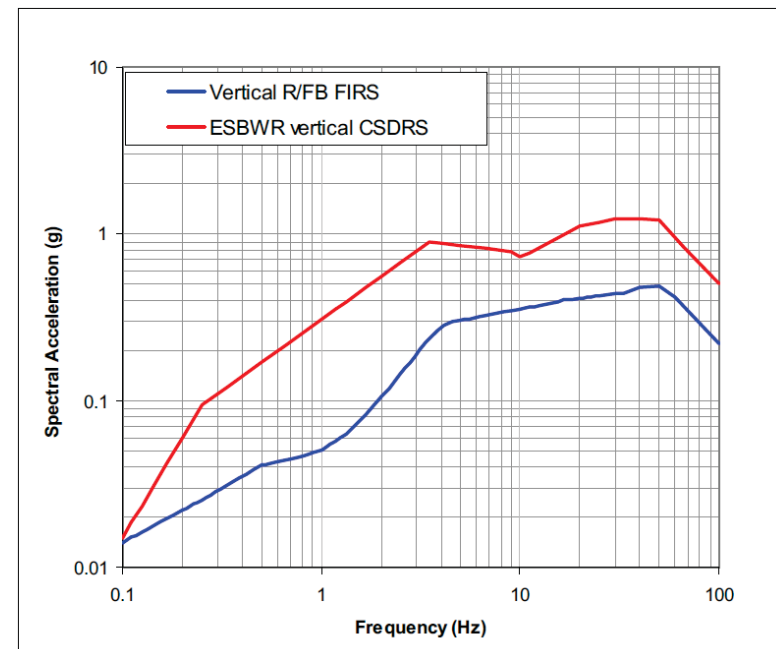
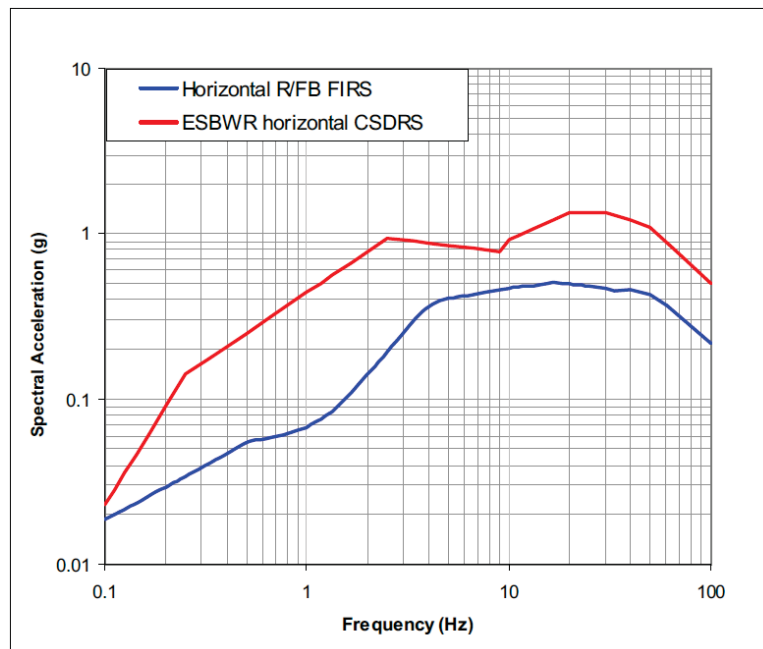
- Seismic Hazard Model in Fermi 3 FSAR
 - Distributed seismicity model using EPRI-SOG (1986) SSC with updates
 - Used current EPRI 2004/2006 ground motion models
 - Updated maximum magnitude distributions and rate of earthquake occurrence for selected source zones of the EPRI-SOG model
 - Updated model for repeated large-magnitude earthquakes in the New Madrid Seismic Zone (NMSZ)
 - A minimum body-wave magnitude (m_b) of 5.0 was used to develop the hard rock seismic hazard
 - The hard rock seismic hazard was used to develop the site amplification functions
 - The CAV filter was applied to all body-wave magnitudes (m_b) above 4.0 to develop the GMRS and FIRS

Fermi 3 Site Response Results



- FSAR Subsection 2.5.2 FIRS for Reactor Building/Fuel Building (RB/FB), Control Building (CB), and Fire Water Service Complex (FWSC) are significantly less than the ESBWR Certified Seismic Design Response Spectra (CSDRS)

FSAR Figure 2.5.2-289
Fermi 3 RB/FB FIRS (5% damping)

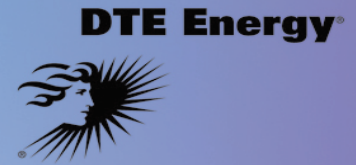


ESBWR Seismic Design Basis



- ESBWR Seismic Design Basis in Design Control Document (DCD)
 - ESBWR CSDRS design ground motion accounts for low and high frequencies
 - Low-frequency ground motion follows RG 1.60 ground spectra anchored to 0.3 g.
 - Moderate to high-frequency ground motions match the severe rock sites in the Eastern US and are anchored to 0.5 g at 100Hz.
- ESBWR CSDRS has substantial margin in the high frequency ranges where the impacts of the CEUS and modified CAV filter are expected to be the greatest for the Fermi 3 site

Fermi 3 Site-Specific SSI Results



- SSI analyses were completed to address the referenced DCD requirements for backfill surrounding the Seismic Category I structures above the top of bedrock
- SSI analyses were not performed to address any exceedance of the CSDRS

Fermi 3 Site-Specific SSI Results (Continued)

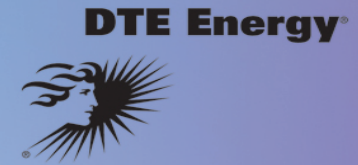
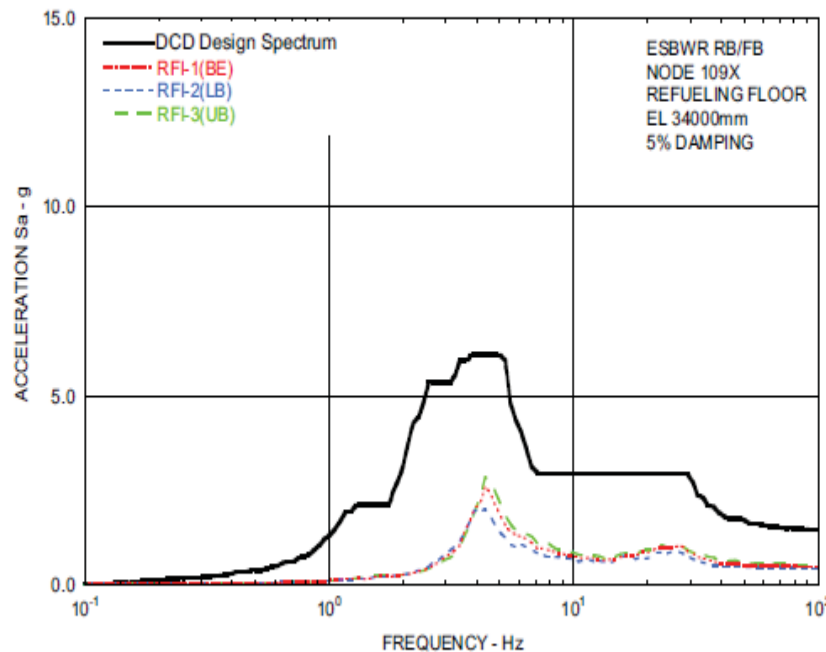


Figure 3.7.2-207a Comparison of Floor Response Spectra - RB/FB
Refueling Floor in X-Direction

[EF3 SUP 3.7-4]

- Floor response spectra (FRS) from the Fermi 3 site-specific SSI analyses are significantly less than the ESBWR DCD design FRS based on the CSDRS



Note: Sa = Spectral Acceleration

FSAR Figure 3.7.2-207a

Fermi 3 Site-Specific SSI Results (Continued)



Fermi 3 site meets minimum Factors of Safety for sliding and overturning with significant margin

	Overturning*	Sliding*
SRP 3.8.5 Minimum	1.1	1.1
Fermi 3 – RB/FB**	1,923	3.90
Fermi 3 – CB**	1,715	2.59

* Dead load + Lateral soil pressure + SSE

** Fermi 3 FSAR Tables 3.8.5-201 and 3.8.5-202 revised by letter NRC3-12-0011, dated March 30, 2012

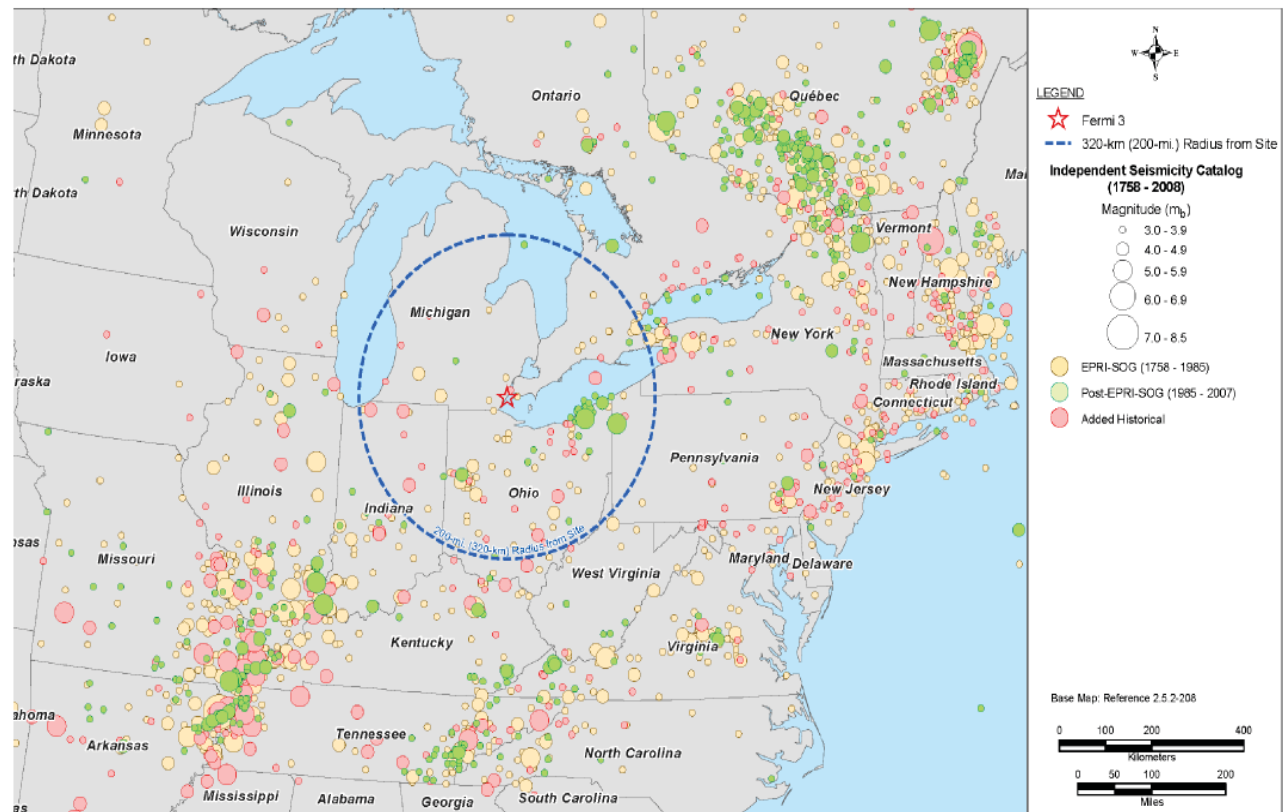
Perspective on Potential Impacts



- The Fermi 3 site is in an area with relatively low seismic activity
- NMSZ model, which is the major source for Fermi 3 at low frequencies, is similar in the FSAR and CEUS SSC
- The impact to the Fermi 3 seismic hazard from other modifications in the CEUS SSC model is not known

Figure 2.5.2-201 Earthquake Catalog for Mid-Continent Region

[EF3 COL 2.0-27-A]



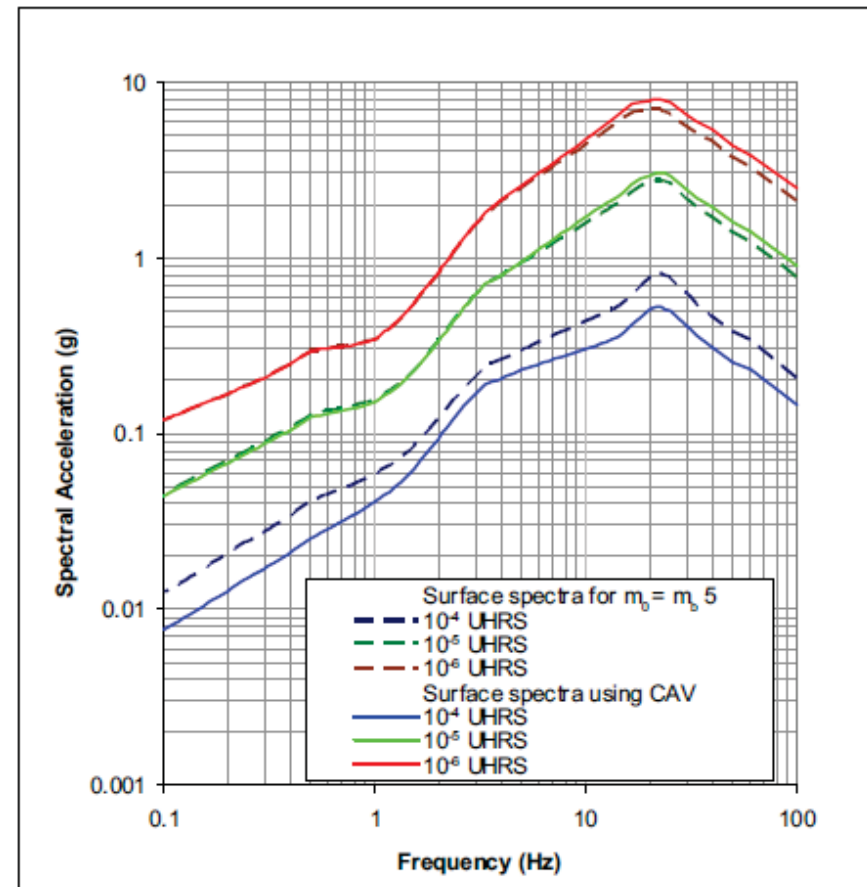
FSAR Figure 2.5.2-201

Perspective on Potential Impacts (Continued)

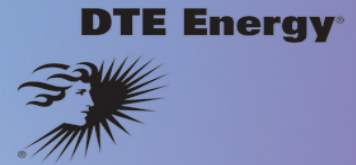


- Revised application of CAV filter is anticipated to increase the surface spectra for 10^{-4} Uniform Hazard Response Spectra (UHRs) at the Fermi 3 site
- Revised application of CAV filter is anticipated to produce similar surface spectra for 10^{-5} and 10^{-6} UHRs at the Fermi 3 site

FSAR Figure 2.5.2-285

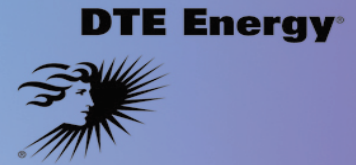


Perspective on Industry Timeline, Risks, and Resources



- Ultimately, the seismic risk at Fermi 3 will need to be assessed using the NGA-East ground motion model. This assessment can be completed post-COL prior to completion of the 52.103(g) finding
- The NRC is providing due consideration for the evolving state of practice for the work being performed to address seismic hazards for the current fleet of operating plants
- The NRC has many tools to regulate future “hold points” before any potential Fermi 3 risk exists

Response Schedule and Relationship to NRC Safety Review



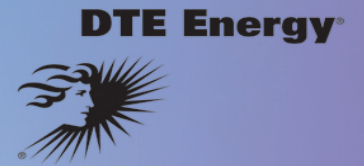
- Detroit Edison currently plans to submit the comparison of the Fermi 3 GMRS and FIRS using the CEUS SSC model to the Fermi 3 FSAR by the end of August 2012
- It is anticipated that the RAI response will provide a basis for supporting staff conclusions on the safety of the Fermi 3 application and will not result in any FSAR revisions
- NRC's schedule to present the site's seismic characterization and SSI analyses to the ACRS subcommittee is December 5, 2012. The above schedule should fully support this meeting and the full ACRS committee meeting scheduled for February 7, 2013



Conclusions

- The planned response will fully address RAI 01.05-1 by providing an assessment of the potential impacts with the expectation that revisions to the Fermi 3 FSAR will not be necessary
- The schedule for the RAI response will exceed the requested 60 day response, but should not have any adverse impact on the COLA review schedule
- By inspection of the DCD design information and the Fermi 3 FSAR results, significant margins exist
- Implementation of applicable Fukushima Near-Term Task Force recommendations to address the evolving state-of-the-practice for assessing seismic risk at Fermi 3 can be effectively regulated via License Condition or ITAAC
- Additional benefits can be gained by coordinating this work with the Fermi 2 implementation of Fukushima recommendations

Questions



Questions