PMFermiCOLPEm Resource

From: Govan, Tekia
Sent: Monday, September 08, 2014 3:49 PM
To: 'Michael K Brandon' (brandonm@dteenergy.com)
Cc: FermiCOL Resource
Subject: FW: Fermi ACRS letter
Attachments: 00-Fermi-Ltr draft final.docx

Mike:

The attached is not final but the context has been voted on by the ACRS Committee. When send you the final as soon as its complete.

Tekia

From: Brown, Christopher
Sent: Monday, September 08, 2014 9:05 AM
To: Govan, Tekia
Subject: RE: Fermi ACRS letter

Tekia,

I have attached the voted out version. I am currently editing (grammar only) and will be sending the official version through the concurrence process this week. Expect the signed version at the end of next week.

Chris

From: Govan, Tekia
Sent: Monday, September 08, 2014 8:52 AM
To: Brown, Christopher
Subject: Fermi ACRS letter

Good morning Christopher:

Could you let me know the status of the Fermi ACRS letter and when we can expect a copy?

Thanks
Tekia

Hearing Identifier: Fermi_COL_Public
Email Number: 1501

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Subject: FW: Fermi ACRS letter
Sent Date: 9/8/2014 3:49:27 PM
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From: Govan, Tekia

Created By: Tekia.Govan@nrc.gov

Recipients:
"FermiCOL Resource" <FermiCOL.Resource@nrc.gov>
Tracking Status: None
"'Michael K Brandon' (brandonm@dteenergy.com)" <brandonm@dteenergy.com>
Tracking Status: None

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G:\ACRS LTRS\Draft Letter Fermi Rev7.docx
09/5/2014
MC/CLB
DRAFT FINAL

The Honorable Allison M. Macfarlane
Chairman
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: REPORT ON THE SAFETY ASPECTS OF THE DTE ELECTRIC COMPANY COMBINED LICENSE APPLICATION FOR FERMI UNIT 3

Dear Chairman Macfarlane:

During the 617th meeting of the Advisory Committee on Reactor Safeguards (ACRS), September 4-6, 2014, we reviewed the NRC staff's Advanced Safety Evaluation Report (ASER) for the DTE Electric Company (DTE) Combined License Application (COLA) for Fermi Unit 3. This application conforms to the design-centered review approach (DCRA).[1] DCRA, which is Commission policy, allows the staff to perform one technical review and reach a decision for a

1 The DCRA is described in Regulatory Issue Summary (RIS) 2006-06, "New Reactor Standardization Needed to Support the Design-Centered Licensing Review Approach," as endorsed by the Commission's Staff Requirements Memorandum in response to SECY-06-0187, "Semiannual Update of the Status of New Reactor Licensing Activities and Future Planning for New Reactors," dated November 16, 2006.

reference COLA addressing issues outside the scope of the design certification and to use this review and decision as a reference to support decisions on other subsequent COLAs. The reactor design selected for Fermi Unit 3 is the 1,520 MWe passive Economic Simplified Boiling Water Reactor (ESBWR). Fermi Unit 3 is the reference COLA for that design.

Our ESBWR Subcommittee held six meetings (May 26, 2011, October 21, 2011, November 30, 2011, August 16, 2012, July 7, 2014, and August 20, 2014), to review the COLA and the staff's ASER. During these meetings, we met with representatives of the NRC staff, DTE and its vendors, and the public. We also had the benefit of the documents referenced. This letter fulfills the requirement of 10 CFR 52.87 that the ACRS report on those portions of the application that concern safety.

CONCLUSION AND RECOMMENDATION

1. There is reasonable assurance that Fermi Unit 3 can be built and operated without undue risk to the health and safety of the public. The COLA for Fermi Unit 3 should be approved following its final revision.

2. There is reasonable assurance that the ESBWR design and the Fermi Unit 3 site satisfy the requirements resulting from the Fukushima Near-Term Task Force recommendations. However, this review has identified generic issues related to seismic reevaluations, mitigating strategies, and spent fuel pool instrumentation. Further action by the staff is needed to resolve these issues not only for Fermi 3 but also for currently operating plants and COL applicants.

BACKGROUND

On September 18, 2008, DTE submitted an application to the NRC for a COL to construct and operate Fermi Unit 3 in accordance with the requirements of 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants." In the application, DTE stated that the Fermi Unit 3 reactor will be an ESBWR located at the existing site. The Fermi application is based on Revision 10 of the ESBWR design control document (DCD).

DISCUSSION

The Fermi site is located in Monroe County Michigan, 30 miles southwest of Detroit. Fermi Unit 1 is decommissioned and is in a safe store status. Fermi Unit 2 is an operating boiling water reactor. Fermi Unit 3 is proposed to be located on the same site southwest of Fermi Unit 2.

DEPARTURES FROM THE ESBWR DCD

The Fermi Unit 3 COLA identified only one departure from the ESBWR design. The ESBWR DCD states that on-site storage space for a six-month volume of packaged waste is provided in the Radwaste Building design. The Fermi Unit 3 Radwaste Building is configured to accommodate a minimum of ten years volume of packaged Class B and C waste, while maintaining space for at least three months of packaged Class A waste. This departure involves a redesign of the Radwaste Building that affects the arrangement of systems and components within the building volume. The systems, structures, and components requiring modifications are associated with the Liquid Waste Management System and Solid Waste Management System. The applicant stated that the existing Radwaste Building Fire Protection and HVAC Systems have sufficient capacity to accommodate the extra volume of Class B and C wastes, and require no modification. The staff has approved this departure and we concur.

SITE CHARACTERISTICS

Site characteristics include potential hazards in proximity of the plant, meteorology, hydrology, geology, seismology, and geotechnical parameters. An applicant must show that the actual site characteristics are bounded by the site parameters for the certified design.

There are two categories of surface-water use: withdrawal [2] (non-consumptive) and consumption [3]. Groundwater is not used at Fermi. Lake Erie is the principal source of water for the operation of Fermi Unit 3. The most important Lake Erie parameter with respect to water use is the lake water level. Fermi Unit 3 has been designed to operate at full capacity assuming the lowest historical water level at the plant intake basin. In addition, the safety-related Ultimate Heat Sink does not require makeup for at least 72 hours and the onsite fire protection system contains sufficient supplemental water to maintain core and spent fuel pool cooling for at least 7 days.

The applicant followed current regulatory guidance to determine the Probable Maximum Flood, the Probable Maximum Precipitation, and flood design considerations for the site and showed that the maximum flood level for Fermi Unit 3 satisfies the enveloping site parameters in the DCD. The Fermi site is located outside the realm of significant impact due to flooding from local streams and rivers. The most severe

2 “Withdrawal” refers to water drawn from surface or groundwater sources that is eventually returned to the area from where it came.
3 “Consumption” refers to water that is withdrawn but not returned to the region.

potential flooding condition at the Fermi Unit 3 site involves a storm-related high surge from Lake Erie.

According to ANS/ANSI-2.8-1992, the probable maximum water surge and seiche is calculated based on a probable maximum wind storm (PMWS). This standard indicates that analysis parameters for the PMWS should be determined by a meteorological study. In lieu of a study, the following standard values may be used for the area of the Great Lakes in the vicinity of the site: 1) Set maximum over-water wind speed to ~ 160 km/hr (100 mph), 2) Set lowest pressure within the PMWS to ~950 mbar, 3) Apply a most critical, constant translational speed during the life of the PMWS, 4) Assume that wind speeds over water vary diurnally from 1.3 (day) to 1.6 (night) times the overland speed and 5) Assume that winds blow 10 degrees across the isobars over the water body.

In order to determine the maximum postulated flood level at the site, the predicted storm surge is combined with the Lake Erie 100-year high water level. Storm simulation and coastal engineering models were used to calculate the run-up that occurs when waves encounter a shoreline or embankment. The analysis shows that the maximum flood level for Fermi Unit 3 satisfies the enveloping site parameter in the DCD. Historically, southwest-to-northeast winds have created seiches with large waves on Lake Erie, sometimes causing flooding on eastern shores. The staff examined the historical events and determined that such large waves do not affect southwestern areas of the coast. The staff reviewed the flooding analysis submitted by DTE and found it to be acceptable.

Fermi Unit 3 is connected to the offsite power grid by three 345kV transmission lines. Fermi Unit 2 is connected to the grid by two 345kV transmission lines and three 120kV transmission lines. All of these transmission lines are routed through a common corridor for approximately four miles before the lines diverge and are routed to separate offsite power substations. The Unit 2 transmission lines also pass through the Unit 3 switchyard, but do not have any connections in that switchyard. The transmission line allocations to specific towers and the spacing of the 345kV towers and 120kV towers in the common corridor ensure that at least one 345kV supply will remain available to each unit following structural damage to any tower line. This configuration satisfies current regulations for physical and electrical separation of redundant offsite power connections for each unit.

The offsite power transmission lines are vulnerable to damage by high winds or other storm-related conditions that may affect the common corridor. Damage to the offsite power supplies for Unit 3 is mitigated by the ESBWR design features that include two non-safety-related standby diesel generators and two non-safety-related ancillary diesel generators. The availability and reliability of these diesel generators are managed by Regulatory Treatment of Non-Safety Systems (RTNSS) controls. Furthermore, the ESBWR design can maintain passive core cooling, containment functions, and spent fuel cooling for at least 72 hours without any AC power. Considering these design features, we conclude that there is reasonable assurance that plant safety can be maintained with this offsite power transmission line configuration.

FUKUSHIMA REQUIREMENTS

Seismic Reevaluation

In 2011, the NRC Near-Term Task Force (NTTF) issued a series of recommendations for improving nuclear power plant safety in the U.S. following the Fukushima earthquake and tsunami. Recommendation 2.1 stated that plants should reevaluate the seismic hazards at their sites against current NRC requirements and guidance. The NRC issued a letter dated March 12, 2012, requesting that all operating nuclear power plants in the U.S. re-evaluate seismic hazards using the most recent information and methodologies available. The letter stated that nuclear power plant sites in the Central and Eastern U.S. (CEUS) should use the seismic source model in NUREG–2115, “Central and Eastern United States Seismic Source Characterization for Nuclear Facilities,” to characterize their seismic hazards. Following the issuance of this letter to the operating nuclear power plants, the staff also requested all COL and Early Site Permit (ESP) applicants to address this issue.

To address NTTF Recommendation 2.1, the staff requested additional information from DTE pertaining to the seismic hazard evaluation. The NRC staff asked DTE to reassess the calculated seismic hazard for the Fermi Unit 3 site using the NUREG-2115 seismic source model and to modify its ground motion response spectra (GMRS) and foundation input response spectra (FIRS) as needed.

To supplement the seismic sources that are evaluated in NUREG-2115, DTE compiled records of additional earthquakes that occurred within 320 km of the Fermi site between 2009 and 2012. In accordance with the methods in NUREG-2115, they then screened out earthquakes with moment magnitudes below 2.9. The compilation and screening assessments considered all possible causes for the earthquakes (e.g., natural ground motion, injection wells, hydraulic fracking). All earthquakes with moment magnitudes of 2.9 or above were included in the updated seismic catalog. DTE appropriately accounted for additional earthquake experience during this interval.

In February 2013, the applicant submitted Revision 5 of the Fermi Unit 3 FSAR that describes the updated seismic hazard analyses. The staff concluded that the applicant has adequately addressed the required information and has evaluated the seismic hazards at the Fermi Unit 3 site against the current state-of-knowledge and the NRC requirements.

We agree that the ESBWR seismic design requirements provide adequate margins above the Fermi Unit 3 site specific hazard. However, we have observed anomalies in the calculated variations of uncertainty with ground motion frequency at Fermi and other sites. We will work with the staff to better understand the analysis methods and computations, since they can affect the seismic hazard assessments for currently operating plants and other COL applicants.

Despite the ongoing discussions with the staff about the variation of uncertainty with ground motion frequency, the ESBWR seismic design requirements provide adequate margins above the Fermi Unit 3 site-specific seismic hazard. Therefore, we have reasonable assurance of the Fermi Unit 3 safety against design basis seismic events.

Seismic Design and Category 1 Structures

Safety-related systems, structures, and components (SSCs) are designed to withstand safe-shutdown earthquake (SSE) loads and other dynamic loads, including wind loads, missiles and those due to reactor building vibration caused by suppression pool dynamics. The ESBWR standard plant design parameters envelope the RG 1.60 Revision 1 ground spectra anchored to 0.3 g and a high-frequency hard rock spectra anchored to 0.5g peak ground acceleration (PGA). Based on the updated seismic hazard and Fermi Unit 3 site-specific soil-structure interaction analyses, the applicant developed site-specific seismic inputs consisting of performance- based surface response spectra, foundation input response spectra, site-specific ground motion time histories, and subsurface material profiles with corresponding dynamic properties used in the site-specific soil structure interaction analyses.

The site-specific foundation input response spectra are enveloped by the ESBWR certified seismic design response spectra in both horizontal and vertical directions. The applicant also performed analyses to address the following two Fermi Unit 3 site-specific conditions: (1) to confirm that the ESBWR standard plant design is applicable to the Fermi Unit 3 site-specific conditions, where some structures are partially embedded in the rock base, with an engineered granular backfill surrounding the structures from the top of the rock to the grade level of the plant; (2) to confirm that the standard plant design is applicable even though the DCD requirements for the engineered granular backfill that surrounds the seismic Category I structures are not being met in all cases.

The site-specific structural models for the reactor and fuel buildings used accepted analytical practices; e.g., plate finite elements arranged in a uniform mesh that was used to represent the exterior walls below grade and basemats. The staff reviewed the seismic design and accepted the adequacy of the structural response to the revised seismic source term. All nuclear safety issues relating to the seismic design and the seismic Category I structural response have been resolved.

One topic of discussion was the approach that the applicant used to justify the low probability of potential dissolution voids (karst) in the bedrock at the Fermi Unit 3 site. The applicant first noted that karst formation is less likely in areas that have been formerly covered by ice sheets and are now covered by glacial deposits, because glaciers typically eroded away carbonate material or filled in existing karst features. Second, the applicant noted the absence of large voids or cavities due to dissolution in the subsurface investigations at the Fermi 3 site. Finally, the applicant noted the absence of any large voids and cavities in bedrock exposures at the nearby Denniston Quarry. The staff determined that the applicant has adequately justified the conclusion that the evidence supports a low probability of karst formation at the site. To further substantiate that there are no subsurface faults or deformation features that could cause a hazard, the staff developed a generic license condition that has been applied to all new plant COLA's requiring the applicant to map and evaluate the bedrock surface exposed during site excavation. For Fermi Unit 3 this would involve all safety-related structures including the nuclear island excavations and should identify solutioned bedrock. The relief of the mapped bedrock surfaces will provide important evidence on the presence of hidden voids in these rocks. Any identification of potential solutioned bedrock will necessarily lead to further study by both direct sampling as well as remote sensing.

DTE performed an assessment of the tornado and hurricane wind speeds that may occur at the Fermi site. That assessment demonstrated that site-specific wind speeds are bounded by the wind loads that are applied for the ESBWR design. According to ESBWR DCD Table 2.0-1, hurricane-generated missiles must be evaluated for Seismic Category NS and Seismic Category II structures that house Regulatory Treatment of Non-Safety Systems (RTNSS) equipment.

The DTE analyses confirmed that the impacts from site-specific hurricane missiles are bounded by the ESBWR design parameters.

ESBWR DCD Table 2.0-1 also specifically notes that tornado missiles do not apply to Seismic Category NS and Seismic Category II buildings. Therefore, tornado-generated missiles that may impact structures that contain RTNSS equipment are not evaluated for the ESBWR design, and they are not evaluated as part of the site-specific analyses. ESBWR DCD Table 19A-4 notes that the Ancillary Diesel Generator Building and the Turbine Building structures are designed for tornado wind loads. The Electrical Building, Service Water Building, and Plant Service Water Structures are designed for hurricane wind loads. However, for wind-driven missiles, all of these buildings are designed only to withstand the design-basis hurricane missiles.

Because the ESBWR design can maintain passive core cooling, containment functions, and spent fuel cooling for at least 72 hours without any AC power, operation of RTNSS equipment is not required until approximately 72 hours after the plant is shut down. However, because of this inconsistency in the wind-driven missile analyses, it is unclear that structures which house RTNSS equipment that is credited for mitigation of beyond-design-basis external events will survive site-specific tornado-generated missiles. We note that the FLEX regional response centers are intended to provide support for defense in depth mitigating strategies if onsite RTNSS equipment is not available after 72 hours.

<u>Mitigation Strategies for Beyond Design Basis External Events</u>

To address NTTF Recommendation 4.2 regarding mitigation strategies for beyond-design-basis external events, NRC Order EA-12-049 outlines a three-phase approach. The initial phase requires the use of installed equipment and resources to maintain or restore core cooling, containment, and spent fuel pool cooling without AC power. The transition phase requires providing sufficient, portable, onsite equipment and consumables to maintain or restore these functions until they can be accomplished with resources brought from offsite. The final phase requires obtaining sufficient offsite resources to sustain those functions indefinitely. The staff endorsed the methodologies described in the industry guidance document Nuclear Energy Institute (NEI) 12–06, Revision 0, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," to provide an acceptable approach for satisfying the applicable requirements.

Fermi Unit 3 references the ESBWR passive design features that provide core cooling, containment, and spent fuel pool cooling for 3 days without relying on AC power. The ESBWR design also includes available onsite equipment to maintain required safety functions in the longer term (from 3 to 7 days), which is controlled by Regulatory Treatment of Non-Safety Systems (RTNSS) requirements. In order to ensure that there is an integrated approach for the mitigation strategies, the staff proposed the following license condition:

> At least one (1) year before the latest date set forth in the schedule for completing the inspections, tests, and analyses in the ITAAC submitted in accordance with 10 CFR § 52.99(a), DTE Electric Company shall use the guidance contained in JLD-ISG-2012-01, "Compliance with Order EA-

12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," Revision 0 and the information presented in Fermi FSAR Section 01.05 to complete the development of strategies and guidance for maintaining and, if necessary, restoring core cooling, containment, and spent fuel pool cooling capabilities beginning 72 hours after loss of all normal and emergency ac power sources, including any alternate ac source under 10 CFR 50.63. These strategies must be capable of:

- Mitigating a simultaneous loss of all ac power sources, both from the onsite and offsite power systems, and loss of normal access to the normal heat sink,
- Maintaining core cooling, containment, and spent fuel pool cooling capabilities for Fermi Unit 3 during and after such an event affecting both Fermi Units 2 and 3, and
- Being implemented in all plant modes.

Before initial fuel load, DTE Electric Company shall fully implement the strategies and guidance required in this license condition, including procedures, training, and acquisition, staging or installing of equipment and consumables relied upon in the strategies.

The staff concluded that the proposed license condition for Fermi Unit 3, as set forth in the schedule for completing the inspections, tests, and analyses in the ITAAC submitted in accordance with 10 CFR 52.99(a), was acceptable and meets applicable guidance in JLD-ISG-2012-01 Revision 0 and NEI 12–06, Revision 0.

We concur with this approach. However, we note that the staff is silent about how RTNSS equipment survivability and operability can be assured in the transition phase following an external event that involves beyond-design-basis conditions. This lack of guidance is a generic issue that needs to be clarified not only for this applicant but also for all currently operating plants and future COL applicants.

Reliable Spent Fuel Pool Instrumentation

The staff evaluated Fermi Unit 3 proposed spent fuel pool (SFP) level instrumentation with respect to NRC Order EA-12-051. The SFP level instrumentation meets the requirements of NRC Order EA-12-051.

DTE will develop operating procedures, testing, and calibration requirements for the installed instrument channels. A proposed License Condition ensures that personnel will be trained on how to establish alternate power connections to the level instruments.

Order EA-12-051 also requires that the primary and backup SFP water level instrument channels be reliable at temperature, humidity, and radiation levels consistent with the SFP water at beyond design basis accident conditions for an extended period of time. However, while it is clear that saturation temperature and humidity conditions would exist for the SFP, we note that the staff is silent about the actual radiation levels that are required for equipment qualification in beyond-design-basis conditions. This lack of guidance is another generic issue that needs to be clarified not only for this applicant but also for operating plants and future COL applicants.

Emergency Preparedness

The Fukushima accident highlighted the need to better determine the levels of plant and offsite staffing needed to respond to a multi-unit event. Additionally, there is a need to ensure that the communication equipment that is relied on has adequate power to coordinate the response to an event during an extended loss of AC power. The applicant proposed and the staff accepted a license condition related to communications and staffing for emergency planning actions.

> “Communications:
>
> At least two (2) years prior to scheduled initial fuel load, the licensee shall have performed an assessment of on-site and off-site communications systems and equipment required during an emergency event to ensure communications capabilities can be maintained during prolonged station blackout conditions. The communications capability assessment will be performed in accordance with NEI 12–01, “Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities”, Revision 0.
>
> At least one hundred eighty (180) days prior to scheduled initial fuel load, DTE shall complete implementation of corrective actions identified in the communications capability assessment described above, including any related emergency plan and

implementing procedure changes and associated training.

Staffing:

At least two (2) years prior to scheduled initial fuel load, the licensee shall have performed assessments of the on-site and augmented staffing capability to satisfy the regulatory requirements for response to a multi-unit event. The staffing assessments will be performed in accordance with NEI 12–01, “Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities”, Rev 0.

At least two (2) years prior to scheduled initial fuel load, the licensee shall revise the Fermi 3 Emergency Plan to include the following:

Incorporation of corrective actions identified in the staffing assessments described above.

Identification of how the augmented staff will be notified given degraded communications capabilities. “

The proposed License Condition ensures that communications and staffing will be adequate for emergency planning operations. We concur with this approach.

SUMMARY

There is reasonable assurance that Fermi Unit 3 can be built and operated without undue risk to the health and safety of the public. The Fermi Unit 3 COLA should be approved following its final revision.

Sincerely,

John W. Stetkar, Chairman

REFERENCES

Detroit Edison Fermi Unit 3 COLA (Final Safety Analysis Report), Rev. 6 (ML14055A128)

Chapter	Chapter Title	Transmittal Memo (Accessions Numbers)	ASER (Accession Numbers)
1	Introduction and Interfaces	ML14141A115	ML14080A144
2	Site Characteristics	ML12170A540	ML121020116
	Section 2.5 (Geology, Seismology, and Geotechnical Engineering)	ML14134A128	ML14101A417
3	Design of Structures, Components, Equipment and Systems	ML12160A508	ML121020121
	Sections 3.7 and 3.8, Seismic Design and seismic Category 1 Structures	ML14167A206	ML14162A375
	Section 3.9, Mechanical Systems and Components	ML14149A269	ML14140A161
4	Reactor	ML111090943	ML111090945
5	Reactor Coolant system and Connected Systems	ML112351087	ML112351095
6	Engineered safety Features	ML112280314	ML112280318
7	Instrumentation and Control Systems	ML111100094	ML111100100
8	Electric Power	ML111110427	ML110960626
	Section 8.2, Offsite Power System	ML14051A444	ML14051A415
9	Auxiliary Systems	ML112990155	ML113000122
10	Steam and Power Conversion System	ML121090162	ML121909187
11	Radioactive Waste Management	ML112971484	ML113000081
12	Radiation Protection	ML112971501	ML113000087
13	Conduct of Operations	ML112580477	ML112971304
	Section 13.3, Emergency Planning	ML14049A162	ML14036A294
14	Initial Test Program	ML121730494	ML12151A291
15	Safety Analyses	ML111120179	ML111120193
16	Technical Specifications	ML112231346	ML11203843
17	Quality Assurance	ML112560380	ML112630120
18	Human Factors Engineering	ML111101035	ML111101066
19	Probabilistic Risk Assessment and Severe Accidents and Loss of Large Areas of the Plant due to Explosions or Fires	ML112580541	ML112580548

While it was clear that the applicant has included all the known seismic activity in the region around the Fermi site, whether natural or induced with moment magnitudes greater than 2.9, certain specific information could be clarified:

- For completeness, the FSAR and the SER could reference the updated seismicity catalogs, including the period from 2009 to 2012, that include induced earthquakes in northeast Ohio originating from disposal of fluids by injection into the subsurface. This is in contrast to the earthquake catalog used by the USGS in preparing the 2014 National Seismic Hazard Maps and they are not tectonic earthquakes that provide clues to the occurrence of future earthquakes.
- The updated seismicity catalog prepared by the NRC staff shows seven earthquakes within a 320-km radius of the Fermi Unit 3 site that exceed a magnitude of 3 and have occurred between 2009 and 2012. In contrast the applicant has only identified two earthquakes that have occurred over this same period in the Fermi Unit 3 region. The

difference is caused by applicant identifying events of moment magnitude greater than 2.9, while the NRC staff's identified events are based on magnitudes greater than 3, not moment magnitudes. The NRC staff for purposes of clarity should identify their updated events as magnitude 3 and not moment magnitude. Pre-2009 earthquake catalog data derived from the CEUS-SSC study is based on moment magnitudes and the staff has used this catalog for the pre-2009 period.

Order EA-12-051 requires that the primary and backup SFP water level instrument channels be reliable at temperature, humidity, and radiation levels consistent with the SFP water at saturation conditions for an extended period. The licensee identified that the radiation levels for qualification of the Fermi SFP would be based on a water level at one foot above the top of the fuel assemblies. This is not consistent with a beyond design basis external event where radiation levels at the location of SFP level sensors and the processing electronics could be considerably higher based on the contribution of radiation levels from BDBEE reactor core damage of a nature similar to the damage that occurred at Fukushima. Thus we recommend that the qualification radiation levels be determined based on an analysis that determines estimated radiation levels based on the scenario noted above.