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10 CFR 50.90

October 22, 2010 NRC-10-0070

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

- Detroit Edison's Letter to NRC, "Proposed License Amendment to Revise the Core Spray Flow Requirement of Technical Specification Surveillance Tests SR 3.5.1.8 and SR 3.5.2.6," NRC-10-0003, dated January 4, 2010
- NRC Letter to Detroit Edison, "Request for Additional Information for License Amendment Request to Revise the Core Spray Flow Requirements (TAC NO. ME3011)," dated September 14, 2010
- Subject:Response to Request for Additional Information for LicenseAmendment Request to Revise the Core Spray Flow Requirement

In Reference 2, Detroit Edison proposed a license amendment to the Fermi 2 Operating License to revise the flow rate in Technical Specification Surveillance Requirements SR 3.5.1.8 and SR 3.5.2.6 from 6350 to 5725 gallons per minute consistent with the flow assumed in the Emergency Core Cooling System (ECCS) safety analyses. In Reference 3, the NRC requested additional information. The Enclosure to this letter provides the additional information requested in Reference 3.

There are no new commitments included in this document.

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Should you have any questions or require additional information, please contact Mr. Rodney W. Johnson of my staff at (734) 586-5076.

Sincerely,

Jesgeh H. Plone

Enclosure: Response to Request for Additional Information

cc: NRC Project Manager NRC Resident Office Reactor Projects Chief, Branch 4, Region III Regional Administrator, Region III Supervisor, Electric Operators, Michigan Public Service Commission USNRC NRC-10-0070 Page 3

I, Joseph H. Plona, 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.

f.H. Plunc Joseph H. Plona

Site Vice President, Nuclear Generation

On this 23^{Nd} day of 0 day of, 2010 before me personally appeared Joseph H. Plona, being first duly sworn and says that he executed the foregoing as his free act and deed.

Notary Public

STACY OAKES NOTARY PUBLIC, STATE OF MI COUNTY OF MONROE MY COMMESSION EXPIRES JUL 28, 2012 ACTING IN COUNTY OF MODICE Enclosure to NRC-10-0070

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

Response to Request for Additional Information

Detroit Edison's Response to NRC Request for Additional Information (RAI):

NRC RAI-1

The Core Spray (CS) pump surveillance requirement is being reduced from 6350 gpm to the ECCS analysis assumption of 5725 gpm per division (2 pumps) corresponding to a reactor pressure of 100 psig. Please confirm that this surveillance flow requirement accounts for the maximum error on RCS pressure and flow. That is, please show that the maximum error on pressure and flow was assumed in developing the head flow curve for the CS pumps assumed in the ECCS analyses. Please identify the error on pressure and flow and show the head vs. flow curve for the CS pumps assumed in the ECCS analyses.

Response:

As provided in the Loss of Coolant Accident (LOCA) analysis in References 4 and 5, the following Core Spray (CS) system operating points are used in the Emergency Core Cooling System (ECCS) analysis:

280 0 100 5625	Reactor Dome Pressure (psig)	CS Injection Flow (gpm)	
100 5625	280	0	
100 3023	100	5625	
0 7013	0	7013	

The developed pump head corresponding to these system operating points defines the minimum two-pump combined CS pump performance. The curve of total developed head vs. the minimum pump flows is labeled as the Safety Analysis Curve on the enclosed graph. This curve includes an additional 100 gpm for assumed core bypass flow.

A maximum EDG under-frequency correction of 2 percent is assumed corresponding to the current Technical Specification Surveillance Requirement (SR) 3.8.1.2. Correction for test instrument pressure and flow accuracy are also applied. Currently, the design that supports implementation of this change request specifies a pressure error of 1.5 psig (or 3.5 feet) corresponding to the specified test instrument accuracy of 0.5 percent (of reading). A flow error of 150 gallon per minute (gpm) has been developed as the combination of both the flow dependent instrument loop and primary element errors. These tolerances are added above the Safety Analysis Curve to establish the Technical Specification SR Curve that is used to develop the surveillance test acceptance criteria. Note that if different instrumentation with different accuracies are used to perform the test, the Technical Specification SR acceptance criteria will be adjusted accordingly. The attached plot depicts the relationship between the Safety Analysis minimum required performance and the minimum test performance to meet the Technical Specification SR. The error adjusted curve defines the minimum pump performance for testing, and is referred to as the Technical Specification SR Curve.

In practice, the Technical Specification SR test acceptance criteria are expressed as a minimum required pump discharge pressure corresponding to the tested flow. This minimum discharge pressure is determined using the developed head from the Technical Specification SR Curve and analytical system hydraulic losses at the tested flow.

Enclosure to NRC-10-0070



NRC RAI-2

Please explain why smaller Appendix K breaks in the range 0.1 to 0.05 ft^2 do not cause higher peak cladding temperatures since the smaller breaks would delay low pressure core spray and produce a longer period of core uncover and heat-up that could potentially produce more limiting break. Were breaks in the range 0.2 to 0.05 ft^2 evaluated? Please explain.

Response:

The base SAFER/GESTR-LOCA analysis for Fermi 2 (Reference 6) evaluated small breaks in a range that encompassed sizes from 0.05 square foot (ft^2) to 0.20 ft². As a result of later changes (References 4 and 5) the current Fermi 2 limiting LOCA has been established as a small break accident with the assumed single failure of the Division I Battery resulting in a loss or operation of all Automatic Depressurization System (ADS) valves, but the High Pressure Coolant Injection (HPCI) system remains functional. A functional HPCI system is able to inject regardless of the increased delay in Core Spray/Low Pressure Coolant Injection (LPCI) injection due to the delay in reactor depressurization as an effect of smaller break sizes (e.g., 0.05 ft² to 0.20 ft²). At these smaller break sizes, HPCI, which injects into the feedwater line, is very effective by providing inventory makeup and depressurizing the vessel (along with the break), so that the low-pressure ECCS can assist. As HPCI injects into the feedwater line, flow enters the downcomer and goes out the recirculation suction line break, with the break flow increasing for larger sizes. As a result, the Peak Cladding Temperature (PCT) is primarily driven by the break size until it reaches a point where vessel depressurization is more readily achieved. Therefore, smaller breaks within the range of 0.05 ft^2 to 0.20 ft^2 as well as larger break sizes were evaluated and sufficiently dispositioned. The determination of the critical break size is as provided in References 4 and 5.

NRC RAI-3

Please identify the limiting axial power shape for the limiting Appendix K small-break loss-of coolant accident (SBLOCA) and verify that top peaked axial power profiles were evaluated for the limiting SBLOCA.

Response:

The limiting axial power shape for the limiting 10 CFR 50 Appendix K SBLOCA is a top peaked axial power shape. It is confirmed that axial power profiles were evaluated and the most recent analysis of record (References 4 and 5) provided evaluations of the limiting SBLOCA using the Division 1 Battery failure and a top peaked axial power shape.

NRC RAI-4

Please confirm that the limiting SBLOCA hot rod heat-up analysis showed cooling from bottom up re-flood and that top down ECCS core spray injection did not terminate the clad heat-up for the hot rod.

Response:

In the Fermi 2 10 CFR 50 Appendix K safety analyses, the increase in hot channel PCT is terminated as a result of bottom up reflood, not top down ECCS Core Spray injection. The Fermi 2 ECCS-LOCA evaluation is based on the SAFER/GESTR-LOCA model as reviewed and approved for use in References 4 and 5.

NRC RAI-5

The licensee states in section 4 of the amendment request that the analysis to demonstrate the adequacy of 5725 gpm took into account instrument uncertainty and emergency diesel generator (EDG) under-frequency. This implies that the potential operation of the EDG at the lowest allowable frequency will result in adequate flow to satisfy Appendix K safety analyses. The paragraph titled "EDG Connected Loads" indicates that the current EDG loading evaluation is bounding for the proposed change. The loading impact on the EDG operating at lower frequency has not been discussed. The EDG allowable frequency range per TS SR 3.8.1.2 is 2.0 percent of 60 Hertz. The allowable voltage range is \geq 3873V and \leq 4580V. Describe the consequences on EDG loading if the EDG operates at the extremes of the voltage and frequency range during emergency operation.

Response:

The EDG Load Calculation maintained at Fermi 2 verifies that sufficient EDG capacity is available by accounting for all predicted loads on the EDGs for loss of off-site power and LOCA. The calculation also demonstrates that adequate voltage is available to the EDG loads when the EDG output voltage is at the Technical Specification minimum voltage for EDG operability.

Regarding EDG sufficient capacity, the calculation demonstrates that the EDGs have sufficient capacity for the postulated loads during the Design Basis Accident for EDG auto sequencing loads (0-10 minutes). An additional load allowance is included to account for a possible 2 percent higher frequency variation. Lower frequency conditions will result in a reduction of EDG loading; therefore, they are not specifically considered in the analysis.

To demonstrate adequate voltage, the calculation performs analysis to show that adequate voltage is available to the EDG loads when the EDG output voltage is at the Technical Specification minimum voltage for auto sequencing (0-10 minutes). An additional load allowance is included to account for a possible 2 percent frequency variation. The design

calculation indicates that all motors have sufficient voltage available to start and run and are within the short time rating of the EDGs.

In Reference 7, Detroit Edison proposed to revise the minimum EDG output voltage acceptance criterion in the Fermi 2 Technical Specification from 3873 to 3950 volts. EDG load calculation revision to reflect this change has been completed and supports the conclusions provided herein. The revised calculation will be implemented upon NRC approval of the license amendment request in Reference 7.

References:

- Fermi 2 NRC Docket No. 50-341 NRC License No. NPF-43
- 2. Detroit Edison's Letter to NRC, "Proposed License Amendment to Revise the Core Spray Flow Requirement of Technical Specification Surveillance Tests SR 3.5.1.8 and SR 3.5.2.6," NRC-10-0003, dated January 4, 2010
- 3. NRC Letter to Detroit Edison, "Request for Additional Information for License Amendment Request to Revise the Core Spray Flow Requirements (TAC NO. ME3011)," dated September 14, 2010
- GE-NE-0000-0047-1716-R1, "Fermi 2 SAFER/GESTR Loss-of-Coolant Accident Analysis for GE11 Fuel," dated June 2008, submitted under Detroit Edison letter NRC-08-0046, "Submittal of Plant Specific Emergency Core Cooling System (ECCS) Evaluation Model Reanalysis," dated June 23, 2008. (ML081830408).
- GE-NE-0000-0030-6565-R1, "Fermi 2 SAFER/GESTR- Loss-of-Coolant Accident Analysis for GE14 Fuel," dated June 2008, submitted under Detroit Edison letter NRC-08-0046, "Submittal of Plant Specific Emergency Core Cooling System (ECCS) Evaluation Model Reanalysis," dated June 23, 2008. (ML081830408).
- NEDC-31982P, "Fermi 2 SAFER/GESTR-LOCA Loss of Coolant Accident Analysis," dated July 1991, submitted to the NRC by Detroit Edison as Attachment 5 to Letter NRC-91-0102, "Proposed License Amendment - Uprated Power Operation," dated September 24, 1991.
- Detroit Edison Letter to NRC, "Response to Request for Additional Information Regarding the Proposed License Amendment to Revise the Degraded Voltage Function Requirements of Technical Specification Table 3.3.8.1-1 to Reflect Undervoltage Backfit Modification," NRC-10-0006, dated July 23, 2010.