Keith J. Polson
Senior Vice President and CNO

DTE Energy Company
6400 N. Dixie Highway, Newport, MI 48166
Tel: 734.586.6515 Fax: 734.586.4172
Email: keith.polson@dteenergy.com

DTE Energy

February 27, 2018
NRC-18-0015

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

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

Subject: Response to Request for Additional Information (Set 1) Regarding License Amendment Request to Revise Technical Specifications to Eliminate Main Steam Line Radiation Monitor Reactor Trip and Primary Containment Isolation System Group 1 Isolation Functions

References:
1) DTE Electric Letter to NRC, "License Amendment Request to Revise Technical Specifications to Eliminate Main Steam Line Radiation Monitor Reactor Trip and Primary Containment Isolation System Group 1 Isolation Functions," NRC-17-0012, dated August 24, 2017 (ML17237A176)
2) NRC Letter to DTE, "Fermi 2 - Supplemental Information Needed for Acceptance of Requested Licensing Action RE: License Amendment Request to Revise Technical Specifications to Eliminate Main Steam Line Radiation Monitor Reactor Trip and Primary Containment Isolation System Group 1 Isolation Functions (CAC No. MG0228; EPID L-2017-LLA-0274)," dated October 10, 2017 (ML17271A220)
3) DTE Electric Letter to NRC, "Supplemental Information Regarding License Amendment Request to Eliminate Main Steam Line Radiation Monitor Reactor Trip and Primary Containment Isolation System Group 1 Isolation Functions," NRC-17-0066, dated October 18, 2017 (ML17298A185)

In Reference 1, DTE Electric Company (DTE) submitted a license amendment request (LAR) to revise the Fermi 2 Technical Specifications (TS) to eliminate the main steam line radiation monitor (MSLRM) reactor trip and primary containment isolation system (PCIS) Group 1 isolation functions. Supplemental information was

A001
NRR

requested by the NRC in Reference 2 and DTE subsequently submitted a supplement to the LAR in Reference 3. In an email from Ms. Sujata Goetz to Mr. Jason Haas dated January 29, 2018, the NRC sent DTE a request for additional information (RAI) regarding this LAR. The response to the RAI is enclosed. Some of the information requested by the NRC is provided in an electronic format requested by the NRC on the enclosed compact disc (CD).

No new commitments are being made in this submittal.

Should you have any questions or require additional information, please contact Mr. Scott A. Maglio, Manager – Nuclear Licensing, at (734) 586-5076.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on February 27, 2018

Keith J. Polson
Senior Vice President and CNO

Enclosed CD:

1) Fermi 2 MSLRM License Amendment Request Electronic Data

Additional Enclosures:

1) Response to Request for Additional Information

cc: NRC Project Manager
NRC Resident Office
Reactor Projects Chief, Branch 5, Region III
Regional Administrator, Region III
Michigan Public Service Commission
Regulated Energy Division (kindschl@michigan.gov)

Enclosure 1 to
NRC-18-0015

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

Response to Request for Additional Information

Response to Request for Additional Information

In the letter dated August 24, 2017, the licensee stated on page 13:

> *As previously indicated, the updated analysis considers potential forced release via the SJAEs [steam jet air ejectors], MVPs [mechanical vacuum pumps], and the GSEs [gland seal exhausters]. The results of the analysis of these release paths demonstrate that, in addition to the existing credited trip of the MVPs, a new automatic trip of the GSEs is also required to ensure the calculated radiological consequences comply with 10 CFR 50.67 limits for onsite personnel and offsite public exposures.*

Please provide information requested below so the NRC staff can perform an independent confirmation of the calculations provided for Fermi 2.

ARCB RAI-1

For each forced pathway (SJAEs, MVPs, and GSEs), provide a detailed description of the analysis performed with enough detail to allow the NRC staff to perform confirmation calculations. Include all relevant information such as the timing of the MVP and GSE trips, assumed flow rates, and volumes assumed in the analysis. Alternatively, the RADTRAD files for all three forced pathways may be provided for the NRC staff's review.

RESPONSE

This RAI requests information related to the steam-jet air ejector (SJAE), mechanical vacuum pump (MVP), and gland seal exhauster (GSE) forced release pathways. Discussion of the SJAE release pathway is provided in the response to RAI-2. Discussion of the MVP and GSE release pathways are provided below.

Although RADTRAD calculations were performed for the MVP and GSE release paths as described in the license amendment request (LAR), these calculations were only used to determine that automatic trips of the MVPs and GSEs were needed. The proposed MVP and GSE trips were then credited to eliminate these potential release paths. Therefore, the dose results in Table 3 of the LAR do not provide doses associated with the MVP and GSE release paths. The credit for the MVP and GSE trips to eliminate the potential release paths was determined to be consistent with existing Fermi 2 licensing basis, precedent for the control rod drop accident (CRDA), and reasonable based on the expected trip time.

For the MVPs, the current NRC-approved CRDA analysis for Fermi 2 credits the automatic trip of the MVPs such that the MVPs are not specifically analyzed as a release pathway. As described in the LAR in Enclosure 1, page 13, the current design of the MVPs includes an automatic trip on detection of high radiation by radiation monitors located downstream of the MVPs in the offgas 2-minute delay pipe. The design change proposed in the LAR results in the automatic trip of the MVPs using the main steam line radiation monitors (MSLRMs). The MSLRMs are located near the main steam lines (MSLs) just downstream of the outboard main

steam isolation valves (MSIVs). This location, which is upstream of the MVPs, results in earlier detection and therefore earlier trip of the MVPs. In consideration of these proposed design changes, the modified MVP trip will occur earlier and therefore the assumption of no releases through the MVP pathway in the LAR is conservative with respect to the previously accepted approach for Fermi 2. In addition, the assumption of no release through the MVP pathway is also consistent with the approach in NEDO-31400A which states that it assumed that the main condenser's mechanical vacuum pump is isolated.

For the GSEs, the current NRC-approved CRDA analysis for Fermi 2 does not consider releases through the GSEs even though there is currently no automatic trip. The Edwin I. Hatch plant is the only plant identified that has an automatic trip as indicated in the LAR in Enclosure 1, page 26. A review of the NRC-approved CRDA analysis for the Hatch plant (ML081770075) did not identify calculation of releases through the GSEs. In consideration of the proposed GSE trip, the assumption of no releases through the GSE pathway in the LAR is conservative with respect to the previously accepted approach for Fermi 2 and consistent with the previously accepted approach for Hatch.

Additional justification for not calculating releases from the MVP and GSE pathways due to credit for the proposed trips is provided as follows. As described in the LAR in Enclosure 1, page 17, the activity released from the fuel is conservatively modeled in the analysis as being transported to the turbine/condenser in 1 second. This conservative 1 second transport time was used in the calculations that identified the need for the proposed MVP and GSE trips. However, this transport time is conservative with respect to the realistic expected transport time during a CRDA. UFSAR Section 12.1.3.4 indicates that a transit time of 7 seconds is conservative for transport from the reactor pressure vessel to the SJAEs during full power operation. Pages 7 and 8 of Enclosure 1 in the LAR describes consequences of a CRDA occurring at low powers (i.e. less than 10%) when steam flow is low such that a transit time of greater than 7 seconds is expected. The time for the MVP and GSE trips to occur based on the MSLRMs is expected to be less than 1 second, based on the typical timing associated with the current trip/isolations which utilize the MSLRMs (i.e. those that are being removed in the LAR) and the logic proposed for the new trips. Once the trip of the MVPs and GSEs has been initiated, the flowrates associated with these pathways will rapidly decrease and thus forced release through these pathways is eliminated. In addition, both the MVP and GSE discharge into the 2-minute delay pipe prior to being discharged to the environment through the reactor building exhaust stack. The purpose of the 2-minute delay pipe is to reduce the concentration of short-lived radionuclides in offgas. Therefore, since the expected trip time is less than the expected transit time and since release path flowrates will decrease rapidly once the trips are initiated, it is reasonable to assume that no forced releases will occur through the MVP and GSE pathways due to credit for the trips.

Since the LAR does not calculate doses associated with the MVP and GSE release pathways, no RADTRAD input values, such as flow rates and volumes, or RADTRAD files are provided for this response.

ARCB RAI-2

For the main condenser pathway and the SJAE pathway, provide a detailed description of the analysis performed with enough detail to allow the NRC staff to perform confirmation calculations. Include all relevant information such as number of control rods in the core, and the assumed flow rates, and volumes assumed in the analysis. Alternately, the RADTRAD files for these pathways may be provided for the NRC staff's review.

RESPONSE

This RAI requests information related to the SJAE and main condenser release pathways. In accordance with the guidance provided in the RAI, as an alternative to providing a detailed description of the analyses, DTE is providing the relevant RADTRAD files for these release pathways. The RADTRAD input and output files listed in Table A on the next page are provided on the enclosed CD. Additional supplemental information regarding fuel rods is provided below.

As described in the LAR in Enclosure 1, pages 16 and 20, the number of failed fuel rods is assumed to be 1200 rods for the bounding case of 10x10 GE14 fuel. In compliance with Section 3.1 of Regulatory Guide 1.183, the fission product inventory of each damaged fuel rod is determined by dividing the total core inventory by the number of effective fuel rods in the core (see LAR Enclosure 5, page 6). The Fermi 2 reactor contains 764 fuel assemblies and 185 control rods as described in the Updated Final Safety Analysis Report (UFSAR), Table 1.3-1, and in the Technical Specifications (TS), Section 4.2. The average number of fuel rods per assembly for 10x10 GE14 fuel is 85.84 as provided to the NRC by Global Nuclear Fuel (GNF) in MFN 14-001 (ML14007A441) in support of an amendment to GESTAR II. Thus the total number of effective rods in the core is 65581.76 rods. The GE14 compliance report associated with GESTAR II (NEDC-32868P, Revision 6) confirms that the assumption of 1200 failed rods during a control rod drop accident is bounding for 10x10 GE14 fuel.

Table A: Requested Electronic Files

File Name	Description
Fermi2_CRDA_AST.rft	Release fraction and timing file
FERMIAST-CRDA.nif	Nuclide inventory file used for main condenser release pathway
FERMIAST-CRDA_SJAE_Release.nif	Nuclide inventory file used for SJAE release pathway
fgr11&12_CRDA.inp	Dose conversion factor file
FERMI2-ASTCRDA_IsoCon_CR_NoCREF.psf	RADTRAD input file used for main condenser release pathway
FERMI2-ASTCRDA_IsoCon_CR_NoCREF.o0	RADTRAD output file used for determining the main condenser release pathway doses reported in LAR Table 3
FERMI2-ASTCRDA_SJAE_2.5%_CR_NoCREF_R1.psf	RADTRAD input file used for SJAE release pathway
FERMI2-ASTCRDA_SJAE_2.5%_CR_NoCREF_R1.o0	RADTRAD output file used for determining the SJAE release pathway doses reported in LAR Table 3

ARCB RAI-3

Discuss any correction factors applied in the analysis and explain why they are appropriate for Fermi 2.

RESPONSE

RADTRAD input and output files were provided in the response to RAI-2. For the main control room (MCR) operator doses, a correction factor was applied to the RADTRAD output prior to use in Table 3 of the LAR. The RADTRAD input files for the MCR operator dose utilize the ventilated volume of the MCR for the model volume, which is significantly larger than the shine volume as indicated in Table 1 of the LAR. This results in an over-estimation of the whole body dose due to air immersion in the MCR airspace. The MCR operator dose results reported in Table 3 of the LAR are therefore adjusted by applying a factor of approximately 0.60 to the whole body dose results obtained from the RADTRAD output files. This adjustment, and the derivation of the factor of approximately 0.60, is described below.

As described in Section 4.2.7 of Regulatory Guide 1.183 (July 2000) the deep dose equivalent (DDE) may be corrected for the difference between finite cloud geometry in the MCR and semi-infinite cloud assumption used in calculating the dose conversion factors. The correction uses the expression:

$$DDE_{finite} = \frac{DDE_{\infty} V^{0.338}}{1173}$$

where DDE_{finite} is the finite cloud dose, DDE_{∞} is the semi-infinite cloud dose, and V is the MCR volume in cubic feet. Since the semi-infinite cloud dose, DDE_{∞}, is independent of the MCR volume, the ratio of the finite cloud dose using the MCR shine volume (56,960 ft^3 from Table 1 of the LAR) rather than the MCR ventilated volume (252,731 ft^3 from Table 1 of the LAR) is:

$$\left(\frac{56960}{252731}\right)^{0.338} = 0.60$$

The whole body doses calculated by RADTRAD are then adjusted using this factor as follows:

$$WB_{LAR} = WB_{RADTRAD} \times 0.60$$

where $WB_{RADTRAD}$ is the MCR whole body dose in the RADTRAD output file and WB_{LAR} is the MCR whole body dose used for determining the MCR total effective dose equivalent (TEDE) doses provided in Table 3 of the LAR. The use of dose results based on the smaller MCR shine volume as described above is consistent with the Fermi 2 LOCA analysis using the alternate source term (AST) methodology, which was previously approved by the NRC in License Amendment 160 (ML042430179).

CD 1

Fermi 2 MSLRM License Amendment Request Electronic Data