



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

September 23, 2016

Mr. Paul Fessler  
Senior Vice President  
and Chief Nuclear Officer  
DTE Electric Company  
Fermi 2 – 210 NOC  
6400 North Dixie Highway  
Newport, MI 48166

SUBJECT: FERMI, UNIT NO. 2 – REVISED RELIEF REQUEST NO. PRR-007 FOR THE  
INSERVICE TESTING PROGRAM THIRD 10-YEAR INTERVAL (CAC NO.  
MF7573)

Dear Mr. Fessler:

By letter dated April 5, 2016 (Agencywide Documents and Access Management System (ADAMS) Accession No. ML16097A172), as supplemented by letter dated June 23, 2016 (ADAMS Accession No. ML16179A150), DTE Electric Company (DTE, the licensee) submitted a request to the U.S. Nuclear Regulatory Commission (NRC) for the use of an alternative to certain American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance of Nuclear Power Plants (OM Code) requirements associated with pump inservice testing (IST) program at Fermi 2.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(1), the licensee requested to use the proposed alternative on the basis that the alternative provides an acceptable level of quality and safety.

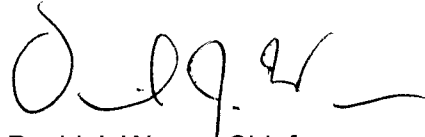
The NRC staff has reviewed the subject request and concludes, as set forth in the enclosed safety evaluation, that DTE has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(1) and provides an acceptable level of quality and safety. Therefore, the NRC staff authorizes the use of the alternative request PRR-007, Revision 1, for Fermi for the third 10-year IST program interval, which began on February 17, 2010, and is scheduled to end on February 16, 2020. All other ASME OM Code requirements for which relief was not specifically requested and approved remain applicable.

P. Fessler

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If you have any questions, please contact the NRC Project Manager, Sujata Goetz, at 301-415-8004, or via e-mail at [Sujata.Goetz@nrc.gov](mailto:Sujata.Goetz@nrc.gov).

Sincerely,

A handwritten signature in black ink, appearing to read 'D. J. Wrona', with a long horizontal flourish extending to the right.

David J. Wrona, Chief  
Plant Licensing Branch III-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-341

Enclosure:  
Safety Evaluation

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REGARDING REQUEST NO. PRR-007

FOR THE THIRD 10-YEAR INTERVAL INSERVICE TESTING PROGRAM

DTE ELECTRIC COMPANY

FERMI 2 POWER PLANT

DOCKET NO. 50-341

1.0 INTRODUCTION

By letter dated April 5, 2016 (Agencywide Documents and Access Management System (ADAMS) Accession No. ML16097A172), as supplemented by letter dated June 23, 2016 (ADAMS Accession Number ML16179A150), DTE Electric Company (DTE, the licensee) submitted a request to the U.S. Nuclear Regulatory Commission (NRC or Commission) for the use of an alternative to certain American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance of Nuclear Power Plants (OM Code) requirements associated with pump inservice testing (IST) program.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(1), the licensee requested to use the proposed alternative on the basis that the alternative provides an acceptable level of quality and safety.

2.0 REGULATORY EVALUATION

The regulation at 10 CFR 50.55a(f), "Inservice Testing Requirements," states, in part, that IST of certain ASME Code Class 1, 2, and 3 pumps and valves be performed in accordance with the specified ASME OM Code and applicable addenda incorporated by reference in the regulations.

10 CFR 50.55a(z)(1) states that alternatives to the requirements of paragraph (f) of 10 CFR 50.55a may be used when authorized by the NRC, if the licensee demonstrates the proposed alternatives would provide an acceptable level of quality and safety.

Based on the above, and subject to the following technical evaluation, the NRC staff finds that regulatory authority exists for the licensee to request and the Commission to authorize the alternative requested by the licensee.

Enclosure

### 3.0 TECHNICAL EVALUATION

#### 3.1 Licensee's Request for an Alternative, PRR-007, Revision 1

The applicable ASME Code requirements are as follows:

- ASME OM Code, 2004 Edition, ISTB-3400, "Frequency of Inservice Tests," refers to Table ISTB-3400-1, "Inservice Test Frequency," which specifies that a comprehensive test be performed biennially for Group A and Group B pumps.
- ASME OM Code, 2004 Edition, ISTB-5123, "Comprehensive Test Procedure," specifies the specific requirements for the comprehensive test for centrifugal pumps.
- ASME OM Code, 2004 Edition, ISTB-5223, "Comprehensive Test Procedure," specifies the specific requirements for the comprehensive test for vertical line shaft pumps.

ASME OM Code Cases, Code Case OMN-18, "Alternate Testing Requirements for Pumps Tested Quarterly within  $\pm 20\%$  of Design Flow," states, in part, that "...the Group A test may be performed quarterly within  $\pm 20\%$  of pump design flow rate, with instrumentation meeting the requirements of Table ISTB-3510-1 (Table ISTB-3500-1 in the 1998 Edition through the 2003 Addenda, Table ISTB 4.7.1-1 in the OMc-1994 Addenda through the OMb-1997 Addenda) for the Comprehensive and Preservice Tests, and no comprehensive test is required."

The licensee requested to use a modified quarterly Group A test for the IST in lieu of a quarterly Group A and a biennial comprehensive pump test (CPT) for the pumps listed in Table 1, below.

The Fermi third 10-year IST program interval began on February 17, 2010, and is scheduled to end on February 16, 2020. The applicable ASME OM Code edition and addenda for the Fermi third 10-year IST program interval is the 2004 Edition, no Addenda.

Table 1

Pump	Description	Current	ASME Class	Classification Pump Type
E1102C002A	RHR Pump A	Group A	2	Centrifugal
E1102C002B	RHR Pump B	Group A	2	Centrifugal
E1102C002C	RHR Pump C	Group A	2	Centrifugal
E1102C002D	RHR Pump D	Group A	2	Centrifugal
E1151C001A	RHR Service Water Pump A	Group A	3	Vertical Line Shaft
E1151C001B	RHR Service Water Pump B	Group A	3	Vertical Line Shaft
E1151C001C	RHR Service Water Pump C	Group A	3	Vertical Line Shaft
E1151C001D	RHR Service Water Pump D	Group A	3	Vertical Line Shaft
E4101C001	High Pressure Coolant Injection Pump	Group A	2	Centrifugal
P4400C001A	Emergency Equip. Cooling Water Div. 1 Pump	Group A	3	Centrifugal
P4400C001B	Emergency Equip. Cooling Water Div. 2 Pump	Group A	3	Centrifugal
P4500C002A	Emergency Equip. Service Water South Pump	Group A	3	Vertical Line Shaft
P4500C002B	Emergency Equip. Service Water North Pump	Group A	3	Vertical Line Shaft
R3001C005	EDG 11 DG Service Water Pump	Group A	3	Vertical Line Shaft
R3001C006	EDG 12 DG Service Water Pump	Group A	3	Vertical Line Shaft
R3001C007	EDG 13 DG Service Water Pump	Group A	3	Vertical Line Shaft
R3001C008	EDG 14 DG Service Water Pump	Group A	3	Vertical Line Shaft
T4100C040	South CCHVAC Chilled Water Pump	Group A	3	Centrifugal
T4100C041	North CCHVAC Chilled Water Pump	Group A	3	Centrifugal

By letter dated April 5, 2016, the licensee stated in part, the following reason for the request:

Table ISTB-3400-1 specifies a biennial frequency for the CPT for Group A and Group B pumps. ISTB-5123 describes the specific requirements for performance of CPT for centrifugal pumps. Performance of the biennial CPT on the identified pumps are unnecessary since the existing quarterly pump tests are performed at sufficient flow rate to adequately monitor for pump degradation.

Proposed Alternative

The licensee proposes that in lieu of the requirements of ISTB-5123 and ISTB-5223, modified Group A tests will be performed quarterly, with instrumentation meeting the instrument accuracy requirements of Table ISTB-3510-1 for the biennial CPT. For the centrifugal pumps, the acceptable range for differential pressure would be 0.90 to 1.06 of the reference value. For the vertical line shaft pumps, the acceptable range for differential pressure would be 0.95 to 1.06 of the reference value, and the alert range would be 0.93 to <0.95 of the reference value. The licensee is proposing this alternative for the pumps listed in Table 1. All of the pumps in Table 1 are currently classified as Group A, and will remain classified as Group A. These acceptable ranges are more conservative than the acceptable ranges in Code Case OMN-18.

Section ISTB-3300 requires that the CPT be performed within  $\pm 20$  percent of the pump design flow rate. This can be interpreted as either the design accident flow rate, design point, or the best efficiency point, provided that the testing is performed in a region of the pump curve where there is a linear flow to head relationship. This allows the test to properly monitor for pump

degradation. Table 2 indicates where each pump is tested with respect to flow rate and the pump curve region.

Table 2

Pump	Description	±20% Design Accident Flow Rate	±20% Best Efficiency Point Flow Rate	Linear Region of Pump Curve
E1102C002A	RHR Pump A	X		X
E1102C002B	RHR Pump B	X		X
E1102C002C	RHR Pump C	X		X
E1102C002D	RHR Pump D	X		X
E1151C001A	RHR Service Water Pump A		X	X
E1151C001B	RHR Service Water Pump B		X	X
E1151C001C	RHR Service Water Pump C		X	X
E1151C001D	RHR Service Water Pump D		X	X
E4101C001	High Pressure Coolant Injection Pump	X		X
P4400C001A	Emergency Equip. Cooling Water Div. 1 Pump	X		X
P4400C001B	Emergency Equip. Cooling Water Div. 2 Pump	X		X
P4500C002A	Emergency Equip. Service Water South Pump		X	X
P4500C002B	Emergency Equip. Service Water North Pump		X	X
R3001C005	EDG 11 DG Service Water Pump		X	X
R3001C006	EDG 12 DG Service Water Pump		X	X
R3001C007	EDG 13 DG Service Water Pump		X	X
R3001C008	EDG 14 DG Service Water Pump		X	X
T4100C040	South CCHVAC Chilled Water Pump	X		X
T4100C041	North CCHVAC Chilled Water Pump	X		X

The use of ASME OM Code Case OMN-18 allows the performance of a Group A test in lieu of a CPT if the Group A test is conducted at the CPT flow rate using pressure instruments that meet the CPT accuracy requirements. Quarterly Group A pump testing performed at the CPT flow rate is more effective in assessing the pumps' operational readiness, through trending, than a

Group A test at lower flow rates in conjunction with a biennial CPT. The modified Group A test acceptance criteria (discussed above) will be used for pump IST rather than having to use the CPT criterion for one biennial test. The acceptance criteria for vibration tests would be the same as for Group A tests shown in Tables ISTB-5121-1 and ISTB-5221-1.

### 3.2 NRC Staff Evaluation

The licensee is proposing to use ASME OM Code Case OMN-18, with a modified acceptance criteria, and perform IST for all the pumps listed in Table 1 in accordance with a modified Group A test procedure.

The ASME OM Code requires that for Group A pumps, a Group A test is performed every quarter, and a CPT is performed biennially. The Group A test is performed within  $\pm 20$  percent of the pump design flow rate (if practicable), the pressure instrument accuracy is  $\pm 2$  percent, and the upper limit for the acceptable range for differential pressure is 110 percent of the reference value. The CPT is performed within  $\pm 20$  percent of the pump design flow rate, the pressure instrument accuracy is  $\pm 1/2$  percent, and the upper limit of the acceptable range for differential pressure is 103 percent of the reference value. Vibration monitoring is performed during both the Group A test and the CPT.

The licensee proposes that for the pumps listed in Table 1, which are classified as Group A, a modified Group A quarterly test be performed every quarter, and the biennial CPT is not required. The modified Group A quarterly test would be performed within  $\pm 20$  percent of the pump design accident flow rate for pumps indicated in Table 2. For the pumps indicated in Table 2 as being tested within  $\pm 20$  percent of pump best efficiency point flow rate, this is acceptable because the pumps will be operating on a sloped portion of the pump curve where degradation is more detectable. The more accurate pressure instrumentation that is required for a CPT ( $\pm 1/2$  percent versus  $\pm 2$  percent) will be used. This modified quarterly test would replace the CPT. The acceptable range for differential pressure for the modified Group A quarterly test is more conservative than the range for the Group A quarterly test.

The licensee is proposing to perform a modified Group A pump test every quarter and not perform a CPT. The licensee will use a more limiting upper bound of 106 percent for the Acceptable Range for differential pressure in lieu of 110 percent that is required by the OM Code for Group A tests. This proposed upper bound of 106 percent is greater than the upper bound of 103 percent for the biennial CPT. All of the pump tests will be performed with pressure instruments with  $\pm 1/2$  percent accuracy. For the pumps that are currently classified as Group A, the elimination of the CPT (with its more limiting differential pressure Acceptable Range upper bound of 103 percent) is compensated for by using more accurate pressure gauges on every quarterly test. This will provide for better trending of pump performance. - Instead of performing seven tests with pressure instruments with  $\pm 2$  percent accuracy, and then performing the eighth test with pressure instruments with  $\pm 1/2$  percent accuracy, all eight tests will be performed with the same  $\pm 1/2$  percent accurate instruments. The proposed alternative would provide reasonable assurance of the operational readiness for the pumps listed in Table 1.

#### 4.0 CONCLUSION

As set forth above, the NRC staff determined that for alternative request PRR-007, Revision 1, for Fermi, the proposed alternative provides an acceptable level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(1) for request PRR-007, Revision 1, and is in compliance with the ASME OM Code's requirement. Therefore, the NRC staff authorizes the use of the alternative request PRR-007, Revision 1, for Fermi for the third 10-year IST program interval, which began on February 17, 2010, and is scheduled to end on February 16, 2020. All other ASME OM Code requirements for which relief was not specifically requested and approved in the subject requests remain applicable.

Principle Contributor: Robert Wolfgang, NRR/DE/EPNB

Date of issuance: September 23, 2016



P. Fessler

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If you have any questions, please contact the NRC Project Manager, Sujata Goetz, at 301-415-8004, or via e-mail at Sujata.Goetz@nrc.gov.

Sincerely,

*/RA/*

David J. Wrona, Chief  
Plant Licensing Branch III-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-341

Enclosure:  
Safety Evaluation

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