



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

August 24, 2015

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 – INSERVICE TESTING PROGRAM RELIEF REQUEST
PRR-012 FOR QUARTERLY TEST OF CORE SPRAY PUMPS (TAC NO.
MF5816)

Dear Mr. Fessler:

By letter dated March 5, 2015, DTE Electric Company (DTE, the licensee) submitted a request to the U.S. Nuclear Regulatory Commission (NRC) for the use of alternatives to certain American Society of Mechanical Engineers (ASME) Code for *Operation and Maintenance* of Nuclear Power Plants (OM Code) requirements associated with the Core Spray Pumps 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. During NRC staff review of the relief request PRR-012, the staff noted that the request will be reviewed in accordance with 10 CFR 50.55a(f)(5)(iii) on the basis that the ASME OM Code requirements are impractical for the facility. This was communicated to and acknowledged by your staff by e-mail dated June 9, 2015.

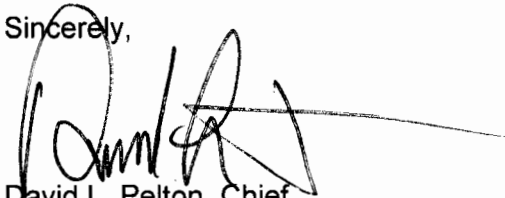
The NRC staff has reviewed the subject request and concludes, as set forth in the enclosed safety evaluation, that DTE has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(f)(6)(i). Therefore, the NRC staff grants relief for request PRR-012 at Fermi 2 from the end of RF-17 to the end of the third 10-year inservice testing program interval, which 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

- 2 -

If you have any questions, please contact the NRC Project Manager, Jennivine Rankin, at 301-415-1530, or via e-mail at Jennivine.Rankin@nrc.gov.

Sincerely,

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

David L. Pelton, 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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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REGARDING REQUEST NO. PRR-012

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 March 5, 2015 (Agencywide Documents and Access Management System (ADAMS) Accession No. ML15064A073), 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 the Core Spray (CS) Pumps at Fermi 2. The licensee proposed to conduct the quarterly testing of CS pumps in parallel for the remainder of the third ten-year interval of the 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. During NRC staff review of relief request PRR-012, the staff noted that the request will be reviewed in accordance with 10 CFR 50.55a(f)(5)(iii) on the basis that the ASME OM Code requirements are impractical for the facility. This was communicated to and acknowledged by your staff by e-mail dated June 9, 2015 (ADAMS Accession No. ML15160A477).

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.

Pursuant to 10 CFR 50.55a(f)(6)(i), relief to the ASME OM Code may be granted by the NRC if the licensee demonstrates that conformance with the ASME OM Code requirements is impractical for the facility.

Enclosure

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 grant the relief requested by the licensee.

3.0 TECHNICAL EVALUATION

3.1 Licensee's Request PRR-012

The applicable ASME Code requirements are as follows:

- ISTB-3300, "Reference Values," describes how reference values shall be obtained for a pump.
- ISTB-5122, "Group B Test Procedure," describes how to conduct a Group B test for a pump.

In its submittal dated March 5, 2015, the licensee has requested relief from the ASME OM Code Group B pump testing requirements for the pumps listed in Table 1 below.

Pump ID	Pump Description	ASME Code Class	ASME OM Code Group	Type	Speed
E2101C001A	Division 1 CS Pump A	2	B	Centrifugal	3560 RPM
E2101C001B	Division 2 CS Pump B	2	B	Centrifugal	3560 RPM
E2101C001C	Division 1 CS Pump C	2	B	Centrifugal	3560 RPM
E2101C001D	Division 2 CS Pump D	2	B	Centrifugal	3560 RPM

The Fermi 2 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 2 third 10-year IST program interval is the 2004 Edition (no Addenda).

Reason for Request

By letter dated March 5, 2015, the licensee states the following when describing the background of the CS system and the reason for the request:

The ASME OM Code is considered applicable to component testing rather than system level testing. Therefore, the general ASME OM Code requirements for Group B pumps are interpreted to be performed on individual pumps. Historically, the Group B test for the [CS] System at Fermi 2 has been performed on two pumps running in parallel due to test system design limitations.

DTE requested relief from the [NRC] to allow the Core Spray pump tests to be conducted with two pumps running in parallel during the first and second ten-year intervals of the IST program. This relief was necessary because the existing flow control valves are not capable of throttling low enough to accommodate single

pump operation without experiencing unstable operation, cavitation, and severe vibration. Additionally, the test system configuration and use of dual pumps required relief to allow DTE to use a pump curve methodology for the acceptance criteria.

Prior to the third ten-year interval, DTE requested relief in Relief Request PRR-002, Revision 0 (Reference 7.1). This relief was similar to the previous relief granted during the first and second ten-year intervals to allow dual pump operation during the quarterly Group B test and use of a pump curve as acceptance criteria. In this request, DTE also described a planned modification to the CS test line to facilitate single pump operation for the quarterly Group B test and the new comprehensive pump test (CPT) (ISTB-5123) by changing test line isolation valve design (E2150F015A&B) on both divisions including the installation of flow restriction orifices. A subsequent request, PRR-002, Revision 1 (Reference 7.2) was granted to extend this relief through RF-17 to allow additional time for planning and scoping the proposed modification.

As DTE continued to plan the modification as described in [relief request PRR-002, Revision 0], the modification became cost prohibitive due to the cost of new valves, reanalysis of the piping system, and the necessary implementation maintenance. The increased cost and risk associated with implementing this modification would not substantially increase the safety benefit to the station; therefore, DTE decided to pursue a different strategy. An alternate modification is planned for RF-17, which will consist of changing the valve internals and actuator gearing on the existing test line isolation valves (E2150F015A&B).

Proposed Alternative

The licensee is requesting to continue performing the CS pump Group B test with the pumps operated in parallel for the remainder of the third ten-year IST interval following refueling outage 17 (RF-17), when the current relief request PRR-002, Revision 1 expires. This is due to the additional time that will be required to perform the surveillance and resultant Limiting Condition for Operation (LCO) time, motor-operated valve (MOV) motor start limitations, loss of historical trend data, and potential valve cavitation. The CPT will be performed by individual pump testing during RF-17, planned for the fall of 2015, after implementing a system modification.

During the quarterly Group B test, both pumps in each division will be tested as a single unit. Since both pumps are run in parallel, acceptance criteria for differential pressure have been established, which are more restrictive than the criteria given in Table ISTB-5121-1 for centrifugal pumps. The licensee states in its submittal, the following additional limitations on acceptance criteria are currently imposed and will be maintained for the duration of the relief request, to assure that any degradation in performance is detected and corrected in a timely manner:

1. In order to enhance the ability to detect the equivalent of one pump's degradation, the following acceptance criteria will be utilized, which are more stringent than ISTB limits:

Acceptable DP [differential pressure] Range - 0.94 [times differential pressure reference value (ΔP_r)] to 1.06 [ΔP_r]

Alert Range - 0.92 [ΔP_r] to <0.94 [ΔP_r]

Required Action Range - Low <0.92 [ΔP_r] and High >1.06 [ΔP_r]

2. If the hydraulic performance of a CS division enters the Alert Range for any reason other than instruments out of calibration, both pumps in that division will be individually evaluated (e.g., perform motor diagnostics, evaluate vibration data, etc.) in order to determine which pump(s) in the division has degraded. The testing frequency will be doubled until the cause of the deviation is determined and the condition is corrected.
3. If the hydraulic performance of a CS division exceeds the Required Action ranges for any reason the CS division will be declared inoperable. Appropriate inspections, tests, and repairs will be completed prior to returning the division to service.
4. New reference curves will be established or the current curves verified after either pump in the division has been repaired, replaced, or serviced.
5. As noted above, the modification performed during RF-17 will change the valve internals and gearing for the CS test line isolation valves (E2150F015A/B). This will allow single pump testing during the [CPT] every two years. This test, which will be performed during RF-17, will also help detect small levels of degradation that may not be as easily noticed during the quarterly Group B test.
6. Measuring and Test Equipment (M&TE) for pressure will meet the ASME OM Code requirements for a [CPT] (+/- 0.5 percent).
7. Vibration data will continue to be performed on each individual pump using the acceptance criteria established in ASME OM Code 2004 Edition (Table ISTB-5121-1). A single Alert criterion and a single Required Action criterion will be used over the range of the pump curve.
8. DTE will use normalization to a reference flow to improve the effectiveness of trending.

3.2 NRC Staff Evaluation

The CS system at Fermi 2 is a unique design which includes two divisions with two pumps in each division. If one of the two pumps in either division is declared inoperable, then that division is inoperable. There are no functions of the CS system for single pump operation in either division. The CS system also includes a test line that is used to test both pumps in each division simultaneously while the plant is at power. Both pumps are required to operate in order to achieve the TS flow rate specified in SR 3.5.1.8 of at least 5725 gpm at a system head corresponding to a reactor pressure of ≥ 100 pounds per square inch.

The ASME OM Code requires in Section ISTB that pumps must be tested individually to detect a deviation in hydraulic and mechanical performance at points of operation readily duplicated during subsequent tests. These points of operation, referred to as reference values, are the baseline points from which the acceptance criteria are established. When maintenance on a pump has the potential to affect an individual reference value or a set of reference values, new reference values must be established. If the deviation in hydraulic performance of an individual centrifugal pump falls within the required action range, the pump is declared inoperable until the cause of the deviation is determined and the condition is corrected.

The design of the CS system at Fermi 2 is such that each train is capable of being tested at substantial flow conditions, but it is impractical to test each pump in the train individually for the Group B test because the motor-operated valve in the test flow loop has motor start limitations and can potentially cavitate. Also, the TS surveillance test is done at the same time as the Group B test (not simultaneously). Conducting both tests at the same time challenges the LCO time. The NRC staff concludes that operation of the CS system pumps individually for testing is, therefore, impractical within the limitations of the current system design.

As stated above, the licensee proposed the following limitations on acceptance criteria when performing the Group B test for the CS pumps:

- Use pressure instruments with ± 0.5 percent accuracy instead of the ASME OM Code allowed accuracy of ± 2 percent.
- Perform vibration measurements for individual pumps using the acceptance criteria stated in Table ISTB-5121-1. A single Alert criterion and a single Required Action criterion will be used over the range of the pump curve. The ASME OM Code does not require vibration measurements for Group B tests.
- Tighten the differential pressure Acceptable Range to $0.94 P_r$ to $1.06 P_r$ from the ASME OM Code range of $0.90 P_r$ to $1.10 P_r$.
- Have an Alert Range for differential pressure of $0.92 P_r$ to $<0.94 P_r$. The ASME OM Code does not have an alert range for Group B tests. If the pumps enter the Alert Range, except for instruments out of calibration, they will be individually evaluated to determine which pump is degraded. The test frequency will be doubled until the cause of the degradation is determined and corrected.
- Have a Required Action Range of Low $<0.92 P_r$ and High $>1.06 P_r$ instead of the ASME OM Code Required Action Range of Low $<0.90 P_r$ and High $>1.10 P_r$. If two pumps when tested enter the Required Action Range, they will be declared inoperable, and appropriate inspections, tests, and repairs will be completed prior to returning them to service.
- Use normalization to a reference flow to improve the effectiveness of trending.

The licensee also stated that the biennial CPT will be performed for individual CS pumps commencing during RF-17, planned for the fall of 2015, after implementing a system modification.

The NRC staff finds that the additional limitations on the acceptance criteria are conservative as they are more stringent than the ASME OM Code. Therefore, the NRC staff concludes that the proposed alternative of performing the CS pump Group B test with the pumps operated in parallel and the additional limitations on the acceptance criteria provide reasonable assurance that any degradation in performance is detected and corrected in a timely manner, and the CS pumps will remain operationally ready.

4.0 CONCLUSION

As set forth above, the NRC staff determined that it is impractical for the licensee to comply with the Group B testing requirements of the ASME OM Code for testing of the CS pumps E2101C001A, E2101C001B, E2101C001C, and E2101C001D. The proposed CS pump Group B testing, specified above, provides reasonable assurance that these CS pumps will remain operationally ready.

Granting relief pursuant to 10 CFR 50.55a(f)(6)(i) is authorized by law and will not endanger life or property or the common defense and security, and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(f)(6)(i). Therefore, the NRC staff grants relief for request PRR-012 at Fermi 2 from the end of RF-17 to the end of the third 10-year IST program interval, which 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.

Principle Contributor: Robert Wolfgang, NRR

Date: August 24, 2015

P. Fessler

- 2 -

If you have any questions, please contact the NRC Project Manager, Jennivine Rankin, at 301-415-1530, or via e-mail at Jennivine.Rankin@nrc.gov.

Sincerely,

/RA/

David L. Pelton, 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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