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DTE Energy

August 15, 2017
NRC-17-0054

10 CFR 50.55a

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

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

Subject: Proposed Alternative to Utilize Code Case N-513-4, "Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping Section XI, Division 1" for Fermi 2

Pursuant to 10 CFR 50.55a, "Codes and Standards," paragraph (z)(2), DTE Electric Company (DTE) is requesting a proposed alternative to the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," on the basis that compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Specifically, DTE is requesting to apply the evaluation methods of ASME Code Case N-513-4, "Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping Section XI, Division 1," to Class 2 and 3 moderate energy piping including elbows, bent pipe, reducers, expanders, and branch tees.

DTE requests NRC approval of this relief request within one calendar year of the date of this letter.

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.

Sincerely,

Keith J. Polson
Site Vice President

Enclosure: Proposed Alternative to Utilize Code Case N-513-4 for Fermi 2

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 to
NRC-17-0054

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

Proposed Alternative to Utilize Code Case N-513-4 for Fermi 2

10 CFR 50.55a Relief Request
Proposed Alternative to Use Code Case N-513-4
In Accordance with 10 CFR 50.55a(z)(2)
Hardship Without a Compensating Increase in Quality and Safety

1. ASME Code Component(s) Affected

ASME Code Class:	Code Class 2 and 3
References:	ASME Section XI, 2001 Edition with 2003 Addenda
Examination Category:	C-H, D-B Pressure Retaining Components
Item Numbers:	C7.10, D2.10
Description:	Use of ASME Code Case N-513-4 for evaluation of Class 2 and 3 components within the scope of the Code Case
Components:	All American Society of Mechanical Engineers (ASME) Section XI, Class 2 and 3 moderate energy piping systems meeting Code Case N-513-4 operating limits, which are a maximum operating temperature not in excess of 200 degrees Fahrenheit and an operating pressure not in excess of 275 pounds per square inch

2. Applicable Code Edition and Addenda

ASME Section XI, 2001 Edition with 2003 Addenda

3. Applicable Code Requirement

ASME Code, Section XI, subarticles IWC-3120 and IWC-3130 apply to Class 2 components and require that flaws exceeding the specified acceptance criteria be corrected by repair or replacement, or be deemed acceptable by analytic evaluation. ASME Code, Section XI, paragraph IWD-3120(b) applies to Class 3 components and requires that components exceeding the acceptance standards of IWD-3400 be subject to supplemental examination, or to a repair or replacement activity.

4. Reason for Request

In accordance with 10 CFR 50.55a(z)(2), DTE Electric Company (DTE) is requesting a proposed alternative to the Code requirements for repair and replacement activity of moderate energy piping components, due to limitations posed by ASME Code Case N-513-3, "Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping, Section XI, Division 1," regarding the evaluation of flaws in certain locations. Under the current code, moderately degraded piping could require a plant shutdown within the required action statement timeframes to repair the observed degradation. The resulting dose accrual and plant risk would fail to provide a compensating increase in levels of quality or safety when the degraded condition is demonstrated to retain adequate margin for component functionality. While ASME Code Case N-513-3 is limited to the evaluation of flaws in

straight piping, Code Case N-513-4 provides guidance for evaluating flaws located in elbows, bent pipe, reducers, expanders, and branch tees, provided those flaws are at least a minimum formulated distance from circumferential pipe welds. Code Case N-513-4 also provides for the evaluation of heat exchanger external tubing or piping.

The use of an acceptable analytic evaluation in lieu of immediate repair or replacement activities for the components covered by Code Case N-513-4 would conserve dose and decrease plant risk where shutdowns and immediate repair/replace activities on components that prove to have adequate margin can be prevented in favor of planned, orderly repairs or replacement scheduled in the longer term. Accordingly, compliance with the current code requirements represents a hardship without a compensating increase in the level of quality or safety.

5. Proposed Alternative and Basis for Relief

Pursuant to 10 CFR 50.55a(z)(2), DTE requests authorization to apply the evaluation methods of ASME Code Case N-513-4, "Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 and 3 Piping Section XI, Division 1," to Class 2 and 3 components that meet the design and operational limits described in Code Case N-513-4.

The NRC approval of Code Case N-513 versions in Regulatory Guide 1.147, "Inservice Inspection Code Case Applicability, ASME Section XI, Division 1" (Reference 1), allows the acceptance of partial through-wall or through-wall leaks for an operating cycle provided all conditions of the Code Case and the NRC conditions are met. The Code Case also requires the Owner to demonstrate system operability due to leakage. Limitations in Code Case N-513-3 related to its use on components such as elbows, bent pipe, reducers, expanders, and branch tees, as well as external tubing or piping attached to heat exchangers, have been addressed in Code Case N-513-4. The major differences between the NRC-approved Code Case N-513-3 and the Code Case N-513-4 are listed below:

1. Revised the maximum allowed time of use from no longer than 26 months to the next scheduled refueling outage.
2. Added applicability to piping elbows, bent pipe, reducers, expanders, and branch tees where the flaw is located more than $(R_o t)^{1/2}$ (where R_o is the outside pipe radius and t is the evaluation wall thickness) from the centerline of the attaching circumferential piping weld.
3. Expanded use to external tubing or piping attached to heat exchangers.
4. Revised to limit the use to liquid systems.
5. Revised to clarify treatment of Service Level load combinations.
6. Revised to address treatment of flaws in austenitic pipe flux welds.
7. Revised to require minimum wall thickness acceptance criteria to consider longitudinal stress in addition to hoop stress.
8. Other minor editorial changes to improve the clarity of the Code Case.

Code Case N-513-4 uses technical evaluation approaches that are based on principles that are accepted in other Code documents already approved by the NRC. The conservative natures of the calculations, temporary acceptance period, and leakage monitoring frequency given in Code Case N-513-4 make it no less technically rigorous in its approach than the approved Code Case N-513-3 and the NRC conditions applied to that Code Case. A technical evaluation of the significant changes in Code Case N-513-4 when compared to NRC approved Code Case N-513-3 was provided by ASME and was previously provided to the NRC in Attachment 4 of an Exelon fleet-wide relief request submittal to utilize Code Case N-513-4 (Reference 2) which was approved by the NRC. The technical information provided in Attachment 4 of Reference 2 is applicable for Fermi 2's intended use of Code Case N-513-4.

The design basis is considered for each leak and evaluated using the Fermi 2 Operability Determination Process. The evaluation process must consider requirements or commitments established for the system, continued degradation and potential consequences, operating experience, and engineering judgment. As required by the Code Case, the evaluation process considers but is not limited to system make-up capacity, containment integrity with the leak not isolated, effects on adjacent equipment, and the potential for room flooding.

Leakage rate is not typically a good indicator of overall structural stability in moderate energy systems, where the allowable through-wall flaw sizes are often on the order of inches. The periodic inspection interval defined using paragraph 2(e) of Code Case N-513-4 provides evidence that a leaking flaw continues to meet the flaw acceptance criteria and that the flaw growth rate is such that the flaw will not grow to an unacceptable size.

The effects of leakage may impact the operability determination or the plant flooding analyses specified in paragraph 1(f). For a leaking flaw, the allowable leakage rate will be determined by dividing the critical leakage rate by a safety factor of four. The critical leakage rate is determined as the lowest leakage rate that can be tolerated and may be based on the allowable loss of inventory or the maximum leakage that can be tolerated relative to room flooding, among others. The safety factor of four on leakage is based upon Code Case N-705, which is accepted without condition in Regulatory Guide 1.147 (Reference 1). Paragraph 2.2(e) of N-705 requires a safety factor of two on flaw size when estimating the flaw size from the leakage rate. This corresponds to a safety factor of four on leakage for nonplanar flaws. Although the use of a safety factor for determination of an unknown flaw is considered conservative when the actual flaw size is known, this approach is deemed acceptable based upon the precedent of Code Case N-705. Note that the alternative herein does not propose to use any portion of Code Case N-705 and that citation of N-705 is intended only to provide technical basis for the safety factor on leakage.

During the temporary acceptance period, leaking flaws will be monitored daily as required by paragraph 2(f) of Code Case N-513-4 to confirm the analysis conditions used in the evaluation remain valid. Significant change in the leakage rate is reason to question that the analysis conditions remain valid, and would require re-inspection per paragraph 2(f) of the

Code Case. Any re-inspection must be performed in accordance with paragraph 2(a) of the Code Case.

The leakage limit provides quantitative measurable limits which ensure the operability of the system and early identification of issues that could erode defense-in-depth and lead to adverse consequences.

In summary, DTE proposes to apply ASME Code Case N-513-4 to the evaluation of Class 2 and 3 components that are within the scope of the Code Case. The application of Code Case N-513-4, along with leakage limits, will maintain acceptable structural and leakage integrity while minimizing plant risk and personnel radiation exposure as compared to repairing instances of degradation in certain components under the current criteria.

6. Duration of Proposed Alternative

This relief is requested for the duration of the Third Inservice Inspection Interval, which began on May 2, 2009 and is scheduled to end on May 1, 2019, or until the NRC publishes Code Case N-513-4 in a future revision of Regulatory Guide 1.147 or other document.

7. Precedent

Letter from U. S. Nuclear Regulatory Commission (USNRC) to Exelon, "Braidwood Station, Units 1 and 2; Byron Station, Unit Nos. 1 and 2; Calvert Cliffs Nuclear Power Plant, Units 1 and 2; Clinton Power Station, Unit No. 1; Dresden Nuclear Power Station, Units 2 and 3; LaSalle County Station, Units 1 and 2; Limerick Generating Station, Units 1 and 2; Nine Mile Point Nuclear Station, Units 1 and 2; Oyster Creek Nuclear Generating Station; Peach Bottom Atomic Power Station, Units 2 and 3; Quad Cities Nuclear Power Station, Units 1 and 2; R. E. Ginna Nuclear Power Plant; and Three Mile Island Nuclear Station, Unit 1 – Proposed Alternative to Use ASME Code Case N-513-4 (CAC Nos. MF7301–MF7322)," dated September 6, 2016 (ML16230A237).

8. References

1. NRC Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability ASME Section XI, Division 1", Revision 17, August 2014 (ML13339A689).
2. Letter from Exelon Generation Company, LLC to U.S. Nuclear Regulatory Commission, "Proposed Alternative to Utilize Code Case N-513-4, 'Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping Section XI, Division 1'," dated January 28, 2016 (ML16029A003).