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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

ON THE THIRD 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM

REQUEST FOR RELIEF RR-12

CONSUMERS ENERGY COMPANY

PALISADES PLANT

DOCKET NO. 50-255

1.0 INTRODUCTION

Inservice inspection of the American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components at the Palisades Nuclear Plant is performed in accordance with Section XI of the ASME *Boiler and Pressure Vessel Code* (Code) and applicable addenda as required by 10 CFR 50.55a(g). 10 CFR 50.55a(a)(3) states that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The applicable ASME Code, Section XI, for the Palisades Plant's third 10-year inservice inspection (ISI) interval is the 1989 Edition. The components (including supports) may meet the requirements set forth in subsequent editions and addenda of the ASME Code incorporated by reference in 10 CFR 50.55a(b) subject to the limitations and modifications listed therein and subject to Commission approval.

Pursuant to 10 CFR 50.55a(g)(5), if the licensee determines that conformance with an examination requirement of Section XI of the ASME Code is not practical for its facility, information shall be submitted to the Commission in support of that determination and a request made for relief from the ASME Code requirement. After evaluation of the determination, pursuant to 10 CFR 50.55a(g)(6)(i), the Commission may grant relief and may impose alternative requirements that are determined to be authorized by law, will not endanger life, property, or the common defense and security, and are otherwise in the public interest, giving

due consideration to the burden upon the licensee that could result if the requirements were imposed.

By letter dated February 12, 1999, Consumers Energy Company (the licensee) submitted to the NRC a revision to relief request RR-12, which was originally submitted in a letter dated October 6, 1998, containing additional information on the original request. This relief request was in response to an inspector follow-up item identified during an NRC inspection (50-255/98006) of the ISI program. The request for relief pertains to a group of welds listed in the licensee's submittal which were ultrasonically examined from one side of the weld for the required volumetric coverage since the Code-required examination of the weld volume from both sides was impractical due to component configuration. The staff has reviewed and evaluated the licensee's request for relief and the supporting information, pursuant to 10 CFR 50.55a(g)(6)(i) for the Palisades Plant.

2.0 DISCUSSION

Component Identification

Pressure Retaining Welds in Code Class 1 and 2 Piping listed in Table 1.

Code Requirement

The ASME Code, Section XI, 1989 Edition, requires a volumetric and a surface examination of the piping welds listed in Table 1 in Examination Categories, B-J, B-F, C-F-1 and C-F-2, Item Numbers, B9.11, B9.31, B5.130, C5.11, C5.21 and C5.51. The volumetric examination of the welds in Table 1 is by ultrasonics. In accordance with ASME Code, Section XI, Appendix III, Article 4420, the examination volume is required to be examined from two sides of the weld, where practicable, or from one side of the weld as a minimum when examining for reflectors parallel to the weld seam.

Licensee's Basis for Relief

Pursuant to 10 CFR 50.55a(g)(5)(iii), the licensee submitted information to support its finding that the code required volumetric examinations by ultrasonic examination from both the upstream and downstream direction of the welds is considered to be impractical at certain terminal ends and structural discontinuities. Table 1, "Single Side Axial Examinations" provides a list of welds associated with this relief request. The access limitations from either the upstream or downstream direction do not allow the required axial ultrasonic angle beam examination. The Code-required transverse ultrasonic angle beam examinations required by Appendix III, Article 4430 are not limited. For the welds identified in Table 1, "Single Side Axial Examinations," the examination volume is limited to access from only one side of the weld seam when scanning in the axial direction.

It has been well established that detection of a substantial number of intergranular stress corrosion cracks (IGSCC) located on the far side of the weld cannot be detected with suitable reliability, using the best available technology. This conclusion is based on the performance of the Electric Power Research Institute (EPRI) Performance Demonstration Initiative (PDI) candidates, EPRI experience on field removed samples and an EPRI research project.

Suitable reliability for this purpose as defined by EPRI / PDI is 80 percent detection with a false call rate less than 20 percent. This rate is obtainable for mechanical and thermal fatigue cracks, but not for IGSCC. As identified by EPRI/PDI, the single sided endorsement for the examination of any austenitic weld where the ultrasonic beam is required to propagate through the austenitic weld material is applicable only to welds where ultrasonic examination from both sides of the weld are impossible due to the configuration (i.e. pipe to valve, pump, penetration, etc.).

Licensee's Proposed Alternate Examination

"Where the component configuration will not allow an ultrasonic angle beam examination for the axial scans (upstream and downstream), the following will be performed (which is the best available technology as demonstrated through the EPRI/PDI program):

a. For the similar metal welds, 100 percent of the required volume will be examined in one axial direction by ultrasonic examination using personnel and techniques qualified through the EPRI/PDI program for single sided access relating to the material type to be examined.

b. For the Austenitic to Inconel dissimilar metal welds, 100 percent of the required volume will be examined in one axial direction by ultrasonic examination using personnel and techniques qualified through EPRI/PDI program for single sided austenitic.

c. For the Austenitic to Ferritic dissimilar metal welds, 100 percent of the required volume will be examined in one axial direction by ultrasonic examination using personnel and techniques qualified through EPRI/PDI program for single sided ferritic.

d. 100 percent of the required volume for the transverse scans will be performed in both directions as required by Appendix III, Article 4430.

e. The code required surface examination will be performed."

3.0 EVALUATION

The staff has determined that the welds listed in Table 1 do not provide access for ultrasonic examination of the weld volume from both sides of the weld when examining for reflectors parallel to the weld seam due to component configuration, i.e., pipe to valve, branch connection, valve to safe-end, etc. Therefore, it is impractical to perform the Code-required examination. The licensee has performed an examination of the welds using examination procedures, equipment, and personnel qualified by performance demonstration in accordance with the PDI program. The performance demonstration requires that equipment, procedures, and examiners be tested on flawed and notched materials and configurations similar to those found in actual plant conditions. Hence, performance based ultrasonic techniques provide a higher degree of reliability for detection and characterization of flaw than the conventional technique which the licensee would have used under the applicable Code. The NRC has endorsed the use of PDI as an effective program for implementing the rules of the ASME Code, Section XI, Appendix XIII "Performance Demonstration for Ultrasonic Examination Systems."

The staff, therefore, accepts the technique that the licensee has adopted in examining the welds.

The staff has further considered in its evaluation the burden on the licensee of redesigning and replacing components that the subject welds connect if the Code requirements were to be imposed. The staff believes that the licensee's alternate examination of the welds by performing a single-sided examination of 100 percent weld volume using ultrasonic technique developed under the PDI program provides reasonable assurance of the structural integrity of the welds.

4.0 CONCLUSION

The staff concludes that it is impractical to comply with the requirement of the applicable ASME Code, Section XI, for welds listed in Table 1 to examine from both sides of the weld for reflectors parallel to the weld due to component configuration. The staff has further determined that if the Code requirements were to be imposed on the licensee, the components would need to be redesigned, which would impose a significant burden on the licensee. The staff believes that the examination performed using techniques developed under the Performance Demonstration Initiative provides reasonable assurance of the structural integrity of the subject welds. Therefore, the relief is granted pursuant to 10 CFR 50.55a(g)(6)(i) for the third 10-year inservice inspection interval of the Palisades Plant. The relief granted 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.

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Date: June 3, 1999

TABLE 1
SINGLE SIDE AXIAL EXAMINATIONS

Component Reference ID	Configuration	Material Type	Section X1 Cat Item
ESS-12-SIS-IAI-10	Valve to Tee	Austenitic	B-J / B9.11
ESS-12-SIS-1A1-9	Valve to Tee	Austenitic	B-J / B9.11
ESS-12-SIS-1B1-13	Valve to Tee	Austenitic	B-J / B9.11
ESS-12-SIS-1B1-14	Valve to Tee	Austenitic	B-J / B9.11
ESS-12-SIS-2A1-12	Valve to Tee	Austenitic	B-J / B9.11
ESS-12-SIS-2A1-13	Tee to Valve	Austenitic	B-J / B9.11
ESS-12-SIS-2B1-12	Valve to Tee	Austenitic	B-J / B9.11
ESS-12-SIS-2B1-13	Tee to Valve	Austenitic	B-J / B9.11
PCS-4-PRS-1 P2-3	Pipe to Fitting	Austenitic	B-J / B9.11
PCS-42-RCL-1 H-3/12	Branch Connection	Ferritic	B-J / B9.31
PCS-42-RCL-2H-3/12	Branch Connection	Ferritic	B-J / B9.31
PCS-30-RCL-IA-11/12	Branch Connection	Ferritic	B-J / B9.31
PCS-30-RCL-IB-10/12	Branch Connection	Ferritic	B-J / B9.31
PCS-30-RCL-2A-1 1/12	Branch Connection	Ferritic	B-J / B9.31
PCS-30-RCL-2B-10/12	Branch Connection	Ferritic	B-J / B9.31
PCS-12-SIS-1A1-11	Valve to Safe End	Austenitic/Inconel	B-F / B5.130
PCS-12-SIS-1B1-15	Valve to Safe End	Austenitic/Inconel	B-F / B5.130
PCS-12-SIS-2A1-14	Valve to Safe End	Austenitic/Inconel	B-F / B5.130
PCS-12-SIS-2B1-14	Valve to Safe End	Austenitic/Inconel	B-F / B5.130
PCS-30-RCL-1A-9	Pump to Transition	Austenitic/Ferritic	B-F / B5.130
PCS-30-RCL-1 B-9	Pump to Transition	Austenitic/Ferritic	B-F / B5.130
PCS-30-RCL-2A-10	Pump to Transition	Austenitic/Ferritic	B-F / B5.130
PCS-30-RCL-2B-9	Pump to Transition	Austenitic/Ferritic	B-F / B5.130
ESS-12-SIS-1A1-8	Elbow to Valve	Austenitic	C-F-1 / C5.11
ESS-12-SIS-IBI-12	Elbow to Valve	Austenitic	C-F-1 / C5.11
ESS-1 2-SIS-2A1 -11	Elbow to Valve	Austenitic	C-F-1 / C5.11
ESS-1 2-SIS-2B1-1 1	Elbow to Valve	Austenitic	C-F-1 / C5.11
ESS-3-SIS-CRA-214	Pipe to Valve	Austenitic	C-F-1 / C5.21
ESS-3-SIS-CRA-215	Valve to Reducer	Austenitic	C-1 / C5.21
FWS-18-FWL-1S1-246	Pipe to Valve	Ferritic	C-F-2 / C5.51
FWS-18-FWL-2S1-245	Elbow to Valve	Ferritic	C-F-2 / C5.51
ESS-3-SIS-CRA-214	Pipe to Valve	Austenitic	C-F-1 / C5.21
ESS-3-SIS-CRA-215	Valve to Reducer	Austenitic	C-F-1 / C5.21
FWS-18-FWL-1S1-246	Pipe to Valve	Ferritic	C-F-2 / C5.51
FWS-18-FWL-2S1-245	Elbow to Valve	Ferritic	C-F-2 / C5.51