



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE INSERVICE INSPECTION PROGRAM REQUESTS FOR RELIEF FOR
COMMONWEALTH EDISON COMPANY

DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3

DOCKET NOS. 50-237 AND 50-249

1.0 INTRODUCTION

By letter dated February 24, 1994, as supplemented April 6, 1994, Commonwealth Edison Company (ComEd, the licensee) requested approval for the implementation of the alternative rules of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) Section XI, Code Case N-524 dated August 9, 1993, entitled, "Alternative Examination Requirements for Longitudinal Welds in Class 1 and 2 Piping Section XI, Division I," pursuant to 10 CFR 50.55a(a)(3) to be applied to the third ten year Inservice Inspection (ISI) program for Dresden, Units 2 and 3.

The Technical Specifications (TS) for Dresden Nuclear Power Station, Units 2 and 3, state that the inservice inspection and testing of the ASME Code Class 1, 2, and 3 components shall be performed in accordance with Section XI of the ASME Code and applicable Addenda as required by 10 CFR 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). In 10 CFR 50.55a(a)(3) it 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 difficulties 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 on 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 ten-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) on the date twelve months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The applicable edition of Section XI of the ASME Code for the Dresden Nuclear Station, Units 2 and 3,

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third 10-year ISI interval is the 1986 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. However, the licensee has prepared the third ten-year interval inservice inspection program plan for Dresden Nuclear Power Station, Units 2 and 3, to meet the requirements of the 1989 Edition of the ASME Code. The third ten year interval inservice inspection program plan was approved by the NRC staff on May 19, 1994.

2.0 RELIEF REQUEST CR-17

2.1 Compound Identification

Longitudinal welds in Class 1 and 2 piping.

2.2 ASME Code, Section XI, Third Interval Requirements

Table IWC-1 Category C-F that require volumetric and/or a surface examination of longitudinal welds.

2.3 Licensee's Basis For Relief

The licensee states:

Unlike circumferential welds, longitudinal welds are typically fabricated during original manufacturing under controlled shop conditions. In addition, the vast majority of longitudinal piping welds undergo solution heat treatment as part of the manufacturing process. Heat treatment enhances the material properties of the weld and reduces the residual stresses created by welding. Heat treatment of the piping and longitudinal weld also makes the material properties more uniform throughout the piping.

The benefits of the enhanced material properties of shop fabricated longitudinal welds are demonstrated by the past 20 years of industry experience. In a survey conducted by the ASME Task Group on ISI Optimization it was found that the number of recordable indications discovered in longitudinal piping welds during 261 cumulative years of operation was very minimal. And more importantly, none of the recordable indications were found to be rejectable service induced flaws.

On the basis of the above information, the additional costs and man-rem exposure associated with the incremental inspection of such welds, in association with circumferential butt weld inspections as currently required by Section XI, are not technically warranted. The ASME Code has recognized this fact and has recently published Code Case N-524 to allow alternate examination coverage of longitudinal piping welds.

Based on the above, Dresden Station requests relief from the current ASME Section XI requirements for examination coverage of longitudinal piping welds as specified in Tables IWB-2500-1 and IWC-2500-1.

2.4 Alternate Testing

The licensee proposes to apply Code Case N-524 as alternative rules for the examination of longitudinal welds in Class 1 and 2 piping.

2.5 Evaluation/Conclusions

The ASME Code, Section XI (1989 Edition), requires one pipe diameter in length, but no more than 12 inches, be examined for Class 1 longitudinal piping welds. Class 2 longitudinal piping welds are required to be examined for a length of $2.5t$, where t is the thickness of the weld. These lengths of weld are measured from the intersection of the circumferential weld and longitudinal weld. The licensee's proposed alternative, Code Case N-524, limits the volumetric and surface examination requirements of the longitudinal weld to the volume or area contained within the examination requirements of the intersecting circumferential weld.

Longitudinal welds are produced during the manufacturing process of the piping, not in the field - as is the case for circumferential welds. The ASME Code contains requirements for characteristics and performance of materials and products, and specifies examination requirements for the manufacturing of the subject longitudinal piping welds.

In addition, there are material, chemical, and tensile strength requirements in the Code. The manufacturing process that is specified by the Code provides assurance of the structural integrity of the longitudinal welds at the time the piping is manufactured.

The preservice examination and subsequent inservice examinations have provided assurance of the structural integrity of the longitudinal welds during the service life of the plant to date. The experience in the United States has been that ASME Code longitudinal welds have not experienced degradation that would warrant continued examination beyond the boundaries required to meet the circumferential weld examination requirements. No significant loading conditions or known material degradation mechanisms, which specifically relate to longitudinal seam welds in nuclear plant piping, have become evident to date. If any degradation associated with a longitudinal weld were to occur, it is expected that it would be located at the intersection with a circumferential weld. This intersection is inspected in accordance with the provisions of Code Case N-524. In addition, there is a significant accumulation of man-rem associated with the examination of longitudinal welds, especially in Class 1 piping. The staff concludes that continued imposition of the Code examination requirements for longitudinal welds constitutes a hardship without a compensating increase in the level of quality and safety.

3.0 CONCLUSION

Accordingly, the licensee's proposed alternative to use Code Case N-524 is authorized for Dresden Nuclear Station, Units 2 and 3, pursuant to 10 CFR 50.55a(a)(3)(ii) until such time as the Code Case is published in a future revision of Regulatory Guide 1.147. At that time, the licensee is to follow all provisions in Code Case N-524, with limitations issued in Regulatory Guide 1.147, if any, if the licensee continues to implement this relief request.

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Date: August 16, 1995