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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

ALTERNATIVE TO ASME SECTION XI CODE REQUIREMENTS

TO USE CODE CASE N-516-1 FOR UNDERWATER WELDING

PHILADELPHIA ELECTRIC COMPANY

LIMERICK GENERATING STATION, UNITS 1 AND 2

DOCKET NOS. 50-352 AND 50-353

1.0 INTRODUCTION

By letter dated July 18, 1997, Philadelphia Electric Company (PECO, the licensee) proposed an alternative to the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (ASME Code), Section XI repair and replacement requirements under Title 10 of the Code of Federal Regulations (10 CFR) Section 50.55a(a)(3). PECO proposed to use Code Case N-516-1, "Underwater Welding, Section XI, Division 1," to install the modified suction strainer at the Limerick Generating Station (LGS), Units 1 and 2. The licensee's modification of the suction strainer in the suppression chamber is in response to IE Bulletin 96-03, "Potential Plugging of Emergency Core Cooling Suction Strainers by Debris in Boiling Water Reactors," as a proactive corrective action to mitigate its potential plugging. The subject modification is currently planned for the upcoming outage at LGS, Unit 1, scheduled to begin in April 1998.

Pursuant to 10 CFR 50.55a(a)(3), proposed alternatives to the requirements of 10 CFR 50.55a(g) may be used when authorized by the NRC. The licensee must demonstrate that 1) the proposed alternative would provide an acceptable level of quality and safety [(a)(3)(i)], or 2) compliance with the requirements of 10 CFR 50.55a(g) would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety [(a)(3)(ii)]. If a licensee determines that ASME Code requirements are impractical, 10 CFR 50.55a(g)(6)(i) specifies that the Commission may grant such relief and may impose such alternative requirements as it determines 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.

2.0 EVALUATION

ASME Section XI Code Requirement

The licensee indicated that the 1986 Edition (no Addenda), is the currently applicable ASME Code to the LGS, Units 1 and 2 Inservice Inspection (ISI) and Repair and Replacement Programs. Further, the 1992 Edition, including the 1992 Addenda of this Code, is currently applicable to these programs, when applied to the primary containment vessel. Articles IWE-4000, "Repair Procedures," and IWA-4000, "Repair and Replacement," of the later Section XI Code Edition and Addenda provide rules and requirements for the repair or replacement of pressure retaining components and their supports. IWA-4170(b) "Code Applicability,"

specifies that "repairs and installation of replacement items shall be performed in accordance with the Owner's Design Specification and the original Construction Code of the component or system." the Owner's Design Specification and the original Construction Code require repair and replacement welding in air.

Proposed Alternative

The licensee proposed to use ASME Code Case N-516-1 as an alternative to the ASME Code, Section XI, Subarticle IWE-4100 and IWA-4000 requirements for repair and replacement to install the modified suction strainer in the suppression chamber at LGS, Units 1 and 2. Using Code Case N-516-1 is necessary because Subarticles IWE-4100 and IWA-4000 do not contain guidance on performing underwater welding for repair and replacement.

Licensee's Basis for the Proposed Alternative (as stated)

The licensee indicated the following to support use of Code Case N-516-1 as an alternative to the ASME Code, Section XI requirements for repair and replacement:

> ...[U]se of the Code Case will enable PECO Energy to avoid extreme hardship and unusual difficulties associated with needed ASME Section XI Repairs and Replacements.
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> ...Without the alternative for underwater welding, it would be necessary to perform welding in air necessitating the draining of the suppression chamber, or drilling and bolting underwater. Draining of the suppression chamber is a complex evolution that would result in the movement of a significant quantity of contaminated water. These options would require additional installation time and increased dose without a compensating increase in safety. These options would also result in a significant financial hardship as a result of lost generation due to an extended outage, and additional modification costs. Additionally, incidental welding repairs to the suppression chamber pressure boundary may be necessary during the installation of suction strainers which would necessitate the use of this code case.

Staff Evaluation

The staff is currently reviewing Revision 0 of Code Case N-516 to include it in Regulatory Guide 1.147. Revision 0 of Code Case N-516 provides guidelines for underwater welding of P-No. 8 and P-No. 4X materials. Revision 1 of Code Case N-516 extends the application to P-No. 1 materials. The results of the staff's preliminary review of Revision 0 of Code Case N-516 have shown that Revision 1 of the Code Case is acceptable for use, provided that for welding of highly irradiated materials, a mockup, using material with similar fluence levels, should be used to demonstrate that cracks do not result. The added condition of testing irradiated materials should also be imposed upon Code Case N-516-1. However, in the subject application of welding the modified suction strainers in the suppression chamber, the added condition of testing the irradiated materials is not applicable because the components in the suppression chamber will not be irradiated to any degree of significance.

The staff concludes that draining the suppression chamber in order to weld in air would cause hardship, and present unusual difficulties because draining the suppression chamber would be a multiple-day critical path evolution that would extend the refueling outage without a corresponding benefit in weld quality. The licensee would have to process large amounts of radioactive suppression chamber water, and then dispose of the water since no large water storage facilities are available. PECO would then have to produce large amounts of high-quality to replace the discarded water. PECO would ultimately lose electrical generation due to an extended outage.

On the basis of a review of the licensee's submittal, the staff has determined that the use of Code Case N-516-1 to weld the modified suction strainer in the suppression chamber at LGS, Units 1 and 2, is acceptable in that it will provide assurance of weld integrity.

3.0 CONCLUSION

On the basis of a review of the licensee's submittal, the staff concludes that the licensee's compliance with the requirements of 10 CFR 50.55a(g) would result in hardship or unusual difficulty without a compensatory increase in the level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the staff authorizes the licensee-proposed use of Code Case N-516-1 to weld the modified suction strainer in the suppression chamber at LGS, Units 1 and 2.

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Date: February 4, 1998