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Office of Nuclear Reactor Regulation
Attention: Mr. Thomas E. Murley, Director
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Gentlemen:

Subject: **Docket Nos. 50-361 and 50-362**
Helical Coil Threaded Inserts for Steam Generator Stud Holes
San Onofre Nuclear Generating Station
Units 2 and 3

Reference: Case N496 of the ASME Boiler and Pressure Vessel Code, "Helical Coil Threaded Inserts", Dated March 14, 1991

This letter requests NRC approval to use Code Case N496 which defines the American Society of Mechanical Engineers (ASME) rules for use of helical coil threaded inserts. A helical coil insert is a stainless steel coil fitted inside stud hole threads that have been slightly oversized by drilling and thread tapping. The helical coil insert restores the stud hole to the original thread size, protects the threads, and increases the stud hole thread life. Edison intends to utilize helical coil inserts on SONGS 2 and 3 steam generator manway and handhole stud holes.

BACKGROUND

Case N496 of the ASME Boiler and Pressure Vessel (B&PV) Code, referenced above, documents the approval for use of helical coil threaded inserts provided certain conditions concerning the purchase, installation, maintenance, and documentation are met. Code Case N496 has not yet been approved by the NRC and does not appear in Regulatory Guide 1.85, "Materials Code Case Acceptability-ASME Section III Division 1," Revision 28, dated April 1992; Regulatory Guide 1.84, "Design and Fabrication Code Case Acceptability-ASME Section III Division I," Revision 28, dated April 1992; nor in Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability-ASME Section XI Division 1," Revision 9, dated April 1992. Therefore, authorization by the Director of Nuclear Reactor Regulation, as allowed by 10CFR 50.55a, Footnote 6, is needed to use ASME Code Case N496 pursuant to the following conditions from 10CFR50.55a(a)3:

(1) Alternatives to the Code must be demonstrated to provide "an acceptable level of quality and safety"

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(2) Complying with the requirements of the Code "would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety."

DISCUSSION

Demonstration of Acceptable Level of Quality and Safety

ABB-Combustion Engineering (CE), one of Southern California Edison's (SCE's) qualified suppliers for helical coil inserts, has completed the enclosed Design Report CR-9448-CSE92-1106, "Southern California Edison - San Onofre Steam Generator Manway and Handhole Stud/Studhole Repair Evaluation, Units 2 and 3." This report identifies and justifies the minimum thread engagements for the use of helical coil inserts in steam generator primary manways, secondary manways, and secondary handholes for Units 2 and 3, and concludes that the helical coil inserts meet ASME B&PV Code standards in terms of stress loads, thermal expansion, and material compatibility.

This design report was based on specifications of the Helicoil brand of threaded inserts, which is the brand SCE currently intends to use at Units 2 and 3. If, in the future, another brand of helical coil inserts is to be used, this design report will be updated to demonstrate that the new brand meets ASME B&PV Code acceptance criteria for reinforcement area and shear stress, and is acceptable in terms of thermal expansion and material compatibility.

Helical coil inserts are being used in other plants and have demonstrated acceptable results. For example, in San Onofre Unit 1 helical coil inserts have been used in the SGs since 1984 and have been installed in 45 SG stud holes. Our experience at Unit 1 has shown all of the inserts have performed as intended.

San Onofre Unit 1 is constructed to Section VIII of the ASME B&PV Code for material requirements, whereas San Onofre Units 2 and 3 are constructed to Section III requirements. There were and are provisions in ASME Section VIII that allowed the use of parts such as helical coil inserts when performing Section XI replacements at Unit 1. Therefore, NRC approval was not required to install helical coil inserts at Unit 1.

Hardship or Unusual Difficulties

Damage to stud hole threads is caused by galling, which is associated with stud seizure on the threads, and minor drill misalignment during the removal of a seized stud. Repairing damaged stud holes by installing a helical coil involves minimal drilling and thread tapping of the damaged stud hole. This increases the hole diameter just enough to install a helical coil insert on the new threads and use the same size stud.

The two thread repair methods currently specified in the ASME B&PV Code are: 1) Drilling and thread tapping and 2) welding. The more viable of these two

techniques is drilling and thread tapping which removes additional metal and forms a larger threaded hole (oversized). As a result, if a helical coil insert is not used, this repaired stud hole requires an oversized stud. The use of non-uniform studs poses procurement and logistic difficulties and complicates subsequent maintenance operations.

The other viable repair technique, which is less desirable, restores metal to the hole by welding and reforms the hole by drilling and tapping. Welding on a pressure vessel in a field environment presents numerous difficulties. These difficulties include significant expenditure of engineering planning resources, base metal preparation for welding, protection of the gasket seating (sealing) surface from welding process damage, and heat treatment.

Also, welding would generally take significantly longer to perform than installation of helical coil inserts. Because the dose rates with the best available shielding are approximately 100 mrem/hr to a welder performing repairs on the primary manway and secondary handhole, the potential exists for significantly increased radiation exposure when using this technique in these two areas.

The helical coil repair technique involves less metal removal from the stud hole than the other two repair techniques currently available. Therefore, repair using helical coils minimizes the potential need to add metal to the component by welding to repair any future damage to the same threads.

Without the installation of a helical coil insert the repaired hole threads are in direct contact with the stud threads and the hole threads are subject to further galling or damage during future repairs due to drill misalignment. The helical coil, which can be easily replaced, bears the risk of galling and provides a buffer for minor drill misalignment during any subsequent seized stud removal. Accordingly, the longevity of a repair without a helical coil insert may be shorter than that achievable using the insert.

SUMMARY

In summary, the helical coil threaded inserts have demonstrated an acceptable level of quality and safety through both evaluation and plant experience. Repairs of seized studs without the use of helical coil inserts lead to unusual difficulties including complicating maintenance procedures and probably reducing the longevity of repairs.

Because the helical coil inserts have been shown to meet both criteria of 10CFR50.55a(a)(3), SCE requests approval to use helical coil inserts. Upon approval, SCE plans to install helical coil inserts in any damaged stud holes found in the primary manways, secondary manways, and secondary handholes of SGs of Units 2 and 3. The use of the helical coil inserts will be in accordance with the conditions of ASME B&PV Code Case N496.

NRC approval for the use of Code Case N496 is requested by February 1, 1993, to provide sufficient time to implement the necessary programmatic changes and allow SCE to use the helical coil inserts beginning with the Unit 2 Cycle 7

refueling outage, which could start as early as May 1, 1993. However, SCE requests approval as soon as possible before February 1993 to prepare for any unanticipated outages prior to refueling where removal of the SG manways or handhole covers is necessary.

If you have any questions or comments, please let me know.

Sincerely,

R M Rosenblum

Enclosure

cc: J. B. Martin, Regional Administrator, NRC Region V
C. W. Caldwell, NRC Senior Resident Inspector, San Onofre Units 1, 2&3
M. B. Fields, NRC Project Manager, San Onofre Units 2 and 3