



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

PENNSYLVANIA POWER & LIGHT COMPANY

ALLEGHENY ELECTRIC COOPERATIVE, INC.

SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2

DOCKET NOS. 50-387 AND 388

1.0 BACKGROUND

Pennsylvania Power & Light Company (PP&L) is in the process of replacing the existing tube bundles contained within the jacket water heat exchangers of the A, B, C and D Diesel Generators. The existing heat exchangers were originally supplied as ASME Section III, Class 3 items from an ASME 'N' Certificate Holder. This original equipment manufacturer has since dropped its Section III Certification. Therefore, utilizing the guidance provided in Generic Letter 89-09, PP&L intends to replace the ASME Section III tube bundles with ASME Section VIII tube bundles supplied from the same original manufacturer.

2.0 EVALUATION

The original heat exchangers were designed, manufactured, and stamped to the 1974 Edition including Summer 1974 Addenda of the ASME Code, Section III as Class 3 components by American Standard, Heat Transfer Division. The company is now known as ITT Standard and is no longer in possession of an ASME Section III Certification. However, they do possess an ASME Section VIII Certification. The licensee has two possible options. One option would be to replace the heat exchangers in their entirety with new ones designed, fabricated, and stamped to ASME Section III requirements by another manufacturer who is in possession of ASME Section III Certification. This option according to the licensee would be very costly and significantly increase the scope of work. This is because each heat exchanger has four nozzles - two each for the shell and water side inlets and outlets. These nozzles are flanged and connected to existing piping systems. Additionally, the heat exchangers are anchored in place. Therefore, to replace the heat exchangers completely with new ones made by a different manufacturer in such a way that all four (4) nozzle flanges match their corresponding mating flanges would be a major task. The second option would be to utilize NRC's Generic Letter 89-09 which provides guidance on how to procure non-stamped ASME Section III components under special circumstances.

In accordance with the staff position stated in the Generic Letter 89-09, cost cannot be used as a justification for purchasing non-stamped parts. In this case however, replacement of the entire heat exchanger is not warranted. The only degradation that has occurred is in the heat

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exchanger tubes. Replacement of tube bundles is considered the most reasonable approach to repair the damage due to corrosion of the tubes. However, the manufacturer of the original heat exchangers does not currently manufacture nuclear components. In this case, it is necessary to procure a non-stamped replacement tube bundle from the original manufacturer in order to ensure adequate operation and proper fit of the heat exchangers. This is consistent with the intent of the Generic Letter 89-09 provided the replacement meets all other applicable requirements of Section III endorsed by NRC regulations. The existing tubes in the jacket water heat exchangers are made of 90/10 Cu-Ni alloy (SB-111) and tubesheets are made of copper alloy (SB-171). The replacement tubes will be made of SB-690 or SB-676 and the tubesheets will be made of SB-688. Approval of these materials for use in ASME Section III components is provided in Code Case N-436-1 which was previously approved by NRC. These alloys, which have a commercial designation of AL-6XN have excellent resistance to chloride pitting and crevice corrosion and appear to be highly suitable for the present application. AL-6XN has a high content of chromium, molybdenum, nickel, and nitrogen and has been used in service water piping at several nuclear power plants. It is well suited for plate and frame type heat exchangers where a high level of corrosion resistance and good formability are required. The alloy tubing can be roller expanded into tubesheets and headers with equipment and procedures used for other tube material. Tight, leak-free joints are possible without tubesheet distortion. Tubes can be flared after rolling to reduce inlet turbulence, although the erosion resistant properties of this material eliminates the necessity for flaring.

The tube bundles are being procured by PP&L from ITT Standard. As stated previously, ITT Standard is the original manufacturer of the heat exchangers. They are no longer in possession of an ASME Section III Certification, but they do possess an ASME Section VIII Certification. The materials for the tubes and tubesheets shall be procured from Allegheny-Ludlum by ITT Standard. Allegheny-Ludlum does not currently hold an ASME Certification either as a Material Manufacturer or Material Supplier. However, ITT Standard shall provide PP&L with Certified Materials Test Reports. Additionally, PP&L intends to perform chemical and physical analyses on the material specimens, as necessary, to assure authenticity of the materials.

The tube bundles shall be designed to the ASME Section III requirements using the same edition and addenda of the Code which was used for the construction of original heat exchanger. Fabrication of the tube bundles entails drilling holes in the tubesheets and assembling the tubes into tubesheets by rolling and expanding only. There will be intermediate tube supports known as baffle plates. Since no welding is performed on the tube bundles, no examinations are required. Each tube bundle shall be subjected to a hydrostatic test by the manufacturer at their shop. The hydrostatic pressure test shall be 1.5 times the design pressure of the coolant.

3.0 CONCLUSION

Based on a review of the information provided by the licensee, the staff concludes that the tube bundle replacement for the jacket water heat exchanger at the Susquehanna Steam Electric Station conforms with the guidance in the Generic Letter 89-09 "ASME Section III Component Replacements." dated May 8, 1989, and is an alternative that will provide an acceptable level of quality and safety. The replacement tube bundles will provide adequate structural and pressure integrity. The licensee should indicate this replacement in the Final Safety Analysis Report annual update and certify their compliance with the guidance provided in GL 89-09. PP&L should maintain on file for the service lifetime of this replacement the information detailing the basis for the action and all related documentation which demonstrates conformance with the guidance in this Generic Letter. Accordingly, pursuant to 10 CFR 50.55a(a)(3)(i) relief is granted to PP&L to replace ASME Section III tube bundles with the ASME Section VIII tube bundles supplied by the same original manufacturer.

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