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New York Power Authority

John C. Brons
Executive Vice President
Nuclear Generation

May 4, 1988
JPN-88-017

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Subject: James A. FitzPatrick Nuclear Power Plant (JAFNPP)
Docket No. 50-333
Technical Justification for Continued Operation
with Weld Overlays in Place

References: 1. NYPA Letter, J.C. Brons to NRC, dated March 10, 1987 (JPN-87-008).

Dear Sirs:

Reference 1 submitted a report to the NRC concerning weld overlays installed in the JAFNPP. The report provided technical justification for continued operation of the plant with weld overlays installed on several welds in the recirculation system piping.

Since that submittal two pages of the subject report have been revised to clarify the allowable stress values used in weld overlay and flaw evaluation studies. The stress allowable used in the weld overlay design is 15.9 ksi from ANSI B31.1, 1977 edition. This applies a lower allowable stress in comparison to JAF FSAR and ASME Section III values and, therefore, results in a more conservative evaluation. It also results in a more conservative approach than the approach presented in the JAF FSAR. The revised pages are provided in Attachment I.

Should you or your staff have any questions regarding this matter, please contact Mr. J. A. Gray, Jr. of my staff.

Very truly yours,

John C. Brons
Executive Vice President
Nuclear Generation

cc: U. S. Nuclear Regulatory Commission
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ATTACHMENT I

New York Power Authority
ames A. FitzPatrick Nuclear Power Plant
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2.2 Weld Overlay Repairs

As a result of deep and/or long UT indications, welds 12-12, 12-23, 12-64, 12-69, 12-70, and 22-22 were repaired by depositing weld overlay material 360 degrees around and to either side of the existing weld. Weld overlay repairs of this type have been used in operating BWRs to increase pressure boundary thickness, restore the original design basis structural margins of the piping, and produce a favorable compressive residual stress pattern in cases where relatively large IGSCC-like indications have been found. IGSCC-resistant, Type 308L weld metal with controlled (high) ferrite content was used for all overlay repairs at FitzPatrick, to prevent the propagation of the IGSCC into the repair itself.

2.2.1 Weld Overlay Design Methodology

Piping stresses in the J. A. FitzPatrick recirculation system obtained from the General Electric Company (GE) stress report [5] were used in the weld overlay design calculations of [4]. Figures 2-3 and 2-4 illustrate the piping model used by GE. Stresses taken from [5] for the twelve affected weld joints are summarized in Table 2-2.

Weld overlay thickness was determined iteratively using the applied stresses in Table 2-2 and the allowable flaw size table for wrought, austenitic material from ASME Section XI, IWB-3640 [6] (Table 2-14 of this report). The allowable stress value, S_h, used in this procedure (15.9 ksi) was taken from ANSI B31.1 [29], rather than using S_m (16.9 ksi) from Section III of the ASME Code, as specified in Section XI. This leads to greater conservatism in weld overlay design. Comparison of primary stresses (Pressure + Deadweight + Seismic) to the B31.1 allowable S_h is more conservative than the original design [5], where these stresses were compared to 1.2 X S_h. Minimum weld overlay length was chosen to be $1.5\sqrt{Rt}$ where R and t are outside radius and wall thickness of the pipe, respectively.

It is noteworthy that, although not required by the ASME Section XI, thermal stresses were included in the original overlay design calculations to account for possible effects of low toughness weld materials. Referring to Table 2-2, the stresses due to (pressure + deadload + thermal expansion) were used for crack growth evaluations and the stresses due to (pressure + deadload + thermal expansion + seismic) were used for weld overlay design

15. "Alternative Alloys for BWR Pipe Applications", EPRI NP-2671-LD, October 1982

16. General Electric Company, "Third Party Review of the Technical Justification for Continued Operation of James A. FitzPatrick, Nuclear Power Plant with Existing Recirculation System Piping", Transmitted by letter from J. Silva (GE) to T. Dougherty (NYPA) dated April 21, 1986: JS-86-0421-1.

17. "Assessment of the Feasibility of Producing Pipe Samples with Tight Through-Wall IGSCC, EPRI NP-2241-LD, February 1982.

18. "Verification of Intergranular Stress Corrosion Crack Resistance in Boiling Water Reactor Large-Diameter Pipe," Final Report, EPRI NP-3650-LD, July 1984.

19. Pickett, A.E., "Assessment of Remedies for Degraded Piping - First Semi-Annual Progress Report," NEDC-30712-1, September 1984.

20. Pickett, A.E., "Assessment of Remedies for Degraded Piping - Second Semi-Annual Progress Report," NEDC-30712-2, August 1984 - August 1985.

21. N.R. Hughes and A.J. Giannuzzi, "Evaluation of Near-Term BWR Piping Remedies, Vol. 1 & 2", EPRI NP-1222, Nov. 1979.

22. "Extended Lifetime Test Program for Weld Overlays at Hatch, Unit 1", Structural Integrity Associates, SIR-84-030, September 1984.

23. "Continued Service Justification for Weld Overlay Pipe Repairs," EPRI, BWROG Ad Hoc Committee, May 25, 1984.

24. J. Park, D. Kupperman, W. Shack, "Examination of Overlay Pipe Weldments Removed from Hatch-2 Reactor," Argonne National Laboratory, September 1984.

25. L. Becker, et al., "Examination of Weld Overlayed Pipe Joints," EPRI NDE Center Report RP-1570-2, April 1985.

26. J. Park and D. Kupperman, "Ultrasonic and Metallurgical Examination of a Cracked Type 304 Stainless Steel BWR Pipe Weldment," ANL-84-1, January 1984.

27. G.M. Wilkowski, et al., "Degraded Piping Program - Phase II," NUREG/CR-4082, BMI-2120, Semi-Annual Report, 10-84 to 3-85.

28. G.M. Wilkowski, et al., "Degraded Piping Program - Phase II," NUREG/CR-4082, BMI-2120, Semi-Annual Report, 3-85 to 10-85 (Draft).

29. ANSI/ASME B31.1 "Power Piping," 1977 Edition.