

March 27, 2003

Mr. John T. Conway
Vice President Nine Mile Point
Nine Mile Point Nuclear Station, LLC
P. O. Box 63
Lycoming, NY 13093

SUBJECT: NINE MILE POINT NUCLEAR STATION, UNIT NO. 1 - EVALUATION OF FLAW INDICATIONS IN RECIRCULATION AND REACTOR WATER CLEANUP SYSTEM PIPING (TAC NO. MB6435)

Dear Mr. Conway:

By letter dated September 13, 2002, Nine Mile Point Nuclear Station, LLC (NMPNS), proposed changes to its previous commitments (letter dated September 14, 1999) regarding inspection requirements for certain Nine Mile Point Nuclear Station, Unit No. 1, piping welds:

- (1) Conduct reinspection of welds 32-WD-046, 32-WD-086, 32-WD-126, and 32-WD-168 in accordance with American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, Subsection IWB-2420(b), rather than follow the inspection schedule described in Generic letter (GL) 88-01 for intergranular stress corrosion cracking (IGSCC) Category "F" welds; and
- (2) Perform future inspection of weld 33-FW-22 (classified as IGSCC Category E) in accordance with the qualification requirements of the Electric Power Research Institute's Performance Demonstration Initiative program for weld overlays, rather than the performance demonstration recommendations of GL 88-01.

The Nuclear Regulatory Commission (NRC) staff has reviewed NMPNS's submittal. As discussed in the enclosed safety evaluation, the NRC staff determined that the proposed changes are acceptable. This completes NRC's efforts on the subject matter.

Sincerely,

/RA/

Peter S. Tam, Senior Project Manager, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-220

Enclosure: As stated

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RECIRCULATION AND REACTOR WATER CLEANUP SYSTEM PIPING WELD INSPECTION

NINE MILE POINT NUCLEAR STATION, UNIT NO. 1

NINE MILE POINT NUCLEAR STATION, LLC

DOCKET NO. 50-220

1.0 INTRODUCTION

During Refueling Outage 15 (RFO15) of 1999, Nine Mile Point Nuclear Station, LLC (the licensee) performed intergranular stress corrosion cracking inspection (IGSCC) at Nine Mile Point Nuclear Station, Unit No. 1 (NMP1). Flaws were detected by ultrasonic examination (UT) on four safe-end to elbow welds (32-WD-046, 32-WD-086, 32-WD-126, and 32-WD-168) in the reactor recirculation system piping. The licensee performed a flaw evaluation, considering flaw growth from both IGSCC and fatigue. The results of the licensee's flaw evaluation showed that the subject safe-end to elbow welds could be operated without repair for one fuel cycle. By letter dated January 14, 2000, the Nuclear Regulatory Commission (NRC) staff issued a safety evaluation which approved the continued operation of NMP1 for one fuel cycle without repairing the flawed safe-end to elbow welds. The NRC staff stated the requirements in Generic Letter (GL) 88-01 and NUREG-0313, Revision 2, that four successive inspections (every refueling outage) be performed on those welds to ensure that the IGSCC flaw sizes are stabilized before returning to the original IGSCC inspection category.

2.0 REGULATORY EVALUATION

During RFO16, the licensee re-inspected the referenced safe-end to elbow welds by UT. The results of the UT indicated that there were no changes in the flaw indications previously identified during RFO15. By letter dated September 13, 2002, the licensee proposed some changes to its IGSCC inspection of the subject piping welds as follows:

- (1) Conduct reinspection of welds 32-WD-046, 32-WD-086, 32-WD-126, and 32-WD-168 in accordance with American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, Subsection IWB-2420(b), rather than follow the inspection schedule described in GL 88-01 for IGSCC Category "F" welds;
- (2) Perform future inspection of weld 33-FW-22 (classified as IGSCC Category E) in accordance with the qualification requirements of the Electric Power Research Institute (EPRI)'s Performance Demonstration Initiative (PDI) program for weld overlays, rather than the performance demonstration recommendations of GL 88-01.

Enclosure

3.0 TECHNICAL EVALUATION

3.1 Re-inspection Schedule For Safe-End To Elbow Welds

The licensee proposed to perform three successive examinations of the subject 4 safe-end to elbow welds to confirm the absence of IGSCC. The examination schedule will follow that specified in ASME Code, Section XI, Subsection IWB-2420(b) instead of the schedule for IGSCC Category F welds specified by GL 88-01 (i.e., every refueling outage). According to IWB-2420(b), the successive inspections are required to be performed during the next three inservice inspection periods listed in the schedules of the inspection programs of IWB-2410. The inspection period specified in IWB-2410 varies from a period of 3 to 4 calendar years of plant service.

Based on review of the licensee's submittal, the NRC staff determined that the licensee's proposed re-inspection schedule for the subject safe-end to elbow welds in accordance with that specified in ASME Code, Section XI, Subsection IWB-2420(b) is acceptable. The NRC staff's determination is based on the following considerations:

- (a) During RFO15, flaw indications were found at four safe-end to elbow welds. These welds were re-examined by UT during RFO16. The results of the licensee's UT inspection performed in RFO16 showed that there are no changes in flaw sizes in the subject safe-end to elbow welds. Based on the UT examination results, it is reasonable to conclude that the actual crack growth in the subject welds is very small and is much less than that estimated by the licensee's flaw evaluation.
- (b) The ultrasonic responses from the flaw indications do not exhibit the characteristics typical of IGSCC, such as branching, faceting and axial components. It appears that these UT indications were fabrication-related indications associated with inconsistent weld root conditions such as non-fusion, lack of penetration and mismatch.
- (c) The licensee's flaw evaluation considered flaw growth due to IGSCC and fatigue. The majority of the flaw growth comes from IGSCC, as the contribution from fatigue is very small. In the absence of IGSCC, the licensee's flaw evaluation showed that it would take more than 50 years for the largest flaw to grow only by fatigue to a size that would exceed the Code allowable. Since the proposed re-inspection will be performed every 3 to 4 years (about 2 fuel cycles), there is adequate safety margin in maintaining the structural integrity of the subject safe-end to elbow welds because substantial flaw growth is not expected during the re-inspection period.
- (d) The licensee reported that the occupational exposure associated with the inspection of the subject welds is very high. Based on current dose rate trending, the total accumulated dose in examining these welds in RFO17 is estimated to be about 36 rem. Allowing inspection in accordance with IWB-2420(b) would reduce substantially occupational exposure in RFO17, and is consistent with the radiation protection principles to achieve occupational doses that are as low as reasonably achievable (ALARA).

According to GL 88-01, after successful completion of the proposed re-inspection to confirm the absence of IGSCC, the subject welds will return to the inspection schedule corresponding to their original IGSCC Category.

3.2 Inspection of Weld-Overlay-Repaired Weld 33-FR-22

This weld is located on the Reactor Water Cleanup System piping.

For the performance of IGSCC examinations, GL 88-01 requires that, in addition to complying with the applicable ASME Code requirements, the detailed procedure, equipment and examination personnel shall be qualified by a formal program approved by the NRC such as that being conducted in accordance with the Nondestructive Examination (NDE) Coordination Plan agreed upon by NRC, EPRI, and Boiling Water Reactor Owners Group for IGSCC Research, being implemented at the EPRI NDE Center in Charlotte, North Carolina. Subsequently, the EPRI's PDI program was developed to qualify inspectors to satisfy the requirements of Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems," to ASME Code, Section XI. By letter dated September 2, 1998, NRC formally recognized that the PDI program is an acceptable alternative to the IGSCC Coordination Plan. By letter dated January 15, 2002, NRC informed the industry that PDI's performance demonstration program for weld overlays is an acceptable alternative to the performance demonstration recommendations specified in GL-88-01. The letter further indicated that, starting on November 22, 2001, the examination of weld-overlay repaired welds should follow the requirements of ASME Code, Appendix VIII, Supplement 11, "Qualification Requirements for Full Structural Overlaid Wrought Austenitic Piping Welds."

Based on the above, the NRC staff determined that the licensee's proposed inspection of the weld-overlay-repaired weld 33-FW-22 is in accordance with the qualification requirements of the EPRI PDI Program, and is acceptable.

4.0 CONCLUSION

The NRC staff has reviewed the licensee's September 13, 2002, submittal. The NRC staff determined that the licensee's proposed IGSCC inspection changes are acceptable as delineated in the above sections.

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Date: March 27, 2003

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