



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

February 23, 2012

Mr. Ken Langdon
Vice President Nine Mile Point
Nine Mile Point Nuclear Station, LLC
P.O. Box 63
Lycoming, NY 13093

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION REGARDING NINE MILE POINT
NUCLEAR STATION, UNIT NO. 1 – RELIEF REQUEST NO. 11SI-004: REQUEST
FOR ALTERNATIVE FOR REPAIR OF CONTROL ROD DRIVE HOUSING
PENETRATIONS (TAC NO. ME5789)

Dear Mr. Langdon:

By letter dated March 25, 2011 (Agencywide Documents Access Management System (ADAMS) Accession No. ML110950307), as supplemented on September 29, 2011 (ADAMS Accession No. ML11279A037), Nine Mile Point Nuclear Station, LLC (NMPNS) submitted for Nuclear Regulatory Commission (NRC) staff review and approval, Relief Request No. 11SI-004, an alternative to the requirements of Title 10 of the *Code of Federal Regulations*, Section 50.55a(g) for the Repair of Control Rod Drive Housing Penetrations for the remainder of the license renewal period of extended operation for Nine Mile Point, Unit No. 1.

The NRC staff is reviewing the information provided in those letters and has determined that additional information is needed to support its review. Enclosed is the NRC staff's request for additional information (RAI). The RAI was discussed with your staff on February 8, 2012, and it was agreed that your response would be provided within 45 days from the date of this letter.

Sincerely,

A handwritten signature in black ink, appearing to read "R. Guzman", with a long horizontal flourish extending to the right.

Richard V. Guzman, Senior Project Manager
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-220

Enclosure:
As stated

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION (RAI)

NINE MILE POINT NUCLEAR STATION, UNIT NO. 1

REQUEST FOR RELIEF NO. 1ISI-004

RELATED TO REPAIR OF CONTROL ROD DRIVE HOUSING PENETRATIONS

DOCKET NO. 50-220

The Nuclear Regulatory Commission (NRC) staff has reviewed the information provided by Nine Mile Point Nuclear Station, LLC (NMPNS, the licensee) for Nine Mile Point, Unit 1 (NMP1) in its letter dated March 25, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML110950307), and in the licensee's response to NRC's request for additional information (RAI) letter dated September 29, 2011 (ADAMS Accession No. ML11279A037), and has determined that additional information is necessary to complete the review of Relief Request No. 1ISI-004.

Based on the NRC staff's review of the responses to RAI-1, RAI-2 and RAI-3 please provide a response which addresses the following questions:

1. In Proposed Alternative 5A of the submittal, the licensee requested relief from American Society of Mechanical Engineers Boiler and Pressure Code (ASME Code), Section XI, IWA-4610(a), which requires the use of thermocouples and recording instruments to monitor process temperatures. In RAI-1 of the RAI letter dated August 11, 2011, the NRC staff requested that the licensee describe how an acceptable level of quality and safety can be maintained in this repair if both heat transfer calculations and temperature measurement on a test coupon are not performed instead of interpass measurement. By letter dated September 29, 2011, the licensee's response stated, in part that, "NMPNS will either perform heat flow calculations or measure the maximum interpass temperature on a representative test coupon, but not both. This approach is consistent with the associated requirements specified in American Society of Mechanical Engineers (ASME) Code Case N-638-4, which the NRC has determined to be conditionally acceptable in Regulatory Guide 1.147, Revision 16." As stated in the submittal, and consistent with the "Safety Evaluation Report Related to the License Renewal of Nine Mile Point Nuclear Station, Units 1 and 2" (ADAMS Accession No. ML061460313), the licensee is pursuing a "variation of the welded repair geometry specified in BWRVIP-58-A subject to the approval of the NRC using Code Case N-606-1 in the event that a zero leakage condition is not achieved for a control rod drive (CRD) housing penetration that has been roll-repaired in accordance with the provisions of Code Case N-730." Therefore, the NRC staff review and assessment pertains to ASME Code Case N-606-1; not ASME Code Case N-638-4.

In the RAI response dated September 29, 2011, NMPNS discussed prior work performed by AREVA on pressurized-water reactor (PWR) control rod drive mechanism (CRDM) nozzle penetration modifications which they stated represents a similar configuration to the NMP1 reactor vessel bottom head CRD housing internal weld repair. However, PWR CRDM nozzle penetration modifications and boiling-water reactor (BWR) reactor vessel bottom head CRD housing internal weld repairs have fundamental differences, and any comparison

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between them must address these differences. For a comparison to be valid, this comparison shall be made on all welds previously repaired without interpass temperature measurement with the current weld to be repaired. The comparison of data from the welding of CRDM nozzles is to include the following for each weld:

- a) Thickness of weld and all components joined by it.
- b) Types of all materials involved.
- c) Welding parameters, i.e., volts, amps, travel speed (heat input) etc.
- d) The results of all non-destructive examinations performed on the weld since its original construction to the present day.
- e) Any cracks, defects or indications found in the welds since their repair or modification and the analysis of those cracks, defects or indications.
- f) A comparison between the operating conditions of each weld and the subject bottom head and CRD housing weld.
- g) The length of time that the welds have been in service.
- h) A comparison between the actual repairs being performed, using drawings of each weld and the subject bottom head and CRD housing weld. The comparison shall include temperature comparisons between the temperatures measured on the mockup and the calculated temperature.

Include all welds repaired without interpass temperature measurement in this data. The NRC staff requests that this data and comparison be submitted to the NRC for review.

2. In Proposed Alternative 6A of the submittal, the licensee requested relief from ASME Code Case N-606-1, "Similar and Dissimilar Metal Welding Using Ambient Temperature Machine Gas Tungsten Arc Welding Temper Bead Technique for BWR CRD Housing Stub Tube Repairs," Section XI, Division 1, Paragraph 1(f) which prohibits peening of the final weld layer. Peening is a process which can crack or otherwise damage welds. It can also mask non-destructive examination methods from identifying defects in a weld. If peening is performed on a weld, the potential for creating or masking defects exists. The stress profile of the peened surface is unknown; and the effect of peening on the mechanical and other properties, such as, fatigue, corrosion or stress-corrosion cracking is unknown. The prohibition of peening of the final weld surface is contained in Paragraph 1(f) of ASME Code Case N-606-1 as stated above, and also in paragraph NB-4422 of ASME Code, Section III. There is no precedent of rotary peening of the final weld layer of a BWR CRD housing.

In order to adequately evaluate a deviation from the ASME Code, a rigorous technical basis would need to be submitted for NRC staff review in order to evaluate the process of rotary peening of the final weld layer of a BWR CRD housing. This technical basis should be sufficiently detailed to potentially justify a deviation to the ASME Code (i.e., an ASME White paper).

3. RAI-3 of the RAI letter dated August 11, 2011, referenced the original submittal which stated, in part that, "in the event that roll expansion does not seal the [Control Rod Drive Housing] penetration and stop the leak, a repair shall be performed based on BWRVIP-58-A as depicted in Figure 1 with variations thereto as discussed and justified herein." Section 3 of BWRVIP-58-A, "BWR Vessel and Internals Project, CRD Internal Access Weld Repair," discusses repair of CRD welds. Section 3.3 of BWRVIP-58-A discusses making a weld repair if water is leaking through a crack and states that, "the welding is performed at a pressure (~60 pounds per-square-inch) that would prevent leakage of water into the cavity during the welding process. The pressure in the cavity is maintained during the welding process by sealing at the CRD housing flange and at the nozzle bore plug. This hyperbaric-chamber environment must be maintained during an initial drying cycle when any residual moisture from the AWJ [Abrasive water jet] process or leakage is removed, and during the first three layers of welding to insure the leak path is sealed."

If this process or any other similar process is performed, then this weld is a dry underwater weld, and as such, the rules of ASME Code, Section XI, IWA-4660, "Underwater Welding" apply. The rules of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(b)(2)(xii) also apply, in which case permission to perform underwater welding must be sought from the NRC.

In its RAI response dated September 29, 2011, NMPNS concluded that the NMP1 CRD housings may be considered non-irradiated material for the purpose of the proposed weld repair, and that a request for relief from the requirements of 10 CFR 50.55a(b)(2)(xii) is not required. Since there is a radiation field at the bottom of the vessel, a request for relief is required to be submitted, and as part of the request, the licensee must provide the accumulated dose at the weld.

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Sincerely,

/RA/

Richard V. Guzman, Senior Project Manager
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

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ADAMS Accession No.: ML12048A836 *Concurrence via memo. No substantial changes made. NRR-088

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