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SUBJECT: Provides supplemental info to 970207 ltr in response to matters discussed w/staff during recent telcon re GL 94-03, "Intergranular Stress Corrosion Cracking of Core Shrouds in BWRs."

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February 28, 1997
NMP1L 1190

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

RE: Nine Mile Point Unit 1
Docket No. 50-220
DPR-63

Subject: *Generic Letter 94-03, "Intergranular Stress Corrosion Cracking of Core Shrouds in Boiling Water Reactors"*

Gentlemen:

By letter dated February 7, 1997, Niagara Mohawk Power Corporation (NMPC) provided inspection plans for Nine Mile Point Unit 1 (NMP1) pertaining to core shroud welds. This letter provides supplemental information to the February 7, 1997 letter in response to matters discussed with the Staff during a recent telephone conference. The information is related to clarification of: 1) NMPC's planned shroud vertical weld inspections; and 2) the basis for the H8 weld inspection scope as a follow up to our conference call on February 21, 1997. The shroud vertical weld inspection plans described in this communication supplements the description provided by our letter of February 7, 1997 and supersedes the vertical weld inspection plans discussed in our letter of October 4, 1995. The vertical weld inspection scope discussed in our letter of October 4, 1995 was based on a draft version (not submitted) of BWRVIP-07, "Guidelines for Reinspection of BWR Core Shrouds," since that was all that was available at that time. Subsequently, the BWRVIP submitted BWRVIP-07, "Guidelines for Reinspection of BWR Core Shrouds, EPRI Report TR-105747," dated February 1996. That report addresses: baseline inspection scope, expansion of inspection scope if cracking is found, re-inspection requirements and acceptance criteria. NMPC plans to follow the shroud vertical weld baseline inspection recommendations, described in section 4.4.1 (Option B) of the February 1996 BWRVIP-07 report, at RFO14.

1. Shroud Vertical Weld Inspection Plan

NMPC will perform an enhanced VT-1 of the OD of the entire accessible length of either weld V9 or V10 and a minimum of 23 inches of weld V11 (refer to the shroud weld map in Figure 1). This inspection scope equates to the BWRVIP-07 recommended 25% of the equivalent length of all shroud vertical welds. For NMP1 the equivalent length of all vertical shroud welds is approximately 451 inches, therefore a minimum of 113 inches of vertical weld will be inspected. Following completion of the baseline inspection and assuming no cracking was identified, NMPC plans to follow BWRVIP-07 for shroud

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vertical weld inspections performed during future refuel outages. If any cracking is detected in a weld during the baseline inspection, NMPC intends to follow the BWRVIP-07 expanded sample guidance, amended, as follows.

Shroud Vertical Weld Inspection Expanded Sample Criteria

Below (items 1 through 8) is the expanded sample criteria NMPC will follow if cracking is detected in the baseline shroud vertical weld inspection sample. The criteria below was extracted from an NMPC Engineering Specification prepared to aid inspection personnel in the development of their inspection procedures.

1. If any cracking is detected in a weld, inspect all accessible portions of the entire weld from the ID and OD of the weld.
2. If cumulative cracking is less than or equal to 10% of the equivalent length of weld inspected and the cracking at any individual weld is less than or equal to 10% of the length of that weld, then the inspection is complete.
3. If cumulative cracking is less than or equal to 10% of the equivalent length of weld inspection but the cracking at any individual weld is greater than 10% of the length of that weld, then the minimum required uncracked length will be verified for that weld from the OD and ID, and the inspection scope shall be expanded to include a total of 50% of the equivalent length of all vertical welds from the OD or ID.

The minimum required uncracked length for each weld is:

V3, V4-12", V7, V8-10", V9, V10-27", V11, V12-16", V15, V16-11"

Minimum ligament lengths were obtained from Nuclear Engineering Report NER-1M-031, "Reactor Core Shroud Vertical & Ring Segment Weld Structural Evaluation."

4. If cumulative cracking in the original sample is greater than 10% of the equivalent length of weld inspected but no individual weld is cracked greater than 10% of the length of that weld, then the inspection scope shall be expanded to include a total of 50% of the equivalent length of all vertical welds from the OD or ID.
5. If cumulative cracking in the expansion sample is less than or equal to 10% of the equivalent length of weld inspected, and the cracking at any new individual weld is less than or equal to 10% of the length of that weld, then the inspection is complete.
6. If cumulative cracking in the expansion sample is less than or equal to 10% of the equivalent length of welds inspected, but the cracking at any individual weld is greater than 10% of the length of that weld, then the inspection scope shall be expanded to include a total of 100% of the equivalent length of all vertical welds from the OD or ID, and the minimum required uncracked length will be verified from the OD and ID for any weld where cracking exceeds 10% of the inspected length.



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7. If cumulative cracking in the expansion samples is greater than 10% of the equivalent length of weld inspected, then the inspection scope shall be expanded to verify the minimum required uncracked length for each vertical weld that is located above the elevation of the core plate from the OD and ID. Additionally, the inspection scope shall be expanded to inspect the two welds (V15 and V16) located below the elevation of the core plate from the OD.
8. If no cracking is detected on the OD of V15 and V16 then contact engineering immediately for further evaluation as justification will be required to support an OD only exam. If any cracking is detected in V15 or V16, inspect all accessible portions of that entire weld from the ID and OD of the weld to verify the uncracked length of each weld is greater than or equal to 11 inches. The recommended inspection methods is UT from the OD.

There are two differences between the above criteria (items 1 through 8) and the BWRVIP-07 criteria. The first is that NMPC proposes to expand the scope to include 50% of the equivalent weld length of all vertical welds, if cumulative cracking exceeds 10% of the initial sample, and verify the minimum required uncracked length (Lmin) exists for each cracked weld. Whereas, BWRVIP-07 recommends that the sample be immediately expanded to verify Lmin of all ten vertical shroud welds if cumulative cracking exceeds 10% of the initial sample. At NMP1, if cumulative cracking exceeds 10% of the new 50% expanded sample, then NMPC would expand the scope to verify Lmin for all ten of the vertical shroud welds. The second is that for vertical welds V15 and V16, which are below the core plate and for which access to the ID surface is difficult, a graded approach utilizing engineering analysis is proposed as described in item 8 above. This alternative will be used only if no cracking is found on the OD surface of welds V15 and V16.

Justification

For NMP1 the above proposed change is requested because 10% of a 25% sample of the total vertical cumulative length (100% for a BWR-2 such as NMP1 is \approx 451 inches) represents only \approx 11 inches of cumulative cracking which is within the industry experience norm. NMPC does not consider cumulative indications totaling 11 inches or a single indication of 11 inches as an anomaly which requires a complete Lmin of all ten vertical welds based on recent industry experience with shroud vertical weld inspections. The BWRVIP-07 guidelines were written considering a typical BWR-3/4/5 shroud which has approximately 800 to 1100 inches of cumulative vertical weld; where 10% of a 25% sample represents an indication on the order of 20 to 28 inches. Consistent with the typical BWR-3/4/5 plants, if cumulative cracking exceeds 22 inches, NMPC will expand the scope to verify Lmin for all ten of the vertical shroud welds. It is emphasized that if any cracking is seen in the initial inspection sample, the Lmin values listed above will be verified for each cracked weld. Considering these factors and the relatively small Lmin values as compared to the equivalent length of each weld, the proposed criteria for expanding the inspection to a minimum ligament inspection of all ten vertical welds is considered conservative and consistent with the BWRVIP-07 guideline intent.



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2. H8 Inspection

The following is a clarification of the basis for the inspection plans submitted on February 7, 1997, regarding the H8 weld inspection scope.

The H8 shroud re-inspection analysis submitted as Attachment 1 to the February 7, 1997, establishes that the required re-inspection interval (i.e., UT examination of the weld) for the H8 weld is 6 years. This analysis has bounded the potential growth of the UT indication using the standard $5.5e-5$ crack growth and therefore the UT inspection of this indication is not required until the 6 year interval inspection is due and will not be performed at RFO14.

The baseline inspection of the H8 weld covered 38% of the H8 circumference. The UT examination was augmented by enhanced VT-1 with cleaning over the remainder of the accessible H8 circumference. The inspection plans for RFO14 are to perform an enhanced VT-1 with cleaning of the accessible portions of the 38% of the H8 weld circumference for which the baseline UT was performed. This additional visual inspection is required to verify the re-inspection analysis basis that no top side cracking exists where the UT examination was performed.

In addition, the previously identified visual indication will be examined to determine if any growth has occurred. It is important to emphasize that the re-inspection analysis which derived the 6 year interval assumes that the location where the visual indications were identified is cracked through wall. The analysis actually assumes that all portions of the circumference not inspected with UT is cracked through wall and that the location of the UT indication is cracked through wall and these cracks are assumed to grow at $5e-5$ in/hr.

If the re-inspection of the H8 weld, using enhanced VT-1, identifies top sided cracking in portions of the H8 weld assumed in the analysis to be uncracked, then the 6 year interval will require re-evaluation. If the previously identified visual indications show growth, then the impact on the 6 year analysis assumptions will be reviewed to determine if any changes are required. Since this portion of the circumference was assumed to have through wall cracking, no impact on the six-year interval is expected.

Very truly yours,



Martin J. McCormick Jr.
Vice President Nuclear Engineering

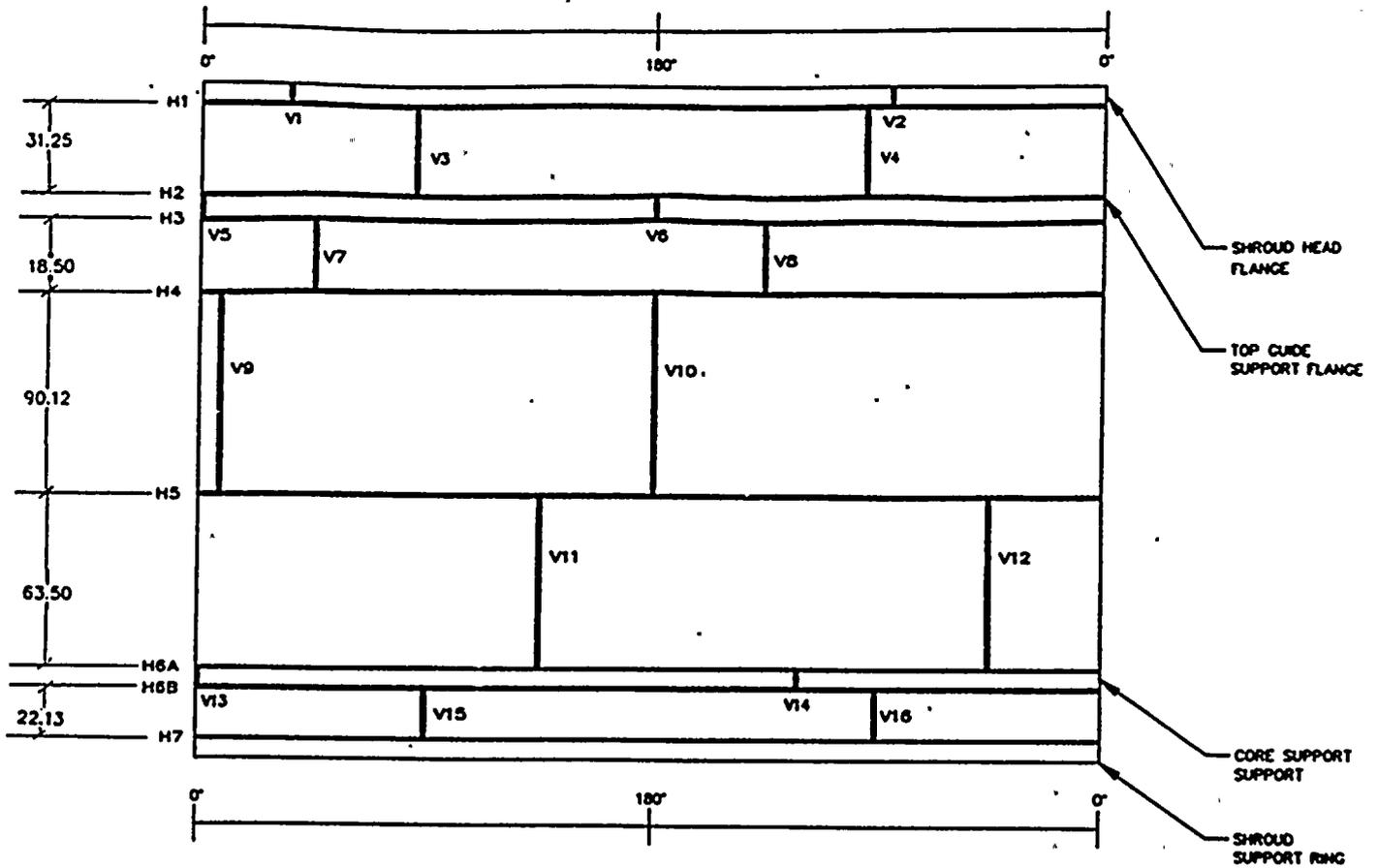
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xc: Mr. H. J. Miller, NRC Regional Administrator, Region I
Mr. S. S. Bajwa, Acting Director, Project Directorate I-1, NRR
Mr. B. S. Norris, Senior Resident Inspector
Mr. D. S. Hood, Senior Project Manager, NRR
Records Management



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FIGURE 1: SHROUD WELD MAP





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