CATEGORY 1

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9809150286 DOC.DATE: 98/09/08 NOTARIZED: NO DOCKET #
FACIL:50-220 Nine Mile Point Nuclear Station, Unit 1, Niagara Powe 05000220
50-410 Nine Mile Point Nuclear Station, Unit 2, Niagara Moha 05000410
AUTH.NAME AUTHOR AFFILIATION
ABBOTT,R.B. Niagara Mohawk Power Corp.
RECIP.NAME RECIPIENT AFFILIATION
Records Management Branch (Document Control Desk)

SUBJECT: Responds to comments to UCS re util request to extend core shroud inspection interval for NMPNS Unit 1.

DISTRIBUTION CODE: A001D COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 6
TITLE: OR Submittal: General Distribution

NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	PD1-1 LA	1	1	PD1-1 PD	1	1
	HOOD,D	1	1			
INTERNAL:	ACRS	1	1	FILE CENTER 01	1	1
	NRR/DE/ECGB/A	1	1	NRR/DE/EMCB	1	1
	NRR/DRCH/HICB	1	1	NRR/DSSA/SPLB	1	1
	NRR/DSSA/SRXB	1	1	NUDOCS-ABSTRACT	1	1
	OGC/HDS3	1	0			
EXTERNAL:	NOAC	1	1	NRC PDR	1	1

CATEGORY 1 DOCUMENT

NOTE TO ALL "RIDS" RECIPIENTS:
PLEASE HELP US TO REDUCE WASTE. TO HAVE YOUR NAME OR ORGANIZATION REMOVED FROM DISTRIBUTION LISTS OR REDUCE THE NUMBER OF COPIES RECEIVED BY YOU OR YOUR ORGANIZATION, CONTACT THE DOCUMENT CONTROL DESK (DCD) ON EXTENSION 415-2083

TOTAL NUMBER OF COPIES REQUIRED: LTTR 14 ENCL 13

Niagara Mohawk

Richard B. Abbott
Vice President
Nuclear Engineering

Office: (315) 349-1812
Fax: (315) 349-4417

September 8, 1998
NMP1L 1360

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

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

Nine Mile Point Unit 2
Docket No. 50-410
NPF-69

Subject: ***Response to Comments by the Union of Concerned Scientists Regarding the Request by Niagara Mohawk Power Corporation to Extend Core Shroud Inspection Interval for Nine Mile Point Unit 1***

Gentlemen:

Niagara Mohawk Power Corporation (NMPC) provides in the attachment to this letter responses to the Union of Concerned Scientists' (UCS) questions relative to NMPC's request to extend the core shroud inspection interval for Nine Mile Point Unit 1 (NMP1). The attachments contain NMPC's responses to the nine questions raised on pages 5 and 6 of the UCS letter dated June 24, 1998 to Mr. Samuel J. Collins, Director, Office of Nuclear Reactor Regulation. In this connection, Mr. Singh S. Bajwa, Director Project Directorate I-1, in a letter to Mr. David A. Lochbaum of UCS, which was dated June 30, 1998, had stated: "I understand NMPC intends to provide written comments to the NRC Staff regarding your letter."

Very truly yours,

Richard B. Abbott
Vice President Nuclear Engineering

RBA/GJG/sc
Attachment

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

A001

ATTACHMENT 1
RESPONSE TO UNION OF CONCERNED SCIENTISTS QUESTION RELATIVE TO NIAGARA MOHAWK POWER CORPORATION'S REQUEST TO EXTEND THE NINE MILE POINT UNIT 1 CORE SHROUD INSPECTION INTERVAL

Question #1:

Why wasn't the design verification performed by General Electric for its technical reports 97181-TR-02 and 97181-TR-03?

Response:

As a matter of clarification Technical Reports 97181-TR-02 and 97181-TR-03 were not produced by General Electric (GE). Both of these reports were products of Altran Corporation. Technical Report 97181-TR-02 is entitled "Interpretation of Metallurgical Report on Core Shroud Vertical Weld Boat Samples" and Technical Report 97181-TR-03 is entitled "EPR Testing of Boat Samples from Core shroud Vertical Welds V-9 and V-10 at NMP-1."

These reports were prepared by Altran personnel experienced in interpretation of metallurgical examinations. In addition, independent reviews were performed for both reports by experienced individuals at NMPC and metallurgical consultants of NMPC. This independent peer review is an appropriate verification method for Technical Reports 97181-TR-02 and 97181-TR-03. Technical Report 97181-TR-03 documents EPR testing performed at McDermott Laboratories. Altran provided independent technical oversight of the EPR testing performed at McDermott. GE provided independent cross laboratory verification of the laboratory testing procedures and apparatus. Since EPR testing was in itself a verification activity, this method of review was appropriate.

In summary, the appropriate independent verification was performed for all analyses, testing, and metallurgical assessments that constitute the basis for the NMPC submittal.

Question #2:

Does the recent discovery of core shroud cracking on Nine Mile Point Unit 2 challenge the conclusion that the core shroud cracking on Nine Mile Point Unit 1 was caused by poor reactor chemistry during the plant's early years of operation?

Response:

NMPC has not changed its conclusion that the root cause of core shroud cracking at both Nine Mile Point 1 (NMP1) and Nine Mile Point 2 (NMP2), is Intergranular Stress Corrosion Cracking (IGSCC).

For IGSCC to occur, the material must be susceptible to the IGSCC phenomenon, the material must be sensitized (sensitization can be introduced by certain manufacturing processes such as welding and/or grinding), the environment must be conducive to the formation of IGSCC and the material must be under stress (combined applied and residual). The NMP1 and NMP2 shrouds were fabricated from 304 and 304L stainless steel, respectively, which are susceptible to IGSCC, the Boiling Water Reactor (BWR) environment is conducive to IGSCC formation, and both shrouds have stresses in and adjacent to the weld heat affected zones in addition to fabrication (fit-up) stresses. Therefore, the analysis of severity of cracking focuses on the degree of material susceptibility, corrosiveness of the water chemistry and level of stress.

During the initial operation of NMP1, water chemistry guidelines were less stringent than current BWR guidelines. The IGSCC phenomenon was not, at the time, known to have a significant impact on plant operation. Therefore, NMPC has concluded that one reason for the severity of cracking at NMP1 was that initial water quality did not meet water quality guidelines developed in the early 1980's, as knowledge of the IGSCC phenomenon increased. It is inappropriate, however, to characterize the water chemistry at NMP1 during its early years of operation as "poor," in view of the general industry guidelines existing at that time.

At NMP2, water chemistry has been maintained, generally, within industry standards since plant startup. As stated above, the BWR environment combined with the construction practices used for the NMP2 shroud makes it susceptible to cracking. Although not unexpected, the cracking was found relatively early in plant operational life. This may be attributed to the stresses placed on the shroud during the fabrication process (see response to Question #9).

Question #3:

How were control specimens used in the boat sample tension tests?

Response:

As stated on page 12 of Attachment 2 "Niagara Mohawk's Nine Mile Point 1 Boat Sample Analysis Part III: Tension Test" which was included in NMPC's February 27, 1998 letter (NMP1L 1290), the control specimens were intended to establish scaling factors. However, due to the low yield strength at 550°F, scaling factors could not be obtained.

Question #4:

Was it appropriate to rely on control specimens made from "off-the-shelf" Type 304 stainless steel just because Niagara Mohawk did not have core shroud archive material samples?

Response:

As noted in response to Question 3, the control samples were not useful in determining scaling factors, and were thus not used in the evaluation. However, NMPC made a decision early in

the evaluation to attempt to determine scaling factors, and thus obtained material which had material properties as similar to the boat samples as possible. Since samples were not available from the shroud, NMPC and its consultants believe that the choice of material was appropriate.

Question #5:

Did General Electric properly discount the high results during the EPR testing of the boat samples?

Response:

NMPC has concluded that the appropriate EPR estimates were applied in the GE PLEDGE analysis since the EPR estimates were based upon cross-calibration of the McDermott Laboratories measurement techniques, and independent metallurgic assessment based upon GE expertise.

Subsequently, on June 8, 1998, the NRC has issued a Safety Evaluation Report approving the Boiling Water Reactor Vessel Internals Project (BWRVIP) Report Number BWRVIP-14, which addresses crack growth rate for 304SS material in the BWR environment. It should be noted that the BWRVIP-14 equation for crack growth rate does not include a term for degree of sensitization. The BWRVIP-14 crack growth rate of $2.2E^{-5}$ in/hr applies to core shroud 304SS independent of the degree of sensitization (i.e., EPR).

Question #6:

Can Figure 3 from General Electric report GE-NE-523-B13-01869-113NP be made publicly available.

Response:

A non-proprietary version of Figure 3 is provided as Attachment 2.

Question #7:

Why is Nine Mile Point Unit 1 in operating cycle 13 with its next refueling outage being Refuel 15?

Response:

Initial cycles at NMP1 were not numbered sequentially (i.e., 1A, 1B vs. 1, 2), which when corrected caused the mismatch between the refueling outage number and the operating cycle.

Question #8:

What cracked the horizontal welds on the Unit 2 core shroud?

Response:

As noted in a letter from Mr. C.D. Terry, Vice President, Nuclear Safety Assessment and Support, dated July 9, 1998, the cause of the cracking of the NMP2 core shroud is IGSCC.

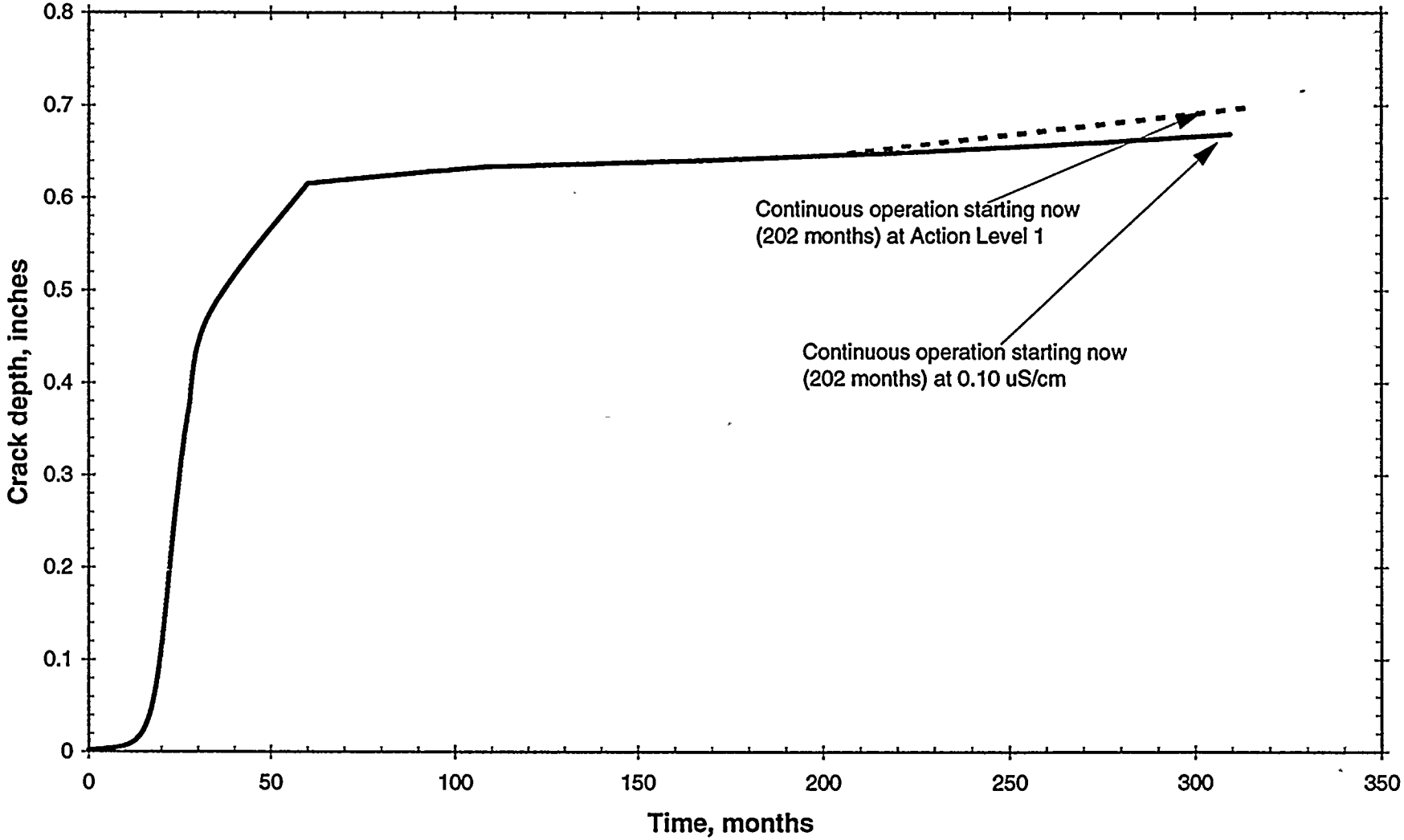
Question #9:

If the Unit 2 cracking was caused by stress from "lifting, forming, and lifting," why were the flaws not detected until the 1998 outage?

Response:

Forming increases the residual stresses in the weld heat affected zones, but would not cause an immediate crack. When the shroud was then exposed to the BWR environment, over time IGSCC developed. The reason the flaws were not discovered until the 1998 outage is that: 1) crack initiation and growth takes time, and 2) the examinations performed prior to 1998 were visual only and were not performed to the BWRVIP-03 standards. It should be noted that several of the locations visually inspected in 1993 were inside diameter (ID) locations. The 1998 ultrasonic testing (UT) inspections did not show ID indications in the locations that were visually inspected in 1993. Further, due to the tight configuration of the IGSCC flaws and the oxide film, the visual examination used in 1993 may not have been capable of detecting these indications.

Figure 3: Crack Depth vs. Time: NMP-1 Shroud Vertical Weld Cracks (Parameters Selected for Consistency with Current Depth of Cracking)



ATTACHMENT 2