

**PRIORITY 1**  
(ACCELERATED RIDS PROCESSING)

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9503140090    DOC. DATE: 95/03/06    NOTARIZED: NO    DOCKET #  
 FACIL: 50-220 Nine Mile Point Nuclear Station, Unit 1, Niagara Powe    05000220  
 AUTH. NAME    AUTHOR AFFILIATION  
 ABBOTT, R.B.    Niagara Mohawk Power Corp.  
 RECIP. NAME    RECIPIENT AFFILIATION  
                                  Document Control Branch (Document Control Desk)

SUBJECT: Forwards plant evaluation of insp results of indication near nozzle 23A will not prevent sparger from performing function of providing spray flow to core.

DISTRIBUTION CODE: A001D    COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 4  
 TITLE: OR Submittal: General Distribution

NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTTR ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR ENCL
	PD1-1 LA BRINKMAN, D.	1 1 1 1	PD1-1 PD	1 1
INTERNAL:	ACRS	6 6	FILE CENTER 01	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

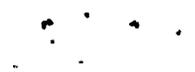
NOTE TO ALL "RIDS" RECIPIENTS:

PLEASE HELP US TO REDUCE WASTE! CONTACT THE DOCUMENT CONTROL  
 DESK, ROOM P1-37 (EXT. 504-2083) TO ELIMINATE YOUR NAME FROM  
 DISTRIBUTION LISTS FOR DOCUMENTS YOU DON'T NEED!

TOTAL NUMBER OF COPIES REQUIRED: LTTR 17 ENCL 16

MAF

P  
R  
I  
O  
R  
I  
T  
Y  
  
D  
O  
C  
U  
M  
E  
N  
T



March 6, 1995  
NMP1L 0912

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:** *Evaluation Report of Indication on Core Spray Sparger Loop "A", near Nozzle "23A" Discovered During RFO-13*

Gentlemen:

In a February 23, 1995 telephone conference, NMPC notified NRC of the subject indication near nozzle 23A. Enclosed for your review and approval is the evaluation report of the inspection results of the indication near nozzle 23A pursuant to NMPC's In-Service-Inspection (ISI) Program Plan per IE Bulletin 80-13, "Cracking in Core Spray Spargers."

The enclosed evaluation concludes that the indication observed near core spray sparger nozzle 23A will not prevent the sparger from performing its function of providing spray flow to the core between the current refueling outage (RFO-13) and RFO-14 (1997). Therefore, no repair is needed at this time.

Your approval of this report is requested by March 13, 1995, so we can proceed with reactor reassembly as early as March 15, 1995.

Very truly yours,



R. B. Abbott  
Plant Manager NMP1

RBA/NSB/lmc  
Enclosure

140055

xc: Regional Administrator, Region I  
Mr. L. B. Marsh, Director, Project Directorate I-1, NRR  
Mr. D. S. Brinkman, Senior Project Manager, NRR  
Mr. L. T. Doerflein, Region I  
Mr. B. S. Norris, Senior Resident Inspector  
Records Management

9503140090 950306  
PDR ADOCK 05000220  
P PDR

Aool  
7/1



## ENCLOSURE

### **Nine Mile Point Unit 1 1995 Core Spray Sparger Examination Evaluation of Rejectable Indication in Loop A Near Nozzle 23A**

#### INTRODUCTION

In accordance with Niagara Mohawk's commitment to the NRC per IE Bulletin 80-13, NMPC performs a visual examination of the accessible portions of the Nine Mile Point Unit 1 core spray spargers during each refueling outage using remote underwater television cameras. During the 13th Refueling Outage (RFO-13) in February 1995, a rejectable indication was identified in the Loop A core spray sparger pipe near the 23A spray nozzle. The indication was reported to the NRC in a telephone conversation on February 23, 1995.

The indication is approximately 3.5 inches long and runs from the sparger pipe-to-nozzle weld heat affected zone into the sparger pipe. The indication also has several branches. The sparger pipe is nominal 3.5-inch diameter schedule 40 Type 304 stainless steel.

This is the second indication identified in the NMP1 core spray spargers. The first indication was found in 1981 in the Loop A sparger pipe near the 26A nozzle, which is about 15 inches from the 23A nozzle. NMPC reported this earlier indication to the NRC in 1981 and has examined the indication each refueling outage to monitor any growth. To date the size of the indication near nozzle 26A has not changed.

#### SUMMARY OF EVALUATION

##### *Crack Initiation*

Intergranular stress corrosion cracking (IGSCC) is considered to be the cause of initiation for the indication found in 1995 for the following reasons:

As described above, NMPC discovered and reported cracking in the Loop A sparger pipe near nozzle 26A during an examination in the 1981 refueling outage. The most probable cause of crack initiation near nozzle 26A was considered to be IGSCC. The sparger stress state and material at the 23A nozzle are similar to those at the 26A nozzle position.

The indication near 23A appears to initiate near the toe of the sparger pipe-to-nozzle weld where the sparger pipe material may have been sensitized during welding.



100

100

.

.

.

.

.

.

.

.

.

.

## *Crack Growth*

To determine whether the indication near nozzle 23A is actively growing, NMPC personnel reviewed videotapes of core spray sparger examinations taken during refueling outages from 1981 to 1993 inclusive. Review of the videotapes revealed that portions of the indication near the 23A nozzle were visible in videotapes recorded in 1981 and 1988. The indications were observed during this review by first studying the 1995 tape and noting the location of the indication relative to features on the sparger surface, and then checking the same location in the earlier examinations. Improvements in photography techniques and experience of the NDE personnel made identification of the indication possible in 1995 (RFO-13).

Detailed examinations of the sparger pipe near the 23A nozzle performed in February and March 1995 showed the following:

One end of the indication lies near the toe of the sparger pipe-to-nozzle weld. The indication does not appear to extend behind the nozzle. This portion of the indication is visible in the 1988 examination videotape. The end of the indication in the 1988 videotape is at or near the same location as it is in the 1995 videotape.

The other end of the indication lies in the sparger piping. This end of the indication is visible in the 1981 videotape. The location of this end of the indication is about the same in the 1981 and 1995 videotapes.

The indication has two branches. Each is about 0.25-inch long. Neither can be seen in the 1981 or 1988 videotapes.

Since neither end of the indication has propagated noticeably since at least 1988, there is little or no ongoing crack propagation near the 23A nozzle. No information is available from videotapes predating 1995 regarding the indication branches; therefore the branch growth rate is unknown.

The NMPC evaluation of the cracking found near nozzle 26A in 1981 considered that the initial crack propagation may have been due to residual bending moment loads left in the spargers after installation. Propagation after installation is limited because these bending loads are self relieving. Little or no crack growth has occurred in this area as observed during examinations performed in each refueling outage since 1981.

### *Impact on Structural Capability of the Sparger*

Fracture mechanics methods were used to determine if the indication could prevent the sparger from performing its function of providing spray flow to the core. The analysis used the following assumptions:

1. The analysis assumed that each end of the indication will grow. The growth rate assumed was  $5E-5$  inch/hour, which is the maximum expected growth rate for IGSCC-type cracks. This is a conservative assumption because as described above the ends of the indication do not appear to have propagated since at least 1988.



2 2 2 2 2

2. The analysis assumes that growth could occur in any direction.
3. The analysis assumes that the sparger is cracked throughwall along the entire length of the indication.

The length of the indication at the end of the upcoming operating cycle was determined by multiplying the propagation rate for each end by the cycle duration (two years) and adding to the 3.5-inch length measured in the 1995 examination. The indication length calculated in this manner is about 5.25 inches. The sparger was then analyzed to determine whether the remaining uncracked ligament could withstand deadweight and seismic loads and the loads resulting from a core spray injection transient. Additionally, stress intensity factors in the axial and circumferential directions were calculated at the indication tip assuming the maximum indication length and compared to the critical stress intensity factor for the sparger material.

Based on these analyses, the maximum calculated indication length (5.25 inches) at the end of the 1995 to 1997 operating cycle is acceptable: specifically, the remaining uncracked ligament can withstand loads associated with a sparger injection transient, and the axial and circumferential stress intensity factors at the indication tip (6.3 and 9.7 ksi-square root inch, respectively) are less than the maximum permitted critical stress intensity factor (150 ksi-square root inch). Indication length used in these analyses was determined assuming that each end of the indication will grow at the maximum expected growth rate for IGSCC-type cracks. This growth rate assumption is conservative since as described earlier, the length of the indication near the 23A nozzle has not noticeably changed since at least 1988.

#### *Impact on Hydraulic Performance of the Sparger*

The conservative crack growth rate calculated as described above will not result in severance of the sparger or nozzle at least until the next refueling outage. Leakage flow through the indication is calculated to be less than one gpm, and its impact on the spray flow and distribution will be negligible. Therefore, the indication will not prevent the sparger from providing its design basis flow and distribution to the core.

#### CONCLUSIONS AND CORRECTIVE ACTIONS

The indication observed near the NMP1 core spray sparger nozzle 23A will not prevent the sparger from performing its function of providing spray flow and distribution to the core at least between RFO-13 and the next refueling outage (RFO-14). Therefore, no repair is needed at this time. NMPC will continue to examine the indication at each refueling outage and any propagation noted will be evaluated as required by IE Bulletin 80-13.



100