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DOCDATE: 04/26/78
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DOCTYPE: LETTER NOTARIZED: NO
SUBJECT:
FORWARDING DESCRIPTION OF APPLICANT"S PROPOSED INSPEC PROGRAM FOR FEEDWATER AND CONTROL ROD DRIVE NOZZLES FOR THE 1979 SPRING REFUELING OUTAGE.

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LTR 1 ENCL 1

PLANT NAME: NINE MILE PT - UNIT 1

REVIEWER INITIAL: XJM
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********** DISTRIBUTION OF THIS MATERIAL IS AS FOLLOWS **********

BWR FEEDWATER NOZZLES/SPARGERS OR CONTROL ROD DRIVE RETURN LINE NOZZLE (DISTRIBUTION CODE A024)

FOR ACTION: BR CHIEF LEAR**W/4 ENCL

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DISTRIBUTION: LTR 40 ENCL 40
SIZE: 1P+5P

CONTROL NBR: 781220081

********** THE END **********

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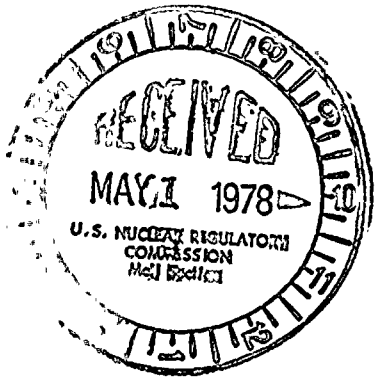
NIAGARA MOHAWK POWER CORPORATION

NIAGARA MOHAWK

300 ERIE BOULEVARD, WEST
SYRACUSE, N. Y. 13202

April 26, 1978



Director of Nuclear Reactor Regulation
Attn: Mr. George Lear, Chief
Operating Reactors
Branch #3
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Gentlemen:

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

Pursuant to your letter of August 11, 1977, provided herewith is a description of our proposed inspection program for feedwater and control rod drive nozzles.

The inspection program will consist of ultrasonic examinations on the feedwater nozzles with the sensitivity to detect cracks as small as 5/64 inches in depth. In addition, an underwater visual examination of accessible areas of the spargers, flow baffles and supports will be performed. The only examination to be done on the control rod drive hydraulic return nozzle will be an underwater visual of accessible areas. A final report will be submitted following completion of the refueling outage.

Very truly yours,

NIAGARA MOHAWK POWER CORPORATION

Gerald K. Rhode, Vice President
System Project Management

MGM/szd

Attachment

781220081

A024/5 *
1/1

NINE MILE POINT UNIT 1

FEEDWATER AND CONTROL ROD DRIVE NOZZLE

INSPECTION PLAN FOR

SPRING 1979 REFUELING OUTAGE

I. Background

A. Feedwater Nozzles

During the Spring 1977 refueling, the feedwater spargers were removed and the four nozzles were inspected. The cladding and a thin layer of base metal were removed using a specially developed, remote-controlled single point boring machine. Cracks of up to approximately 1.5 inches total depth (including clad) were identified and removed from one nozzle and up to 1.3 inches in another nozzle. The resulting nozzle configurations were analyzed and were found to be satisfactory under Section XI of the ASME Code. Replacement spargers were installed and the Station was subsequently returned to service.

The replacement sparger[1] design provides assurance of reducing the high frequency temperature cycling. Additionally, the effectiveness of the thermal sleeve in insulating the nozzle from normal plant thermal transients is considerably improved. The main features which provide these improvements are:

1. The replacement spargers incorporate interference fit thermal sleeves and piston ring seals to minimize bypass leakage.

2. The replacement sparger design incorporates double flow baffles which prevent mixing of hot recirculation water with cooler feedwater on reactor vessel and nozzle surfaces. These flow baffles seat against machined conical surfaces in the face of each nozzle with a significant preload. The preload, double baffle, and positive seating arrangement provide assurance of a good seal to the vessel. In addition, leakoffs are provided in each baffle to direct any leakage away from the nozzle surfaces.

   Either the piston ring seals or the flow baffles are considered sufficient to prevent appreciable thermal cycling in the feedwater nozzles. These features in conjunction with removal of stainless steel cladding assure that nozzle degradation will not occur.

   During the Spring 1977 refueling, ultrasonic examinations[1,2] of the nozzles were performed by the reactor manufacturer. The results were correlated with the actual defects. As a result of this and other work, an ultrasonic examination procedure is now available to detect significant future feedwater nozzle cracks.

B. Control Rod Drive Nozzle

The control rod drive hydraulic system return nozzle was also inspected to determine whether similar cracks had developed in the nozzle. The inspection involved destructively removing the nozzle safe end and thermal sleeve, so that liquid penetrant examination could be performed on the nozzle. No nozzle cracks were identified. The nozzle safe end was also PT examined, and three cracks were found in the inside bore. These cracks were metallurgically examined and were found to be stress corrosion cracks, attributable to the safe end's furnace sensitized type 304 stainless steel material. Accordingly, solution heat treated type 316 stainless steel with low carbon was used for the replacement safe end and thermal sleeve. This material provides substantially increased resistance to stress corrosion cracking.

II. Ultrasonic Testing Plan

A. Feedwater Nozzles

During the Spring 1979 refueling outage, Niagara Mohawk Power Corporation will perform ultrasonic testing on all feedwater nozzles at Nine Mile Point Unit 1. Testing will be performed by General Electric in accordance with their ultrasonic test procedure described in NEDE-21821, "Boiling Water Reactor Feedwater Nozzle/Sparger Final Report." In addition to the ultrasonic examination, an underwater visual examination will be performed on all accessible areas of the spargers, flow baffles and supports.

General Electric's ultrasonic techniques are capable of detecting cracks as small as 5/64 inches deep into base metal when cladding has been removed from the inner radius and bore of the feedwater nozzle. These ultrasonic techniques and procedures for feedwater nozzle inner radius and bore examination were qualified at the Nine Mile Point reactor. General Electric personnel examined the southeast nozzle before clad removal, where multiple cracks were found by liquid penetrant techniques. Ten areas were identified from repair records as sites where cracks had penetrated into the low alloy steel forging at least 7/32 inches. The significant cracks (greater than 7/32 inches deep) were detected and evaluated as cracks by the ultrasonic technique, which has a sensitivity of 5/16 inches on clad nozzles. Analyses indicate that a future crack of at least 1/2 inch in depth can be tolerated in any location of a feedwater nozzle. Repair of such a crack by grinding could be accommodated within the criteria previously established.[1] Adequate margin between allowable crack depth and ultrasonic sensitivity is thus available to assure ultrasonic detection of any crack before it reaches the maximum allowable depth.

II. A. Feedwater Nozzles (Continued)

Should indications of cracks be found in any nozzles during the Spring 1979 testing, sparger removal and dye penetrant tests will be performed on those nozzles. If cracks are found by penetrant testing in any nozzle, sparger removal and penetrant testing will be performed on all nozzles.

B. Control Rod Drive Nozzles

During the Spring 1979 refueling outage, we will perform an underwater visual examination of all accessible areas of the control rod drive hydraulic return nozzle. This examination is based on the results of the previous inspection where no nozzle cracks were found and the furnace sensitized stainless steel safe end and thermal sleeve were replaced with material resistant to stress corrosion cracking.

REFERENCES

1 "Summary Report - 1977 Feedwater Sparger Replacement Project-Nine Mile Point Nuclear Station Unit 1" dated November 16, 1977.

2 NEDE 24047 "Ultrasonic Examination of Feedwater Nozzle Inner Radius and Bore at Nine Mile Point Unit 1."