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AUTH. NAME AUTHOR AFFILIATION
MANGAN, C. V. Niagara Mohawk Power Corp.
RECIP. NAME RECIPIENT AFFILIATION
ADENSAM, E. G. BWR Project Directorate 3

SUBJECT: Clarifies items from 860509 request for relief from ASME Code requirements for preservice insp of nuclear piping sys & reactor pressure vessel.

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NIAGARA MOHAWK POWER CORPORATION/300 ERIE BOULEVARD WEST, SYRACUSE, N.Y. 13202/TELEPHONE (315) 474-1511

July 9, 1986
(NMP2L 0773)

Ms. Elinor G. Adensam, Director
BWR Project Directorate No. 3
U.S. Nuclear Regulatory Commission
7920 Norfolk Avenue
Washington, DC 20555

Dear Ms. Adensam:

Re: Nine Mile Point Unit 2
Docket No. 50-410

Included with my letter of May 9, 1986 were 11 requests for relief from ASME code requirements for the preservice inspection of nuclear piping systems and the reactor pressure vessel. A number of items from those relief requests that require clarification have been identified; this letter provides such clarification.

1) In relief request RR-IWB-6, weld number FWB20 appears on page 4 of 5 as a pipe-to-safe end weld; on page 5 of 5, it appears as a pipe-to-sweep-o-let weld. The weld is a pipe-to-safe end weld. As discussed in (4) below, this weld has been removed from RR-IWB-6 and included in a new relief request, RR-IWB-10. On page 5 of 5, the pipe-to-sweep-o-let weld has been correctly identified as SW002.

2) In relief request RR-IWB-6, weld FWB10 appears twice on page 4 of 5. One of these listings has been eliminated.

3) In relief request RR-IWB-6, weld FWA05 appears twice on page 4 of 5. One of these listings has been eliminated.

4) The following ten pipe-to-safe end extension welds appeared in both RR-IWB-6 and RR-IWB-8, and relief was requested for these welds for two reasons. So that no weld will appear in more than one relief request, a new relief request (RR-IWB-10) has been prepared that covers these ten welds.

Weld Numbers

2RCS-64-00-FWA17	2RCS-64-00-FWB17
2RCS-64-00-FWA18	2RCS-64-00-FWB18
2RCS-64-00-FWA19	2RCS-64-00-FWB19
2RCS-64-00-FWA20	2RCS-64-00-FWB20
2RCS-64-00-FWA21	2RCS-64-00-FWB21

They have been removed from both RR-IWB-6 and RR-IWB-8. An additional weld, 2RCS-64-00-FWA04, is now included in RR-IWB-10.

B001

5) Relief request RR-IWC-8 included weld number 2RHS-66-57-SW005. Sufficient other welds have been satisfactorily examined to meet code requirements; this weld has been removed from the preservice inspection program. Consequently, it has been removed from RR-IWC-8.

In addition to the above clarifications, there have been other substantive changes in several relief requests as summarized below:

1) RR-IWB-4 - Eight new groups of welds (31 welds) have been added to the earlier seven groups (34 welds);

2) RR-IWB-5 - Page 1 of the relief request has been altered; one weld (2RCS-64-00-RCS LW15) has been deleted, as it has received a complete examination; 21 new welds have been added and a column showing the percentage of coverage for the volumetric and surface examinations which were carried out;

3) RR-IWB-6 - Twenty-one new welds have been added, two of which are category BF, item number B5.50.

4) RR-IWB-8 - Two new nozzle-to-safe-end welds on nozzle 9 have been added; as a consequence, the remark on the first page regarding the recirculation system has been deleted.

5) RR-IWC-7 - Two new welds have been added, and two typographical errors, involving the addition of "A"s, corrected.

6) RR-IWC-8 - Thirty-three new welds have been added. A column has been added to the list of welds showing the percent coverage of the volumetric/surface examinations for each weld; consequently, ten sketch sheets have been deleted.

Relief requests RR-IWB-4, RR-IWB-5, RR-IWB-6, RR-IWB-8, RR-IWC-7 and RR-IWC-8 have been revised and RR-IWB-10 issued to take the above changes into account. Revised pages of the first six relief requests and a copy of the new relief request are enclosed as Attachment I.

We believe that this submittal will allow you to complete the review of the plan for pre-service inspection of nuclear piping systems and the reactor pressure vessel.

Very truly yours,

C. V. Mangan
Senior Vice President

RAC:ja
1760G

Attachment

xc: R. A. Gramm, NRC Resident Inspector
Project File (2)

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of)

Niagara Mohawk Power Corporation) Docket No. 50-410

(Nine Mile Point Unit 2))

AFFIDAVIT

C. V. Mangan, being duly sworn, states that he is Senior Vice President of Niagara Mohawk Power Corporation; that he is authorized on the part of said Corporation to sign and file with the Nuclear Regulatory Commission the documents attached hereto; and that all such documents are true and correct to the best of his knowledge, information and belief.

C V Mangan

Subscribed and sworn to before me, a Notary Public in and for the State of New York and County of Onondaga, this 9th day of July, 1986.

Janis M Macro
Notary Public in and for
Onondaga County, New York

My Commission expires:

JANIS M. MACRO
Notary Public in the State of New York
Qualified in Onondaga County No. 4784555
My Commission Expires March 30, 1987

ATTACHMENT I

Nine Mile Point Unit 2

Relief Request No: RR-IWB-4

Due to interferences on the following welds, 100% coverage of surface examinations could not be accomplished. Approximately 75% of the weld exam area has been covered to full code requirements.

Weld	Interferences
2FWS-47-18-FW300 thru 301	Permanent Plate
2MSS-01-13-FW324 thru 327	Permanent Plate
2MSS-01-14-FW320 thru 323	Permanent Plate
2MSS-01-15-FW310 thru 317	Permanent Clamp
2MSS-01-15-FW320 thru 323	Permanent Plate
2MSS-01-15-FW332 thru 335	Permanent Clamp
2MSS-01-16-FW308 thru 315	Permanent Clamp
2MSS-01-13-FW320 thru 323	Permanent Clamp
2MSS-01-13-FW328 thru 331	Permanent Plate
2MSS-01-14-FW334 thru 337	Permanent Plate
2MSS-01-16-FW324 thru 327	Permanent Plate
2MSS-01-16-FW334,336,338	Permanent Plate
2FWS-47-13-FW312 thru 315	Permanent Plate
2FWS-47-14-FW304 thru 307	Permanent Plate
2FWS-47-18-FW302 thru 305	Permanent Plate

Nine Mile Point Unit 2

Relief Request No: RR-IWB-5

1. Identification of Components

Page 3 and 4 identifies those piping welds for which relief from partial ASME XI exam is required.

2. ASME Section XI Requirements

Volumetric and surface examinations are required for the piping welds in accordance with table IWB-2500-1, Category B-J, Item No. B9.11 and Category B-F, Item No. B5.10.

3. Basis for Relief

The surface and volumetric examinations of these piping welds as identified in the NMP2 PSI Program Plan can only be performed on a limited scope due to permanent interferences as are indicated on Page 3 and 4. Page 3 and 4 also identify the approximate extent of coverage obtained by the ASME XI Preservice examinations as well as the permanent interferences. The integrity of the piping welds has also been previously verified by non destructive volumentric surface examinations during erection under ASME Sect. III.

4. Inspection Period for Relief Request

Pre Service Inspection

5. Alternate Tests or Examinations

Due to the amount of coverage obtained no alternate exams are performed.

6. Schedule for Implementing Alternate Test

Not applicable

Nine Mile Point Unit 2

Relief Request No: RR-IWB-5

7. Impact to Overall Plant Level of Quality

Overall Plant qualilty is not impacted.

8. Preservice Examination Results

ASME XI volumetric/surface examination results will be submitted in the final summary report.

9. Radiation Considerations

None

Nine Mile Point Unit 2

Relief Request No: RR-IWB-5

Due to interferences on the following welds, 100% coverage could not be accomplished.

Weld	% Coverage Vol/Surf	Interferences
2MSS-01-14-SW020	100/65	Permanent Integral Attachment
2MSS-01-15-SW016	100/80	Permanent Integral Attachment
2MSS-01-13-FW07	95/100	Valve Taper
2MSS-01-15-SW14	98/100	Permanent Weld-o-let
2MSS-01-15-FW03	100/98	Permanent Welded Restraint
2MSS-01-15-FW06	98/100	Permanent Restraint
2MSS-01-14-HYV7B	90/100	Valve Body Configuration
2ICS-57-7-FW14	75/100	(2) Sock-o-lets
2ICS-57-7-FW21	85/100	Sock-o-let
2RHS-66-50-SW013	99/100	Weld/Base Metal Configuration
2RCS-6400-LW05	97/99	Permanent Restraint
2RCS-6400-LW06A	90/100	(2) Sock-o-lets
2RCS-6400-LW06B	98/100	(2) Sock-o-lets
2RCS-6400-LW07	90/100	(3) Sock-o-lets
2RCS-6400-LW24	98/100	Permanent Welded Attachment
2RCS-6400-LW36	98/100	Permanent Restraint
2RCS-6400-LW37A	95/100	(2) Sock-o-lets
2RCS-6400-LW37B	95/100	(2) Sock-o-lets
2RCS-6400-LW38	90/100	(3) Sock-o-lets
2RCS-6400-LW39	99/100	Permanent Restraint

Nine Mile Point Unit 2

Relief Request No: RR-IWB-5

Weld	% Coverage Vol/Surf	Interferences
2RCS-6400-LW54	98/100	Permanent Welded Attachment
2RCS-6400-LW57	98/100	Permanent Welded Attachment
RPV-KB-13	98/100	Permanent Welded Attachment

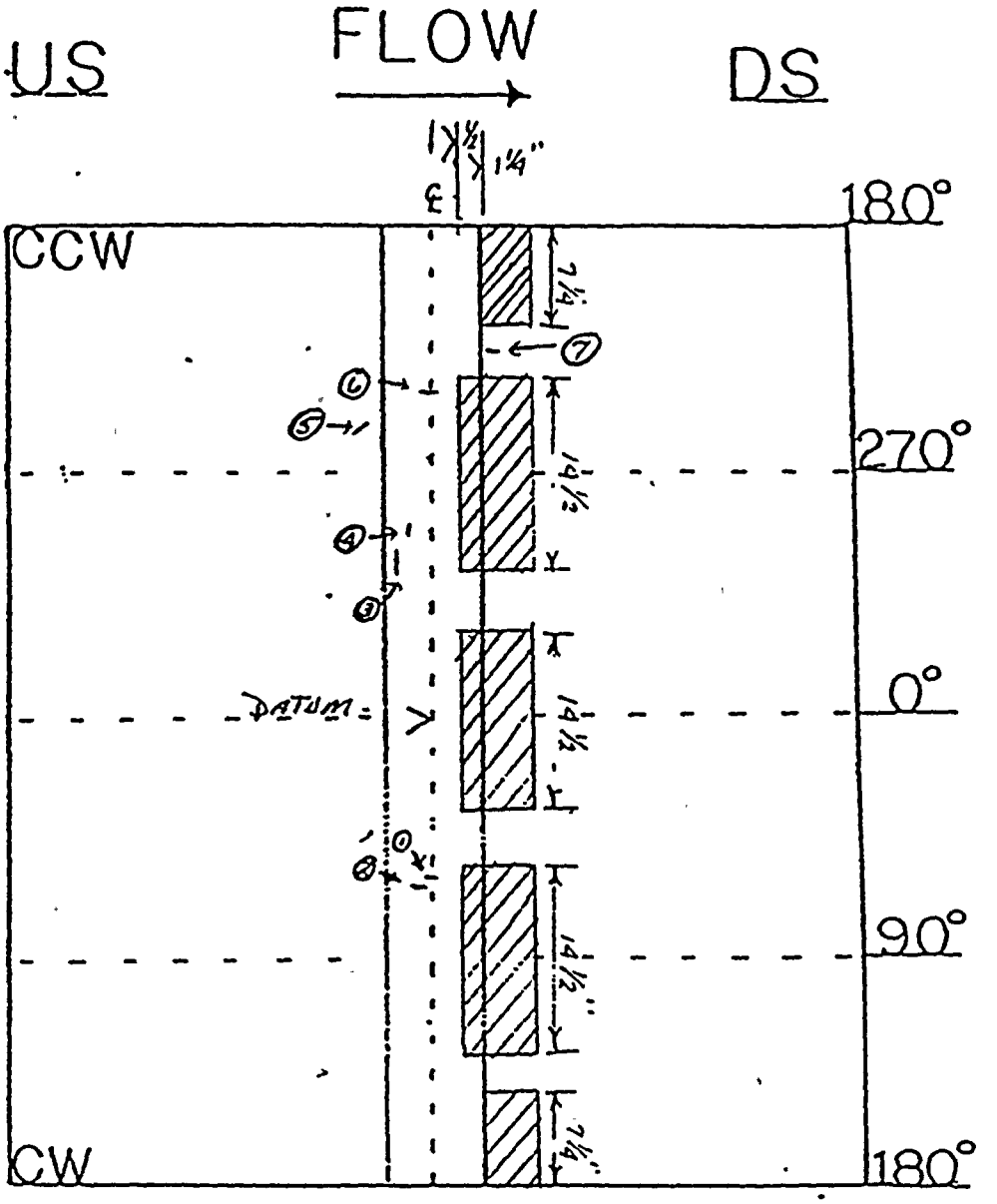
NINE MILE POINT UNIT 2
RELIEF REQUEST NO: RR-IWB-5

SKETCH SHEET

Area/System MSS/ 01-15 RR-IWB-5 Page 2 of 2

Data Sheet No. 7720-1930

Item No. 2-MSS-SW 01-15-SW016



NOT TO SCALE

INFORMATION ONLY

Examiner [signature] Level III Date 2-1-86

Examiner N/A Level N/A Date N/A

Reviewer [signature] Level III Date 2/5/86

NES NUCLEAR ENERGY SERVICES

Nine Mile Point Unit 2

Relief Request No: RR-IWB-6

1. Identification of Components

Page 4 thru 5 identifies the stainless steel circumferential butt welds for which partial relief from ASME XI exam is required.

2. ASME Section XI Requirements

Volumetric and surface examinations are required for these piping butt welds in accordance with table IWB-2500-1, Category BJ, Item No's. B9.11, B9.31 and Cat BF item B5.50.

3. Basis for Relief

The volumetric examinations of the subject welds as identified in the NMP2 PSI Program can only be performed on a limited scope due to piping system design and fitting configuration. These stainless steel welds have been examined from one side using the UT techniques specified on applicable line D or F of the attached matrix. The inspection data sheet for each specific weld defines in detail the extent of coverage obtained by the combination of angles, directions and techniques utilized. Structural integrity has also been verified during erection by volumetric and surface examinations under ASME Sect. III.

NOTE: Welds with exam limitations due to both joint configurations and varying degrees of austentic overlay are addressed on RR-IWB-10.

4. Inspection Period for Relief Request

Pre Service Inspection

5. Alternate Tests or Examinations

ASME XI surface exams are performed on the code required surface area of the subject welds. Although code required coverage is not obtained, latest UT techniques are employed and documented in detail in order to establish as much baseline data as possible for future ISI comparisons.

6. Schedule for Implementing Alternate Test: During Pre-Service Inspection

Nine Mile Point Unit 2

Relief Request No: RR-IWB-6

CAT	ITEM	WELD #	CONFIGURATION	EXAM FROM
B-J	B9.31	2RCS-64-00-SW56	Pipe to Sweep-o-let	Pipe Side Only
B-J	B9.11	FWB08	Elbow to VLV	Elbow Side Only
B-J	B9.31	SW29	Pipe to Sweep-o-let	Pipe Side Only
B-J	B9.11	SW27	Pipe to Tee	Pipe Side Only
B-J	B9.31	SW55	Pipe to Sweep-o-let	Pipe Side Only
B-J	B9.11	SW58	Pipe to Cross	Pipe Side Only
B-J	B9.11	SW59	Pipe to Cross	Pipe Side Only
B-J	B9.31	SW60	Pipe to Sweep-o-let	Pipe Side Only
B-J	B9.31	SW61	Pipe to Sweep-o-let	Pipe Side Only
B-J	B9.11	FWA16	Pipe to Sweep-o-let	Pipe Side Only
B-J	B9.11	FWA14	Pipe to Reduce	Pipe Side Only
B-J	B9.31	SW28	Pipe to Sweep-o-let	Pipe Side Only
B-J	B9.11	SW15	Pipe to Cross	Pipe Side Only
B-J	B9.31	SW16	Pipe to Sweep-o-let	Pipe Side Only
B-J	B9.31	SW17	Pipe to Sweep-o-let	Pipe Side Only
B-J	B9.11	SW38	Pipe to Toe	Pipe Side Only
B-J	B9.31	SW41	Pipe to Sweep-o-let	Pipe Side Only
B-J	B9.31	SW01	Pipe to Sweep-o-let	Pipe Side Only
B-J	B9.31	FWA24	Pipe to Sweep-o-let	Pipe Side Only
B-J	B9.11	SW37	Pipe to Tee	Pipe Side Only
B-J	B9.11	FWB05	Elbow to Pump	Elbow Side Only
B-J	B9.11	FWB10	Elbow to VLV	Elbow Side Only
B-J	B9.31	FWB24	Pipe to Sweep-o-let	Pipe Side Only
B-J	B9.31	SW07	Pipe to Sweep-o-let	Pipe Side Only
B-J	B9.31	SW51	Pipe to Sweep-o-let	Pipe Side Only
B-J	B9.11	SW12	Tee to Reducer	Reducer Side Only
B-J	B9.11	SW52	Tee to Reducer	Reducer Side Only
B-J	B9.11	FWB07	Pipe to VLV	Pipe Side Only
B-J	B9.11	FWA08	Pipe to VLV	Pipe Side Only
B-J	B9.11	FWA10	Elbow to VLV	Elbow Side Only
B-J	B9.11	FWA07	Pipe to VLV	Pipe Side Only
B-J	B9.11	FWA13	Pipe to Sweep-o-let	Pipe Side Only
B-J	B9.11	FWA03	Elbow to VLV	Elbow Side Only
B-J	B9.11	FWA05	Elbow to Pump	Elbow Side Only
B-J	B9.11	FWB03	Elbow to VLV	Elbow Side Only
B-J	B9.11	FWB09	Pipe to VLV	Pipe Side Only
B-J	B9.11	2RCS-64-00-FWA09	Pipe to VLV	Pipe Side Only
B-J	B9.11	FWB04	Pipe to VLV	Pipe Side Only
B-J	B9.11	FWA12	Pipe to Sweep-o-let	Pipe Side Only
B-J	B9.11	FWB12	Pipe to Sweep-o-let	Pipe Side Only
B-J	B9.11	FWB13	Pipe to Sweep-o-let	Pipe Side Only
B-J	B9.11	FWA01	Pipe to Safe End Ext.	Pipe Side Only
B-J	B9.11	FWB01	Pipe to Safe End Est.	Pipe Side Only
B-F	B5.50	2WCS-09-05-SW028	Pipe to Tee	Tee Side Only

Nine Mile Point Unit 2

Relief Request No: RR-IWB-6

CAT	ITEM	WELD #	CONFIGURATION	EXAM FROM
B-J	B9.11	SW030	Pipe to Tee	Tee Side Only
B-J	B9.11	SW032	Pipe to Tee	Tee Side Only
B-J	B9.11	SW033	Pipe to Flange	Pipe Side Only
B-J	B9.11	SW025	Pipe to Flange	Pipe Side Only
B-J	B9.11	FW015	Pipe to Sweep-o-let	Pipe Side Only
B-F	B5.50	SW020	Pipe to Tee	Pipe Side Only
B-J	B9.11	SW021	Pipe to Tee	Pipe Side Only
B-J	B9.11	SW022	Pipe to Tee	Pipe Side Only
B-J	B9.11	SW023	Pipe to Tee	Pipe Side Only
B-J	B9.11	SW024	Pipe to Tee	Pipe Side Only
B-J	B9.11	SW026	Pipe to Tee	Pipe Side Only
B-J	B9.11	SW029	Pipe to Tee	Pipe Side Only
B-J	B9.11	SW031	Pipe to Tee	Pipe Side Only
B-J	B9.11	SW034	Pipe to Tee	Pipe Side Only
B-J	B9.11	2RCS-6400-FWB16	Pipe to Sweep-o-let	Pipe Side Only
B-J	B9.11	SW003	Pipe to Flange	Pipe Side Only
B-J	B9.11	SW002	Pipe to Sweep-o-let	Pipe Side Only
B-J	B9.11	SW042	Pipe to Sweep-o-let	Pipe Side Only
B-J	B9.11	SW043	Pipe to Flange	Pipe Side Only
B-J	B9.11	FWB15	Pipe to Sweep-o-let	Pipe Side Only
B-J	B9.11	FWA14	Pipe to Sweep-o-let	Pipe Side 1/2 Sweep
B-J	B9.11	FWA11	Pipe to Tee	Pipe Side Only
B-J	B9.11	2RHS-6655-FW001	Pipe to Tee	Pipe Side Only
B-J	B9.11	2RHS-6654-FW006	Pipe to Sweep-o-let	Pipe Side Only
B-J	B9.11	2RHS-6653-FW007	Pipe to Sweep-o-let	Pipe Side Only

NINE MILE POINT UNIT 2

RELIEF REQUEST NO.: RR-IWB-8

1. Identification of Components

Page 2 identifies the welds for which partial relief from ASME XI exam is required.

2. ASME Section XI Requirements

Volumetric and Surface examinations are required for these welds in accordance with table IWB-2500-1, category BJ, item no. B9.11 and category BF, item no. B5.10.

3. Basis for Relief

The volumetric examinations of the subject welds as identified in the NMP2 PSI program plan can only be performed on a limited scope due to varying degrees of austenitic weld overlays. The ultrasonic responses encountered while performing examinations are described in the attached report. The inspection data sheet for each specific weld defines in detail the extent of coverage obtained for use as a baseline for future ISI comparison. Other welds in the system that are subject to the same operating conditions receive complete ASME XI volumetric examinations. Structural integrity has also been verified during erection by volumetric and surface examination under ASME sect III.

NOTE: Welds with exam limitations due to both joint configurations and varying degrees of austentic overlay are addressed on RR-IWB-10.

4. Inspection Period for Relief Request

Pre Service Inspection

5. Alternate Tests or Examinations

ASME XI surface exams are performed on the code required surface area of the subject welds. Latest UT techniques, described in the attached report, are employed and documented in detail.

6. Schedule for Implementing Alternate Test

During Pre Service Inspections

7. Impact to Overall Plant Level of Quality

Overall Plant Quality is not impacted

8. Preservice Examination Results

ASME XI surface and volumetric exam results will be submitted in the final report.

9. Radiation Considerations

None

NINE MILE POINT UNIT 2

RELIEF REQUEST NO: RR-IWB-8

WELD NUMBERS

2-RCS-64-00-FWB 11
2-RCS-64-00-FWA 06
2-RCS-64-00-FWB 06
RPV KB-30
RPV KB-29

Nine Mile Point Unit 2

Relief Request No: RR-IWC-7

Due to Component support on the following welds, 100% coverage of Magnetic Particle Examinations could not be accomplished.

2-RDS-65-00-IAW01B-12 thru 19
IAW06A-12 thru 19
IAW03A-12 thru 19
IAW07B-12 thru 19
IAWSP-2N-1 thru 8
IAWSP-2S-1 thru 8
IAW04B-12 thru 19
IAW22A-16 thru 25
IAW12A-20A thru 27A
IAW12A-30 and 31
IAW13B-20 thru 27
IAW13B-32 and 33
IAW09A-16 thru 25
IAW15A-20 thru 27
IAW15A-30 and 31
IAW16B-20 thru 27
IAW16B-32 and 33
IAW19B-20 thru 25
IAW19B-32 and 33
IAW10B-16 thru 23
IAW19B-26 and 27

Nine Mile Point Unit 2

Relief Request No: RR-IWC-8

1. Identification of Components

Page 3 and 4 of 4 identifies those integral attachment, piping and valve body welds for which relief from partial ASME XI exam is required.

2. ASME Section XI Requirements

Surface and/or volumetric examinations are required these welds in accordance with table IWC-2500-1, Exam Categories CA, CB, CC, CF and CG.

3. Basis for Relief

The surface and volumetric examinations of the subject welds as identified in the NMP2 PSI Program Plan can only be performed on a limited scope due to permanent interferences as are indicated on Page 3 and 4 of 4. The integrity of the subject welds has also been previously verified by nondestructive examination during erection under ASME Sect. III.

4. Inspection Period for Relief Request

Pre Service Inspection

5. Alternate Tests or Examinations

Results of ASME Sect. III volumetric and surface examination will also be used.

6. Schedule for Implementing Alternate Test

During Pre Service Inspection

7. Impact to Overall Plant Level of Quality

Overall Plant Quality is not impacted.

8. Preservice Examination Results

ASME XI and ASME III volumetric and or surface will be submitted in the final summary report.

9. Radiation Considerations

None

Nine Mile Point Unit 2

Relief Request No: RR-IWC-8

Due to interferences on the following welds, 100% coverage of could not be accomplished.

Weld	Exam Category	% Coverage Vol / Surf	Interferences
2RHS-66-57-FW307	C-C	NA/45	Permanent Tube Steel
2RHS-66-12 VWMOV1C-B thru D	C-G	NA/85	Permanent Stiffener Plate
2RHS-66-13 VWMOV2A-A thru C	C-G	NA/90	Permanent Stiffener Plate
2CSL-26-01 VWMOV112-B thru D	C-G	NA/85	Permanent Stiffener Plate
2MSS-01-05-FW-08	C-F	95/100	Sock-o-let
2MSS-01-04-FW-12	C-F	98/100	Header Configuration
2CSH-25-04-FW-03	C-F	70/100	Weld Configuration
2CSH-25-04-FW-07	C-F	85/100	Weld Configuration
2CSH-25-04-FW-08	C-F	85/100	Weld Configuration
2CSH-25-08-FW-06	C-F	85/100	Permanent Restraint
2CSH-25-09-FW-04	C-F	66/100	Permanent Restraint
2CSH-25-09-FW-300	C-C	NA/55	Concrete Structure
2CSH-25-09-FW-305	C-C	NA/55	Concrete Structure
2CSL-26-02 VWHCV118 C & D	C-G	NA/80	Welded Attachment
2CSL-26-03-FW-25	C-F	90/100	Sweep-o-let
2RHS-66-13-FW-21	C-F	50/100	One Side S.S. Exam
2RHS-66-14-FW-01	C-F	90/100	Permanent Restraint
2RHS-66-14-PW-114A	C-C	NA/70	Integral Attachments
2RHS-66-15-HW-100A	C-A	99/100	Welded Attachments

Nine Mile Point Unit 2

Relief Request No: RR-IWC-8

Weld	Exam Category	% Coverage Vol / Surf	Interferances
2RHS-66-15-HW-101A	C-A	98/100	Adjacent Nozzle Weld
2RHS-66-15-HW-102A	C-B	90/100	Adjacent Flange Weld
2RHS-66-15-HW-103A	C-B	95/100	Sock-o-let
2RHS-66-15-HW-105A	C-B	75/100	Nozzle Configuration
2RHS-66-16-FW-304	C-C	NA/95	Floor Sleeve
2RHS-66-18-FW-311,312	C-C	NA/60	Permanent Restraint
2RHS-66-19-SW-26	C-F	95/100	Weld Configuration
2RHS-66-20-FW-303-306	C-C	NA/70	Permanent Restraint
2RHS-66-22-FW-19	C-F	50/100	One Side S.S. Exam
2RHS-66-32-FW-05	C-F	95/100	Sock-o-let
2RHS-66-57-FW-305,306	C-C	NA/85	Permanent Restraint

NINE MILE POINT UNIT 2

RELIEF REQUEST NO.: RR-IWB-10

1. Identification of Components

   Page 3 identifies recirculation system welds for which partial relief from ASME XI exam is required. All of these welds are for a pipe to safe end extension.

2. ASME Section XI Requirements

   Volumetric and Surface examinations are required for these recirculation system welds in accordance with table IWB-2500-1, category BJ, item no. B9.11.

3. Basis for Relief

   The volumetric examinations of the subject welds as identified in the NMP2 PSI program plan can only be performed on a limited scope due to the following two reasons:

   a. The piping system design and fitting configuration allows inspection from only one side (the pipe side) of the weld;

   b. There is austenitic weld overlay on the weld that interferes with the ultrasonic examination.

   The ultrasonic responses encountered while performing examinations are described in the attached report. The inspection data sheet for each specific weld defines in detail the extent of coverage obtained for use as a baseline for future ISI comparison. Other welds in the system that are subject to the same operating conditions receive complete ASME XI volumetric examinations. Structural integrity has also been verified during erection by volumetric and surface examination under ASME Section III.

4. Inspection Period for Relief Request

   Pre-service Inspection

5. Alternate Tests or Examinations

   ASME XI surface exams are performed on the code required surface area of the subject welds. Latest UT techniques, described in the attached report, are employed and documented in detail.

6. Schedule for Implementing Alternate Test

   During Pre-service inspections

7. Impact to Overall Plant Level of Quality

   Overall plant quality is not impacted.

8. Pre-service Examination Results

   ASME XI surface and volumetric exam results will be submitted in the final report.

9. Radiation Considerations

   None

NINE MILE POINT UNIT 2

RELIEF REQUEST NO.: RR-IWB-10

WELD NUMBERS	ESTIMATE OF TOTAL PERCENT CODE REQUIRED VOLUME COMPLETED
2-RCS-64-00-FWA 21	25
2-RCS-64-00-FWA 20	25
2-RCS-64-00-FWA 19	25
2-RCS-64-00-FWA 18	25
2-RCS-64-00-FWA 17	25
2-RCS-64-00-FWB 17	25
2-RCS-64-00-FWB 18	20
2-RCS-64-00-FWB 19	20
2-RCS-64-00-FWB 20	25
2-RCS-64-00-FWB 21	25
2-RCS-64-00-FWA 04	0

NUCLEAR ENERGY SERVICES

ULTRASONIC EXAMINATION OF RECIRCULATION LINE
STAINLESS STEEL OVERLAYED WELDS
NINE MILE POINT, UNIT 2

This report serves to document the information from ultrasonic findings with regard to the Metallurgical nature of the weldments contained within the recirculation loops. (see list attached)

Welds within the recirculation loops have been overlayed with welding (an example is shown in Figure 1). During the examination of these welds, it was noted that in certain welds the intended angle at which the sound should travel was not the actual angle observed.

It appears that the ultrasound has a tendency to divert from it's intended path and redirect in an almost perpendicular fashion to the inside wall (ID) of the pipe. The generally accepted theory pertaining to this type of occurence is that the columnar grain structure present in Austenitic weldments provides a "wave guide" effect and thus carries the sound in a direction other than the intended one. Other theories such as granular impedence or filtration have also been postulated.

Examinations

These were performed in accordance with the appropriate procedure. Beam redirection was noted and where this occurence was evident, other examination frequencies and angles were used to try and overcome the effects produced by the grain structure. A low frequency was selected because of it's longer wavelength and greater penetration abilities.

1. 45° x 1.5 MHz shear wave search units were initially applied with little success. Reflections which when plotting at the calibration measured 45° angle, appeared to occur at approximately 3/4 'T' metal path. These reflections when postulated perpendicular to the surface, occur at or around 'T' 0° (Velocity Shear Wave). Counterbore could be detected but this appeared almost directly beneath the search unit, confirming beam redirection.

2. 60° x 1.5 MHz shear wave was selected and applied as above. The results noted with this unit were not unlike those noted when using the 45° shear wave unit. Again the reflection observed, appeared to originate from the ID surface.

3. The frequency was then reduced to 1.0 MHz with much the same result as in 1 + 2 above.

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4. Refracted longitudinal techniques were applied. The rationale behind this excerise was consideration to the fact that (a) A longer wavelength can be achieved for a given frequency. (b) Penetration should be greater due to (a) above and (c) It has been demonstrated in the past in similar situations, longitudinal modes are less prone to beam redirection than are shear modes.

   The disadvantage is that while using longitudinal wave modes, the response to corner reflectors (cracks) is less desirable than the response noted when using shear wave modes. (This is due to mode conversion and energy losses in a corner situation using longitudinal wave modes.) We essentially have a "trade-off" situation.

   4.1 One of the other problems generated is that because of the incident angle necessary to produce a refracted longitudinal wave mode in the material, the "noise" generated in the search unit (SU) is greater than that in a shear wave search unit. To overcome this, a transmit/receive unit is used. Here again there is a trade off in that, for a given size SU the element size has to be smaller resulting in a greater beam divergence for a given frequency. This reduces the amount of energy that is transmitted into the material.

   4.2 With these and other considerations in mind, this technique was applied at code calibration sensitivity which resulted in excessive amounts of noise returning to the SU from within the material. To add to this, it was discovered that the beam redirection noted when using the shear wave techniques, also occurred when using the refracted "L" Wave techniques.

   4.3 An interesting observation was that the redirection is not necessarily the same when facing the sound "beam" in opposite directions. For example when facing the SU (on a vertical pipe) in the upward direction, beam redirection was noted to be considerably greater than when rotating the search unit through 180° and facing the beam downward. We can readily assume that this has to do with the direction of the columnar grains (which follow the direction of heat dissippation during their formation and generally grow epitaxially from weld bead to weld bead). We can also assume that in a vertically welded situation, the structure will differ considerably from that welded in a horizontal situation, basically determining that the responses observed should be weld direction sensitive.

5. To unquestionably verify the above, a variable angle search unit was applied. This unit is a 2 1/4 MHz transducer mounted on a device which enables the sound to be introduced into the material at any

selected angle. 0° longitudinal wave was the starting point, with the unit mounted on the overlayed area on FWB11 facing upwards, (toward the weld) the instrument calibrated in metal path for longitudinal velocity.

5.1 A back reflection (BR) and repeat BR's were apparent on the CRT. The unit was scanned forward and the BR appeared constant until the counterbore (CB) was located, at which time the metal path changed accordingly. The unit was replaced to its original position and the BR returned to its original position on the time base. The unit was then angled to produce a refracted longitudinal wave. The BR signal amplitude was seen to reduce and a second reflection (CB) could be seen appearing just after the BR (later in time). The unit was angled over until the second signal was at peak amplitude at which time the BR could no longer be seen. The unit was scanned forward toward the CB and the signal moved closer in time until it disappeared. This sequence was repeated, each time with a steeper angle. It is noteworthy that regardless of the angle introduced into the material, the CB always appeared at or slightly after 'T" 0°. This confirmed the fact that the beam was not being reflected in the manner in which it should be, given "normal" conditions.

5.2 At some point as the angle was increased, a series of signals could be seen later in time as the unit was scanned back and forth. These signals appeared at or about 'T" 0° for shear wave and increased in amplitude as the beam angle was increased. This was established to be shear wave redirection (due to its position in time on the time base).

5.3 The unit could indicate that higher angles, beam redirection may be more evident for a given grain structure. Similar results were observed while going through the "longitudinal wave" range.

5.4 The unit was rotated through 180° and the above was repeated. This time beam redirection was minimal as noted above in 4.3. The absense of 'T' 0° signals would indicate that there is not significant redirection while scanning in this direction (facing away from the weld (down)). A Pitch/Catch using 45° shear wave also performed in this (downward) direction and a "full vee path" could be detected at a measured and calculated angle of approximately 43°, which would tend to substantiate the conclusion that the sound is extremely sensitive to the dendritic formation angle, and in this case is redirecting mainly when scanning with the beam directed upwards toward the weld.

6. The possibility of introducing large amounts of low frequency energy was considered, and a dual 1 MHz x 1" diameter longitudinal wave SU was applied (each side having a 1" diameter element). The unit had

a "roof angle" of approximately 2° and a forward refracted angle of 45° in the material under test. Beam redirection was still apparent, but due to the large energy source, return signals were noted. These were calculated as occurring from ID geometry at an angle of approximately 45°. the "prose" were that we were now penetrating the material at a known angle. The cons were more in evidence. The search unit being so large and the surface undulations being such as they are, contact was made and lost too frequently to perform a meaningful examination. With this condition, the beam shape characteristics change due to variations in contact. Considering the small area available (due to physical geometric constraints - the coverage and information acquired would be marginal in terms of calling the examination "meaningful" with this unit).

Recommendations

In cases where 45° longitudinal examinations have not been attempted, these should be carried out where possible. The results should be documented and included with the existing data. We determine that based on the above exercise, the returns for effort in terms of ALARA and ultimate defect detectability will be marginal in some cases and request for relief from examination of specific welds be sought.

NES is constantly researching new techniques and technology and as developments occur, these will be made known to the utility.

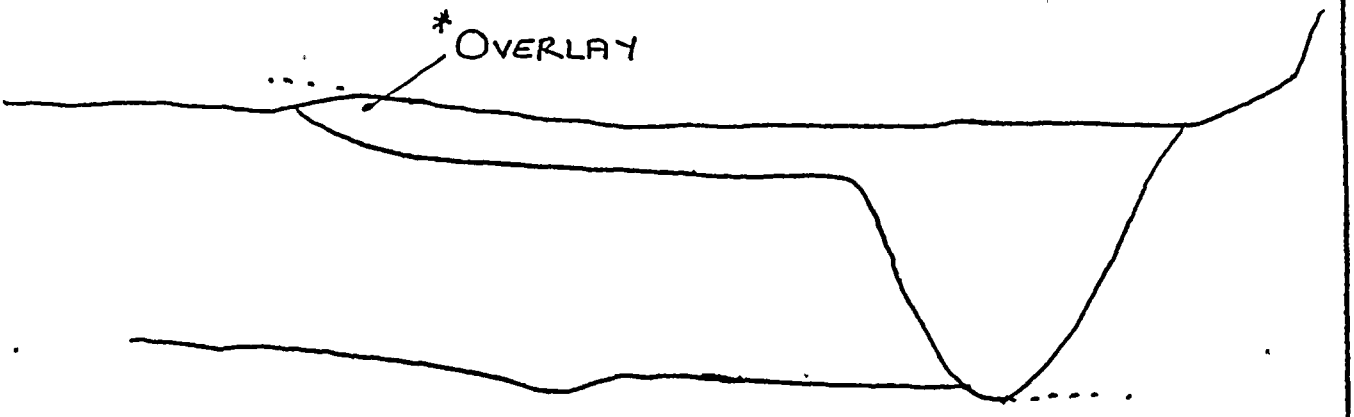
Michael L. Shakinovsky

SKETCH SHEET

Area/System _____ Page ___ of ___

Data Sheet No. _____

Item No. _____



*ESTIMATED THICKNESS BASED ON ACTUAL MEASUREMENT FROM EDGE

WELD PROFILE - ULTRASONIC + PIN GAGE

FIGURE 1

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