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SUBJECT: Forwards response to NRC Questions 121.19 through 121.22 re preservice insp program,per 811016 meeting.

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Docket No. 50-397

December 23, 1981
G02-81-545

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US NUCLEAR REGULATORY COMMISSION
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Director, Office of Nuclear Regulation
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: R. L. Tedesco
Assistant Director for Licensing
Division of Licensing

Subject: SUPPLY SYSTEM NUCLEAR PROJECT NO. 2
RESPONSE TO NRC QUESTIONS ON THE WNP-2
PRESERVICE INSPECTION PROGRAM

Reference: Draft Memorandum, W. V. Johnson (NRC) to R. L. Tedesco (NRC), "Meeting with WPPSS Concerning the Preservice Inspection Program on October 9, 1981"

On October 16, 1981, Supply System representatives met with Mr. Martin Humm and Raj Auluck of the NRC staff and Mr. Jeff Cook of EG&G, an NRC consultant. The meeting was held to discuss the WNP-2 Preservice Inspection Program. The referenced memorandum contained an agenda and specific questions which required formal responses.

Attached are the Supply System's responses to these questions (121.19 through 121.22). During the meeting, the Supply System was asked to write an executive summary to the PSI Program Plan and to answer 14 other questions which came up during the meeting. These items are also attached.

G D Bouchey

G. D. Bouchey (MD 370)
Deputy Director,
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Q PDR

Item 1 WNP-2 will provide information to indicate those areas on the RPV that cannot be fully mechanically inspected by inservice examinations.

Response:

Those areas on the RPV that cannot be fully mechanically inspected inservice will be identified in the final PSI report. They are also included in request for relief PSI-2-001.

Item 2 WNP-2 will provide an update of the list of non-examinable welds (provided in response to Q121.19) in January, 1982.

Response:

An updated list of welds that did not receive a full reference code examination is provided in the response to Q121.19. They are also included in request for relief PSI-2-001.

Item 3 (Q121.20) WNP-2 will provide an expanded response to discuss the design vs. operating temperature and pressure on those lines exempted from Preservice volumetric and/or surface examination based on Paragraph IWC-1220(a) of Section XI for those lines to which this exemption criteria was applied that have a design temperature of 212°F (vs. 200°F).

Response:

The response to Q121.20 has been expanded to discuss design vs. operating temperature on those lines exempted from Preservice volumetric and/or surface examination based on Paragraph IWC-1220(a) of the reference code.

Item 4 (Q121.20) WNP-2 will revise the response to indicate that a volumetric examination, in lieu of a surface examination for HPCS piping 1/2" thick, will be conducted on 10% of those welds exempted by chemistry; otherwise, the commitment of 10% sample by a surface method was acceptable.

Additionally, a table itemizing those welds exempted by chemistry will be attached to the response of Q121.20, showing sizes, and operating temperatures and pressures.

Response:

The response to Q121.20 has been revised to indicate the above.

Item 5 (Q121.21) The response to this question will be revised to add the following paragraph:

> "During the conduct on inservice examinations the criteria for evaluating a crack-like indication will not be limited to

signal amplification alone. Appropriate consideration will be given to other factors such as the location of the indication. Those indications determined to be crack-like will be evaluated."

Response:

The response to Q121.21 has been revised to add the above paragraph.

Item 6 (Q121.22) WNP-2 will revise the response to this question to add the following statements:

"Any additional welds which require PSI will be included in that program in Amendment No. 3 scheduled for submittal 12/81.

Figures 3.6-147a through d in Section 3.6 of the FSAR define the break exclusion areas. Section 3.6.1 commits to an augmented Inservice Inspection Program on these lines. Section 5.2.4 of the FSAR will be amended to reflect these augmented requirements. (Section 5.2.4 draft attached.)

For those lines beyond the outboard containment isolation valves which are not normally pressurized, the inspection boundary will stop at the outboard isolation valve. This approach is consistent with that taken by the piping designer. No pipe whip restraints are installed beyond the containment isolation valve by the designer because these lines are not pressurized and therefore are not subject to pipe whips."

Response:

The response to Q121.22 has been revised to add the above statements.

Item 7 WNP-2 will submit a relief request for the requirement to perform a surface vs. a volumetric examination on the RHR pump casing welds. (Question 3)

Response:

WNP-2 Preservice Program Description (executive summary) Section III.8 has a statement that the RHR pump casings were examined to the 1977 Edition Summer 1978 Addenda.

Item 8 Include a statement in the executive summary to the PSI Program that 1/2 inch wall thickness, which is part of the Summer 1978 Code, has been used in this program. (Question 4)

Response:

The WNP-2 Preservice Inspection Program Description (executive summary) Section III.6 has a statement that the 1/2 inch wall thickness is part of the Summer 1978 Code and has been used in this program.

Item 9 WNP-2 will include a statement in the executive summary of the PSI Program that the four-inch nominal pipe size is taken from the 1978 Addenda of ASME Section XI.

Response:

The WNP-2 Preservice Inspection Program Description (executive summary) includes a statement in Section III.1 that the four-inch nominal pipe size is from the 1978 Summer Addenda.

Item 10 WNP-2 will provide a statement in the executive summary of the PSI Program Plan stating that bolting examinations in Categories B-G-1, B-G-2, and C-D to ASME Section XI 1977 Edition to Summer 1978 Addenda will be accomplished.

Response:

The WNP-2 Preservice Inspection Program Plan (executive summary) contains a statement in Section III.3 that the bolting in Categories B-G-1, B-G-2 and C-D will be accomplished to Summer 1978 Addenda.

Item 11 WNP-2 will add a statement to the executive summary of the PSI Program Plan to indicate that the Summer 1978 Code is used in performing branch connection examinations.

Response:

A statement has been added to the WNP-2 Preservice Inspection Program Description (executive summary), Section III.5, that the Summer 1978 Code is used in performing branch connection examinations.

Item 12 WNP-2 will provide a statement to the executive summary of the PSI Program to indicate that RPV nuts and studs were examined per the Summer 1978 Addenda to Section XI.

Response:

The WNP-2 Preservice Inspection Program Description (executive summary) contains a statement in Section III.4 that the RPV closure nuts and studs are examined to Summer 1978 Addenda.

Item 13 WNP-2 will submit a relief request for those RPV and piping welds where full code compliance cannot be accomplished. (Submit by 12/14/81.)

Response:

See relief request PSI-2-001.

Item 14 WNP-2 will provide a description of the Reactor vessel examination made in the PSI Program executive summary.

Response:

The WNP-2 Preservice Inspection Program Description (executive summary) contains a description of the Reactor vessel examination in Section IV.

WNP-2 PRESERVICE INSPECTION
PROGRAM DESCRIPTION

I. INTRODUCTION

The Preservice Inspection (PSI) Program Plan was prepared in accordance with ASME Section XI 1974 Edition Summer 1975 Addenda. This represents a voluntary upgrade from the applicable 1971 Edition, Winter 1971 Addenda. It should be noted that at the time this Plan was prepared, the 1977 Edition Summer 1978 Addenda had not been approved and therefore could not be used as a referenced code. The overall intent of the Supply System in preparing the Plan was to develop a program which reflects a good balance of the following objectives and constraints:

a. To the maximum extent practical, comply with the latest approved codes and regulations governing inservice inspection of nuclear power plant components.

b. Provide a smooth transition of the PSI Program into the Inservice Inspection (ISI) phase of plant life. In this regard, the Supply System considered the latest "unapproved" (1977 Code) ASME Section XI code editions and addenda in order to assess the changes in examination coverage and examination techniques; and then incorporated, wherever practical, these code changes into the PSI Program Plan provided the overall program effectiveness was not compromised. For any change of examination coverage or technique not allowed by the referenced code, detailed justification is provided. Such changes are held to a minimum and are applied only when there is significant benefit; such as eliminating the taking of baseline data which will never be used inservice, or substituting an examination technique which is superior in effectiveness relative to the code required technique for the particular application and, in many cases, is the same change made in later code addenda. In some cases, a voluntary increase in examination is incorporated to ensure baseline data will be available when the program is updated inservice to a later code which will require increased examination coverage.

By applying the above philosophy, the Supply System has baseline data which will be useful inservice. For example, if the letter of the law were strictly followed, Appendix III of ASME Section XI would not have been used. This would mean that the Supply System could not (1) have data comparable to that taken during the ISI or (2) use the latter approved and required code technique for piping examinations. Appendix III has subsequently been approved.

The Supply System believes that the WNP-2 Preservice Inspection Program Plan reflects the above philosophy and, as such, will result in a program of inspections which is in the best interests of the health and safety of the general public. The intent of 10CFR50.55a(g) and ASME Section XI have been met. All deviations

from the specified requirements are contained herein. Again, these deviations are necessary because of conflicting requirements of a changing code.

II. SCOPE

This Program Plan governs all manual and automated non-destructive examinations, visual examinations, evaluations, and reporting activities required by ASME Section XI as invoked by 10CFR50.55a(g), and applicable augmented examination requirements from NRC regulatory guides. Pump and valve testing required by Sub-articles IWP and IWV of ASME Section XI are the subject of a separate document and are not included herein.

III. REFERENCED CODE

At the time when the program was developed, the latest approved ASME Section XI Code was the 1974 Edition, Summer 1975 Addenda. This is the referenced Code. However, in keeping with our program philosophy, as outlined in the preceeding section, several exceptions have been taken to this Code.

The exceptions to the referenced Code are listed below. Detailed descriptions and justifications can be found in Chapter 7.0 of the Program Plan.

1. Control rod drive housings will be subjected to a visual examination for evidence of leakage in lieu of a volumetric examination. A break in the CRD housing weld will be within the makeup requirements of the normal reactor makeup systems (IWB-1220(b)(1), even though they exceed 3" nominal pipe size.

2. Pressure retaining bolting exceeding 2" diameter will be examined using a volumetric method when examined in place, and using volumetric, surface, and visual methods when examined after removal. Pressure retaining bolting less than or equal to 2" nominal diameter will be examined using a visual method.

   The bolting will be examined to ASME Section XI, 1977 Edition, Summer 1978 Addenda. See Note 1 and Note 3.

3. RPV closure studs and nuts will be examined to the 1977 Edition, Summer 1978 Addenda. See Note 1, Note 3, and Note 4.

4. Class 2 piping branch connection welds will be examined to 1977 Edition, Summer 1978 Addenda. See Note 1 and Note 2.

5. Class 2 piping with wall thickness $\leq$ ½" will be examined to 1977 Edition, Summer 1978 Addenda. See Note 1 and Note 2.

6. WNP-2 is applying the pressure/temperature exemption of 275 psi and 200°F, respectively, to RHR and ECCS lines where the actual design temperature is 212°F. The design pressure is less than 275 psi in all cases. The Supply System feels this

meets the intent of the Code, that is in exempting low energy lines. Later Code rules allow the use of operating temperature which, in the case of WNP-2, is much lower than 200°F for the lines exempted.

7. RHR pump casing welds will be examined with a surface examination from the I.D. in lieu of a volumetric examination. This is allowed by 1977 Edition, Summer 1978 Addenda. See Note 1 and Note 2.

8. Class 1 piping less than 4" nominal pipe size will be examined by a surface in lieu of a volumetric method. This is allowed by 1977 Edition, Summer 1978 Addenda. See Note 1 and Note 2.

9. The ultrasonic examination procedure governing the examination of piping welds, UTP-10, reflects the guidelines of ASME Section XI, Appendix III, entitled "Ultrasonic Examination Method for Class 1 and 2 Piping Systems Made From Ferritic Steels," which was introduced with the Winter 1975 Addenda to 1974 Edition. This Appendix is acceptable to the NRC based on the acceptance of the Summer 1978 Addenda to the 1977 Edition. The Winter 1975 Addenda and the Summer 1978 Addenda of Appendix III are essentially the same. The Supply System has met all of the requirements of the 1978 Addenda. The use of this Appendix has also been approved at a number of other nuclear power plants.

   The use of Appendix III for piping welds is considered by the Supply System to be more appropriate than the use of Article 5 of Section V, which is applicable per the 1974 Edition of Section XI through the Summer 1975 Addenda. Appendix III is written to be specifically applicable to piping welds, whereas Article 5 of Section V is intended for all types of welds including thick-walled components such as pressure vessels, and was not intended for use with piping welds. Furthermore, Appendix III will be applicable for subsequent inservice examinations, so its use during the preservice examinations will provide for a better data comparison in the future.

The following examinations which are in addition to the reference code requirements will also be done:

1. Augmented ISI - An augmented Inservice Inspection Program will be implemented for WNP-2 on high-energy Class 1 piping systems which penetrate containment for which the effects of postulated pipe breaks would be unacceptable.

2. Class 1 piping will be examined by a surface method along with the volumetric examination required by the reference code.

3. Class 2 piping greater than ½" will be examined by a surface method in addition to the referenced code volumetric method.

4. Ten percent of the ASME Class 2 ECCS welds will receive either a volumetric (HPCS) or surface (RHR Loop C and LPCS) exam.

5. All angle beam examination results are recorded on a strip chart recorder for future comparisons with ISI results.

IV. SUMMARY RPV EXAMINATIONS

Manual preservice ultrasonic examinations were completed on essentially 100% of the WNP-2 Reactor Pressure Vessel (RPV) circumferential, longitudinal, nozzle-to-vessel, vessel support welds, and nozzle inner radii, in February 1977. Those examinations were performed prior to the installation of the vessel while it was resting in its shipping cradle (horizontal) in storage at the plant site. Examinations were performed by Nuclear Energy Services (NES) to a program plan prepared by NES and approved by the Supply System. The program was prepared in accordance with the 1971 Edition of ASME Section XI with Addenda through Winter 1971, with additional evaluations performed per the requirements of the 1974 Edition of ASME Section XI with Addenda through Summer 1975. The top and bottom heads and the nozzle safe end welds were examined manually by LMT in 1981. No examinations are done on those portions of the bottom head welds which are inaccessible due to the CRD penetrations. The manual exam of the RPV revealed a very "clean" vessel. There were no angle beam reflectors greater than 50% DAC. The only reflectors found were mid-plate segregates by 0° beam in seven locations. With this information, the Supply System decided it would serve no purpose to perform another complete baseline using mechanized techniques. Instead, the Supply System decided to perform a limited examination to demonstrate that the equipment was usable and that the mechanized technique produced results equivalent in sensitivity and repeatability to the manual technique. As of October 1981, this has essentially been completed.

Before examinations were begun, a fit and function was done of all mechanized equipment that would be used inservice.

The following mechanized exams were conducted:

a) all nozzle-to-vessel welds.

b) all areas (except the top portion of weld BD) where NES found indications during the manual examination.

c) major repair area in the beltline region.

d) portion of one longitudinal weld including the vessel diameter transition.

e) portion of one circumferential weld.

The results of these mechanized exams compared favorably with the manual examination results in that they did not reveal any angle beam reflectors greater than 50% DAC. The exams found the mid-plate segregates (by 0°) in the same general areas as NES found them.

NOTE 1: The scope and method of examinations are defined in the 1977 Edition, 1978 Addenda of Section XI. The acceptance criteria and procedure requirements applied are from the 1974 Edition, Winter 1975 Addenda.

NOTE 2: The acceptance criteria for surface examinations used (Winter 1975 Addenda) is more strict than the Summer 1978 Addenda (Table IWB-3514-2).

NOTE 3: The acceptance criteria used for surface and volumetric examination (Winter 1975 Addenda) is identical to the acceptance criteria of the Summer 1978 Addenda.

NOTE 4: The RPV closure nuts will receive an augmented ultrasonic examination. The examination will be a L-wave from the end and shear wave from four directions (two parallel to axis and two perpendicular to axis).

Q. 121.19

To evaluate your compliance with 10CFR50.55(g)(2), we will require that all Class 1 and 2 pressure retaining welds that cannot be examined as required by Section XI of the ASME Code be identified with a supporting technical justification.

A. Where relief is requested for pressure retaining welds in the reactor vessel, identify the specific welds that did not receive a 100% preservice ultrasonic examination and estimate the extent of the examination that was performed.

B. Where relief is requested for piping system welds (Examination Category B-J, C-F, and C-G), provide a list of the specific welds that did not receive a complete Section XI preservice examination including a drawing or isometric identification number, system, weld number, and physical configuration, e.g., pipe to nozzle weld, etc. Estimate the extent of the preservice examination that was performed. When the volumetric examination was performed from one side of the weld, discuss whether the entire weld volume and heat affected zone (HAZ) and base metal on the far side of the weld were examined. State the primary reason that a specific examination is impractical, e.g., support or component restricts access, fitting prevents adequate ultrasonic coupling on one side, component to component weld prevents ultrasonic examination, etc. Indicate any alternative or supplemental examinations performed and method(s) of fabrication examination.

Response

The final Preservice Inspection report will identify all Class 1 and 2 pressure retaining welds that did not receive 100% examinations as required by the ASME Code. The final report will define the extent of the exam on all welds that did not receive full coverage.

Attached (Attachment I) are the identified welds which have to date not been examined or have been partially examined due to limited access or geometry.

The PSI Summary Report (sample attached, Attachment II) will show all areas which have not received a complete examination per procedure. It should be noted, however, that the procedure requirements exceed those of the Code. Therefore, many examinations which have limited volumetric scans have received an adequate "one sided" examination. Unless otherwise noted, volumetric examinations which were performed from one side of a weld covered the entire weld volume, heat affected zone and base metal on the far side of the weld.

ATTACHMENT I

NOTES TO FOLLOWING WELD TABLES

A. Isometric drawing numbers (Iso. No.) which start with a "1" such as MS-101 are Code Class 1 and Section XI Category B-J.

B. Isometric drawing numbers (Iso. No.) which start with a "2" such as MS-201 are Code Class 2 and Section XI Category C-F.

ATTACHMENT I (Continued)

ISO. NO.	WELD NUMBER	DATA SHEET	DESCRIPTION	SECTION III EXAM	REMARKS
RPV-101	AE	1210-1, 1A, 2, 2A, 3	Vessel to Flange	MT, UT, RT	Thermocouples at 135°, 270°, and 360°
RPV-101	AD	1210-13, 14, 15, 5, 9, 7, 8, 16	#3-#4 SC-CRC WD	MT, UT, RT	8 - 2-foot long key lugs obstruct weld @ 45° intervals
RPV-101	BJ	1210-5, 7, 8	#3 SC VRT WD @ 50°	MT, UT, RT	Key lug at weld AD intersection
RPV-101	BK	1210-6, 46, 16, 21	#3 SC VRT WD @ 170°	MT, UT, RT	Key lug at weld AD intersection
RPV-101	BE	1210-6, 10, 26	#2 SC VRT @ 10°	MT, UT, RT	One foot obstructed by nozzle pad
RPV-101	AA	1210-32, 38, 42	BTM HD-SC #1 WD	MT, UT, RT	Thermocouples at 0°, 135°, 270°
RPV-102	DA	1210-35, 38, 42	BTM HD MRD @ 272	MT, UT, RT	Thermocouples at weld AA intersection
RPV-101	CG	1210-34, 37, 45	Skirt Knuckle	MT, UT, RT	Thermocouples at 0°, 135°, 270°
					Note: The above UT exams were done by NES before the vessel was installed.
RPV-102	DG	RPU-085, 075, 094, 126	BOT HD DOL @ 270°	MT, UT, RT	See Note 1
RPV-102	DR	RPU-086, 076, 095, 127	BOT HD DOL @ 90°	MT, UT, RT	See Note 1
RPV-102	DA	RPU-088, 116, 078, 110, 104, 106	BOT HD MRD @ 272°	MT, UT, RT	See Note 2
RPV-102	DB	RPU-089, 117, 079, 111, 099, 107	BOT HD MRD @332	MT, UT, RT	See Note 2

ATTACHMENT I (Continued)

ISO. NO.	WELD NUMBER	DATA SHEET	DESCRIPTION	SECTION III EXAM	REMARKS
RPV-102	DC	RPU-090, 118, 080, 112, 100, 108	BOT HD MRD @ 32	MT, UT, RT	See Note 2
RPV-102	DD	RPU-091, 119, 081, 113, 101, 109	BOT HD MRD @ 92	MT, UT, RT	See Note 2
RPV-102	DE	RPU-092, 120, 082, 114, 102, 122	BOT HD MRD @ 152	MT, UT, RT	See Note 2
RPV-102	DF	RPU-093, 121, 083, 115, 103, 123	BOT HD MRD @ 212		See Note 2

Note 1: Only 12" to 23" on each end of the weld, starting from the intersection of weld AJ, can be examined due to CRD penetrations and housings.

Note 2: Only 21" starting from the intersection of weld AA and 14" starting from the intersection of weld AJ can be examined due to vessel support skirt. (Approximately one foot is not being examined on each weld.)

ATTACHMENT I (Continued)

ISO. NO.	WELD NUMBER	DATA SHEET NO.	SEC. XI EXAM	DESCRIPTION	SECTION III EXAM	REMARKS
MS-202	26 MS(1) B-22LD	MSP-262 MSU-544	PT UT	Pipe Long Seam	RT	All exams limited 1" to 5" by welded "N" stamp. (4 inches not examined)
MS-202	26 MS(1) B-23LU	MSP-262 MSU-544	PT UT	Pipe Long Seam	RT	All exams limited 2" to 5" by "N" stamp. (3 inches not examined)
RHR-201	20 RHR(1) A-4	RHP-190	PT	Pipe to Reducer	RT	No exam 330°-0°-30° due to permanent obstruction
RHR-207	18 RHR(1) B-7/ 6 RHR(7)-2	RHP-154	PT	Branch Connection	RT	1½" around 0° not examined due to permanen (welded hanger interference)
RHR-207	20 RHR(1) B-4	RHP-201	PT	Pipe to Elbow	RT	No exam 330°-0°-30° due to permanent obstruction (6" not examined)
RHR-207	18 RHR(1) B-42	RHP-201	PT	Pipe to Elbow	RT	No exam 4" around 180° obstructed by permanent hanger.
RFW-101	18 RFW(1) A-4	FWP-046	PT	Pipe to Reducer	RT/PT	2½ inch around 0° not examined-welded "N" stamp
RHR-106	12 RHR(1) B-11LDO	RHU-075	UT	Elbow Seam	RT/PT	No exam 4" to 5½" due to branch connection 1½" not examined
RRC-101	24 RRC(2) A-8LDI	RRU-101	UT	Elbow Seam	RT/PT	No exam 18" to 19" due to instrument line interference (1" not examined)
RRC-101	24 RRC(2) A-8LDO	RRU-103	UT	Elbow Seam	RT/PT	No exam 38" to 40" due to branch connectio (2" not examined)
RRC-102	24 RRC(1) B-6LDI	RRU-112	UT	Tee Seam	RT/PT	No exam 17" to 18" due to fitting (1" not examined)

ATTACHMENT II

WNP-02
INTERVAL: PSI
PERIOD: NA
OUTAGE: PSI
DRAWING NO. MS-204

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
NON-DESTRUCTIVE EXAMINATION SUMMARY TABLE
SYSTEM OR COMPONENT MS(1)-4
DESCRIPTION: MAIN STEAM LINE D

DATE 25/11/81

IDENT. NO.	EXAM. MTH.	EXAM. DATA SHEET NO.	EXAMINATION RESULTS NO INDIC.	INSIGNIF INDIC.	SIGNIFICANT GEOMETRY	SIGNIFICANT OTHER	REMARKS
30MS(1)D-9ALU							
	VOL	MSU-244	0, 45				
	SUR	MSP-151	ACC				
30MS(1)D-9A							
	VOL	MSU-246	0	45			SC 4 80% DAC SPOT @ 45. IWC=1 MP=1.86
	SUR	MSP-151	ACC				
30MS(1)D-9ALD							
	VOL	MSU-245	0		45		SC 11 100% DAC OD, EXT THRU. IWC=2 MP=4.02 WELD CROWN GEO.
	SUR	MSP-151	ACC				
30MS(1)D-11							
	VOL	MSU-553	0, 45				180 DEG MINUS 7" TO 180 DEG PLUS 7" (WELDED SUPPORT COVERING WELD).
	SUR	MSP-254		ACC			THE AREA OF 180 DEG PLUS & MINUS 7" IS COVERED BY A WELDED SUPPO AND WAS NOT EXAMINED. NOTE: NUMEROUS GRINDING MARKS TRANSVERSE TO THE WELD.
30MS(1)D-11LD							
	VOL	MSU-250	0	45			SC 12 95% DAC ID, EXT THRU. IWC=1 MP=2.07
	SUR	MSP-134	ACC				
MS-62							
	VT-3						
	VT-4						

Q 121.20

Paragraph 50.55a(b)(2)(iv) requires that piping welds in the Residual Heat Removal Systems, Emergency Core Cooling Systems, and Containment Heat Removal Systems be examined. List the lines in these systems that were exempted from preservice volumetric and/or surface examination based on Paragraph IWC-1220 of Section XI and provide a technical justification. The control of water chemistry to minimize stress corrosion described in Paragraph IWC-1220(c) of Section XI is not an acceptable basis for exempting ECCS, RHR, and CHR components from examination because practical evaluation, review, and acceptance standards cannot be defined. To satisfy the inspection requirements of General Design Criteria 36, 39, 42, and 45, the Inservice Inspection Program must include the examination of a representative sample of welds in the RHR, ECCS, and Containment Heat Removal Systems in accordance with 10CFR50.55a(b)(2).

Response

WNP-2 exempted the welds of the lines listed in Table 2 by Paragraph IWC-1220(c). This paragraph allows exemption of ECC systems if the control of the chemistry of the contained fluid is verified by periodic sampling. The NRC will not allow piping systems to be exempted based on IWC-1220(c).

Evaluation, review and acceptance criteria have not been developed for these welds and later codes have stated "requirements are being developed" for these systems, therefore WNP-2 will perform the following examinations:

a) a representative sample of ten percent of the HPCS welds exempted by IWC-1220(c) will be examined volumetrically,

b) a representative sample of ten percent of the RHR Loop C and LPCS welds exempted by IWC-1220(c) will be examined by surface methods.

WNP-2 has exempted parts of the ECC system (See Table 1) based on Paragraph IWC-1220(a). This paragraph allows moderate energy lines to be exempted from examination. The 1974 S75 code has defined the break between moderate and high energy lines as design parameters (200°F and 275 psig). Later codes and the WNP-2 FSAR define the break as operating parameters (200°F and 275 psig).

As can be seen in Table 1, all design pressures are below 275 psig. All design temperatures are 212°F which is 12° above the temperature requirement for moderate energy lines in the 1974 S75 code. WNP-2 considers these lines moderate energy as their operating pressures and temperatures are below 200° and 275 psig as shown in Table I.

Based on the convention that moderate energy lines are defined by operating parameters and the intent of Paragraph IWC-1220(a) of the 1974 S75 code is to exempt moderate energy lines, WNP-2 has taken the exemption of IWC-1220(a) for the lines listed in Table 1.

All welds in the lines listed in Table 1 will have a Preservice Inspection for evidence of leakage by visual methods.

TABLE 1

LINES EXEMPT BY PRESSURE/TEMPERATURE
IWC-1220(2) (a)

SYSTEM	DESIGN PRESSURE	DESIGN TEMPERATURE	OPERATING PRESSURE	OPERATING TEMPERATURE
RHR(4)-1 Test Line V-21 thru V-174	125	212	50	120
RHR(4)-1 Test Line V-174 to Suppression Pool	125	212	50	120
RHR(3)-1 Pump Suction Suppression Pool to V-4C	125	212	10	120
RHR(3)-1 Pump Suction V-4 C to Pump	125	212	10	120
RHR(21)-1 Condensate Filter	125	212	100	100
HPCS(2)-1 Pump V-15 to E22-Cool	100	212	50	120
HPCS92)-1 Suppression Pool to V-15	100	212	50	120
HPCS(3)-1 V-23 to V-64	100	212	50	120
HPCS(3)-1 V-64 to Suppression Pool	100	212	50	120
LPCS(3)-1 Test Line to Suppression Pool	100	212	50	120
LPCS(2)-1 V-1 to Pump	100	212	50	120
Suppression Pool to V-1	100	212	50	120
LPCS(10)-1 RHR Crosstie	100	212	50	120

TABLE 2

SYSTEMS EXEMPTED BY CHEMISTRY

System	Size	No Welds	Exam Method	Pressure	Temperature
RHR(1)-2, Pump dischg Loop C	14"	17	SUR	235	358
	18"	16	SUR	235	358
E22-C001 to V-4	16"	51	VOL	1250	120
	12"	1	VOL	1250	120
HPCS(3)-4, Test line to V-23	12"	2	VOL	1250	120
HPCS(9)-4, Dischg to Cond Storage Tnk	10"	5	VOL	1250	120
LPCS(1)-2, Pump dischg to V-5	12"	1	SUR	200	120
	16"	36	SUR	200	120
	14"	1	SUR	200	120
LPCS(3)-2, to test line	12"	2	SUR	200	120
LPCS(4)-2, to min flow line	6"	7	SUR	200	120
		139			

Q. 121.21

For pressure retaining welds, the 1974 Edition, Summer 1975 Addenda, Section XI, paragraph IWA 2232 requires that ultrasonic examinations shall be conducted in accordance with the provisions of Appendix I of Section XI. Application of Appendix I is limited to Class 1 and Class 2 ferritic vessels, 2-1/2 inches and over in wall thickness, with clad vessels included. Where Appendix I is not applicable (for example, piping welds) ultrasonic examination is required to be conducted in accordance with the application requirements of Article 5, Section V of the ASME Code, 1974 Edition, Summer 1975 Addenda, as amended by IWA-2232. Provide a technical justification for any alternatives used such as Section XI, Appendix III, Supplement 7 for austenitic piping welds and discuss the following:

a. All modifications permitted by Supplement 7.

b. Methods of assuring adequate examination sensitivity over the required examination volume.

c. Methods of qualifying the procedure for examination through the weld (if complete examination is to be considered for examination conducted with only one side access).

When using Appendix III of Section XI for inservice examination of either ferritic or austenitic piping welds the following should be incorporated:

d. Any crack-line indication, 20 percent of DAC or greater, discovered during examination of piping welds or adjacent base

Question 121.21 (continued)

metal materials should be recorded and investigated by a Level II or Level III examiner to the extent necessary to determine the shape, identity, and location of the reflector.

e. The Owner should evaluate and take corrective action for the disposition of any indication investigated and found to be other than geometrical or metallurgical in nature.

Response

Justification for using Section XI, Appendix III and supplements for WNP-2 PSI.

The 1974 Edition of Section XI, including Summer 1975 Addenda requires that where Appendix I is not applicable, the rules of Article V of Section V shall apply. The Supply System chose to follow the rules of Appendix III as added to Section XI in the Winter of 1975 Addenda, instead of Article V of Section V. By adopting Appendix III, the Supply System has utilized IWA 2240, which allows the use of newly developed techniques. Since Appendix III has remained in Section XI to date, and was approved for use by NRC in the Summer 1978 Addenda, it is apparent it has been accepted as a newly developed technique.

The only appreciable change made to Appendix III in the Summer 1978 Addenda was to record indications which exceed 50% DAC, instead of 100% DAC as required in Winter 1975 Addenda. The Supply System requires recording to 50% DAC, as stated in Table 4.1 of the WNP-2 PSI Program Plan.

Response to Question 121.21 (continued)

Once in operation, WNP-2 will be required to update to the newer editions of Section XI. By having a baseline examination performed using the same examination technique as is required in the newer editions of Section XI, we will have data which is meaningful for comparison purposes.

Similar Metal Welds (Ferritic and Austenitic)

To assure adequate examination sensitivity over the required examination volume, the ultrasonic instrument is calibrated to cover 2.5 nodes (V-Paths) for piping less than .5" thick, 2 nodes for piping greater than .5" through and including 1.0", and 1.5 nodes for piping greater than 1.0" through and including 2.0".

The examinations are then performed from both sides of the weld, which exceeds the requirements of Appendix III when calibrated to this extent.

When the weld configuration prohibits examination from both sides of the weld (pipe to valve or pipe to pump), the examinations are performed from one side only. By having the instrument calibrated to the above described extent, we are fulfilling the requirements of Appendix III.

The ultrasonic examination procedure is qualified by performing and documenting a successful calibration (to the extent mentioned above) on calibration blocks which meet the requirements of Appendix III.

Dissimilar Metal Welds

For the examination of dissimilar metal welds, such as nozzle to safe end welds, calibration is performed to the extent specified for similar metal welds. The calibration blocks for the nozzle to safe end welds were fabricated for the Supply System by the NSSS supplier. These blocks were manufactured from the same material as the nozzle and safe end, and contain the dissimilar metal weld (see Section 11.0 of the WNP-2 PSI Program Plan). The calibration reflectors are located in the weld itself. The calibrations are performed from both sides of the calibration block, and the welds examined from both sides with the appropriate calibration.

When the weld can only be examined from one side (which is generally caused by nozzle configuration or by not being able to achieve a successful angle beam calibration from one side of the block), the weld will additionally be examined with a calibrated straight beam.

The ultrasonic examination procedure is qualified in the same manner as for similar metal welds. These calibrations and examinations fulfill the requirements of Appendix III.

As previously stated, the Supply System records indications which exceed 50% of DAC. In addition, oscillograph strip chart records are made of each weld examination. The chart record contains both indication sweep location and amplitude channels. The strip chart is triggered by the ultrasonic instrument amplitude gate which is usually set at 15% full

screen height. Therefore, while the examination is being performed at 2x sensitivity, the strip chart will record indication signals of lower amplitudes than 50% of DAC. Exactly how much lower depends on the indication sweep location in relation to the DAC curve.

To date, no crack-like indications have been reported to the Supply System by the PSI Contractor. During the conduct of inservice examinations, the criteria for evaluating a crack-like indication will not be limited to signal amplification alone. Appropriate considerations will be given to other factors such as the location of the indication. Those indications determined to be crack-like will be evaluated.

In addition to the contractor Level III data review, each weld strip chart record is reviewed by a Supply System Level II or III. As is specified in the WNP-2 PSI Program Plan (Section 12.6) the Supply System is responsible for evaluating all reportable indications and for initiating any corrective action.

Supplement 7, Appendix III

All of the requirements of Supplement 7 have been met.

Q. 121.22

The augmented inspection requirement for high-energy piping systems, as discussed in Standard Review Plan 3.6.1 and Branch Technical Position APCSB 3-1, states that "Piping classification as required by Regulatory Guide 1.26 should be maintained without change until beyond the outboard restraint. If the restraint is located at the isolation valve, a classification change at the valve interface is acceptable."

Discuss the examination of welds between outboard containment isolation valves and piping restraints in accordance with the augmented examination provisions of SRP 3.6.1 and 3.6.2.

Response

An augmented Inservice Inspection Program is being developed for all ASME Class 1 piping in the break exclusion area. For those lines beyond the outboard containment isolation valves which are not normally pressurized, the inspection boundary will stop at the outboard isolation valve. This approach is consistent with that taken by the piping designer. No pipe whip restraints are installed beyond the containment isolation valve by the designer because these lines are not pressurized and therefore are not subject to pipe whips. This program will be included in the WNP-2 Inservice Inspection Program Plan. Any additional welds which require PSI will be included in that program in Amendment No. 3 scheduled for submittal 12/81.

Figures 3.6-147a through d in Section 3.6 of the FSAR define the break exclusion areas. Section 3.6.1 commits to an augmented Inservice Inspection Program on these

lines. Section 5.2.4 of the FSAR will be amended to reflect these augmented requirements. (See 5.2.4 draft attached.)

5.2.4.9 AUGMENTED INSERVICE INSPECTION TO PROTECT AGAINST POSTULATED PIPING FAILURES

An augmented Inservice Inspection Program will be implemented for WNP-2, on highenergy* Class 1 piping systems which penetrate containment for which the effects of postulated pipe breaks would be unacceptable. This program will entail a volumetric examination of all circumferential butt welds (surface examination for socket welds) between the first pipe whip restraint beyond the inside containment isolation valve, and first pipe whip restraint beyond the outside containment isolation valve on high-energy Class 1 lines greater than one (1) inch which penetrate the containment.

In those cases where the piping beyond the containment isolation valve is not pressurized (i.e. low energy), the augmented Inservice Inspection boundary will stop at the containment isolation valve.

This program will include branch lines which fall within the augmented Inservice Inspection boundary to the first pipe whip restraint beyond the branch line isolation valve on the first normally closed valve, whichever comes first.

*High-energy lines include those systems that, during normal plant conditions, are either in operation or maintained pressurized and where either the maximum operating pressure exceeds 275 psig or maximum operating temperature exceeds 200°F. If, for a particular line, the above pressure and temperature limits are not exceeded more than 2% of the time that the system is in operation, then that line is considered moderate energy and is exempt from the requirement for augmented Inservice Inspection.