

# PRIORITY 1

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SUBJECT: Provides response to request for addl info re Rev 1 to GL 92-01, "Reactor Vessel Structural Integrity."

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July 28, 1994  
G02-94-180

Docket No. 50-397

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

Gentlemen:

Subject: **WNP-2, OPERATING LICENSE NPF-21  
RESPONSE TO THE REQUEST FOR ADDITIONAL INFORMATION  
FOR GENERIC LETTER 92-01, REVISION 1, REACTOR VESSEL  
STRUCTURAL INTEGRITY**

Reference: Letter dated April 20, 1994, JW Clifford (NRC) to JV Parrish (SS), "Generic Letter 92-01, Revision 1, 'Reactor Vessel Structural Integrity' Washington Public Power Supply System, WPPSS Nuclear Project No. 2 (TAC NO. M83527)"

This submittal provides the Supply System's response to the referenced request for additional information in response to Generic Letter 92-01, Revision 1, "Reactor Vessel Structural Integrity."

This letter provides the information required by the NRC to assess compliance with requirements and commitments regarding reactor vessel integrity.

Question 1

The initial  $RT_{NDT}$  values determined by General Electric's (GE) initial methodology have not been validated and the BWR Owners Group Report, GE-NE-523-109-0893, entitled, "Basis for GE  $RT_{NDT}$  Estimation Method," did not resolve the issue. The staff has requested the Supply System commit to the BWR Owners Group's effort or schedule a plant specific analysis to resolve the issue.

Response

The Supply System is committed to the BWR Owners Group's effort in determining  $RT_{NDT}$  in the transverse direction for the reactor vessel beltline materials.

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**RESPONSE TO THE REQUEST FOR ADDITIONAL INFORMATION FOR GENERIC LETTER 92-01, REVISION 1, REACTOR VESSEL STRUCTURAL INTEGRITY**

Question 2

The staff requested confirmation of the plant-specific applicability of the topical report, NEDO-32205, Revision 1, "10 CFR 50, Appendix G, Equivalent Margin Analysis for Low Upper Shelf Energy in BWR/2 through/6 Vessels," as specified in Appendix B of the report. The Supply System shall submit a request for approval of the topical report as the basis for demonstrating compliance with 10 CFR 50, Appendix G, Paragraph IV.A.1.

Response

The Supply System is submitting a request for approval of NEDO-32205-A, Revision 1 as the basis for demonstrating compliance with 10 CFR 50, Appendix G, paragraph IV.A.1 for WNP-2's reactor vessel. Currently, using the power uprate fluences, the worst case percent decrease in upper shelf energy due to irradiation damage is predicted to be 13% for the beltline plates and welds. These values are under the current limits identified in NEDO-32205-A Revision 1, Appendix B for beltline plates and weld metal.

Question 3

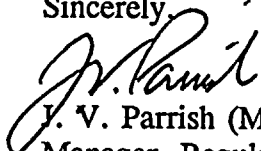
The staff requested review for accuracy of the information provided for the Supply Systems WNP-2 reactor vessel entered in the staff's data base.

Response

Attached are the edited tables the staff provided for review to the Supply System. The information provided incorporates the fluences predicted for power uprate at WNP-2. These fluences were adjusted based upon the results of WNP-2's flux wire evaluation. The fluences were also adjusted for the specific plate thickness used in the fabrication of WNP-2's vessel beltline.

With the completion of this submittal, the Supply System considers the actions relative to Generic Letter 92-01, Revision 1 complete.

Sincerely,



J. V. Parrish (Mail Drop 1023)  
Manager, Regulatory Programs

CGB/kd  
Attachment

cc:	NRC Sr. Resident Inspector - 927N	LJ Callan - NRC RIV
	NS Reynolds - Winston & Strawn	JW Clifford - NRC
	KE Perkins, Jr. - NRC RIV, Walnut Creek Field Office	DL Williams - BPA/399

# ATTACHMENT 1

## WNP-2 BELTLINE MATERIALS RT<sub>NDT</sub> SUMMARY

NOTE: All RT<sub>NDT</sub>'s are based on GE document Y1006A006

### A. Plates

<u>Heat No.</u>	<u>Start RT<sub>NDT</sub> (°F)</u>
C1272-1	+28
C1272-2	0
C1273-1	+20
C1273-2	+4
B5301-1*	-20
C1336-1	-8
C1337-1	-20
C1337-2	-20

### B. Weld Material in Beltline Welds

<u>Heat No./Lot No.</u>	<u>Start RT<sub>NDT</sub> (°F)</u>	<u>Weld Seams</u>
492L4871/A422B27AF	-50	AB
04T931/A423B27AG	-50	AB
04P046/D217A27A	-48	BA, BB, BD, BF, BH
07L669/K004A27A	-50	BA, BB
C3L46C/J020A27A	-20	BB, BC, BD
08M365/G128A27A	-48	BB
09L853/A111A27A	-50	BC
05P018/D211A27A	-38	BF
624063/C228A27A	-50	BG
624039/D224A27A	-36	BG
624039/D205A27A	-50	BH
5P6756/0342	-50	AB
3P4955/0342	-44	AB
**3P4966/1214*	-26	BA, BB, BC, BD, BE, BF, BG, BH
***3P4966/1214*	-6	AB, BA

- \* These materials are also in the WNP-2 reactor surveillance program.
- \*\* Single Wire Process
- \*\*\* Tandem Wire Process

# Summary File for Upper Shelf Energy

## WNP-2

Plant Name	Beltline Ident.	Heat No.	Material Type	1/4T Use at EOL	1/4T Neutron Fluence at EOL	Unirrad. Use	Method of Determin. Unirrad. Use
WNP-2 EOL: 12/ 20/2023	Ring #1	C1272-1	A 5338-1	EMA <sup>2</sup>	[6.8 E17]	EMA <sup>2</sup>	---
	Ring #1	C1273-1	A 5338-1	EMA <sup>2</sup>	[6.8 E17]	EMA <sup>2</sup>	---
	Ring #1	C1272-2	A 5338-1	EMA <sup>2</sup>	[6.8 E17]	EMA <sup>2</sup>	---
	Ring #1	C1273-2	A 5338-1	EMA <sup>2</sup>	[6.8 E17]	EMA <sup>2</sup>	---
	Ring #2	B5301-1	A 5338-1	EMA <sup>2</sup>	[7.3 E17]	EMA <sup>2</sup>	---
	Ring #2	C1336-1	A 5338-1	EMA <sup>2</sup>	[7.3 E17]	EMA <sup>2</sup>	---
	Ring #2	C1337-1	A 5338-1	EMA <sup>2</sup>	[7.3 E17]	EMA <sup>2</sup>	---
	Ring #2	C1337-2	A 5338-1	EMA <sup>2</sup>	[7.3 E17]	EMA <sup>2</sup>	---
	Circ. Weld AB	5P6756(S)	Linde 124	79	[7.3 E17]	91	direct
	Circ. Weld AB	5P6756(T)	Linde 124	84	[7.3 E17]	97	direct
	Circ. Weld AB	3P4955(S)	Linde 124	81	[7.3 E17]	90	direct
	Circ. Weld AB	3P4955(T)	Linde 124	86	[7.3 E17]	95	direct
	Axial Welds BA/BD	3P4966	Linde 124, SAW	EMA <sup>2</sup>	[6.8 E17]	EMA <sup>2</sup>	---
	Axial Welds BE/BH	3P4966	Linde 124, SAW	EMA <sup>2</sup>	[6.8 E17]	EMA <sup>2</sup>	---

### References for WNP-2

UUSE data for circ. welds are from the attachment to the response to RAI (GL 92-01) dated September 21, 1993.

Weld chemical composition data are from Table 5.3-5 of Technical Specifications. Plate chemical composition and IRT data are from Table 5.3-4 of FSAR.

Fluence datum is from page 5.3-5d of the WNP-2 FSAR (Amendment 36, December 1985)

Plate UUSE data are from page B 3/4.4.6-1 of the WNP-2 Technical Specifications. There are no weld UUSE data.

Fluence based on power uprate.

<sup>2</sup>Licensee must confirm applicability of Topical Report NEDO-32205, Rev. 1

# Summary File for Pressure-Temperature Limits

## WNP-2

Plant Name	Beltline Ident.	Nest No. Ident.	ID Neut. Fluence at EOL	IRT <sub>NDT</sub>	Method of Determin. IRT <sub>NDT</sub>	Chemistry Factor	Method of Determin. CF	% Cu	% Ni
WNP-2 EOL: 12/20/2023	Ring #1	C1272-1	1.1 E18	28°F <sup>1</sup>	Plant specific	110	Table	0.15	0.60
	Ring #1	C1273-1	1.1 E18	20°F <sup>1</sup>	Plant specific	100	Table	0.14	0.60
	Ring #1	C1272-2	1.1 E18	0°F <sup>1</sup>	Plant specific	110	Table	0.15	0.60
	Ring #1	C1273-2	1.1 E18	4°F <sup>1</sup>	Plant specific	100	Table	0.14	0.60
	Ring #2	B5301-1	1.1 E18	-20°F	Plant specific	95.5	Table	0.14	0.50
	Ring #2	C1336-1	1.1 E18	-8°F <sup>1</sup>	Plant specific	91	Table	0.13	0.50
	Ring #2	C1337-1	1.1 E18	-20°F	Plant specific	105.05	Table	0.15	0.51
	Ring #2	C1337-2	1.1 E18	-20°F	Plant specific	105.05	Table	0.15	0.51
	Circ. Weld AB	5P6756 (S)	1.1 E18	-60°F	Plant specific	122	Table	0.09	0.93
		5P6756 (T)	1.1 E18	-50°F	Plant specific	122	Table	0.09	0.92
		3P4955 (S)	1.1 E18	-20°F	Plant specific	41	Table	0.03	0.90
		3P4955 (T)	1.1 E18	-20°F	Plant specific	41	Table	0.03	0.95
	Axial Welds BA/BD	3P4966	1.1 E18	-26°F <sup>1</sup>	Plant specific	41	Table	0.03	0.85
	Axial Welds BE/BH	3P4966	1.1 E18	-26°F <sup>1</sup>	Plant specific	41	Table	0.03	0.85

### References for WNP-2

IRT data for circ. welds are from the attachment to the response to RAI (GL 92-01) dated September 21, 1993.

Welds chemical composition and IRT data are from Table 5.3-5 of Technical Specifications. Plate chemical composition on IRT data are from Table 5.3-4 of FSAR.

Fluence datum is from page 5.3-5d of the WNP-2 FSAR (Amendment 36, December 1985).

Fluence based on power uprate.

<sup>1</sup>Additional information required to confirm value.

# ATTACHMENT 1

## WNP-2 BELTLINE MATERIALS RT<sub>NDT</sub> SUMMARY

NOTE: All RT<sub>NDT</sub>'s are based on GE document Y1006A006

### A. Plates

<u>Heat No.</u>	<u>Start RT<sub>NDT</sub> (°F)</u>
C1272-1	+28
C1272-2	0
C1273-1	+20
C1273-2	+4
B5301-1*	-20
C1336-1	-8
C1337-1	-20
C1337-2	-20

### B. Weld Material in Beltline Welds

<u>Heat No./Lot No.</u>	<u>Start RT<sub>NDT</sub> (°F)</u>	<u>Weld Seams</u>
492L4871/A422B27AF	-50	AB
04T931/A423B27AG	-50	AB
04P046/D217A27A	-48	BA, BB, BD, BF, BH
07L669/K004A27A	-50	BA, BB
C3L46C/J020A27A	-20	BB, BC, BD
08M365/G128A27A	-48	BB
09L853/A111A27A	-50	BC
05P018/D211A27A	-38	BF
624063/C228A27A	-50	BG
624039/D224A27A	-36	BG
624039/D205A27A	-5 -50	BH
5P6756/0342	-0 -50	AB
3P4955/0342	-44	AB
**3P4966/1214*	-26	BA, BB, BC, BD, BE, BF, BG, BH
***3P4966/1214*	-6	AB, BA

- \* These materials are also in the WNP-2 reactor surveillance program.
- \*\* Single Wire Process
- \*\*\* Tandem Wire Process





# Summary File for Pressure-Temperature Limits

WNP-2

Plant Name	Seltline Ident.	Heat No: Ident.	ID Neut. Fluence at EOL	IRT <sub>max</sub>	Method of Determin. IRT <sub>max</sub>	Chemistry Factor	Method of Determin. CF	XCu	XNi
WNP-2  EOL: 12/20/2023	Ring #1	C1272-1	<del>1.4E18</del> 1.1E18	28°F	Plant specific	110	Table	0.15	0.60
	Ring #1	C1273-1	<del>1.4E18</del> 1.1E18	20°F	Plant specific	100	Table	0.14	0.60
	Ring #1	C1272-2	<del>1.4E18</del> 1.1E18	0°F	Plant specific	110	Table	0.15	0.60
	Ring #1	C1273-2	<del>1.4E18</del> 1.1E18	4°F	Plant specific	100	Table	0.14	0.60
	Ring #2	B5301-1	<del>1.4E18</del> 1.1E18	-20°F	Plant specific	95.5	Table	0.14	0.50
	Ring #2	C1336-1	<del>1.4E18</del> 1.1E18	-8°F	Plant specific	91	Table	0.13	0.50
	Ring #2	C1337-1	<del>1.4E18</del> 1.1E18	-20°F	Plant specific	105.05	Table	0.15	0.51
	Ring #2	C1337-2	<del>1.4E18</del> 1.1E18	-20°F	Plant specific	105.05	Table	0.15	0.51
	Circ. Weld AB	5P6756 (S)	<del>1.4E18</del> 1.1E18	-60°F	Plant specific	122	Table	0.09	0.93
		5P6756 (T)	<del>1.4E18</del> 1.1E18	-50°F	Plant specific	122	Table	0.09	0.92
		3P4955 (S)	<del>1.4E18</del> 1.1E18	-20°F	Plant specific	41	Table	0.03	0.90
		3P4955 (T)	<del>1.4E18</del> 1.1E18	-20°F	Plant specific	41	Table	0.03	0.95
	Axial Welds BA/BD	3P4966	<del>1.4E18</del> 1.1E18	-26°F	Plant specific	41	Table	0.03	0.85
	Axial Welds BE/BH	3P4966	<del>1.4E18</del> 1.1E18	-26°F	Plant specific	41	Table	0.03	0.85

## References for WNP-2

IRT data for circ. welds are from the attachment to the response to RAI (GL 92-01) dated September 21, 1993.

Weld chemical composition and IRT data are from Table 5.3-5 of Technical Specifications. Plate chemical composition and IRT data are from Table 5.3-4 of FSAR.

Fluence datum is from page 5.3-5d of the WNP-2 FSAR (Amendment 36, December 1985)

Fluence Based on Power Uprate

Additional information required to confirm value.

# Summary File for Upper Shelf Energy

WNP-2

Plant Name	Beltline Ident.	Heat No.	Material Type	1/4T USE at EOL	1/4T Neutron Fluence at EOL	Unirrad. USE	Method of Determin. Unirrad. USE
WNP-2 EOL: 12/20/2023	Ring #1	C1272-1	A 5338-1	EXA <sup>2</sup>	<del>6.8 E17</del> 9.6E17	EXA <sup>2</sup>	---
	Ring #1	C1273-1	A 5338-1	EXA <sup>2</sup>	<del>9.6E17</del> 6.8 E17	EXA <sup>2</sup>	---
	Ring #1	C1272-2	A 5338-1	EXA <sup>2</sup>	<del>6.8 E17</del> 9.6E17	EXA <sup>2</sup>	---
	Ring #1	C1273-2	A 5338-1	EXA <sup>2</sup>	<del>6.8 E17</del> 9.6E17	EXA <sup>2</sup>	---
	Ring #2	B5301-1	A 5338-1	EXA <sup>2</sup>	<del>7.3 EN</del> 9.6E17	EXA <sup>2</sup>	---
	Ring #2	C1336-1	A 5338-1	EXA <sup>2</sup>	<del>7.3 EN</del> 9.6E17	EXA <sup>2</sup>	---
	Ring #2	C1337-1	A 5338-1	EXA <sup>2</sup>	<del>7.3 E17</del> 9.6E17	EXA <sup>2</sup>	---
	Ring #2	C1337-2	A 5338-1	EXA <sup>2</sup>	<del>7.3 E17</del> 9.6E17	EXA <sup>2</sup>	---
	Circ. Weld AB	5P6756(S)	Linde 124	79	<del>9.6E17</del> 7.3 EN	91	direct
	Circ. Weld AB	5P6756(T)	Linde 124	84	<del>9.6E17</del> 7.3 E17	97	direct
	Circ. Weld AB	3P4955(S)	Linde 124	81	<del>9.6E17</del> 7.3 E17	90	direct
	Circ. Weld AB	3P4955(T)	Linde 124	86	<del>9.6E17</del> 7.3 E17	95	direct
	Axial Welds BA/BD	3P4966	Linde 124, SAW	EXA <sup>2</sup>	<del>9.6E17</del> 6.8 E17	EXA <sup>2</sup>	---
	Axial Welds BE/BH	3P4966	Linde 124, SAW	EXA <sup>2</sup>	<del>9.6E17</del> 6.8 E17	EXA <sup>2</sup>	---

## References for WNP-2

UUSE data for circ. welds are from the attachment to the response to RAI (GL 92-01) dated September 21, 1993.

Weld chemical composition data are from Table 5.3-5 of Technical Specifications. Plate chemical composition and IRT data are from Table 5.3-4 of FSAR.

Fluence datum is from page 5.3-5d of the WNP-2 FSAR (Amendment 36, December 1985)

Plate UUSE data are from page B 3/4.4.6-1 of the WNP-2 Technical Specifications. There are no weld UUSE data.

Fluence Based on Power Operate

<sup>2</sup>Licensee must confirm applicability of Topical Report NEDO-32205, Rev. 1