PWROG
PWR Owners Group

Program Management Office
20 International Drive
Windsor, Connecticut 06095

August 6, 2007

ANP-2650

OG-07-357

Project Number 693

U. S. Nuclear Regulatory Commission
Document Control Desk and Chief Financial Officer
Washington, DC 20555-0001

Subject: PWR Owners Group
Transmittal of PWR Owners Group (PWROG) Report ANP-2650 "Updated Results for Request for Additional Information Regarding Reactor Pressure Vessel Integrity", PA-MSC-0317

References:

1. Revision to BAW-2325 – RAI Regarding Reactor Pressure Vessel Integrity Generic Letter 92-01, February 2, 1999 (B&WOG letter OG-1739).

The purpose of this letter is to transmit to the NRC report ANP-2650, which is an update to BAW-2325, Revision 1. This report is provided for information only with no review requested. ANP-2650 is provided in response to an NRC request made by email on March 9, 2006 and through a conference call held on April 6, 2006.

Information from capsules tested prior to January 1999 can be found in document BAW-2325, Revision 1, dated January 1999. The ANP-2650 document updates BAW-2325, Revision 1 adding data from capsules tested between January 1999 and May 2007. This document provides the following:

1. Credibility and surveillance capsule data chemistry factor assessments for each Linde 80 heat including new capsules tested since BAW-2325, Revision 1.

2. Pressurized Thermal Shock (PTS) values for each of the above-listed plants are updated for the plant's current licensing period (40 calendar years or 60 calendar years for plants with license renewal) considering the surveillance data obtained from the new capsules. The PTS values are consistent with the plants current licensing basis (as of May 2007).

3. Adjusted Reference Temperature (ART) values for each of the above-listed plants are updated for the plant's current effective P/T curves considering surveillance data obtained from the new capsules (as of May 2007).

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For technical questions regarding the enclosed report, please contact the program technical lead Brian Hall at (434) 832-2537 or Bill Gray at (434) 832-2783. If you have any additional questions or comments on the enclosed report, feel free to contact Jim Molkenthin at (860) 731-6727.

Sincerely yours,

Frederick P. "Ted" Schiffley, II, Chairman
PWR Owners Group

FPS:JPM:las

Enclosures: (1) – PWROG Report ANP-2650

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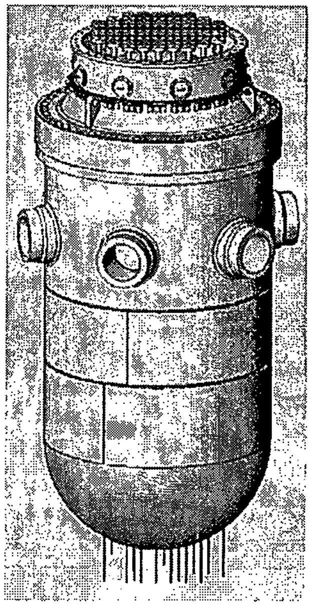
ANP-2650
July 2007

Updated Results for Request for Additional Information Regarding Reactor Pressure Vessel Integrity



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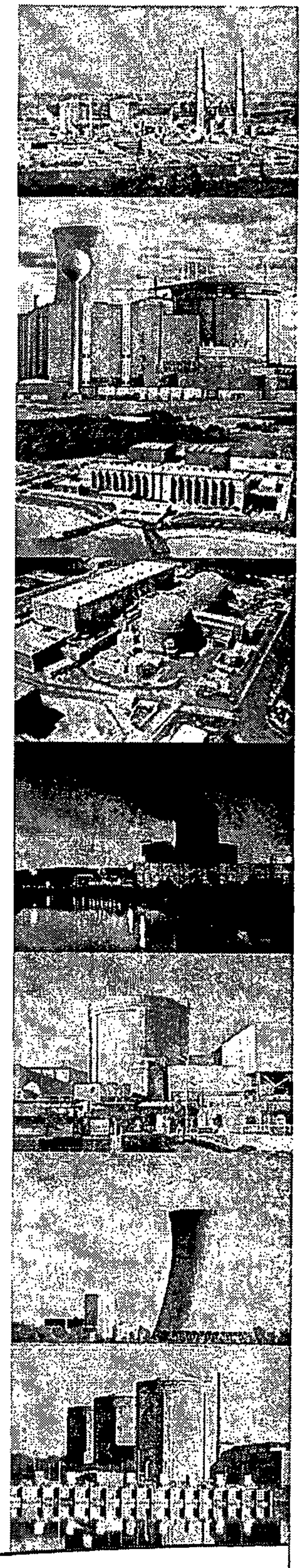

Dominion Generation
Duke Energy Corporation
Entergy Operations, Inc.
Exelon Nuclear Corporation
First Energy Nuclear Operating Company
Florida Power & Light Company
Nuclear Management Company
Progress Energy

AREVA NP Inc.

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ANP-2650
July 2007

Updated Results for Request for Additional Information Regarding Reactor Pressure Vessel Integrity

PWR Owner's Group

Prepared by:

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Record of Revisions

Revision	Description	Date
000	Original Release	July 2007

Table of Contents

Table of Contents (cont'd)

List of Tables

List of Tables (Cont'd)

1. Introduction

This report provides updated results to and supersedes BAW-2325, Revision 1[1] which was a request for additional information issued by the U. S. Nuclear Regulatory Commission (NRC) regarding reactor pressure vessel integrity. Responses are provided for the following PWR Owner's Group (PWROG) participants' plants, formerly part of the B&W Owner's Group (B&WOG) Reactor Vessel Working Group (RVWG):

Plant	Owner
Arkansas Nuclear One Unit 1	Entergy Operations, Inc.
Crystal River Unit 3	Progress Energy
Davis-Besse	First Energy Nuclear Operating Company
Oconee Unit 1	Duke Energy Corporation
Oconee Unit 2	Duke Energy Corporation
Oconee Unit 3	Duke Energy Corporation
Point Beach Unit 1	Nuclear Management Company
Point Beach Unit 2	Nuclear Management Company
Surry Unit 1	Dominion Generation
Surry Unit 2	Dominion Generation
Three Mile Island Unit 1	Exelon
Turkey Point Unit 3	Florida Power and Light
Turkey Point Unit 4	Florida Power and Light

2. Executive Summary

The request for additional information regarding reactor pressure vessel integrity was made to the PWR Owner's Group (PWROG) through an email, dated March 9, 2006, and a conference call held on May 6, 2006. The following is the email from March 9, 2006:

"Mandated Surveillance Capsule Analyses for Plants Participating in the Babcock and Wilcox Master Integrated Surveillance Program

AREVA periodically updates the Babcock and Wilcox (B&W) Master Integrated Surveillance Program (henceforth B&WMISP) for B&W fabricated reactor vessels (RVs) by periodically sending in updates of Report BAW-1543, "Supplement to the Master Integrated Reactor Vessel Surveillance Program." The latest revision of this report was Revision 4, which was submitted in Letter Number NRC:05:073/OG:05:1877, dated December 20, 2005.

The last update of the surveillance capsule result analyses by either B&W, Framatome or AREVA was performed in January 1999 in Report No. BAW-2325, Revision 1. However, the updates in the Revisions of BAW-1543 only report that some capsules had been tested and do not update the surveillance data chemistry factor analyses and surveillance data credibility analyses that are required under the requirements of 10 CFR 50.61.

Since January 1999, a number of capsules in the integrated program have been removed from some of the reactors participating in the B&WMISP. If the plants are going to rely on the B&WMISP data, it is imperative that AREVA perform updates of the BAW-2325 report whenever a new integrated capsule is removed that could impact the surveillance data analyses, or at least on some sort of regular (periodic) basis."

Information from capsules tested prior to January 1999 can be found in document BAW-2325, Revision 1[1], dated January 1999. This document includes the data from capsules tested between January 1999 and May 2007. This document provides the following:

1. Credibility and surveillance capsule data chemistry factor assessments for each Linde 80 heat including new capsules since BAW-2325, Revision 1.
2. Pressurized Thermal Shock (PTS) values for each of the above-listed plants are updated for the plant's current licensing period (40 calendar years or 60 calendar years for plants with license renewal) considering the surveillance data obtained from the new capsules. The PTS values are consistent with the plants current licensing basis (May 2007).
3. Adjusted Reference Temperature (ART) values for each of the above-listed plants are updated for the plant's current effective P/T curves considering surveillance data obtained from the new capsules (May 2007).

No new chemical composition data has been obtained; the best-estimate chemistry values from BAW-2325, Revision 1 are still applicable to the Linde 80 welds and are shown in Section 3.

3. Assessment of Best-Estimate Chemistry

The standard welding practice used by the Babcock & Wilcox Company (B&W) to fabricate reactor pressure vessels including the automatic submerged-arc (ASA) process with copper-plated manganese-molybdenum-nickel (Mn-Mo-Ni) filler wire and Linde 80 flux. The composition range (weight percent) of the filler wire was as follows:

Carbon (C)	0.10 – 0.14	Silicon (Si)	0.10 max
Manganese (Mn)	1.75 – 2.25	Nickel (N)	0.50 – 0.70
Phosphorus (P)	0.020 max	Molybdenum (Mo)	0.35 – 0.55
Sulfur (S)	0.020 max		

The copper plating was used to promote electrical conductance during welding and corrosion resistance during storage. The copper concentration in the as-deposited weld metal results from the combination of the copper plating and the base filler wire alloy copper concentration. However, the principal source is the copper plating.

Thirty specific copper-plated wire/Linde 80 flux combinations were used in the fabrication of the RVWG reactor vessel beltline regions. These combinations were produced using 15 different heats of filler wire and 19 separate lots of Linde 80 flux. Table 3.2-1 presents the listing of the RVWG reactor vessel beltline region weld metals fabricated using copper-plated wire and Linde 80 flux sorted by wire heat number.

3.1 Weld Wire Heat Copper and Nickel Chemical Composition Analyses for High-Copper Linde 80 Weld Metals[1]

Over the years, extensive chemical analyses have been performed on available as-deposited weld metals fabricated with copper-plated filler wire and Linde 80 flux. These data have been reported in BAW-1500, *"Chemistry of 177-FA B&W Owners' Group Reactor Vessel Beltline Welds,"*[2] BAW-1799, *"B&W 177-FA Reactor Vessel Beltline Weld Chemistry Study,"*[3] and BAW-2121P, *"Chemical Composition of B&W Fabricated Reactor Vessel Beltline Welds."*[4] The sources for these weld metals include weldments in the form of nozzle belt forging dropouts, Midland reactor vessel beltline region cutout, surveillance program test blocks and test specimens, weld qualifications, and reanalysis of original weld qualification chemistry samples. An NRC Inspection of AREVA NP Inc. (Inspection Report No.: 99901300/97-01 dated January 28, 1998) identified additional data relevant to the determination of the best-estimate copper and nickel chemical contents for the high-copper Linde 80 weld metals during the review process. However, in the Inspection Report, it was determined that the best-estimate copper and nickel chemical contests previously used were conservative in most cases because either (a) the licensee's copper and nickel data were conservative relative to the raw data or (b) when included in the calculations, the formerly unconsidered data had a negligible effect. The listing of the raw copper and nickel chemical composition data for the high-copper Linde 80 weld metals is presented in Appendix A of BAW-2325, Revision 1.

3.2 High-Copper Linde 80 Weld Wire Heat Best-Estimate Copper and Nickel Chemical Compositions[1]

The best-estimate copper and nickel chemical compositions for the high-copper Linde 80 weld metals were determined by first establishing the mean for each particular material source (i.e., nozzle belt dropout, Midland reactor vessel beltline region cutout, surveillance block/specimen, weld qualification, and weld qualification retest). These material source means were then used to calculate the mean for the weld wire heat (e.g., mean-of-the-means).

For certain weld wire heats, individual measured copper and/or nickel chemical compositions are considered suspect and are not used in the determination of the best-estimate chemical compositions for that weld wire heat. These data are identified with shaded cells in the weld wire heat copper and nickel chemical composition tables presented in Appendix A of BAW-2325, Revision 1. The basis for excluding the individual measured copper and/or nickel chemical compositions in the best-estimate calculation are based on one or more of the following criteria:

- The suspect composition data point is lower/higher than the expected range based on the other measured data points from the same particular weld wire heat; a chemical analysis retest on the sample yields a chemical composition that is more representative of the expected range.
- The suspect composition data point is lower than the expected range based on other measured data points from the same particular weld wire heat; chemical composition data point not used for conservatism.
- The suspect composition data point falls outside the expected range based on other measured data points from the same particular weld wire heat; the chemical analysis may have been performed in the base metal region of the sample.

Table 3.2-2 summarizes the best-estimate copper and nickel chemical compositions for the high-copper Linde 80 weld metals. In addition, the individual copper and nickel chemical compositions for each of the weld wire heat sources are also presented.

Table 3.2-1. B&W Fabricated Reactor Vessel Beltline Welds

Wire Heat	Weld Metal Designation	Flux Lot	Reactor Vessel	Chemistry Factor Changed Since BAW-2325, Revision 1?
299L44	SA-1526 WF-25	8596 8650	Surry-1, TMI-1 Oconee-1, Oconee-2, TMI-1	NO
406L44	WF-112 WF-154	8688 8720	ANO-1 Oconee-2	NO
61782	SA-847 SA-1135	8350 8457	Point Beach-1 Oconee-1	YES (from 141.1 to Table Chemistry Factor 157.4)
71249	SA-1101 SA-1229 SA-1769	8445 8492 8738	Point Beach-1, Turkey Point-3, Turkey Point-4 Oconee-1 Crystal River-3	NO
72105	WF-70	8669	Crystal River-3, Oconee-3, TMI-1 Turkey Point-4	NO
72442	SA-1484 WF-67	8579 8669	Point Beach-2, Turkey Point-3 Oconee-3, Turkey Point-4	NO
72445	SA-1585 SA-1650	8597 8632	Oconee-1, Surry-1, Surry-2 Surry-1	YES (from 137.8 to Table Chemistry Factor 158.0)
821T44	WF-182-1 WF-200	8754 8773	ANO-1, Davis-Besse Oconee-3	YES (from 158.3 to Table Chemistry Factor 178.0)
T29744	WF-233	8790	Davis-Besse	NO
1P0661	SA-775	8304	Point Beach-1	NO
1P0815	SA-812	8350	Point Beach-1	NO
1P0962	SA-1073	8445	Oconee-1	NO
8T1554	SA-1494 WF-169-1	8579 8754	Surry-1, TMI-1 Crystal River-3	NO
8T1762	SA-1426 SA-1430 SA-1493	8553 8553 8578	Oconee-1, Point Beach-1 Oconee-1 Oconee-1	NO
8T3914	WF-232	8790	Davis-Besse	NO

Table 3.2-2. Best-Estimate Copper and Nickel Chemical Compositions for B&W Fabricated Reactor Vessel Beltline Welds

Weld Wire Heat Number	Weld ID Number	Flux Lot No.	Source of Weldment	No. of Observ.		Source Mean	
				Cu	Ni	Cu	Ni
299L44	SA-1526	8596	Weld Qualification	1	1	0.46	0.60
			CR-3 Nozzle Dropout	13	13	0.37	0.70
			Surry-1 RVSP Weld	11	11	0.23	0.64
	WF-19	8650	Weld Qualification	1	1	0.29	0.72
	WF-25	8650	Weld Qualification	4	3	0.32	0.71
			TMI-1 RVSP Weld	10	9	0.33	0.67
			ONS-3 Nozzle Dropout	2	2	0.36	0.70
			TMI-2 Nozzle Dropout	122	121	0.33	0.67
			Weld Wire Heat Best-Estimate (Mean of the Sources)			**0.34**	**0.68**
406L44	WF-112	8688	Weld Qualification	3	3	0.30	0.58
			ONS-1 RVSP Weld	22	23	0.32	0.59
	WF-154	8720	Weld Qualification	3	3	0.26	0.59
	WF-183	8754	Weld Qualification	1	1	0.21	0.59
	WF-193	8773	Weld Qualification	2	3	0.28	0.60
			ANO-1 RVSP Weld	9	9	0.27	0.58
			Point Beach-2 RVSP Weld	1	1	0.25	0.59
			Weld Wire Heat Best-Estimate (Mean of the Sources)			**0.27**	**0.59**
61782	SA-847	8350	Weld Qualification	1	0	0.20	-------
	SA-848	8373	Weld Qualification	1	1	0.22	0.49
	SA-948	8408	Weld Qualification	1	1	0.18	0.55
	SA-1014	8436	Weld Qualification	1	1	0.23	0.46
	SA-1036	8436	Weld Qualification	1	1	0.31	0.64
			ONS-1 Nozzle Dropout	12	12	0.20	0.49
			REG RVSP Weld	10	10	0.24	0.52
	SA-1118	8443	Weld Qualification	1	1	0.22	0.52
	SA-1135	8457	Weld Qualification	1	1	0.17	0.50
			ONS-2 Nozzle Dropout	29	29	0.27	0.59
	SA-1346	8504	Weld Qualification	1	1	0.20	0.51
	SA-1779	8738	Weld Qualification	1	1	0.28	0.45
	SA-1788	8754	Weld Qualification	1	1	0.29	0.47
			Weld Wire Heat Best-Estimate (Mean of the Sources)			**0.23**	**0.52**

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Table 3.2-2. (Cont'd) Best-Estimate Copper and Nickel Chemical Compositions for B&W Fabricated Reactor Vessel Beltline Welds

Weld Wire Heat Number	Weld ID Number	Flux Lot No.	Source of Weldment	No. of Observ.		Source Mean	
				Cu	Ni	Cu	Ni
71249	SA-1094	8457	Weld Qualification	1	1	0.23	0.55
			TP-4 RVSP Weld	4	1	0.29	0.60
	SA-1101	8445	Weld Qualification	1	1	0.21	0.57
			ONS-1 Nozzle Dropout	37	36	0.19	0.59
			TP-3 RVSP Weld	6	1	0.33	0.57
	SA-1229	8492	Weld Qualification	1	1	0.20	0.57
	SA-1344	8504	Weld Qualification	1	1	0.21	0.62
	SA-1706	8669	Weld Qualification	1	1	0.21	0.55
	SA-1769	8738	Weld Qualification	1	1	0.19	0.66
			W Surv. Weld	41	36	0.28	0.62
			Weld Wire Heat Best-Estimate (Mean of the Sources)			**0.23**	**0.59**
72105	WF-70	8669	Weld Qualification	3	1	0.31	0.58
			MD-1 Nozzle Dropout	78	78	0.39	0.58
			MD-1 Beltline Weld	54	54	0.28	0.57
	WF-113	8688	Weld Qualification	3	3	0.29	0.60
	WF-209	8773	Weld Qualification	2	1	0.37	0.59
	WF-209-1	8773	Weld Qualification	3	2	0.37	0.59
			ONS-2 RVSP Weld	7	7	0.35	0.58
			CR-3 RVSP Weld	4	4	0.36	0.61
			ONS-3 RVSP Weld	53	53	0.29	0.56
			MD-1 RVSP Weld	12	12	0.36	0.59
			ZN-1 RVSP Weld	19	19	0.25	0.54
			ZN-2 RVSP Weld	22	22	0.25	0.55
			Weld Wire Heat Best-Estimate (Mean of the Sources)			**0.32**	**0.58**
72442	SA-1450	8467	Weld Qualification	1	1	0.25	0.60
	SA-1484	8579	Weld Qualification	1	1	0.25	0.64
			CR-3 Nozzle Dropout	18	18	0.26	0.59
	WF-67	8669	Weld Qualification	4	3	0.32	0.58
			MD-1 Nozzle Dropout	27	27	0.22	0.60
			Weld Wire Heat Best-Estimate (Mean of the Sources)			**0.26**	**0.60**

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Table 3.2-2. (Cont'd) Best-Estimate Copper and Nickel Chemical Compositions for B&W Fabricated Reactor Vessel Beltline Welds

Weld Wire Heat Number	Weld ID Number	Flux Lot No.	Source of Weldment	No. of Observ.		Source Mean	
				Cu	Ni	Cu	Ni
72445	SA-1263	8504	Weld Qualification	1	1	0.24	0.47
			PB-1 RVSP Weld	2	2	0.23	0.62
	SA-1471	8578	Weld Qualification	1	1	0.18	0.54
	SA-1582	8596	Weld Qualification	1	1	0.25	0.49
	SA-1585	8597	Weld Qualification	1	1	0.25	0.51
			ANO-1 Nozzle Dropout	32	32	0.22	0.59
	SA-1650	8632	Weld Qualification	1	1	0.20	0.47
	WF-9	8632	Weld Qualification	1	1	0.17	0.60
	WF-101	8688	Weld Qualification	0	1	-------	0.60
			Weld Wire Heat Best-Estimate (Mean of the Sources)			**0.22**	**0.54**
821T44	WF-182	8754	Weld Qualification	3	3	0.26	0.61
	WF-182-1	8754	Weld Qualification	5	4	0.22	0.63
			TMI-2 RVSP Weld	4	4	0.28	0.63
			DB-1 RVSP Weld	6	6	0.22	0.63
	WF-195	8773	Weld Qualification	1	1	0.18	0.63
	WF-200	8773	Weld Qualification	1	1	0.26	0.64
			Weld Wire Heat Best-Estimate (Mean of the Sources)			**0.24**	**0.63**
T29744	WF-233	8790	Weld Qualification	4	3	0.25	0.63
			KORI-1 RVSP Weld	13	10	0.21	0.67
	WF-282	8806	Weld Qualification	1	1	0.16	0.66
			Weld Wire Heat Best-Estimate (Mean of the Sources)			**0.21**	**0.65**
72102	SA-1187	8479	Weld Qualification	1	1	0.21	0.53
	WF-29	8650	Weld Qualification	3	2	0.21	0.62
			Weld Wire Heat Best-Estimate (Mean of the Sources)			**0.21**	**0.58**
1P0661	SA-775	8304	Weld Qualification	1	1	0.19	0.63
	SA-1060	8446	Weld Qualification	1	1	0.14	0.65
			Weld Wire Heat Best-Estimate (Mean of the Sources)			**0.17**	**0.64**

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Table 3.2-2. (Cont'd) Best-Estimate Copper and Nickel Chemical Compositions for B&W Fabricated Reactor Vessel Beltline Welds

Weld Wire Heat Number	Weld ID Number	Flux Lot No.	Source of Weldment	No. of Observ. Cu	No. of Observ. Ni	Source Mean Cu	Source Mean Ni
1P0815	SA-806	8304	Weld Qualification	1	1	0.25	0.48
	SA-812	8350	Weld Qualification	1	1	0.12	0.52
	SA-1366	8544	Weld Qualification	1	1	0.13	0.57
			Weld Wire Heat Best-Estimate (Mean of the Sources)			**0.17**	**0.52**
1P0962	SA-1073	8445	Weld Qualification	1	1	0.21	0.64
			Weld Wire Heat Best-Estimate (Mean of the Sources)			**0.21**	**0.64**
8T1554	SA-1174	8479	Weld Qualification	1	1	0.19	0.60
	SA-1413	8504	Weld Qualification	0	0	-------	-------
	SA-1494	8579	Weld Qualification	1	1	0.14	0.45
	WF-69	8669	Weld Qualification	1	1	0.15	0.61
	WF-169-1	8754	Weld Qualification	3	3	0.16	0.61
			Weld Wire Heat Best-Estimate (Mean of the Sources)			**0.16**	**0.57**
8T1762	SA-1426	8553	Weld Qualification	1	1	0.18	0.61
	SA-1430	8553	Weld Qualification	1	1	0.16	0.60
	SA-1493	8578	Weld Qualification	1	0	0.22	------
	SA-1580	8596	Weld Qualification	1	1	0.22	0.60
	WF-4	8597	Weld Qualification	1	1	0.17	0.53
	WF-8	8632	Weld Qualification	1	1	0.20	0.61
	WF-18	8650	Weld Qualification	0	1	------	0.45
			Weld Wire Heat Best-Estimate (Mean of the Sources)			**0.19**	**0.57**
8T3914	WF-232	8790	Weld Qualification	2	3	0.18	0.66
	WF-252	8806	Weld Qualification	0	1	------	0.59
			Weld Wire Heat Best-Estimate (Mean of the Sources)			**0.18**	**0.62**

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3.3 Calculation of PTS and ART Values

These data have been used to complete pressurized thermal shock (RT_{PTS}) and Adjusted Reference Temperature (ART) calculations. Tables 3.3-1 through 3.3-39 show the RT_{PTS} and ART values for Arkansas Nuclear One Unit 1, Crystal River Unit 3, Davis-Besse, Oconee Unit 1, Oconee Unit 2, Oconee Unit 3, Point Beach Unit 1, Point Beach Unit 2, Three Mile Island Unit 1, Surry Unit 1, Surry Unit 2, Turkey Point Unit 3, and Turkey Point Unit 4, respectively.

3.3.1 Pressurized Thermal Shock Reference Temperature Prediction

The reference temperature for pressurized thermal shock (RT_{PTS}) is the nil ductility temperature of the material as defined by 10 CFR 50.61[5], Paragraph (b)(2). It is compared against screening criteria for protection against severe overcooling (thermal shock) of the reactor vessel at high pressure. The pressurized thermal shock (PTS) screening criteria are defined as 270°F for plates, forgings, and axial welds, and 300°F for circumferential welds. Therefore, if the calculated RT_{PTS} values for the reactor vessel beltline materials are less than the specified screening criteria, the vessel is acceptable with regard to the risk of vessel failure for PTS transients.

In accordance with 10 CFR 50.61, the RT_{PTS} for each material in the beltline region is determined by the following expression:

$$RT_{PTS} = \text{Initial } RT_{NDT} + \Delta RT_{NDT} + \text{Margin}$$

where:
- Initial RT_{NDT} = initial reference temperature
- ΔRT_{NDT} = irradiation induced change in reference temperature
- Margin = margin to cover uncertainties

3.3.1.1 Initial RT_{NDT}

The method for determining the initial reference nil-ductility temperature (RT_{NDT}) is specified in the ASME B&PV Code, Section III, Paragraph NB-2331[6]. The initial RT_{NDT} is the greater of the drop weight nil-ductility transition temperature (per ASTM Standard E 208-81) or the temperature that is 60°F below that at which the material exhibits 50 ft-lbs and 35 mils lateral expansion. If measured values of initial RT_{NDT} for the material in question are not available, generic values for that class of material may be used if there are sufficient test results to establish a mean and standard deviation for the class. Measured and generic initial RT_{NDT} values for all plants were found in BAW-2325, Revision 1.

Alternative initial reference temperatures were used for calculations of PTS for Surry Unit 1 and Surry Unit 2 and Point Beach Unit 1 and Point Beach Unit 2, for the Linde 80 welds as reported in BAW-2308, Revision 1-A, "Initial RT_{NDT} of Linde 80 Weld Materials"[7]. This report was reviewed and approved for use by the Nuclear Regulatory Commission.

Dominion has made an exemption request for the use of the alternative initial RT_{NDT} values for Surry 1 and 2[8] and NMC plans to make an exemption request in 2007.

3.3.1.2 ΔRT_{NDT}

The irradiation-induced change in reference temperature (ΔRT_{NDT}) is defined as the mean value of the shift in reference temperature caused by irradiation and is calculated as follows:

$$\Delta RT_{NDT} = (CF) * (ff)$$

where: CF = chemistry factor
ff = fluence factor

3.3.1.2.1 Chemistry Factor

The chemistry factor (CF) is a function of the material's copper and nickel content. The CF is determined from Table 1 (for weld metals) and Table 2 (for base metals) in 10 CFR 50.61. When determining the CF, the weight percent copper and nickel are the best estimate values for the material; these values are normally taken as the mean of the measured values. When using initial RT_{NDT} values from BAW-2308, Revision 1-A, there are restrictions on the CF. The CF cannot be less than 167°F. In cases where surveillance data is not credible or unavailable, the Table chemistry factors are used as described above. The surveillance data is evaluated in Section 4 including data tested through May 2007. For data deemed credible and conservative the chemistry factor is calculated based on the surveillance data (see Section 4). None of the Linde 80 weld wire heats with surveillance data are deemed credible in this evaluation.

3.3.1.2.2 Fluence Factor

In accordance with 10 CFR 50.61, the fluence factor (ff) is determined as follows:

$$ff = f^{(0.28 - 0.10 \log f)}$$

where: f = fluence (10^{19} n/cm^2, E > 1.0 MeV) at the reactor vessel wetted surface

3.3.1.3 Margin

The "margin" is the quantity that is added to obtain conservative, upper-bound values of the pressurized thermal shock reference temperature. The margin is determined by the following expression:

$$\text{Margin} = 2\sqrt{\sigma_I^2 + \sigma_\Delta^2}$$

where: σ_I = standard deviation for the initial RT_{NDT}
σ_Δ = standard deviation for ΔRT_{NDT}

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If a measured value of initial RT_{NDT} for the material in question is available, σ_I is zero because the measured initial value is an absolute value and it is assumed to have no error. If generic values of initial RT_{NDT} are used, σ_I is the standard deviation obtained from the set of data used to establish the mean value. When using initial RT_{NDT} values from BAW-2308, Revision 1-A, σ_I is specified in BAW-2308, Revision 1-A.

The standard deviation for ΔRT_{NDT}, σ_Δ, is established in 10 CFR 50.61, as 28°F for welds and 17°F for base metals, except that σ_Δ need not exceed 0.50 times the mean value of ΔRT_{NDT}. When using initial RT_{NDT} values from BAW-2308, Revision 1-A, there are restrictions on σ_Δ. σ_Δ must be 28°F.

3.3.1.4 Use of Surveillance Data

To verify that the RT_{PTS} for each vessel beltline material is a bounding value for the reactor vessel, plant-specific information shall be considered. This information includes, but is not limited to, the reactor vessel operating temperature and surveillance program results.

The results from the plant-specific surveillance programs & MIRVP must be integrated into the RT_{PTS} estimate if the plant-specific surveillance data has been deemed credible as judged by the following criteria:

1. The materials in the surveillance capsules must be those which are the controlling materials with regard to radiation embrittlement.

2. Scatter in the plots of Charpy energy versus temperature for the irradiated and unirradiated conditions must be small enough to permit the determination of the 30 ft-lb temperature unambiguously.

3. Where there are two or more sets of surveillance data from one reactor, the scatter of ΔRT_{NDT} values must be less than 28°F for welds and 17°F for base metal. Even if the range in the capsule fluences is large (two or more orders of magnitude); the scatter may not exceed twice those values.

4. The irradiation temperature of the Charpy specimens in the capsule must equal the vessel wall temperature at the cladding/base metal interface within ±25°F.

5. The surveillance data for the correlation monitor material in the capsule, if present, must fall within the scatter band of the data base for the material.

The surveillance data deemed credible according to the criteria specified above must be used to determine a material-specific value of CF for use in the following equation:

$$\Delta RT_{NDT} = CF * ff$$

A material-specific value of CF is determined from the following equation:

$$CF = \frac{\sum_{i=1}^{n} [A_i * ff_i]}{\sum_{i=1}^{n} ff_i^2}$$

where: n = number of surveillance data points

A_i = measured value of ΔRT_{NDT}

ff_i = fluence factor for each surveillance data point.

For cases in which the results from a credible plant-specific surveillance program are used, the value of σ_Δ to be used is 14°F for welds and 8.5°F for base metals; however the value of σ_Δ may not exceed one-half ΔRT_{NDT}.

See Section 4 for credibility assessments for Linde 80 weld materials which include data from capsules tested since 1999. BAW-2325, Revision 1 has credibility assessments for the base metal materials. Only base metal heats C4339-1 and 123S266 have had new data produced since 1999. The data from the S2-Y capsule[9] and TP3-X capsule[10] are evaluated in Section 4 of this document; only 123S266 is deemed credible.

3.3.2 Adjusted Reference Temperature (ART) Calculations

The adjusted reference temperatures (ARTs) are used in setting the upper limit for pressure as a function of temperature during heatup and cooldown at the end of a given service period as required by 10 CFR 50 Appendix G. The ART values are calculated following NRC Regulatory Guide 1.99, Revision 2[11]. The calculation of the ART for each material in the beltline is the same as the PTS calculation, however differs in the following ways:

1. Fluence and fluence factors are calculated at the ¼T and ¾T locations, where "T" is the depth into the vessel wall measured from the vessel inside (wetted) surface. The fluence at the ¼T and ¾T locations is determined as follows:

$$f = f_{surf}(e^{-0.24x})$$

where f_{surf} (10^{19} n/cm^2, E > 1.0 MeV) is the calculated value of the neutron fluence at the inner wetted surface of the vessel, and "x" (in inches) is the depth into the vessel wall measured from the vessel inner (wetted) surface.

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2. The fluence values which are used (the vessel inside surface fluence used to calculated fluence and fluence factors at ¼T and ¾T) are those which correspond to the current NRC approved pressure/temperature curves for the applicable plant.
3. The resulting ART values are given at the ¼T location and ¾T location.

Table 3.3-1. Arkansas Nuclear One Unit 1 RT_{PTS} at 48 EFPY (60 Calendar Years)

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	Fluence @ 48 EFPY* ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	RT_{PTS} at 48 EFPY	Licensing Basis[13]
528360 (AYN 131)	Lower Nozzle Belt Forging	0.03	0.70	1.11	20.0	Table	+3	31	17.0	65.3	88.9	—
C5120-2	Upper Shell Plate	0.17	0.55	1.17	122.8	Table	-10	0	17.0	34.0	152.1	—
C5114-2	Upper Shell Plate	0.15	0.52	1.17	105.6	Table	-10	0	17.0	34.0	134.2	—
C5120-1	Lower Shell Plate	0.17	0.55	1.16	122.8	Table	-10	0	17.0	34.0	151.8	—
C5114-1	Lower Shell Plate	0.15	0.52	1.16	105.6	Table	0	0	17.0	34.0	144.0	—
821T44 (WF-182-1)	Lower Nozzle Belt to Upper Shell Circ. Weld (100%)	0.24	0.63	1.11	178.0	Table	-5	19.7	28.0	68.5	246.7	—
8T1762 (WF-18)	Upper Shell Long. Weld (Both 100%)	0.19	0.57	1.02	152.4	Table	-5	19.7	28.0	68.5	216.7	—
406L44 (WF-112)	Upper to Lower Shell Circ. Weld (100%)	0.27	0.59	1.15	182.6	Table	-5	19.7	28.0	68.5	253.2	278.0
8T1762 (WF-18)	Lower Shell Long. Weld (Both 100%)	0.19	0.57	1.02	152.4	Table	-5	19.7	28.0	68.5	216.7	—

*Updated fluence based on calculations through EOC 18 and extrapolation to 48 EFPY.

Table 3.3-2. Arkansas Nuclear One Unit 1 ¼T ART at 32 EFPY*

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¼T Fluence @ 32 EFPY*@ ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	¼T ART @ 31 EFPY	Licensing Basis[14]
528360 (AYN 131)	Lower Nozzle Belt Forging	0.03	0.70	0.462	20.0	Table	+3	31	17.0	64.0	82.7	—
C5120-2	Upper Shell Plate	0.17	0.55	0.498	122.8	Table	-10	0	17.0	34.0	122.9	—
C5114-2	Upper Shell Plate	0.15	0.52	0.498	105.6	Table	-10	0	17.0	34.0	109.8	—
C5120-1	Lower Shell Plate	0.17	0.55	0.492	122.8	Table	-10	0	17.0	34.0	122.5	—
C5114-1	Lower Shell Plate	0.15	0.52	0.492	105.6	Table	0	0	17.0	34.0	118.7	—
821T44 (WF-182-1)	Lower Nozzle Belt to Upper Shell Circ. Weld (100%)	0.24	0.63	0.462	178.0	Table	-5	19.7	28.0	68.5	203.2	—
8T1762 (WF-18)	Upper Shell Long. Weld (Both 100%)	0.19	0.57	0.407	152.4	Table	-5	19.7	28.0	68.5	177.9	—
406L44 (WF-112)	Upper to Lower Shell Circ. Weld (100%)	0.27	0.59	0.483	182.6	Table	-5	19.7	28.0	68.5	209.0	213.5
8T1762 (WF-18)	Lower Shell Long. Weld (Both 100%)	0.19	0.57	0.404	152.4	Table	-5	19.7	28.0	68.5	177.5	—

*Note: ANO P/T curves are based on fluences 32 EFPY, however based on a discrepancy in calculating the reference temperature, validity of the P/T curves was decreased from 32 EFPY to 31 EFPY.[14]

@Updated fluence based on calculations through EOC 18 and extrapolation to 32 EFPY.

Table 3.3-3. Arkansas Nuclear One Unit 1 ¾T ART at 32 EFPY*

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¾T Fluence @ 32 EFPY*@ ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	¾T ART @ 31 EFPY	Licensing Basis[14]
528360 (AYN 131)	Lower Nozzle Belt Forging	0.03	0.70	0.168	20.0	Table	+3	31	17.0	62.9	76.5	—
C5120-2	Upper Shell Plate	0.17	0.55	0.181	122.8	Table	-10	0	17.0	34.0	91.0	—
C5114-2	Upper Shell Plate	0.15	0.52	0.181	105.6	Table	-10	0	17.0	34.0	81.6	—
C5120-1	Lower Shell Plate	0.17	0.55	0.179	122.8	Table	-10	0	17.0	34.0	90.6	—
C5114-1	Lower Shell Plate	0.15	0.52	0.179	105.6	Table	0	0	17.0	34.0	91.3	—
821T44 (WF-182-1)	Lower Nozzle Belt to Upper Shell Circ. Weld (100%)	0.24	0.63	0.168	178.0	Table	-5	19.7	28.0	68.5	157.5	—
8T1762 (WF-18)	Upper Shell Long. Weld (Both 100%)	0.19	0.57	0.148	152.4	Table	-5	19.7	28.0	68.5	139.6	—
406L44 (WF-112)	Upper to Lower Shell Circ. Weld (100%)	0.27	0.59	0.175	182.6	Table	-5	19.7	28.0	68.5	161.8	165.2
8T1762 (WF-18)	Lower Shell Long. Weld (Both 100%)	0.19	0.57	0.147	152.4	Table	-5	19.7	28.0	68.5	139.3	—

*Note: ANO P/T curves are based on fluences 32 EFPY, however based on a discrepancy in calculating the reference temperature, validity of the P/T curves was decreased from 32 EFPY to 31 EFPY.[14]

@Updated fluence based on calculations through EOC 18 and extrapolation to 32 EFPY.

Table 3.3-4. Crystal River Unit 3 RT_{PTS} at 32 EFPY (40 Calendar Years)

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	Fluence @ 32 EFPY* ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	RT_{PTS} at 32 EFPY	Licensing Basis[1]
123V190 (AZJ 94)	Lower Nozzle Belt Forging	0.13	0.72	0.708	94.0	Table	+3	31.0	17.0	70.7	158.6	—
C4344-1	Upper Shell Plate	0.20	0.54	0.790	115.8	Surv. Data	+20	0	8.5	17.0	145.1	—
C4344-2	Upper Shell Plate	0.20	0.54	0.790	141.8	Table	+20	0	17.0	34.0	186.4	—
C4347-1	Lower Shell Plate	0.12	0.58	0.800	82.6	Table	-10	0	17.0	34.0	101.4	—
C4347-2	Lower Shell Plate	0.12	0.58	0.800	82.6	Table	+45	0	17.0	34.0	156.4	—
71249 (SA-1769)	Lower Nozzle Belt to Upper Shell Circ. Weld (ID 40%)	0.23	0.59	0.708	167.6	Table	+10	0	28.0	56.0	217.4	—
8T1554 (WF-169-1)	Lower Nozzle Belt to Upper Shell Circ. Weld (OD 60%)	0.16	0.57	N/A	143.9	Table	-5	19.7	28.0	N/A	N/A	—
8T1762 (WF-8)	Upper Shell Long. Weld (100%)	0.19	0.57	0.740	152.4	Table	-5	19.7	28.0	68.5	203.0	—
8T1762 (WF-18)	Upper Shell Long. Weld (100%)	0.19	0.57	0.740	152.4	Table	-5	19.7	28.0	68.5	203.0	—
72105 (WF-70)	Upper to Lower Shell Circ. Weld (100%)	0.32	0.58	0.773	199.3	Table	-26	0	28.0	56.0	214.9	289.0
8T1762 (SA-1580)	Lower Shell Long. Weld (Both 100%)	0.19	0.57	0.696	152.4	Table	-5	19.7	28.0	68.5	200.4	—

*Updated fluence based on calculations through EOC 10 and extrapolation to 32 EFPY.

Table 3.3-5. Crystal River Unit 3 ¼T ART at 32 EFPY

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¼T Fluence @ 32 EFPY* ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	¼T ART @ 32 EFPY	Licensing Basis[15]
123V190 (AZJ 94)	Lower Nozzle Belt Forging	0.13	0.72	0.427	94.0	Table	+3	31.0	17.0	70.7	145.5	—
C4344-1	Upper Shell Plate	0.20	0.54	0.476	115.8	Surv. Data	+20	0	8.5	17.0	128.8	—
C4344-2	Upper Shell Plate	0.20	0.54	0.476	141.8	Table	+20	0	17.0	34.0	166.5	—
C4347-1	Lower Shell Plate	0.12	0.58	0.482	82.6	Table	-10	0	17.0	34.0	89.8	—
C4347-2	Lower Shell Plate	0.12	0.58	0.482	82.6	Table	+45	0	17.0	34.0	144.8	—
71249 (SA-1769)	Lower Nozzle Belt to Upper Shell Circ. Weld (ID 40%)	0.23	0.59	0.427	167.6	Table	+10	0	28.0	56.0	193.9	213.0
8T1544 (WF-169-1)	Lower Nozzle Belt to Upper Shell Circ. Weld (OD 60%)	0.16	0.57	N/A	143.9	Table	-5	19.7	28.0	N/A	N/A	—
8T1762 (WF-8)	Upper Shell Long. Weld (100%)	0.19	0.57	0.446	152.4	Table	-5	19.7	28.0	68.5	181.6	—
8T1762 (WF-18)	Upper Shell Long. Weld (100%)	0.19	0.57	0.446	152.4	Table	-5	19.7	28.0	68.5	181.6	—
72105 (WF-70)	Upper to Lower Shell Circ. Weld (100%)	0.32	0.58	0.466	199.3	Table	-26	0	28.0	56.0	186.9	—
8T1762 (SA-1580)	Lower Shell Long. Weld (Both 100%)	0.19	0.57	0.419	152.4	Table	-5	19.7	28.0	68.5	179.1	—

*Updated fluence based on calculations through EOC 10 and extrapolation to 32 EFPY.

Table 3.3-6. Crystal River Unit 3 ¾T ART at 32 EFPY

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¾T Fluence @ 32 EFPY* ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	¾T ART @ 32 EFPY	Licensing Basis[15]
123V190 (AZJ 94)	Lower Nozzle Belt Forging	0.13	0.72	0.155	94.0	Table	+3	31.0	17.0	70.7	121.7	—
C4344-1	Upper Shell Plate	0.20	0.54	0.173	115.8	Surv. Data	+20	0	8.5	17.0	99.0	—
C4344-2	Upper Shell Plate	0.20	0.54	0.173	141.8	Table	+20	0	17.0	34.0	129.9	—
C4347-1	Lower Shell Plate	0.12	0.58	0.175	82.6	Table	-10	0	17.0	34.0	68.4	—
C4347-2	Lower Shell Plate	0.12	0.58	0.175	82.6	Table	+45	0	17.0	34.0	123.4	—
71249 (SA-1769)	Lower Nozzle Belt to Upper Shell Circ. Weld (ID 40%)	0.23	0.59	N/A	167.6	Table	+10	0	28.0	N/A	N/A	—
8T1544 (WF-169-1)	Lower Nozzle Belt to Upper Shell Circ. Weld (OD 60%)	0.16	0.57	0.155	143.9	Table	-5	19.7	28.0	68.5	136.9	144.5
8T1762 (WF-8)	Upper Shell Long. Weld (100%)	0.19	0.57	0.162	152.4	Table	-5	19.7	28.0	68.5	142.7	—
8T1762 (WF-18)	Upper Shell Long. Weld (100%)	0.19	0.57	0.162	152.4	Table	-5	19.7	28.0	68.5	142.7	—
72105 (WF-70)	Upper to Lower Shell Circ. Weld (100%)	0.32	0.58	0.169	199.3	Table	-26	0	28.0	56.0	135.7	—
8T1762 (SA-1580)	Lower Shell Long. Weld (Both 100%)	0.19	0.57	0.152	152.4	Table	-5	19.7	28.0	68.5	140.6	—

*Updated fluence based on calculations through EOC 10 and extrapolation to 32 EFPY.

Table 3.3-7. Davis-Besse RT_{PTS} at 32 EFPY (40 Calendar Years)

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	Fluence @ 32 EFPY* ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	RT_{PTS} at 32 EFPY	RT_{PTS} at 32 EFPY@	Licensing Basis[1]
123Y317 (ADB 203)	Nozzle Belt Forging	0.04	0.68	0.089	26.0	Table	+50	0.0	17.0	10.2	70.5	70.5	—
123X244 (AKJ 233)	Upper Shell Forging	0.04	0.77	1.019	26.0	Table	+20	0.0	17.0	26.1	72.3	72.3	—
5P4086 (BCC 241)	Lower Shell Forging	0.02	0.81	1.017	20.0	Table	+50	0.0	17.0	20.1	90.2	90.2	—
8T3914 (WF-232)	Nozzle Belt to Upper Shell Circ. Weld (ID 9%)	0.18	0.62	0.176	157.3	Table	-5	19.7	28.0	68.5	148.3	108.2	—
T29744 (WF-233)	Nozzle Belt to Upper Shell Circ. Weld (OD 91%)	0.21	0.65	N/A	172.3	Table	-5	19.7	28.0	N/A	N/A	N/A	—
821T44 (WF-182-1)	Upper to Lower Shell Circ. Weld (100%)	0.24	0.63	1.017	178.0	Table	+2	0.0	28.0	56.0	236.8	157.6	195.1

*Updated fluence based on calculations through EOC 14 and extrapolation to 32 EFPY.
@Values in this column use BAW-2308[7] initial RT_{NDT} values.

Table 3.3-8. Davis Besse ¼T ART at 52 EFPY*

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¼T Fluence @ 52 EFPY[@] ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	¼T ART @ 52 EFPY	Licensing Basis[16]
123Y317 (ADB 203)	Nozzle Belt Forging	0.04	0.68	0.087	26.0	Table	+50	0.0	17.0	10.1	70.3	—
123X244 (AKJ 233)	Upper Shell Forging	0.04	0.77	0.965	26.0	Table	+20	0.0	17.0	25.7	71.5	—
5P4086 (BCC 241)	Lower Shell Forging	0.02	0.81	0.959	20.0	Table	+50	0.0	17.0	19.8	89.5	—
8T3914 (WF-232)	Nozzle Belt to Upper Shell Circ. Weld (ID 9%)	0.18	0.62	N/A	167.0	BAW-2308, Revison 1-A [7]	-47.6	17.2	28.0	N/A	N/A	—
T29744 (WF-233)	Nozzle Belt to Upper Shell Circ. Weld (OD 91%)	0.21	0.65	0.176	172.3	Table	-47.6	17.2	28.0	65.7	111.0	—
821T44 (WF-182-1)	Upper to Lower Shell Circ. Weld (100%)	0.24	0.63	0.959	178.0	Table	-80.2	9.3	28.0	59.0	154.7	155.0

*Note: Davis-Besse currently uses pressure/temperature curves for 21 EFPY [16] however new pressure/temperature curves for 52 EFPY will be submitted using the new 2006 embrittlement correlation and the BAW-2308 Revision 1-A lowered initial RT_{NDT} values.
[@]Updated fluence values based on calculations through EOC 14 and extrapolated to 52 EFPY.

Table 3.3-9. Davis Besse ¾T ART at 52 EFPY*

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¾T Fluence @ 52 EFPY@ ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	¾T ART @ 52 EFPY	Licensing Basis[16]
123Y317 (ADB 203)	Nozzle Belt Forging	0.04	0.68	0.032	26.0	Table	+50	0.0	17.0	5.9	61.8	—
123X244 (AKJ 233)	Upper Shell Forging	0.04	0.77	0.350	26.0	Table	+20	0.0	17.0	18.5	57.0	—
5P4086 (BCC 241)	Lower Shell Forging	0.02	0.81	0.348	20.0	Table	+50	0.0	17.0	14.2	78.4	—
8T3914 (WF-232)	Nozzle Belt to Upper Shell Circ. Weld (ID 9%)	0.18	0.62	N/A	167.0	BAW-2308, Revison 1-A [7]	-47.6	17.2	28.0	N/A	N/A	—
T29744 (WF-233)	Nozzle Belt to Upper Shell Circ. Weld (OD 91%)	0.21	0.65	0.064	172.3	Table	-47.6	17.2	28.0	65.7	75.6	—
821T44 (WF-182-1)	Upper to Lower Shell Circ. Weld (100%)	0.24	0.63	0.348	178.0	Table	-80.2	9.3	28.0	59.0	105.1	114.0

*Note: Davis-Besse currently uses pressure/temperature curves for 21 EFPY [16] however new pressure/temperature curves for 52 EFPY will be submitted using the new 2006 embrittlement correlation and the BAW-2308 Revision 1-A lowered initial RT_{NDT} values.

@Updated fluence values based on calculations through EOC 14 and extrapolated to 52 EFPY.

Table 3.3-10. Oconee Unit 1 RT_{PTS} at 48 EFPY (60 Calendar Years)

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	Fluence @ 48 EFPY[17] ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	RT_{PTS} at 48 EFPY	Licensing Basis[18]
ZV-2861 (AHR 54)	Lower Nozzle Belt Forging	0.16	0.65	0.111	119.3	Table	+3	31.0	17.0	70.7	125.9	—
C2197-3	Intermediate Shell Plate	0.15	0.50	1.18	104.5	Table	+1	26.9	17.0	63.6	173.9	—
C3265-1	Upper Shell Plate	0.10	0.50	1.31	65.0	Table	+1	26.9	17.0	63.6	134.5	—
C3278-1	Upper Shell Plate	0.12	0.60	1.31	83.0	Table	+1	26.9	17.0	63.6	153.8	—
C2800-1	Lower Shell Plate	0.11	0.63	1.31	74.5	Table	+1	26.9	17.0	63.6	144.6	—
C2800-2	Lower Shell Plate	0.11	0.63	1.31	74.5	Table	+1	26.9	17.0	63.6	144.6	—
61782 (SA-1135)	Lower Nozzle Belt to INterm. Shell Cric. Weld (Both 100%)	0.23	0.52	0.111	157.4	Table	-5	19.7	28.0	68.5	132.5	—
1P0962 (SA-1073)	Intermediate Shell Long. Weld (Both 100%)	0.21	0.64	0.924	170.6	Table	-5	19.7	28.0	68.5	230.3	230.3
71249 (SA-1229)	Interm. To Upper Shell Circ. Weld (ID 61%)	0.23	0.59	1.19	167.6	Table	+10	0.0	28.0	56.0	241.7	—
299L44 (WF-25)	Interm. To Upper Shell Circ. Weld (OD 39%)	0.34	0.68	N/A	220.6	Table	-7	20.6	28.0	N/A	N/A	—
8T1762 (SA-1493)	Upper Shell Long. Weld (Both 100%)	0.19	0.57	1.12	152.4	Table	-5	19.7	28.0	68.5	220.7	—
72445 (SA-1585)	Upper to Lower Shell Circ. Weld (100%)	0.22	0.54	1.27	158.0	Table	-5	19.7	28.0	68.5	232.0	—
8T1762 (SA-1426)	Lower Shell Long. Weld (100%)	0.19	0.57	1.08	152.4	Table	-5	19.7	28.0	68.5	219.2	—
8T1762 (SA-1430)	Lower Shell Long. Weld (100%)	0.19	0.57	1.08	152.4	Table	-5	19.7	28.0	68.5	219.2	—

Table 3.3-11. Oconee Unit 1 ¼T ART at 33 EFPY

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¼T Fluence @ 33 EFPY[1] ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	¼T ART @ 33 EFPY	Licensing Basis[1]
ZV-2861 (AHR 54)	Lower Nozzle Belt Forging	0.16	0.65	0.0486	119.3	Table	+3	31.0	17.0	70.7	108.1	—
C2197-3	Intermediate Shell Plate	0.15	0.50	0.518	104.5	Table	+1	26.9	17.0	63.6	150.0	—
C3265-1	Upper Shell Plate	0.10	0.50	0.576	65.0	Table	+1	26.9	17.0	63.6	119.6	—
C3278-1	Upper Shell Plate	0.12	0.60	0.576	83.0	Table	+1	26.9	17.0	63.6	134.8	—
C2800-1	Lower Shell Plate	0.11	0.63	0.575	74.5	Table	+1	26.9	17.0	63.6	127.6	—
C2800-2	Lower Shell Plate	0.11	0.63	0.575	74.5	Table	+1	26.9	17.0	63.6	127.6	—
61782 (SA-1135)	Lower Nozzle Belt to INterm. Shell Cric. Weld (Both 100%)	0.23	0.52	0.0486	157.4	Table	-5	19.7	28.0	60.1	100.4	—
1P0962 (SA-1073)	Intermediate Shell Long. Weld (Both 100%)	0.21	0.64	0.405	170.6	Table	-5	19.7	28.0	68.5	191.3	—
71249 (SA-1229)	Interm. To Upper Shell Circ. Weld (ID 61%)	0.23	0.59	0.522	167.6	Table	+10	0.0	28.0	56.0	203.1	203.1
299L44 (WF-25)	Interm. To Upper Shell Circ. Weld (OD 39%)	0.34	0.68	N/A	220.6	Table	-7	20.6	28.0	N/A	N/A	—
8T1762 (SA-1493)	Upper Shell Long. Weld (Both 100%)	0.19	0.57	0.491	152.4	Table	-5	19.7	28.0	68.5	185.4	—
72445 (SA-1585)	Upper to Lower Shell Circ. Weld (100%)	0.22	0.54	0.556	158.0	Table	-5	19.7	28.0	68.5	195.6	—
8T1762 (SA-1426)	Lower Shell Long. Weld (100%)	0.19	0.57	0.474	152.4	Table	-5	19.7	28.0	68.5	184.1	—
8T1762 (SA-1430)	Lower Shell Long. Weld (100%)	0.19	0.57	0.474	15.4	Table	-5	19.7	28.0	68.5	184.1	—

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Table 3.3-12. Oconee Unit 1 ¾T ART at 33 EFPY

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¾T Fluence @ 33 EFPY[1] ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	¾T ART @ 33 EFPY	Licensing Basis[1]
ZV-2861 (AHR 54)	Lower Nozzle Belt Forging	0.16	0.65	0.0176	119.3	Table	+3	31.0	17.0	64.8	86.8	—
C2197-3	Intermediate Shell Plate	0.15	0.50	0.188	104.5	Table	+1	26.9	17.0	63.6	122.6	—
C3265-1	Upper Shell Plate	0.10	0.50	0.209	65.0	Table	+1	26.9	17.0	63.6	102.4	—
C3278-1	Upper Shell Plate	0.12	0.60	0.209	83.0	Table	+1	26.9	17.0	63.6	112.8	—
C2800-1	Lower Shell Plate	0.11	0.63	0.209	74.5	Table	+1	26.9	17.0	63.6	107.8	—
C2800-2	Lower Shell Plate	0.11	0.63	0.209	74.5	Table	+1	26.9	17.0	63.6	107.8	—
61782 (SA-1135)	Lower Nozzle Belt to INterm. Shell Cric. Weld (Both 100%)	0.23	0.52	0.0176	157.4	Table	-5	19.7	28.0	46.7	66.7	—
1P0962 (SA-1073)	Intermediate Shell Long. Weld (Both 100%)	0.21	0.64	0.147	170.6	Table	-5	19.7	28.0	68.5	148.5	—
71249 (SA-1229)	Interm. To Upper Shell Circ. Weld (ID 61%)	0.23	0.59	N/A	167.6	Table	+10	0.0	28.0	N/A	N/A	—
299L44 (WF-25)	Interm. To Upper Shell Circ. Weld (OD 39%)	0.34	0.68	0.190	220.6	Table	-7	20.6	28.0	69.5	185.3	188.0
8T1762 (SA-1493)	Upper Shell Long. Weld (Both 100%)	0.19	0.57	0.178	152.4	Table	-5	19.7	28.0	68.5	146.1	—
72445 (SA-1585)	Upper to Lower Shell Circ. Weld (100%)	0.22	0.54	0.202	158.0	Table	-5	19.7	28.0	68.5	153.8	—
8T1762 (SA-1426)	Lower Shell Long. Weld (100%)	0.19	0.57	0.172	152.4	Table	-5	19.7	28.0	68.5	144.9	—
8T1762 (SA-1430)	Lower Shell Long. Weld (100%)	0.19	0.57	0.172	15.4	Table	-5	19.7	28.0	68.5	144.9	—

AREVA

Table 3.3-13. Oconee Unit 2 RT_{PTS} at 48 EFPY (60 Calendar Years)

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	Fluence @ 48 EFPY[17] ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	RT_{PTS} at 48 EFPY	Licensing Basis[18]
123T382 (AMX 77)	Lower Nozzle Belt Forging	0.13	0.76	1.19	95.0	Table	+3	31.0	17.0	70.7	173.3	—
3P2359 (AAW 163)	Upper Shell Forging	0.04	0.75	1.28	26.0	Table	+20	0.0	17.0	27.8	75.6	—
4P1885 (AWG 164)	Lower Shell Forging	0.02	0.80	1.27	20.0	Table	+20	0.0	17.0	21.3	62.7	—
406L44 (WF-154)	Lower Nozzle Belt to Upper Shell Circ. Weld (100%)	0.27	0.59	1.19	182.6	Table	-5	19.7	28.0	68.5	254.9	—
299L44 (WF-25)	Upper to Lower Shell Circ. Weld (100%)	0.34	0.68	1.23	220.6	Table	-7	20.6	28.0	69.5	295.9	296.8

AREVA

Table 3.3-14. Oconee Unit 2 ¼T ART at 33 EFPY

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¼T Fluence @ 33 EFPY ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	¼T ART @ 33 EFPY	Licensing Basis[1]
123T382 (AMX 77)	Lower Nozzle Belt Forging	0.13	0.76	0.516	95.0	Table	+3	31.0	17.0	70.7	151.2	—
3P2359 (AAW 163)	Upper Shell Forging	0.04	0.75	0.557	26.0	Table	+20	0.0	17.0	21.8	63.5	—
4P1885 (AWG 164)	Lower Shell Forging	0.02	0.80	0.552	20.0	Table	+20	0.0	17.0	16.7	53.4	—
406L44 (WF-154)	Lower Nozzle Belt to Upper Shell Circ. Weld (100%)	0.27	0.59	0.516	182.6	Table	-5	19.7	28.0	68.5	212.4	—
299L44 (WF-25)	Upper to Lower Shell Circ. Weld (100%)	0.34	0.68	0.538	220.6	Table	-7	20.6	28.0	69.5	244.9	248.4

AREVA

Table 3.3-15. Oconee Unit 2 ¾T ART at 33 EFPY

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¾T Fluence @ 33 EFPY ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	¾T ART @ 33 EFPY	Licensing Basis[1]
123T382 (AMX 77)	Lower Nozzle Belt Forging	0.13	0.76	0.188	95.0	Table	+3	31.0	17.0	70.7	126.4	—
3P2359 (AAW 163)	Upper Shell Forging	0.04	0.75	0.202	26.0	Table	+20	0.0	17.0	14.9	49.8	—
4P1885 (AWG 164)	Lower Shell Forging	0.02	0.80	0.201	20.0	Table	+20	0.0	17.0	11.4	42.8	—
406L44 (WF-154)	Lower Nozzle Belt to Upper Shell Circ. Weld (100%)	0.27	0.59	0.188	182.6	Table	-5	19.7	28.0	68.5	164.7	—
299L44 (WF-25)	Upper to Lower Shell Circ. Weld (100%)	0.34	0.68	0.195	220.6	Table	-7	20.6	28.0	69.5	186.9	189.6

Table 3.3-16. Oconee Unit 3 RT_{PTS} at 48 EFPY (60 Calendar Years)

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	Fluence @ 48 EFPY[17] ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	RT_{PTS} at 48 EFPY	Licensing Basis[18]
4680	Lower Nozzle Belt Forging	0.13	0.91	1.14	96.0	Table	+3	31.0	17.0	70.7	173.2	—
522314 (AWS 192)	Upper Shell Forging	0.01	0.73	1.26	20.0	Table	+40	0.0	17.0	21.3	82.6	—
522194 (ANK 191)	Lower Shell Forging	0.02	0.76	1.26	17.4	Surv. Data	+40	0.0	8.5	18.5	77.0	—
821T44 (WF-200)	Lower Nozzle Belt to Upper Shell Circ. Weld (100%)	0.24	0.63	1.14	178.0	Table	-5	19.7	28.0	68.5	248.0	—
72442 (WF-67)	Upper to Lower Shell Circ. Weld (ID 75%)	0.26	0.60	1.22	180.0	Table	-5	19.7	28.0	68.5	253.5	253.5
72105 (WF-70)	Upper to Lower Shell Circ. Weld (OD 25%)	0.32	0.58	N/A	199.3	Table	-26	0.0	28.0	N/A	N/A	—

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Table 3.3-17. Oconee Unit 3 ¼T ART at 33 EFPY

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¼T Fluence @ 33 EFPY ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	¼T ART @ 33 EFPY	Licensing Basis[1]
4680	Lower Nozzle Belt Forging	0.13	0.91	0.499	96.0	Table	+3	31.0	17.0	70.7	151.1	—
522314 (AWS 192)	Upper Shell Forging	0.01	0.73	0.550	20.0	Table	+40	0.0	17.0	16.7	73.3	—
522194 (ANK 191)	Lower Shell Forging	0.02	0.76	0.549	17.4	Surv. Data	+40	0.0	8.5	14.5	69.0	—
821T44 (WF-200)	Lower Nozzle Belt to Upper Shell Circ. Weld (100%)	0.24	0.63	0.499	178.0	Table	-5	19.7	28.0	68.5	206.9	—
72442 (WF-67)	Upper to Lower Shell Circ. Weld (ID 75%)	0.26	0.60	0.532	180.0	Table	-5	19.7	28.0	68.5	211.7	211.7
72105 (WF-70)	Upper to Lower Shell Circ. Weld (OD 25%)	0.32	0.58	N/A	199.3	Table	-26	0.0	28.0	N/A	N/A	—

Table 3.3-18. Oconee Unit 3 ¾T ART at 33 EFPY

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¾T Fluence @ 33 EFPY ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	¾T ART @ 33 EFPY	Licensing Basis[1]
4680	Lower Nozzle Belt Forging	0.13	0.91	0.181	96.0	Table	+3	31.0	17.0	70.7	126.1	—
522314 (AWS 192)	Upper Shell Forging	0.01	0.73	0.200	20.0	Table	+40	0.0	17.0	11.4	62.8	—
522194 (ANK 191)	Lower Shell Forging	0.02	0.76	0.199	17.4	Surv. Data	+40	0.0	8.5	9.9	59.8	—
821T44 (WF-200)	Lower Nozzle Belt to Upper Shell Circ. Weld (100%)	0.24	0.63	0.181	178.0	Table	-5	19.7	28.0	68.5	160.7	—
72442 (WF-67)	Upper to Lower Shell Circ. Weld (ID 75%)	0.26	0.60	0.193	180.0	Table	-5	19.7	28.0	68.5	164.5	164.5
72105 (WF-70)	Upper to Lower Shell Circ. Weld (OD 25%)	0.32	0.58	0.193	199.3	Table	-26	0.0	28.0	56.0	141.8	—

AREVA

Table 3.3-19. Point Beach Unit 1 RT_{PTS} at 53 EFPY (60 Calendar Years)

RPV Base Metal/ Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	Fluence @ 53 EFPY@ (x10^{19} n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	RT_{PTS} at 53 EFPY	RT_{PTS} at 53 EFPY*	Licensing Basis[19]
122P237	Nozzle Belt Forging	0.11	0.82	0.381	77.0	Table	+50	0.0	17.0	34.0	140.4	140.4	—
A9811-1	Intermediate Shell Plate	0.20	0.06	5.21	79.3	Surv. Data	+1	26.9	8.5	56.4	169.3	169.3	—
C1423-1	Lower Shell Plate	0.12	0.07	4.83	35.8	Surv. Data	+1	26.9	8.5	56.4	107.4	107.4	—
8T1762 (SA-1426)	Nozzle Belt to Intermediate Shell Circ. Weld (100%)	0.19	0.57	0.381	152.4	Table	-5	19.7	28.0	68.5	175.2	140.5	—
1P0815 (SA-812)	Intermediate Shell Long. Weld (ID 27%)	0.17	0.52	3.39	138.2	Table	-5	19.7	28.0	68.5	245.8	238.4	—
1P0661 (SA-775)	Intermediate Shell Long. Weld (OD 73%)	0.17	0.64	N/A	157.6	Table	-5	19.7	28.0	N/A	N/A	N/A	—
71249 (SA-1101)	Intermediate to Lower Shell Circ. Weld (100%)	0.23	0.59	4.71	167.6	Table	+10	0	28.0	56.0	299.0	247.3	299.0
61782 (SA-847)	Lower Shell Long. Weld (100%)	0.23	0.52	3.25	157.4	Table	-5	19.7	28.0	68.5	269.6	236.8	—

*The license holder is in the process of submitting an exemption request to 10 CFR 50.61 for use of lowered initial RT_{NDT} values per BAW-2308, Revision 1-A.[7]

@These values agree with the evaluation of the license renewal application performed in NUREG-1839.[20]

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Table 3.3-20. Point Beach Unit 1 ¼T ART at 34 EFPY

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¼T Fluence @ 34 EFPY[21] ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	¼T ART @ 34 EFPY	¼T ART @ 34 EFPY*	Licensing Basis[21]
122P237	Nozzle Belt Forging	0.11	0.82	0.169	77.0	Table	+50	0.0	17.0	34.0	124.8	124.8	—
A9811-1	Intermediate Shell Plate	0.20	0.06	2.288	79.3	Surv. Data	+1	26.9	8.5	56.4	154.5	154.5	—
C1423-1	Lower Shell Plate	0.12	0.07	2.058	35.8	Surv. Data	+1	26.9	8.5	56.4	100.3	100.3	—
8T1762 (SA-1426)	Nozzle Belt to Intermediate Shell Circ. Weld (100%)	0.19	0.57	0.169	152.4	Table	-5	19.7	28.0	68.5	144.3	106.7	—
1P0815 (SA-812)	Intermediate Shell Long. Weld (ID 27%)	0.17	0.52	1.483	138.2	Table	-5	19.7	28.0	68.5	216.8	203.3	—
1P0661 (SA-775)	Intermediate Shell Long. Weld (OD 73%)	0.17	0.64	N/A	157.6	Table	-5	19.7	28.0	N/A	N/A	N/A	—
71249 (SA-1101)	Intermediate to Lower Shell Circ. Weld (100%)	0.23	0.59	2.065	167.6	Table	+10	0	28.0	56.0	266.7	215.0	267.0
61782 (SA-847)	Lower Shell Long. Weld (100%)	0.23	0.52	1.408	157.4	Table	-5	19.7	28.0	68.5	235.8	201.0	—

*The license holder is in the process of submitting an exemption request to 10 CFR 50.61 for use of lowered initial RT_{NDT} values per BAW-2308, Revision 1-A.[7]

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Table 3.3-21. Point Beach Unit 1 ¾T ART at 34 EFPY

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¾T Fluence @ 34 EFPY[21] ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	¾T ART @ 34 EFPY	¾T ART @ 34 EFPY*	Licensing Basis[21]
122P237	Nozzle Belt Forging	0.11	0.82	0.0776	77.0	Table	+50	0.0	17.0	28.3	106.7	106.7	—
A9811-1	Intermediate Shell Plate	0.20	0.06	1.049	79.3	Surv. Data	+1	26.9	8.5	56.4	137.8	137.8	—
C1423-1	Lower Shell Plate	0.12	0.07	0.944	35.8	Surv. Data	+1	26.9	8.5	56.4	92.6	92.6	—
8T1762 (SA-1426)	Nozzle Belt to Intermediate Shell Circ. Weld (100%)	0.19	0.57	0.0776	152.4	Table	-5	19.7	28.0	68.5	119.6	79.6	—
1P0815 (SA-812)	Intermediate Shell Long. Weld (ID 27%)	0.17	0.52	N/A	138.2	Table	-5	19.7	28.0	N/A	N/A	N/A	—
1P0661 (SA-775)	Intermediate Shell Long. Weld (OD 73%)	0.17	0.64	0.680	157.6	Table	-5	19.7	28.0	68.5	204.0	167.0	—
71249 (SA-1101)	Intermediate to Lower Shell Circ. Weld (100%)	0.23	0.59	0.947	167.6	Table	+10	0.0	28.0	56.0	231.0	179.3	232.0
61782 (SA-847)	Lower Shell Long. Weld (100%)	0.23	0.52	0.646	157.4	Table	-5	19.7	28.0	68.5	201.6	164.6	—

*The license holder is in the process of submitting an exemption request to 10 CFR 50.61 for use of lowered initial RT_{NDT} values per BAW-2308, Revision 1-A.[7]

Table 3.3-22. Point Beach Unit 2 RT_{PTS} at 53 EFPY (60 Calendar Years)

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	Fluence @ 53 EFPY ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	RT_{PTS} at 53 EFPY	RT_{PTS} at 53 EFPY*	Licensing Basis[19]
123V352	Nozzle Belt Forging	0.11	0.73	0.525	76.0	Table	+40	0.0	17.0	34.0	136.3	136.3	—
123V500	Intermediate Shell Forging	0.09	0.70	5.26	58.0	Table	+40	0.0	17.0	34.0	155.9	155.9	—
122W195	Lower Shell Forging	0.05	0.72	5.11	42.8	Surv. Data	+40	0.0	8.5	17.0	117.2	117.2	—
21935	Nozzle Belt to Intermediate Shell Circ. Weld (100%)	0.18	0.70	0.525	170.5	Table	-56	17.0	28.0	65.5	149.3	149.3	—
72442 (SA-1484)	Intermediate to Lower Shell Circ. Weld (100%)	0.26	0.60	4.85	180.0	Table	-30	19.7	28.0	68.5	314.8	282.1	276.0

*The license holder is in the process of submitting an exemption request to 10 CFR 50.61 for use of lowered initial RT_{NDT} values per BAW-2308, Revision 1-A.[7]

Table 3.3-23. Point Beach Unit 2 ¼T ART at 34 EFPY

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¼T Fluence @ 34 EFPY[21] ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	¼T ART @ 34 EFPY	¼T ART @ 34 EFPY*	Licensing Basis [21]
123V352	Nozzle Belt Forging	0.11	0.73	0.227	76.0	Table	+40	0.0	17.0	34.0	119.6	119.6	—
123V500	Intermediate Shell Forging	0.09	0.70	2.288	58.0	Table	+40	0.0	17.0	34.0	145.0	145.0	—
122W195	Lower Shell Forging	0.05	0.72	2.234	42.8	Surv. Data	+40	0.0	8.5	17.0	109.1	109.1	—
21935	Nozzle Belt to Intermediate Shell Circ. Weld (100%)	0.18	0.70	0.227	170.5	Table	-56	17.0	28.0	65.5	111.8	111.8	—
72442 (SA-1484)	Intermediate to Lower Shell Circ. Weld (100%)	0.26	0.60	2.119	180.0	Table	-5	19.7	28.0	68.5	280.2	247.6	280.0

*The license holder is in the process of submitting an exemption request to 10 CFR 50.61 for use of lowered initial RT_{NDT} values per BAW-2308, Revision 1-A.[7]

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Table 3.3-24. Point Beach Unit 2 ¾T ART at 34 EFPY

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¾T Fluence @ 34 EFPY[21] ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	¾T ART @ 34 EFPY	¾T ART @ 34 EFPY*	Licensing Basis[21]
123V352	Nozzle Belt Forging	0.11	0.73	0.104	76.0	Table	+40	0.0	17.0	32.3	104.6	104.6	—
123V500	Intermediate Shell Forging	0.09	0.70	1.049	58.0	Table	+40	0.0	17.0	34.0	132.8	132.8	—
122W195	Lower Shell Forging	0.05	0.72	1.024	42.8	Surv. Data	+40	0.0	8.5	17.0	100.1	100.1	—
21935	Nozzle Belt to Intermediate Shell Circ. Weld (100%)	0.18	0.70	0.104	170.5	Table	-56	17.0	28.0	65.5	81.9	81.9	—
72442 (SA-1484)	Intermediate to Lower Shell Circ. Weld (100%)	0.26	0.60	0.971	180.0	Table	-5	19.7	28.0	68.5	242.0	209.4	242.0

*The license holder is in the process of submitting an exemption request to 10 CFR 50.61 for use of lowered initial RT_{NDT} values per BAW-2308, Revision 1-A.[7]

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Table 3.3-25. Three Mile Island Unit 1 RT_{PTS} at 29 EFPY (40 Calendar Years)

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	Fluence @ 29 EFPY* ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	RT_{PTS} at 29 EFPY	Licensing Basis[1]
123S454 (ARY 59)	Lower Nozzle Belt Forging	0.08	0.72	1.035	51.0	Table	+3	31.0	17.0	70.7	125.2	—
C2789-1	Upper Shell Plate	0.09	0.57	1.088	58.0	Table	+1	26.9	17.0	63.6	124.0	—
C2789-2	Upper Shell Plate	0.09	0.57	1.088	58.0	Table	+1	26.9	17.0	63.6	124.0	—
C3307-1	Lower Shell Plate	0.12	0.55	1.088	82.0	Table	+1	26.9	17.0	63.6	148.6	—
C3251-1	Lower Shell Plate	0.11	0.50	1.088	73.0	Table	+1	26.9	17.0	63.6	139.4	—
72105 (WF-70)	Lower Nozzle Belt to Upper Shell Circ. Weld (100%)	0.32	0.58	1.035	199.3	Table	-26	0.0	28.0	56.0	231.3	—
8T1762 (WF-8)	Upper Shell Long. Weld (Both 100%)	0.19	0.57	0.778	152.4	Table	-5	19.7	28.0	68.5	205.2	—
299L44 (WF-25)	Upper to Lower Shell Circ. Weld (100%)	0.34	0.68	1.058	220.6	Table	-7	20.6	28.0	69.5	286.6	—
299L44 (SA-1526)	Lower Shell Long. Weld (100%)	0.34	0.68	0.698	220.6	Table	-7	20.6	28.0	69.5	260.8	262.0
299L44 (SA-1526)	Lower Shell Long. Weld (ID 37%)	0.34	0.68	0.698	220.6	Table	-7	20.6	28.0	69.5	260.8	262.0
8T1554 (SA-1494)	Lower Shell Long. Weld (OD 63%)	0.16	0.57	N/A	143.9	Table	-5	19.7	28.0	N/A	N/A	—

*Updated fluence based on calculations through EOC 15 and extrapolation to 29 EFPY.

AREVA

Table 3.3-26. Three Mile Island Unit 1 ¼T ART at 29 EFPY

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¼T Fluence @ 29 EFPY* ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	¼T ART @ 29 EFPY	Licensing Basis[22]
123S454 (ARY 59)	Lower Nozzle Belt Forging	0.08	0.72	0.605	51.0	Table	+3	31.0	17.0	70.7	117.5	—
C2789-1	Upper Shell Plate	0.09	0.57	0.636	58.0	Table	+1	26.9	17.0	63.6	115.2	—
C2789-2	Upper Shell Plate	0.09	0.57	0.636	58.0	Table	+1	26.9	17.0	63.6	115.2	—
C3307-1	Lower Shell Plate	0.12	0.55	0.636	82.0	Table	+1	26.9	17.0	63.6	136.2	—
C3251-1	Lower Shell Plate	0.11	0.50	0.636	73.0	Table	+1	26.9	17.0	63.6	128.2	—
72105 (WF-70)	Lower Nozzle Belt to Upper Shell Circ. Weld (100%)	0.32	0.58	0.605	199.3	Table	-26	0.0	28.0	56.0	201.2	—
8T1762 (WF-8)	Upper Shell Long. Weld (Both 100%)	0.19	0.57	0.455	152.4	Table	-5	19.7	28.0	68.5	182.5	—
299L44 (WF-25)	Upper to Lower Shell Circ. Weld (100%)	0.34	0.68	0.619	220.6	Table	-7	20.6	28.0	69.5	253.5	251.0
299L44 (SA-1526)	Lower Shell Long. Weld (100%)	0.34	0.68	0.408	220.6	Table	-7	20.6	28.0	69.5	228.2	—
299L44 (SA-1526)	Lower Shell Long. Weld (ID 37%)	0.34	0.68	0.408	220.6	Table	-7	20.6	28.0	69.5	228.2	—
8T1554 (SA-1494)	Lower Shell Long. Weld (OD 63%)	0.16	0.57	N/A	143.9	Table	-5	19.7	28.0	N/A	N/A	—

*Updated fluence based on calculations through EOC 15 and extrapolation to 29 EFPY.

Table 3.3-27. Three Mile Island Unit 1 ¾T ART at 29 EFPY

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¾T Fluence @ 29 EFPY* ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	¾T ART @ 29 EFPY	Licensing Basis[22]
123S454 (ARY 59)	Lower Nozzle Belt Forging	0.08	0.72	0.220	51.0	Table	+3	31.0	17.0	68.5	102.2	—
C2789-1	Upper Shell Plate	0.09	0.57	0.231	58.0	Table	+1	26.9	17.0	63.6	99.7	—
C2789-2	Upper Shell Plate	0.09	0.57	0.231	58.0	Table	+1	26.9	17.0	63.6	99.7	—
C3307-1	Lower Shell Plate	0.12	0.55	0.231	82.0	Table	+1	26.9	17.0	63.6	114.2	—
C3251-1	Lower Shell Plate	0.11	0.50	0.231	73.0	Table	+1	26.9	17.0	63.6	108.8	—
72105 (WF-70)	Lower Nozzle Belt to Upper Shell Circ. Weld (100%)	0.32	0.58	0.220	199.3	Table	-26	0.0	28.0	56.0	148.0	—
8T1762 (WF-8)	Upper Shell Long. Weld (Both 100%)	0.19	0.57	0.165	152.4	Table	-5	19.7	28.0	68.5	143.5	—
299L44 (WF-25)	Upper to Lower Shell Circ. Weld (100%)	0.34	0.68	0.225	220.6	Table	-7	20.6	28.0	69.5	194.4	192.0
299L44 (SA-1526)	Lower Shell Long. Weld (100%)	0.34	0.68	0.148	220.6	Table	-7	20.6	28.0	69.5	172.8	—
299L44 (SA-1526)	Lower Shell Long. Weld (ID 37%)	0.34	0.68	N/A	220.6	Table	-7	20.6	28.0	N/A	N/A	—
8T1554 (SA-1494)	Lower Shell Long. Weld (OD 63%)	0.16	0.57	0.148	143.9	Table	-5	19.7	28.0	68.5	135.5	—

*Updated fluence based on calculations through EOC 15 and extrapolation to 29 EFPY.

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Table 3.3-28. Three Mile Island Unit 1 RT_{PTS} at 50 EFPY (60 Calendar Years)

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	Fluence @ 50 EFPY ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}	σ_I	σ_Δ	Margin	RT_{PTS} at 50 EFPY	Licensing Basis
123S454 (ARY 59)	Lower Nozzle Belt Forging	0.08	0.72	1.836	51.0	Table	+3	31.0	17.0	70.7	133.2	—
C2789-1	Upper Shell Plate	0.09	0.57	1.972	58.0	Table	+1	26.9	17.0	63.6	133.3	—
C2789-2	Upper Shell Plate	0.09	0.57	1.972	58.0	Table	+1	26.9	17.0	63.6	133.3	—
C3307-1	Lower Shell Plate	0.12	0.55	1.972	82.0	Table	+1	26.9	17.0	63.6	161.8	—
C3251-1	Lower Shell Plate	0.11	0.50	1.972	73.0	Table	+1	26.9	17.0	63.6	151.1	—
72105 (WF-70)	Lower Nozzle Belt to Upper Shell Circ. Weld (100%)	0.32	0.58	1.836	199.3	Table	-31.1	13.7	28.0	62.3	263.8	*
8T1762 (WF-8)	Upper Shell Long. Weld (Both 100%)	0.19	0.57	1.311	167.0	BAW-2308, Revison 1-A [7]	-47.6	17.2	28.0	65.7	197.6	—
299L44 (WF-25)	Upper to Lower Shell Circ. Weld (100%)	0.34	0.68	1.914	220.6	Table	-74.3	12.8	28.0	61.6	247.2	—
299L44 (SA-1526)	Lower Shell Long. Weld (100%)	0.34	0.68	1.177	220.6	Table	-74.3	12.8	28.0	61.6	217.8	—
299L44 (SA-1526)	Lower Shell Long. Weld (ID 37%)	0.34	0.68	1.177	220.6	Table	-74.3	12.8	28.0	61.6	217.8	—
8T1554 (SA-1494)	Lower Shell Long. Weld (OD 63%)	0.16	0.57	N/A	167.0	BAW-2308, Revison 1-A [7]	-47.6	17.2	28.0	N/A	N/A	—

*The licensee will submit a license renewal application in 2008, which will be the licensing basis for this calculation.

Table 3.3-29. Three Mile Island Unit 1 ¼T ART at 50 EFPY

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¼T Fluence @ 50 EFPY ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}	σ_I	σ_Δ	Margin	¼T ART @ 50 EFPY	Licensing Basis
123S454 (ARY 59)	Lower Nozzle Belt Forging	0.08	0.72	1.074	51.0	Table	+3	31.0	17.0	70.7	125.7	—
C2789-1	Upper Shell Plate	0.09	0.57	1.153	58.0	Table	+1	26.9	17.0	63.6	124.9	—
C2789-2	Upper Shell Plate	0.09	0.57	1.153	58.0	Table	+1	26.9	17.0	63.6	124.9	—
C3307-1	Lower Shell Plate	0.12	0.55	1.153	82.0	Table	+1	26.9	17.0	63.6	149.9	—
C3251-1	Lower Shell Plate	0.11	0.50	1.153	73.0	Table	+1	26.9	17.0	63.6	140.5	—
72105 (WF-70)	Lower Nozzle Belt to Upper Shell Circ. Weld (100%)	0.32	0.58	1.074	199.3	Table	-31.1	13.7	28.0	62.3	234.5	*
8T1762 (WF-8)	Upper Shell Long. Weld (Both 100%)	0.19	0.57	0.767	167.0	BAW-2308, Revison 1-A [7]	-47.6	17.2	28.0	65.7	172.6	—
299L44 (WF-25)	Upper to Lower Shell Circ. Weld (100%)	0.34	0.68	1.119	220.6	Table	-74.3	12.8	28.0	61.6	215.0	—
299L44 (SA-1526)	Lower Shell Long. Weld (100%)	0.34	0.68	0.688	220.6	Table	-74.3	12.8	28.0	61.6	184.7	—
299L44 (SA-1526)	Lower Shell Long. Weld (ID 37%)	0.34	0.68	0.688	220.6	Table	-74.3	12.8	28.0	61.6	184.7	—
8T1554 (SA-1494)	Lower Shell Long. Weld (OD 63%)	0.16	0.57	N/A	167.0	BAW-2308, Revison 1-A [7]	-47.6	17.2	28.0	N/A	N/A	—

*The licensee will submit a license renewal application in 2008, which will be the licensing basis for this calculation.

Table 3.3-30. Three Mile Island Unit 1 ¾T ART at 50 EFPY

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¾T Fluence @ 50 EFPY ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}	σ_I	σ_Δ	Margin	¾T ART @ 50 EFPY	Licensing Basis
123S454 (ARY 59)	Lower Nozzle Belt Forging	0.08	0.72	0.390	51.0	Table	+3	31.0	17.0	70.7	111.4	—
C2789-1	Upper Shell Plate	0.09	0.57	0.419	58.0	Table	+1	26.9	17.0	63.6	108.6	—
C2789-2	Upper Shell Plate	0.09	0.57	0.419	58.0	Table	+1	26.9	17.0	63.6	108.6	—
C3307-1	Lower Shell Plate	0.12	0.55	0.419	82.0	Table	+1	26.9	17.0	63.6	126.8	—
C3251-1	Lower Shell Plate	0.11	0.50	0.419	73.0	Table	+1	26.9	17.0	63.6	119.9	—
72105 (WF-70)	Lower Nozzle Belt to Upper Shell Circ. Weld (100%)	0.32	0.58	0.390	199.3	Table	-31.1	13.7	28.0	62.3	178.5	*
8T1762 (WF-8)	Upper Shell Long. Weld (Both 100%)	0.19	0.57	0.279	167.0	BAW-2308, Revison 1-A [7]	-47.6	17.2	28.0	65.7	126.8	—
299L44 (WF-25)	Upper to Lower Shell Circ. Weld (100%)	0.34	0.68	0.407	220.6	Table	-74.3	12.8	28.0	61.6	152.8	—
299L44 (SA-1526)	Lower Shell Long. Weld (100%)	0.34	0.68	0.250	220.6	Table	-74.3	12.8	28.0	61.6	125.0	—
299L44 (SA-1526)	Lower Shell Long. Weld (ID 37%)	0.34	0.68	N/A	220.6	Table	-74.3	12.8	28.0	N/A	N/A	—
8T1554 (SA-1494)	Lower Shell Long. Weld (OD 63%)	0.16	0.57	0.250	167.0	BAW-2308, Revison 1-A [7]	-47.6	17.2	28.0	65.7	122.3	—

*The licensee will submit a license renewal application in 2008, which will be the licensing basis for this calculation.

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Table 3.3-31. Surry Unit 1 RT_{PTS} at 48 EFPY (60 Calendar Years)

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	Fluence @ 48 EFPY ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}	σ_I	σ_Δ	Margin	RT_{PTS} at 48 EFPY	Licensing Basis[23]
122V109	Nozzle Belt Forging	0.11	0.74	0.775	76.1	Table	+40	0.0	17.0	34.0	144.7	—
C4326-1	Intermediate Shell Plate	0.11	0.55	5.66	73.5	Table	+10	0.0	17.0	34.0	148.8	—
C4326-2	Intermediate Shell Plate	0.11	0.55	5.66	73.5	Table	0	0.0	17.0	34.0	138.8	—
C4415-1	Lower Shell Plate	0.11	0.50	5.66	85.0	Surv. Data	+20	0.0	8.5	17.0	158.2	—
C4415-2	Lower Shell Plate	0.11	0.50	5.66	73.0	Table	0	0.0	17.0	34.0	138.1	—
25017 (J726)	Nozzle Belt to Intermediate Shell Circ. Weld (100%)	0.33	0.10	0.775	152.0	Table	0	20.0	28.0	68.8	209.9	—
8T1554 (SA-1494)	Intermediate Shell Long. Weld (100%)	0.16	0.57	1.08	167.0	BAW-2308, Revison 1-A[7]	-47.6*	17.2*	28.0	65.7	188.7	—
72445 (SA-1585)	Intermediate to Lower Shell Circ. Weld (ID 40%)	0.22	0.54	5.61	167.0	BAW-2308, Revison 1-A[7]	-72.5*	12.3*	28.0	61.2	226.5	—
72445 (SA-1650)	Intermediate to Lower Shell Circ. Weld (OD 60%)	0.22	0.54	N/A	167.0	BAW-2308, Revison 1-A[7]	-72.5*	12.3*	28.0	N/A	N/A	—
8T1554 (SA-1494)	Lower Shell Long. Weld (100%)	0.16	0.57	1.04	167.0	BAW-2308, Revison 1-A[7]	-47.6*	17.2*	28.0	65.7	187.0	—
299L44 (SA-1526)	Lower Shell Long. Weld (100%)	0.34	0.68	1.04	220.6	Table	-81.8*	11.6*	28.0	60.6	201.8	268.5

*The licensee has made an exemption request to use the initial RT_{NDT} values from BAW-2308, Revision 1-A[8]

Table 3.3-32. Surry Unit 1 ¼T ART at 48 EFPY

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¼T Fluence @ 48 EFPY ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}	σ_I	σ_Δ	Margin	¼T ART @ 48 EFPY	Licensing Basis[8]
122V109	Nozzle Belt Forging	0.11	0.74	0.473	76.1	Table	+40	0.0	17.0	34.0	134.2	—
C4326-1	Intermediate Shell Plate	0.11	0.55	0.345	73.5	Table	+10	0.0	17.0	34.0	141.3	—
C4326-2	Intermediate Shell Plate	0.11	0.55	0.345	73.5	Table	0	0.0	17.0	34.0	131.3	—
C4415-1	Lower Shell Plate	0.11	0.50	0.345	85.0	Surv. Data	+20	0.0	8.5	17.0	149.5	—
C4415-2	Lower Shell Plate	0.11	0.50	0.345	73.0	Table	0	0.0	17.0	34.0	130.6	—
25017 (J726)	Nozzle Belt to Intermediate Shell Circ. Weld (100%)	0.33	0.10	0.473	152.0	Table	0	20.0	28.0	68.8	189.1	—
8T1554 (SA-1494)	Intermediate Shell Long. Weld (100%)	0.16	0.57	0.659	167.0	BAW-2308, Revison 1-A [7]	-47.6*	17.2*	28.0	65.7	165.6	—
72445 (SA-1585)	Intermediate to Lower Shell Circ. Weld (ID 40%)	0.22	0.54	0.342	167.0	BAW-2308, Revison 1-A [7]	-72.5*	12.3*	28.0	61.2	209.4	228.4
72445 (SA-1650)	Intermediate to Lower Shell Circ. Weld (OD 60%)	0.22	0.54	N/A	167.0	BAW-2308, Revison 1-A [7]	-72.5*	12.3*	28.0	N/A	N/A	—
8T1554 (SA-1494)	Lower Shell Long. Weld (100%)	0.16	0.57	0.634	167.0	BAW-2308, Revison 1-A [7]	-47.6*	17.2*	28.0	65.7	163.8	—
299L44 (SA-1526)	Lower Shell Long. Weld (100%)	0.34	0.68	0.634	220.6	Table	-81.8*	11.6*	28.0	60.6	171.3	—

*The licensee has made an exemption request to use the initial RT_{NDT} values from BAW-2308, Revision 1-A[8]

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Table 3.3-33. Surry Unit 1 ¾T ART at 48 EFPY

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¾T Fluence @ 48 EFPY ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}	σ_I	σ_Δ	Margin	¾T ART @ 48 EFPY	Licensing Basis[8]
122V109	Nozzle Belt Forging	0.11	0.74	0.176	76.1	Table	+40	0.0	17.0	34.0	115.0	—
C4326-1	Intermediate Shell Plate	0.11	0.55	0.129	73.5	Table	+10	0.0	17.0	34.0	122.6	—
C4326-2	Intermediate Shell Plate	0.11	0.55	0.129	73.5	Table	0	0.0	17.0	34.0	112.6	—
C4415-1	Lower Shell Plate	0.11	0.50	0.129	85.0	Surv. Data	+20	0.0	8.5	17.0	127.9	—
C4415-2	Lower Shell Plate	0.11	0.50	0.129	73.0	Table	0	0.0	17.0	34.0	112.1	—
25017 (J726)	Nozzle Belt to Intermediate Shell Circ. Weld (100%)	0.33	0.10	0.176	152.0	Table	0	20.0	28.0	68.8	150.8	—
8T1554 (SA-1494)	Intermediate Shell Long. Weld (100%)	0.16	0.57	0.245	167.0	BAW-2308, Revison 1-A[7]	-47.6*	17.2*	28.0	65.7	121.5	—
72445 (SA-1585)	Intermediate to Lower Shell Circ. Weld (ID 40%)	0.22	0.54	N/A	167.0	BAW-2308, Revison 1-A[7]	-72.5*	12.3*	28.0	N/A	N/A	—
72445 (SA-1650)	Intermediate to Lower Shell Circ. Weld (OD 60%)	0.22	0.54	0.127	167.0	BAW-2308, Revison 1-A[7]	-72.5*	12.3*	28.0	61.2	166.9	189.5
8T1554 (SA-1494)	Lower Shell Long. Weld (100%)	0.16	0.57	0.236	167.0	BAW-2308, Revison 1-A[7]	-47.6*	17.2*	28.0	65.7	120.0	—
299L44 (SA-1526)	Lower Shell Long. Weld (100%)	0.34	0.68	0.236	220.6	Table	-81.8*	11.6*	28.0	60.6	113.3	—

*The licensee has made an exemption request to use the initial RT_{NDT} values from BAW-2308, Revision 1-A[8]

Table 3.3-34. Surry Unit 2 RT_{PTS} at 48 EFPY (60 Calendar Years)

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	Fluence @ 48 EFPY ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}	σ_I	σ_Δ	Margin	RT_{PTS} at 48 EFPY	Licensing Basis[23]
123V303	Nozzle Belt Forging	0.11	0.72	0.632	75.8	Table	+30	0.0	17.0	34.0	130.1	—
C4331-2	Intermediate Shell Plate	0.12	0.60	5.38	83.0	Table	-10	0.0	17.0	34.0	141.6	—
C4339-2	Intermediate Shell Plate	0.11	0.54	5.38	73.4	Table	-20	0.0	17.0	34.0	118.0	—
C4208-2	Lower Shell Plate	0.15	0.55	5.38	107.3	Table	-30	0.0	17.0	34.0	156.0	—
C4339-1	Lower Shell Plate	0.11	0.54	5.38	73.4	Table	-10	0.0	17.0	34.0	128.0	—
4275 (L737)	Nozzle Belt to Intermediate Shell Circ. Weld (100%)	0.35	0.10	0.632	160.5	Table	0	20.0	28.0	68.8	208.7	—
72445 (SA-1585)	Intermediate Shell Long. Weld (100%)	0.22	0.54	1.14	167.0	BAW-2308, Revison 1-A [7]	-72.5*	12.3*	28.0	61.2	161.8	—
8T1762 (WF-4)	Intermediate Shell Long. Weld (ID 50%)	0.19	0.57	1.14	167.0	BAW-2308, Revison 1-A [7]	-47.6*	17.2*	28.0	65.7	191.2	—
72445 (SA-1585)	Intermediate Shell Long. Weld (OD 50%)	0.22	0.54	N/A	167.0	BAW-2308, Revison 1-A [7]	-72.5*	12.3*	28.0	N/A	N/A	—
0227 (R3008)	Intermediate to Lower Shell Circ. Weld (100%)	0.19	0.56	5.37	132.4	Surv. Data	0	20.0	14.0	48.8	236.3	—
8T1762 (WF-4)	Lower Shell Long. Weld (100%)	0.19	0.57	1.14	167.0	BAW-2308, Revison 1-A [7]	-47.6*	17.2*	28.0	65.7	191.2	—
8T1762 (WF-4)	Lower Shell Long. Weld (ID 63%)	0.19	0.57	1.14	167.0	BAW-2308, Revison 1-A [7]	-47.6*	17.2*	28.0	65.7	191.2	219.2
8T1762 (WF-8)	Lower Shell Long. Weld (OD 37%)	0.19	0.57	N/A	167.0	BAW-2308, Revison 1-A [7]	-47.6*	17.2*	28.0	N/A	N/A	—

*The licensee has made an exemption request to use the initial RT_{NDT} values from BAW-2308, Revision 1-A[8]

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Table 3.3-35. Surry Unit 2 ¼T ART at 48 EFPY

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¼T Fluence @ 48 EFPY ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}	σ_I	σ_Δ	Margin	¼T ART @ 48 EFPY	Licensing Basis[8]
123V303	Nozzle Belt Forging	0.11	0.72	0.386	75.8	Table	+30	0.0	17.0	34.0	119.8	—
C4331-2	Intermediate Shell Plate	0.12	0.60	0.328	83.0	Table	-10	0.0	17.0	34.0	132.9	—
C4339-2	Intermediate Shell Plate	0.11	0.54	0.328	73.4	Table	-20	0.0	17.0	34.0	110.3	—
C4208-2	Lower Shell Plate	0.15	0.55	0.328	107.3	Table	-30	0.0	17.0	34.0	144.8	—
C4339-1	Lower Shell Plate	0.11	0.54	0.328	73.4	Table	-10	0.0	17.0	34.0	120.3	—
4275 (L737)	Nozzle Belt to Intermediate Shell Circ. Weld (100%)	0.35	0.10	0.386	160.5	Table	0	20.0	28.0	68.8	187.0	—
72445 (SA-1585)	Intermediate Shell Long. Weld (100%)	0.22	0.54	0.695	167.0	BAW-2308, Revison 1-A[7]	-72.5*	12.3*	28.0	61.2	138.7	—
8T1762 (WF-4)	Intermediate Shell Long. Weld (ID 50%)	0.19	0.57	0.695	167.0	BAW-2308, Revison 1-A[7]	-47.6*	17.2*	28.0	65.7	168.1	—
72445 (SA-1585)	Intermediate Shell Long. Weld (OD 50%)	0.22	0.54	N/A	167.0	BAW-2308, Revison 1-A[7]	-72.5*	12.3*	28.0	N/A	N/A	—
0227 (R3008)	Intermediate to Lower Shell Circ. Weld (100%)	0.19	0.56	0.328	132.4	Surv. Data	0	20.0	14.0	48.8	222.5	228.4
8T1762 (WF-4)	Lower Shell Long. Weld (100%)	0.19	0.57	0.695	167.0	BAW-2308, Revison 1-A[7]	-47.6*	17.2*	28.0	65.7	168.1	—
8T1762 (WF-4)	Lower Shell Long. Weld (ID 63%)	0.19	0.57	0.695	167.0	BAW-2308, Revison 1-A[7]	-47.6*	17.2*	28.0	65.7	168.1	—
8T1762 (WF-8)	Lower Shell Long. Weld (OD 37%)	0.19	0.57	N/A	167.0	BAW-2308, Revison 1-A[7]	-47.6*	17.2*	28.0	65.7	N/A	—

*The licensee has made an exemption request to use the initial RT_{NDT} values from BAW-2308, Revision 1-A[8]

AREVA

Table 3.3-36. Surry Unit 2 ¾T ART at 48 EFPY

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¾T Fluence @ 48 EFPY ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}	σ_I	σ_Δ	Margin	¾T ART @ 48 EFPY	Licensing Basis[8]
123V303	Nozzle Belt Forging	0.11	0.72	0.144	75.8	Table	+30	0.0	17.0	34.0	101.4	—
C4331-2	Intermediate Shell Plate	0.12	0.60	1.22	83.0	Table	-10	0.0	17.0	34.0	111.6	—
C4339-2	Intermediate Shell Plate	0.11	0.54	1.22	73.4	Table	-20	0.0	17.0	34.0	91.5	—
C4208-2	Lower Shell Plate	0.15	0.55	1.22	107.3	Table	-30	0.0	17.0	34.0	117.3	—
C4339-1	Lower Shell Plate	0.11	0.54	1.22	73.4	Table	-10	0.0	17.0	34.0	101.5	—
4275 (L737)	Nozzle Belt to Intermediate Shell Circ. Weld (100%)	0.35	0.10	0.144	160.5	Table	0	20.0	28.0	68.8	147.9	—
72445 (SA-1585)	Intermediate Shell Long. Weld (100%)	0.22	0.54	0.258	167.0	BAW-2308, Revison 1-A [7]	-72.5*	12.3*	28.0	61.2	94.3	—
8T1762 (WF-4)	Intermediate Shell Long. Weld (ID 50%)	0.19	0.57	N/A	167.0	BAW-2308, Revison 1-A [7]	-47.6*	17.2*	28.0	N/A	N/A	—
72445 (SA-1585)	Intermediate Shell Long. Weld (OD 50%)	0.22	0.54	0.259	167.0	BAW-2308, Revison 1-A [7]	-72.5*	12.3*	28.0	61.2	94.3	—
0227 (R3008)	Intermediate to Lower Shell Circ. Weld (100%)	0.19	0.56	1.22	132.4	Surv. Data	0	20.0	14.0	48.8	188.5	189.5
8T1762 (WF-4)	Lower Shell Long. Weld (100%)	0.19	0.57	0.259	167.0	BAW-2308, Revison 1-A [7]	-47.6*	17.2*	28.0	65.7	123.8	—
8T1762 (WF-4)	Lower Shell Long. Weld (ID 63%)	0.19	0.57	N/A	167.0	BAW-2308, Revison 1-A [7]	-47.6*	17.2*	28.0	65.7	N/A	—
8T1762 (WF-8)	Lower Shell Long. Weld (OD 37%)	0.19	0.57	0.259	167.0	BAW-2308, Revison 1-A [7]	-47.6*	17.2*	28.0	65.7	123.8	—

*The licensee has made an exemption request to use the initial RT_{NDT} values from BAW-2308, Revision 1-A[8]

AREVA

Table 3.3-37. Turkey Point Unit 3 RT_{PTS} at 48 EFPY (60 Calendar Years)

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	Fluence @ 48 EFPY[24] ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	RT_{PTS} at 48 EFPY	Licensing Basis[25]
122S146	Nozzle Belt Forging	0.11	0.68	0.84*	75.2	Table	+50	0.0	17.0	34.0	155.5	—
123P146	Intermediate Shell Forging	0.06	0.70	7.000	14.6	Surv. Data	+40	0.0	8.5	17.0	78.4	—
123S266	Lower Shell Forging	0.08	0.67	6.000	47.9	Surv. Data	+30	0.0	8.5	17.0	115.8	—
72442 (SA-1484)	Nozzle Belt to Intermediate Shell Circ. Weld (100%)	0.26	0.60	0.84*	180.0	Table	-5	19.7	28.0	68.5	234.7	—
71249 (SA-1101)	Intermediate to Lower Shell Circ. Weld (100%)	0.23	0.59	4.500	167.6	Table	+10	0.0	28.0	56.0	297.4	297.4

*Based on the ratio of the 40 year fluences[1] for the location for the new fluence.

Table 3.3-38. Turkey Point Unit 3 ¼T ART at 32 EFPY

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¼T Fluence @ 32 EFPY[24] ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	¼T ART @ 32 EFPY	Licensing Basis[24]
122S146	Nozzle Belt Forging	0.11	0.68	0.363*	75.2	Table	+50	0.0	17.0	34.0	138.1	—
123P146	Intermediate Shell Forging	0.06	0.70	3.025	14.6	Surv. Data	+40	0.0	8.5	17.0	75.9	—
123S266	Lower Shell Forging	0.08	0.67	2.420	47.9	Surv. Data	+30	0.0	8.5	17.0	106.3	—
72442 (SA-1484)	Nozzle Belt to Intermediate Shell Circ. Weld (100%)	0.26	0.60	0.363*	180.0	Table	-5	19.7	28.0	68.5	193.1	—
71249 (SA-1101)	Intermediate to Lower Shell Circ. Weld (100%)	0.23	0.59	1.815	167.6	Table	+10	0.0	28.0	56.0	261.1	262.0

*Based on the ratio of the 40 year fluences[1] for the location for the new fluence.

AREVA

Table 3.3-39. Turkey Point Unit 3 ¾T ART at 32 EFPY

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¾T Fluence @ 32 EFPY[24] ($x10^{19}$ n/cm²)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	¾T ART @ 32 EFPY	Licensing Basis[24]
122S146	Nozzle Belt Forging	0.11	0.68	0.14*	75.2	Table	+50	0.0	17.0	34.0	121.1	—
123P146	Intermediate Shell Forging	0.06	0.70	1.194	14.6	Surv. Data	+40	0.0	8.5	15.3	70.6	—
123S266	Lower Shell Forging	0.08	0.67	0.955	47.9	Surv. Data	+30	0.0	8.5	17.0	94.3	—
72442 (SA-1484)	Nozzle Belt to Intermediate Shell Circ. Weld (100%)	0.26	0.60	0.14*	180.0	Table	-5	19.7	28.0	68.5	152.2	—
71249 (SA-1101)	Intermediate to Lower Shell Circ. Weld (100%)	0.23	0.59	0.716	167.6	Table	+10	0.0	28.0	56.0	217.8	218.0

*Based on the ratio of the 40 year fluences[1] for the location for the new fluence.

AREVA

Table 3.3-40. Turkey Point Unit 4 RT_{PTS} at 48 EFPY (60 Calendar Years)

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	Fluence @ 48 EFPY[24] ($x10^{19}$ n/cm²)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	RT_{PTS} at 48 EFPY	Licensing Basis[25]
124S309	Nozzle Belt Forging	0.11	0.70	0.84*	75.5	Table	+40	0.0	17.0	34.0	145.8	—
123P481	Intermediate Shell Forging	0.05	0.68	7.000	31.0	Table	+50	0.0	17.0	34.0	129.4	—
122S180	Lower Shell Forging	0.06	0.74	6.000	5.4	Surv. Data	+40	0.0	8.5	7.8	55.6	—
72442 (WF-67)	Nozzle Belt to Intermediate Shell Circ. Weld (ID 67%)	0.26	0.60	0.84*	180.0	Table	-5	19.7	28.0	68.5	234.7	—
72105 (WF-70)	Nozzle Belt to Intermediate Shell Circ. Weld (OD 33%)	0.32	0.58	N/A	199.3	Table	-26	0.0	28.0	N/A	N/A	—
71249 (SA-1101)	Intermediate to Lower Shell Circ. Weld (100%)	0.23	0.59	4.500	167.6	Table	+10	0.0	28.0	56.0	297.4	297.4

*Based on the ratio of the 40 year fluences[1] for the location for the new fluence.

AREVA

Table 3.3-41. Turkey Point Unit 4 ¼T ART at 32 EFPY

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¼T Fluence @ 32 EFPY[24] ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	¼T ART @ 32 EFPY	Licensing Basis[24]
124S309	Nozzle Belt Forging	0.11	0.70	0.363*	75.5	Table	+40	0.0	17.0	34.0	128.4	—
123P481	Intermediate Shell Forging	0.05	0.68	3.025	31.0	Table	+50	0.0	17.0	34.0	124.1	—
122S180	Lower Shell Forging	0.06	0.74	2.420	5.4	Surv. Data	+40	0.0	8.5	6.7	53.4	—
72442 (WF-67)	Nozzle Belt to Intermediate Shell Circ. Weld (ID 67%)	0.26	0.60	0.363*	180.0	Table	-5	19.7	28.0	68.5	193.1	—
72105 (WF-70)	Nozzle Belt to Intermediate Shell Circ. Weld (OD 33%)	0.32	0.58	N/A	199.3	Table	-26	0.0	28.0	N/A	N/A	—
71249 (SA-1101)	Intermediate to Lower Shell Circ. Weld (100%)	0.23	0.59	1.815	167.6	Table	+10	0.0	28.0	56.0	261.1	262.0

*Based on the ratio of the 40 year fluences[1] for the location for the new fluence.

Table 3.3-42. Turkey Point Unit 4 ¾T ART at 32 EFPY

RPV Base Metal/Weld Wire Heat	Beltline Region Location	Best-Estimate Copper (wt%)	Best-Estimate Nickel (wt%)	¾T Fluence @ 32 EFPY[24] ($x10^{19}$ n/cm^2)	Assigned Material Chemistry Factor (CF)	Method of Determining CF	Initial RT_{NDT}[12]	σ_I	σ_Δ	Margin	¾T ART @ 32 EFPY	Licensing Basis[24]
124S309	Nozzle Belt Forging	0.11	0.70	0.14*	75.5	Table	+40	0.0	17.0	34.0	111.2	—
123P481	Intermediate Shell Forging	0.05	0.68	1.194	31.0	Table	+50	0.0	17.0	34.0	115.0	—
122S180	Lower Shell Forging	0.06	0.74	0.955	5.4	Surv. Data	+40	0.0	8.5	5.3	50.6	—
72442 (WF-67)	Nozzle Belt to Intermediate Shell Circ. Weld (ID 67%)	0.26	0.60	N/A	180.0	Table	-5	19.7	28.0	N/A	N/A	—
72105 (WF-70)	Nozzle Belt to Intermediate Shell Circ. Weld (OD 33%)	0.32	0.58	0.14*	199.3	Table	-26	0.0	28.0	56.0	128.3	—
71249 (SA-1101)	Intermediate to Lower Shell Circ. Weld (100%)	0.23	0.59	0.716	167.6	Table	+10	0.0	28.0	56.0	217.8	218.0

*Based on the ratio of the 40 year fluences[1] for the location for the new fluence.

AREVA

4. Evaluation of Surveillance Data

Both Regulatory Guide 1.99, Revision 2 and 10 CFR 50.61 require that surveillance data (if available) be considered in evaluating reactor vessel integrity. The best-estimate copper and nickel chemical compositions for both the weld wire heats and their weld metal sources are used in the evaluation of the surveillance data. The process of evaluating surveillance data includes a credibility assessment against five criteria (found on page 3-10 of this document) and the calculation of the chemistry factor based on the surveillance data.

4.1 Surveillance Data Credibility Assessment

For the applicable reactor vessels, numerous surveillance data are available for evaluation of irradiation embrittlement. Each plant has their own plant-specific reactor vessel surveillance material. However, these plants also participate in the B&WOG Master Integrated Reactor Vessel Surveillance Program (MIRVP) established in 1989, making weld metal surveillance data available from several sources. The reactor vessels participating in the MIRVP include reactor vessel with B&W-designed nuclear steam supply systems (NSSS) and Westinghouse-designed NSSS.

When assessing credibility for surveillance data from several sources, the capsule data is "*adjusted*" to account for the irradiation environment and chemical composition differences. Because of the irradiation environment differences between the B&W-design NSSS and the Westinghouse-design NSSS, the capsule data are *"normalized"* using the mean irradiation temperature of the <u>surveillance specimens</u>. The *"normalized"* temperature adjusted ΔRT_{NDT} is determined using the following equation:

$$\textit{Temperature Adjusted } \Delta RT_{NDT,\,normalized} = \Delta RT_{NDT,\,measured} + 1.0 * (T_{capsule} - T_{capsule\ mean})$$

In addition, if the surveillance data are from multiple sources, it is necessary to adjust the capsule data for chemical composition (copper and nickel contents) differences. For the credibility determination, the surveillance data are *"normalized"* to the mean copper and nickel contents of the <u>surveillance materials</u> using the following equation:

$$\textit{Ratio Adjusted } \Delta RT_{NDT,\,normalized} = \left(\frac{CF_{Table,\,Surv.\,Avg.\,Chem.}}{CF_{Table,\,Surv.\,Chem.}} \right) * \Delta RT_{NDT,\,measured}$$

A best-fit line (least squares regression) is then determined from the adjusted ΔRT_{NDT} capsule surveillance data as a function of the capsule fluence factor.

The data are considered credible if the difference between the adjusted ΔRT_{NDT} (i.e., temperature adjusted and/or chemistry adjusted) and the predicted ΔRT_{NDT} (from the best-fit line) for all the data are within ±28°F for weld metals and ±17°F for base metals. For this evaluation none of the Linde 80 weld heats assessed are credible.

4.2 Credible Surveillance Data

In accordance with Regulatory Guide 1.99, Revision 2 and 10 CFR 50.61, credible surveillance data are used to determine material-specific chemistry factor values for use in reactor vessel integrity assessments. The chemistry factor is determined from a best-line through the surveillance data adjusted to account for differences in chemical composition (i.e., copper and nickel contents) and irradiation environment (i.e., irradiation temperature) between the capsules and the vessel. The surveillance data are adjusted in the same manner as for the credibility determination except that the 30 ft-lb transition temperature values are *"normalized"* to the best estimate copper and nickel contents and the irradiation temperature of the vessel being assessed.

4.3 Non-Credible Surveillance Data

If the surveillance data are determined to be non-credible, the chemistry factor value is calculated from the generic Tables in 10 CFR 50.61 and Regulatory Guide 1.99, Revision 2 unless the chemistry factor determined from the surveillance data is significantly greater than that from the generic Tables, including that the Table chemistry factor is non-conservative. To determine if the generic Table chemistry factor is non-conservative, the following steps are performed:

1. Determine the chemistry factor from the generic Table based on surveillance specimen chemical composition; use this chemistry factor to determine the predicted ΔRT_{NDT} for each capsule:
   $\boldsymbol{(Predicted\ \Delta RT_{NDT} = CF_{Table,\ Surv.\ Avg.\ Chem.} * ff_{capsule})}$

2. Determine difference between the predicted ΔRT_{NDT} and the measured ΔRT_{NDT}.

If the difference between the predicted ΔRT_{NDT} and the measured ΔRT_{NDT} values exceeds 2 standard deviations (i.e. 56°F for weld metals and 34°F for base metals), the Table chemistry factor is determined to be non-conservative, the chemistry factor determined from the "non-credible" surveillance data is used in the assessment of reactor vessel integrity using the "full" value of σ_{Δ} in calculating the Margin term.

4.4 Assessment of Surveillance Data

Based on the best-estimate copper and nickel chemical contents of the high-copper Linde 80 weld wire heats and their weld metal sources, the high-copper Linde 80 weld metal surveillance data have been evaluated in accordance with Regulatory Guide 1.99, Revision 2 and 10 CFR 50.61. The following is a list of capsules tested since January 1999 and their evaluations:

Capsule	Report Number	Reference	Comments
TP3-X	WCAP-15916	26	
S2-Y	WCAP-16001	9	
W1	BAW-2350	27	
A5	BAW-2360	28	
L1	BAW-2400	29	No Charpy Data
A3	BAW-2412	30	
TMI2-LG2	BAW-2439	31	No Charpy Data
DB1-LG2	BAW-2486	32	

Table 4.4-1 summarizes the results of the surveillance data evaluations for the RVWG reactor vessel beltline welds and two base metals tested since January 1999.

The following tables provide the surveillance data evaluation of the weld wire heats and two base metals used in the B&W fabricated reactor vessel beltline region, including capsules tested since January 1999. The evaluation of the other base metal surveillance data can be found in Appendix B of BAW-2325, Revision 1.

NOTE: The original Charpy V-notch impact data were based on hand-fit Charpy curves using engineering judgement; these data were reevaluated using a hyperbolic tangent curve fitting program to achieve consistency in the interpretation of the available surveillance test data.

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Table 4.4-1. Summary of Surveillance Data Reassessments for the B&W Fabricated Reactor Vessel Beltline Welds and Base Metals

Heat	Plant (NSSS) Heat	Surv. Data Credible (Y or N)	Table Chem. Factor Conservative (Y or N)	Chemistry Factor	Method of Determining Chem. Factor
(Weld Wire) 299L44	S-1 TMI-1 OC-2 OC-3 TMI-1	N	Y	208.1	Table
(Weld Wire) 406L44	ANO-2 OC-2	N	Y	189.0	Table
(Weld Wire) 61782	PB-1 OC-1	N	Y	168.5	Table
(Weld Wire) 71249	PB-1 TP-3 TP-4 OC-1 CR-3	N	Y	167.6	Table
(Weld Wire) 72105	CR-3 OC-3 TMI-1 TP-4	N	Y	199.3	Table
(Weld Wire) 72445	OC-1 S-1 S-2	N	Y	158	Table
(Weld Wire) 821T44	ANO-1 D-B OC-3	N	Y	177.6	Table
(Base Metal) C4339-1	S-2	N	Y	73.4	Table
(Base Metal) 123S266	TP-3	N	Y	51.0	Table

AREVA

4.4.1 Weld Wire Heat Number 299L44

Table 4.4.1-1. Credibility Assessment for Weld Wire Heat Number 299L44

Capsule Designation	Cu wt%	Ni wt%	Chem. Factor	Irrad. Temp. (°F)	Fluence ($x10^{19} n/cm^2$)	Fluence Factor	Meas. ΔRT_{NDT} (°F)	Temp. Adjusted ΔRT_{NDT} (°F)	Ratio Adjusted ΔRT_{NDT} (°F)	Predicted ΔRT_{NDT} from Best Fit Line (°F)	(Adjusted - Predicted) ΔRT_{NDT} (°F)
TMI-1: Capsule TMI1-E WF-25: Plant Specific RVSP Material	0.33	0.67	215.2	556	0.107	0.431	74	81.4	78.8	96.8	-18.2
TMI-1: Capsule TMI1-C WF-25: Plant Specific RVSP Material	0.33	0.67	215.2	556	0.882	0.965	166	173.4	167.8	216.8	-49.1
B&WOG: Capsule TMI2-LG1 WF-25: TMI-2 Nozzle Belt Dropout Matl.	0.33	0.67	215.2	556	0.968	0.991	226	233.4	225.8	222.7	2.6
B&WOG: Capsule TMI2-LG1 SA-1526: CR-3 Nozzle Belt Dropout Matl.	0.37	0.70	234.0	556	0.830	0.948	216	223.4	198.7	213.0	-14.8
B&WOG: Capsule CR3-LG1 WF-25: ONS-3 Nozzle Belt Dropout Matl.	0.36	0.70	230.5	556	0.779	0.930	202	209.4	189.1	209.0	-20.4
Surry Unit 1: Capsule T SA-1526: Plant-Specific RVSP Material	0.23	0.64	175.8	538	0.292	0.663	171	160.4	189.9	149.1	40.8
Surry Unit 1: Capsule V SA-1526: Plant-Specific RVSP Material	0.23	0.64	175.8	538	1.992	1.188	250	239.4	283.4	267.0	16.4
Surry Unit 1: Capsule X SA-1526: Plant-Specific RVSP Material	0.23	0.64	175.8	538	1.599	1.130	234	223.4	264.5	253.9	10.0
B&WOG: Capsule W1* SA-1526: CR-3 Nozzle Belt Dropout Matl.	0.37	0.70	234.0	543	0.669	0.887	262	256.4	228.1	199.4	28.2
Surv. Avg.	0.309	0.670	208.1	548.6							

* Capsule has been tested since January 1999

where ***Predicted*** ΔRT_{NDT} ***= (Slope***$_{best\ fit}$***) * (Fluence Factor)*** and

Slope$_{best\ fit}$ ***= best fit line relating Adjusted*** ΔRT_{NDT} ***to the Fluence Factor***
(i.e., 224.7)

These data points are not credible since the scatter is greater than ±28°F for two surveillance points.

AREVA

Table 4.4.1-2. Table Chemistry Factor Non-Conservatism Assessment for Weld Wire Heat Number 299L44

Capsule Designation	Table Chem. Factor (Surv. Avg.)	Capsule Fluence Factor	Adjusted ΔRT_{NDT} (°F)	Predicted ΔRT_{NDT} (°F)	(Adjusted – Predicted) ΔRT_{NDT} (°F)
TMI-1: Capsule TMI1-E WF-25: Plant Specific RVSP Material	208.1	0.431	78.8	89.7	-10.9
TMI-1: Capsule TMI1-C WF-25: Plant Specific RVSP Material	208.1	0.965	167.8	200.8	-33.0
B&WOG: Capsule TMI2-LG1 WF-25: TMI-2 Nozzle Belt Dropout Matl.	208.1	0.991	225.8	206.2	19.6
B&WOG: Capsule TMI2-LG1 SA-1526: CR-3 Nozzle Belt Dropout Matl.	208.1	0.948	198.7	197.3	1.4
B&WOG: Capsule CR3-LG1 WF-25: ONS-3 Nozzle Belt Dropout Matl.	208.1	0.930	189.1	193.5	-4.4
Surry Unit 1: Capsule T SA-1526: Plant-Specific RVSP Material	208.1	0.663	189.9	138.0	51.9
Surry Unit 1: Capsule V SA-1526: Plant-Specific RVSP Material	208.1	1.188	283.4	247.2	36.2
Surry Unit 1: Capsule X SA-1526: Plant-Specific RVSP Material	208.1	1.130	264.5	235.2	29.3
B&WOG: Capsule W1 SA-1526: CR-3 Nozzle Belt Dropout Matl.	208.1	0.887	228.1	184.6	43.5

Since the scatter for all data points is less than 2 standard deviations (56°F), the Table chemistry factor is conservative.

4.4.2 Weld Wire Heat Number 406L44

Table 4.4.2-1. Credibility Assessment for Weld Wire Heat Number 406L44

Capsule Designation	Cu wt%	Ni wt%	Chem. Factor	Irrad. Temp. (°F)	Fluence ($x10^{19}$n/cm^2)	Fluence Factor	Meas. ΔRT_{NDT} (°F)	Temp. Adjusted ΔRT_{NDT} (°F)	Ratio Adjusted ΔRT_{NDT} (°F)	Predicted ΔRT_{NDT} from Best Fit Line (°F)	(Adjusted - Predicted) ΔRT_{NDT} (°F)
ANO-1: Capsule AN1-E WF-193: Plant Specific RVSP Matl.	0.27	0.58	181.1	556	0.0727	0.356	99	102.7	107.2	62.0	45.2
ANO-1: Capsule AN1-A WF-193: Plant Specific RVSP Matl.	0.27	0.58	181.1	556	1.030	1.008	144	147.7	154.2	175.6	-21.4
ANO-1: Capsule AN1-C WF-193: Plant Specific RVSP Matl.	0.27	0.58	181.1	556	1.460	1.105	172	175.7	183.4	192.4	-9.0
Rancho Seco Unit 1: Capsule RS1-B WF-193: Plant Specific RVSP Matl.	0.31	0.59	196.7	556	0.399	0.745	114	117.7	113.1	129.8	-16.6
Rancho Seco Unit 1: Capsule RS1-D WF-193: Plant Specific RVSP Matl.	0.31	0.59	196.7	556	0.660	0.884	146	149.7	143.9	153.8	-10.0
Rancho Seco Unit 1: Capsule RS1-F WF-193: Plant Specific RVSP Matl.	0.31	0.59	196.7	556	1.420	1.097	163	166.7	160.2	191.1	-30.8
Oconee Unit 1: Capsule OC1-E WF-112: Plant Specific RVSP Matl.	0.32	0.59	200.7	556	0.150	0.503	80	83.7	78.9	87.6	-8.7
Oconee Unit 1: Capsule OC1-A WF-112: Plant Specific RVSP Matl.	0.32	0.59	200.7	556	0.895	0.969	171	174.7	164.6	168.7	-4.1
Oconee Unit 1: Capsule OC1-C WF-112: Plant Specific RVSP Matl.	0.32	0.59	200.7	556	0.986	0.996	190	193.7	182.5	173.4	9.1
B&WOG: Capsule DB1-LG1 WF-112 ONS-1 RVSP Material	0.32	0.59	200.7	556	0.821	0.945	190	193.7	182.5	164.5	18.0
Point Beach Unit 2: Capsule V WF-193: Plant Specific RVSP Material	0.25	0.59	174.6	542	0.650	0.879	167	156.7	169.7	153.1	16.6
Point Beach Unit 2: Capsule T WF-193: Plant Specific RVSP Material	0.25	0.59	174.6	542	0.861	0.958	153	142.7	154.5	166.8	-12.3
Point Beach Unit 2: Capsule R WF-193: Plant Specific RVSP Material	0.25	0.59	174.6	542	2.200	1.214	223	212.7	230.3	211.3	18.9
Point Beach Unit 2: Capsule S WF-193: Plant Specific RVSP Material	0.25	0.59	174.6	542	3.100	1.298	222	211.7	229.2	226.1	3.1
B&WOG: Capsule DB1-LG2* WF-112 ONS-1 RVSP Material	0.32	0.59	200.7	556	1.379	1.089	220	223.7	210.7	189.7	21.0
Surv. Avg.	0.289	0.588	189.0	552.3							

* Capsule has been tested since January 1999

where ***Predicted*** ΔRT_{NDT} ***= (Slope***$_{best\ fit}$***) * (Fluence Factor)*** and

Slope$_{best\ fit}$ ***= best fit line relating Adjusted*** ΔRT_{NDT} ***to the Fluence Factor***
(i.e., 174.1)

These data points are not credible since the scatter is greater than ±28°F for two surveillance points.

AREVA

Table 4.4.2-2. Table Chemistry Factor Non-Conservatism Assessment for Weld Wire Heat Number 406L44

Capsule Designation	Table Chem. Factor (Surv. Avg.)	Capsule Fluence Factor	Adjusted ΔRT_{NDT} (°F)	Predicted ΔRT_{NDT} (°F)	(Adjusted – Predicted) ΔRT_{NDT} (°F)
ANO-1: Capsule AN1-E WF-193: Plant Specific RVSP Matl.	189.0	0.356	107.2	67.3	39.9
ANO-1: Capsule AN1-A WF-193: Plant Specific RVSP Matl.	189.0	1.008	154.2	190.5	-36.3
ANO-1: Capsule AN1-C WF-193: Plant Specific RVSP Matl.	189.0	1.105	183.4	208.8	-25.4
Rancho Seco Unit 1: Capsule RS1-B WF-193: Plant Specific RVSP Matl.	189.0	0.745	113.1	140.8	-27.7
Rancho Seco Unit 1: Capsule RS1-D WF-193: Plant Specific RVSP Matl.	189.0	0.884	143.9	167.1	-23.2
Rancho Seco Unit 1: Capsule RS1-F WF-193: Plant Specific RVSP Matl.	189.0	1.097	160.2	207.3	-47.0
Oconee Unit 1: Capsule OC1-E WF-112: Plant Specific RVSP Matl.	189.0	0.503	78.9	95.1	-16.2
Oconee Unit 1: Capsule OC1-A WF-112: Plant Specific RVSP Matl.	189.0	0.969	164.6	183.1	-18.5
Oconee Unit 1: Capsule OC1-C WF-112: Plant Specific RVSP Matl.	189.0	0.996	182.5	188.2	-5.7
B&WOG: Capsule DB1-LG1 WF-112 ONS-1 RVSP Material	189.0	0.945	182.5	178.6	3.9
Point Beach Unit 2: Capsule V WF-193: Plant Specific RVSP Material	189.0	0.879	169.7	166.1	3.6
Point Beach Unit 2: Capsule T WF-193: Plant Specific RVSP Material	189.0	0.958	154.5	181.1	-26.6
Point Beach Unit 2: Capsule R WF-193: Plant Specific RVSP Material	189.0	1.214	230.3	229.5	0.8
Point Beach Unit 2: Capsule S WF-193: Plant Specific RVSP Material	189.0	1.298	229.2	245.3	-16.1
B&WOG: Capsule DB1-LG2 WF-112 ONS-1 RVSP Material	189.0	1.089	210.7	205.8	4.9

Since the scatter for all data points is less than 2 standard deviations (56°F), the Table chemistry factor is conservative.

4.4.3 Weld Wire Heat Number 61782

Table 4.4.3-1. Credibility Assessment for Weld Wire Heat Number 61782

Capsule Designation	Cu wt%	Ni wt%	Chem. Factor	Irrad. Temp. (°F)	Fluence ($x10^{19}$n/cm^2)	Fluence Factor	Meas. ΔRT_{NDT} (°F)	Temp. Adjusted ΔRT_{NDT} (°F)	Adjusted ΔRT_{NDT} (°F)	Predicted ΔRT_{NDT} (°F) from Best Fit Line	(Adjusted - Predicted) ΔRT_{NDT} (°F)
R. E. Ginna: Capsule V SA-1036: Plant Specific RVSP Material	0.24	0.52	161.4	545@	0.5028	0.808	146	142	149	124	25
R. E. Ginna: Capsule R SA-1036: Plant Specific RVSP Material	0.24	0.52	161.4	545@	1.105	1.028	167	163	170	157	13
R. E. Ginna: Capsule T SA-1036: Plant Specific RVSP Material	0.24	0.52	161.4	545@	1.864	1.171	169	165	173	179	-7
R. E. Ginna: Capsule S SA-1036: Plant Specific RVSP Material	0.24	0.52	161.4	545@	3.746	1.342	223	219	229	205	23
B&WOG: Capsule DB1-LG1 SA-1135: ONS-2 Nozzle Belt Dropout Matl.	0.27	0.59	182.6	556	1.030	1.008	138	145	134	154	-20
B&WOG: Capsule DB1-LG2* SA-1135: ONS-2 Nozzle Belt Dropout Matl.	0.27	0.59	182.6	556	1.635	1.136	146	153	141	174	-32
Surv. Avg.	0.250	0.543	168.5	548.7							

* Capsule has been tested since January 1999

@RVSP Capsule temperature derived from Point Beach Unit 1 irradiation history.[33]

where ***Predicted*** ΔRT_{NDT} ***= (Slope$_{best\ fit}$) * (Fluence Factor)*** and

Slope$_{best\ fit}$ = best fit line relating Adjusted ΔRT_{NDT} ***to the Fluence Factor***
(i.e., 153.1)

These data points are not credible since the scatter is greater than ±28°F for one surveillance point.

Table 4.4.3-2. Table Chemistry Factor Non-Conservatism Assessment for Weld Wire Heat Number 61782

Capsule Designation	Table Chem. Factor (Surv. Avg.)	Capsule Fluence Factor	Adjusted ΔRT_{NDT} (°F)	Predicted ΔRT_{NDT} (°F)	(Adjusted – Predicted) ΔRT_{NDT} (°F)
R. E. Ginna: Capsule V SA-1036: Plant Specific RVSP Material	168.5	0.808	149	136.1	12.9
R. E. Ginna: Capsule R SA-1036: Plant Specific RVSP Material	168.5	1.028	170	173.2	-3.2
R. E. Ginna: Capsule T SA-1036: Plant Specific RVSP Material	168.5	1.171	173	197.3	-24.3
R. E. Ginna: Capsule S SA-1036: Plant Specific RVSP Material	168.5	1.342	229	226.1	2.9
B&WOG: Capsule DB1-LG1 SA-1135: ONS-2 Nozzle Belt Dropout Matl.	168.5	1.008	134	169.8	-35.8
B&WOG: Capsule DB1-LG2 SA-1135: ONS-2 Nozzle Belt Dropout Matl.	168.5	1.136	141	191.4	-50.4

Since the scatter for all data points is less than 2 standard deviations (56°F), the Table chemistry factor is conservative.

4.4.4 Weld Wire Heat Number 71249

Table 4.4.4-1. Credibility Assessment for Weld Wire Heat Number 71249

Capsule Designation	Cu wt%	Ni wt%	Chem. Factor	Irrad. Temp. (°F)	Fluence ($x10^{19} n/cm^2$)	Fluence Factor	Meas. ΔRT_{NDT} (°F)	Temp. Adj. ΔRT_{NDT} (°F)	Ratio Adj. ΔRT_{NDT} (°F)	Pred. ΔRT_{NDT} (°F) from best fit line	(Adjusted – Predicted) ΔRT_{NDT} (°F)
Turkey Point Unit 3: Capsule T SA-1101: Plant Specific RVSP Material	0.33	0.57	201.3	546	0.739	0.915	166	165	163.3	158.1	5.2
Turkey Point Unit 3: Capsule V SA-1101: Plant Specific RVSP Material	0.33	0.57	201.3	546	1.530	1.118	179	178	176.2	193.1	-16.9
Turkey Point Unit 4: Capsule T SA-1094: Plant Specific RVSP Material	0.29	0.60	191.0	546	0.708	0.903	211	210	219.0	156.0	63.0
Turkey Point Unit 3: Capsule X* SA-1101: Plant Specific RVSP Material	0.33	0.57	201.3	546	2.900	1.283	191	190	188.0	221.6	-33.6
B&WOG: Capsule A5* SA-1101: TP-3 Plant Specific RVSP Matl.	0.33	0.57	201.3	551	2.572	1.253	215	219	216.7	216.5	0.2
Surv. Avg.	0.322	0.576	199.2	547							

* Capsule has been tested since January 1999

where ***Predicted ΔRT_{NDT} = (Slope$_{best\ fit}$) * (Fluence Factor)*** and

Slope$_{best\ fit}$ = best fit line relating Adjusted ΔRT_{NDT} to the Fluence Factor
(i.e., 172.8)

These data points are not credible since the scatter is greater than ±28°F for two surveillance points.

Table 4.4.4-2. Table Chemistry Factor Non-Conservatism Assessment for Weld Wire Heat Number 71249

Capsule Designation	Table Chem. Factor (Surv. Avg.)	Capsule Fluence Factor	Adjusted ΔRT_{NDT} (°F)	Predicted ΔRT_{NDT} (°F)	(Adjusted – Predicted) ΔRT_{NDT} (°F)
Turkey Point Unit 3: Capsule T SA-1101: Plant Specific RVSP Material	199.2	0.915	163.3	182.5	-19.2
Turkey Point Unit 3: Capsule V SA-1101: Plant Specific RVSP Material	199.2	1.118	176.2	222.7	-46.5
Turkey Point Unit 4: Capsule T SA-1094: Plant Specific RVSP Material	199.2	0.903	219.0	179.9	39.1
Turkey Point Unit 3: Capsule X SA-1101: Plant Specific RVSP Material	199.2	1.283	188.0	255.6	-67.6
B&WOG: Capsule A5 SA-1101: TP-3 Plant Specific RVSP Matl.	199.2	1.253	216.7	249.6	-32.9

The above assessment results indicate that the generic Table chemistry factor for the surveillance data grossly over-predicts the adjusted measured data. Therefore, the Table chemistry factor calculated using the weld wire heat best-estimate copper and nickel contents is considered conservative.

4.4.5 Weld Wire Heat Number 72105

Table 4.4.5-1. Credibility Assessment for Weld Wire Heat Number 72105

Capsule Designation	Cu wt%	Ni wt%	Chem. Factor	Irrad. Temp. (°F)	Fluence ($x10^{19}$n/cm^2)	Fluence Factor	Meas. ΔRT_{NDT} (°F)	Temp. Adjusted ΔRT_{NDT} (°F)	Ratio Adjusted ΔRT_{NDT} (°F)	Predicted ΔRT_{NDT} from Best Fit Line (°F)	(Adjusted - Predicted) ΔRT_{NDT} (°F)
Oconee Unit 2: Capsule OCII-C WF-209-1: Plant Specific RVSP Material	0.35	0.58	209.5	556	0.102	0.421	46	57.3	52.1	71.7	-19.6
Oconee Unit 2: Capsule OCII-A WF-209-1: Plant Specific RVSP Material	0.35	0.58	209.5	556	0.337	0.701	107	118.3	107.6	119.5	-11.9
Oconee Unit 2: Capsule OCII-E WF-209-1: Plant Specific RVSP Material	0.35	0.58	209.5	556	1.210	1.053	174	185.3	168.5	179.4	-11.1
Oconee Unit 3: Capsule OCII-A WF-209-1: Plant Specific RVSP Material	0.29	0.56	185.6	556	0.081	0.376	15	26.3	27.0	64.1	-37.1
Oconee Unit 3: Capsule OCII-B WF-209-1: Plant Specific RVSP Material	0.29	0.56	185.6	556	0.312	0.680	70	81.3	83.4	116.0	-32.6
Oconee Unit 3: Capsule OCII-D WF-209-1: Plant Specific RVSP Material	0.29	0.56	185.6	556	1.450	1.103	142	153.3	157.3	188.0	-30.7
B&WOG: Capsule TMI2-LG1 WF-70: MD1 Nozzle Belt Dropout Matl.	0.39	0.58	224.6	556	0.585	0.850	122	133.3	113.0	144.8	-31.8
B&WOG: Capsule DB1-LG1 WF-70: MD1 Nozzle Belt Dropout Matl..	0.39	0.58	224.6	556	0.663	0.885	137	148.3	125.8	150.8	-25.0
B&WOG: Capsule CR3-LG2 WF-70: MD1 Nozzle Belt Dropout Matl.	0.39	0.58	224.6	556	1.190	1.049	127	138.3	117.3	178.7	-61.4
Zion Unit 1: Capsule T WF-209-1: Plant Specific RVSP Material	0.25	0.54	167.6	529.4	0.310	0.679	108	92.7	105.4	115.7	-10.3
Zion Unit 1: Capsule U WF-209-1: Plant Specific RVSP Material	0.25	0.54	167.6	529.4	1.020	1.006	190	174.7	198.6	171.4	27.2
Zion Unit 1: Capsule X WF-209-1: Plant Specific RVSP Material	0.25	0.54	167.6	529.4	1.260	1.064	192	176.7	200.8	181.3	19.5
Zion Unit 1: Capsule Y WF-209-1: Plant Specific RVSP Material	0.25	0.54	167.6	529.4	1.560	1.123	202	186.7	212.2	191.4	20.8
Zion Unit 2: Capsule U WF-209-1: Plant Specific RVSP Material	0.25	0.55	169.0	529.4	0.270	0.643	138	122.7	138.3	109.6	28.7
Zion Unit 2: Capsule T WF-209-1: Plant Specific RVSP Material	0.25	0.55	169.0	529.4	0.779	0.930	179	163.7	184.5	158.5	26.0
Zion Unit 2: Capsule Y WF-209-1: Plant Specific RVSP Material	0.25	0.55	169.0	529.4	1.460	1.105	223	207.7	234.1	188.3	45.8
Davis-Besse: Capsule A5* WF-209-1: Plant Specific RVSP Material	0.25	0.54	167.6	551	2.600	1.256	215	221.3	251.5	214.0	37.5
B&WOG: Capsule W1* WF-70: MD-1 Nozzle Belt Dropout Matl.	0.39	0.58	224.6	543	0.640	0.877	186	184.3	156.3	149.4	6.9
Surv. Avg.	0.304	0.561	190.5	544.7							

* Capsule has been tested since January 1999

AREVA

where ***Predicted ΔRT_{NDT} = (Slope$_{best\ fit}$) * (Fluence Factor)*** and

***Slope$_{best\ fit}$ = best fit line relating Adjusted ΔRT_{NDT} to the Fluence Factor* (i.e., 170.4)**

These data points are not credible since the scatter is greater than ±28°F for eight surveillance points.

Table 4.4.5-2. Weld Wire Heat Number 72105 Chemistry Factor Calculation

Capsule Designation	Table Chem. Factor (Surv. Avg.)	Capsule Fluence Factor	Adjusted ΔRT_{NDT} (°F)	Predicted ΔRT_{NDT} (°F)	(Adjusted – Predicted) ΔRT_{NDT} (°F)
Oconee Unit 2: Capsule OCII-C WF-209-1: Plant Specific RVSP Material	190.5	0.421	52.1	80.2	-28.1
Oconee Unit 2: Capsule OCII-A WF-209-1: Plant Specific RVSP Material	190.5	0.701	107.6	133.5	-25.9
Oconee Unit 2: Capsule OCII-E WF-209-1: Plant Specific RVSP Material	190.5	1.053	168.5	200.6	-32.1
Oconee Unit 3: Capsule OCII-A WF-209-1: Plant Specific RVSP Material	190.5	0.376	27.0	71.6	-44.6
Oconee Unit 3: Capsule OCII-B WF-209-1: Plant Specific RVSP Material	190.5	0.680	83.4	129.5	-46.1
Oconee Unit 3: Capsule OCII-D WF-209-1: Plant Specific RVSP Material	190.5	1.103	157.3	210.1	-52.8
B&WOG: Capsule TMI2-LG1 WF-70: MD1 Nozzle Belt Dropout Matl.	190.5	0.850	113.0	161.9	-48.9
B&WOG: Capsule DB1-LG1 WF-70: MD1 Nozzle Belt Dropout Matl..	190.5	0.885	125.8	168.6	-43.0
B&WOG: Capsule CR3-LG2 WF-70: MD1 Nozzle Belt Dropout Matl.	190.5	1.049	117.3	199.8	-82.5
Zion Unit 1: Capsule T WF-209-1: Plant Specific RVSP Material	190.5	0.679	105.4	129.3	-23.9
Zion Unit 1: Capsule U WF-209-1: Plant Specific RVSP Material	190.5	1.006	198.6	191.6	7.0
Zion Unit 1: Capsule X WF-209-1: Plant Specific RVSP Material	190.5	1.064	200.8	202.7	-1.9
Zion Unit 1: Capsule Y WF-209-1: Plant Specific RVSP Material	190.5	1.123	212.2	213.9	-1.7
Zion Unit 2: Capsule U WF-209-1: Plant Specific RVSP Material	190.5	0.643	138.3	122.5	15.8
Zion Unit 2: Capsule T WF-209-1: Plant Specific RVSP Material	190.5	0.930	184.5	177.2	7.3
Zion Unit 2: Capsule Y WF-209-1: Plant Specific RVSP Material	190.5	1.105	234.1	210.5	23.6
Davis-Besse: Capsule A5 WF-209-1: Plant Specific RVSP Material	190.5	1.256	251.5	239.3	12.2
B&WOG: Capsule W1 WF-70: MD-1 Nozzle Belt Dropout Matl.	190.5	0.877	156.3	167.1	-10.8

The above assessment results indicate that the generic Table chemistry factor for the surveillance data grossly over-predicts the adjusted measured data. Therefore, the Table chemistry factor calculated using the weld wire heat best-estimate copper and nickel contents is considered conservative.

4.4.6 Weld Wire Heat Number 72442

Table 4.4.6-1. Credibility Assessment for Weld Wire Heat Number 72442

Capsule Designation	Cu wt%	Ni wt%	Chem. Factor	Irrad. Temp. (°F)	Fluence ($x10^{19}$n/cm^2)	Fluence Factor	Meas. ΔRT_{NDT} (°F)	Predicted ΔRT_{NDT} from Best Fit Line (°F)	(Adjusted - Predicted) ΔRT_{NDT} (°F)
B&WOG: Capsule CR3-LG1 WF-67: MD1 Nozzle Belt Dropout Matl.	0.22	0.60	167.0	556	0.609	0.861	167	124	43
B&WOG: Capsule CR3-LG1 WF-67: MD1 Nozzle Belt Dropout Matl.	0.22	0.60	167.0	556	1.95	1.182	138	170	-32
Surv. Avg.	0.220	0.600	167.0	556					

where ***Predicted*** ΔRT_{NDT} ***= (Slope$_{best\ fit}$) * (Fluence Factor)*** and

Slope$_{best\ fit}$ = best fit line relating Adjusted ΔRT_{NDT} ***to the Fluence Factor***
(i.e., 143.5)

These data points are not credible since the scatter is greater than ±28°F for both surveillance points.

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Table 4.4.6-2. Weld Wire Heat Number 72442 Chemistry Factor Calculation

Capsule Designation	Table Chem. Factor (Surv. Avg.)	Capsule Fluence Factor	Adjusted ΔRT_{NDT} (°F)	Predicted ΔRT_{NDT} (°F)	(Adjusted – Predicted) ΔRT_{NDT} (°F)
B&WOG: Capsule CR3-LG1 WF-67: MD1 Nozzle Belt Dropout Matl.	167.0	0.861	167	144	23
B&WOG: Capsule CR3-LG1 WF-67: MD1 Nozzle Belt Dropout Matl.	167.0	1.182	138	197	-59

The above assessment results indicate that the generic Table chemistry factor for the surveillance data grossly over-predicts the adjusted measured data for one data point while the other data point is within 2 standard deviations (i.e., ±56°F). Therefore, the Table chemistry factor calculated using the weld wire heat best-estimate copper and nickel contents is considered conservative.

4.4.7 Weld Wire Heat Number 72445

Table 4.4.7-1. Credibility Assessment for Weld Wire Heat Number 72445

Capsule Designation	Cu wt%	Ni wt%	Chem. Factor	Irrad. Temp. (°F)	Fluence ($x10^{19}$n/cm^2)	Fluence Factor	Meas. ΔRT_{NDT} (°F)	Temp. Adjusted ΔRT_{NDT} (°F)	Ratio Adjusted ΔRT_{NDT} (°F)	Predicted ΔRT_{NDT} from Best Fit Line (°F)	(Adjusted - Predicted) ΔRT_{NDT} (°F)
B&WOG: Capsule CR3-LG1 SA-1585: ANO-1 Nozzle Belt Dropout Matl.	0.22	0.59	165.5	556	0.510	0.812	139	150.1	153.7	118.9	34.8
B&WOG: Capsule CR3-LG2 SA-1585: ANO-1 Nozzle Belt Dropout Matl.	0.22	0.59	165.5	556	1.670	1.141	164	175.1	179.3	167.1	12.2
Point Beach Unit 1: Capsule V SA-1263: Plant Specific RVSP Matl.	0.23	0.62	172.4	542@	0.634	0.872	107	104.1	102.4	127.7	-25.4
Point Beach Unit 1: Capsule S SA-1263: Plant Specific RVSP Matl.	0.23	0.62	172.4	542@	0.829	0.947	165	162.1	159.4	138.7	20.7
Point Beach Unit 1: Capsule R SA-1263: Plant Specific RVSP Matl.	0.23	0.62	172.4	541.6@	2.190	1.213	155	151.7	149.1	177.5	-28.4
Point Beach Unit 1: Capsule T SA-1263: Plant Specific RVSP Matl.	0.23	0.62	172.4	533.4@	2.230	1.217	181	169.5	166.6	178.2	-11.6
B&WOG: Capsule W1* SA-1585: ANO-1 Nozzle Belt Dropout Matl.	0.22	0.59	165.5	543	0.660	0.884	138	136.1	139.4	129.4	10.0
Surv. Avg.	0.226	0.607	169.4	544.9							

* Capsule has been tested since January 1999
@RVSP Capsule temperature derived from Point Beach Unit 1 irradiation history.[33]

where ***Predicted ΔRT_{NDT} = (Slope$_{best\ fit}$) * (Fluence Factor)*** and

Slope$_{best\ fit}$ = best fit line relating Adjusted ΔRT_{NDT} to the Fluence Factor
(i.e., 146.4)

These data points are not credible since the scatter is greater than ±28°F for two surveillance points.

Table 4.4.7-2. Weld Wire Heat Number 72445 Chemistry Factor Calculation

Capsule Designation	Table Chem. Factor (Surv. Avg.)	Capsule Fluence Factor	Adjusted ΔRT_{NDT} (°F)	Predicted ΔRT_{NDT} (°F)	(Adjusted – Predicted) ΔRT_{NDT} (°F)
B&WOG: Capsule CR3-LG1 SA-1585: ANO-1 Nozzle Belt Dropout Matl.	169.4	0.812	153.7	137.6	16.1
B&WOG: Capsule CR3-LG2 SA-1585: ANO-1 Nozzle Belt Dropout Matl.	169.4	1.141	179.3	193.3	-14.0
Point Beach Unit 1: Capsule V SA-1263: Plant Specific RVSP Matl.	169.4	0.872	102.4	147.7	-45.3
Point Beach Unit 1: Capsule S SA-1263: Plant Specific RVSP Matl.	169.4	0.947	159.4	160.4	-1.0
Point Beach Unit 1: Capsule R SA-1263: Plant Specific RVSP Matl.	169.4	1.213	149.1	205.5	-56.4
Point Beach Unit 1: Capsule T SA-1263: Plant Specific RVSP Matl.	169.4	1.217	166.6	206.2	-39.6
B&WOG: Capsule W1 SA-1585: ANO-1 Nozzle Belt Dropout Matl.	169.4	0.884	139.4	149.7	-10.3

The above assessment results indicate that the generic Table chemistry factor for the surveillance data grossly over-predicts the adjusted measured data. Therefore, the Table chemistry factor calculated using the weld wire heat best-estimate copper and nickel contents is considered conservative.

4.4.8 Weld Wire Heat Number 821T44

Table 4.4.8-1. Credibility Assessment for Weld Wire Heat Number 821T44

Capsule Designation	Cu wt%	Ni wt%	Chem. Factor	Irrad. Temp. (°F)	Fluence ($x10^{19}$n/cm^2)	Fluence Factor	Meas. ΔRT_{NDT} (°F)	Ratio Adjusted ΔRT_{NDT} (°F)	Predicted ΔRT_{NDT} from Best Fit Line (°F)	(Adjusted - Predicted) ΔRT_{NDT} (°F)
Davis-Besse: Capsule TE1-F WF-182-1: Plant Specific RVSP Matl.	0.22	0.63	172.0	556	0.196	0.565	104	107.4	96.1	11.3
Davis-Besse: Capsule TE1-B WF-182-1: Plant Specific RVSP Matl.	0.22	0.63	172.0	556	0.592	0.853	107	110.5	145.2	-34.7
Davis-Besse: Capsule TE1-A WF-182-1: Plant Specific RVSP Matl.	0.22	0.63	172.0	556	1.290	1.071	162	167.3	182.3	-15.0
Davis-Besse: Capsule TE1-D WF-182-1: Plant Specific RVSP Matl.	0.22	0.63	172.0	556	0.962	0.989	140	144.6	168.3	-23.7
TMI-2: Capsule TMI2-C WF-182-1: Plant Specific RVSP Matl.	0.28	0.63	191.7	556	0.168	0.529	120	111.2	90.0	21.2
TMI-2: Capsule TMI2-E WF-182-1: Plant Specific RVSP Matl.	0.28	0.63	191.7	556	0.174	0.537	110	101.9	91.4	10.5
B&WOG: Capsule A3* WF-182-1: DB-1 Plant Specific RVSP Matl.	0.22	0.63	172.0	556	1.059	1.016	211	217.9	172.9	45.0
Surv. Avg.	0.237	0.630	177.6	556						

* Capsule has been tested since January 1999

where ***Predicted ΔRT_{NDT} = (Slope$_{best\ fit}$) * (Fluence Factor)*** and

Slope$_{best\ fit}$ = best fit line relating Adjusted ΔRT_{NDT} to the Fluence Factor
(i.e., 170.2)

These data points are not credible since the scatter is greater than ±28°F for two surveillance points.

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Table 4.4.8-2. Weld Wire Heat Number 821T44 Chemistry Factor Calculation

Capsule Designation	Table Chem. Factor (Surv. Avg.)	Capsule Fluence Factor	Adjusted ΔRT_{NDT} (°F)	Predicted ΔRT_{NDT} (°F)	(Adjusted – Predicted) ΔRT_{NDT} (°F)
Davis-Besse: Capsule TE1-F WF-182-1: Plant Specific RVSP Matl.	177.6	0.565	107.4	100.3	7.1
Davis-Besse: Capsule TE1-B WF-182-1: Plant Specific RVSP Matl.	177.6	0.853	110.5	151.5	-41.0
Davis-Besse: Capsule TE1-A WF-182-1: Plant Specific RVSP Matl.	177.6	1.071	167.3	190.2	-22.9
Davis-Besse: Capsule TE1-D WF-182-1: Plant Specific RVSP Matl.	177.6	0.989	144.6	175.6	-31.0
TMI-2: Capsule TMI2-C WF-182-1: Plant Specific RVSP Matl.	177.6	0.529	111.2	93.9	17.3
TMI-2: Capsule TMI2-E WF-182-1: Plant Specific RVSP Matl.	177.6	0.537	101.9	95.4	6.5
B&WOG: Capsule A3 WF-182-1: DB-1 Plant Specific RVSP Matl.	177.6	1.016	217.9	180.4	37.5

Since the scatter for all data points is less than 2 standard deviations (56°F), the Table chemistry factor is conservative.

4.4.9 Base Metal Heat Number C4339-1

Table 4.4.9-1. Credibility Assessment for Base Metal Heat Number C4339-1

Capsule Designation	Cu wt%	Ni wt%	Chem. Factor	Irrad. Temp. (°F)	Fluence (x10^{19}n/cm^2)	Fluence Factor	Meas. ΔRT_{NDT} (°F)	Temp. Adjusted ΔRT_{NDT} (°F)	Predicted ΔRT_{NDT} from Best Fit Line (°F)	(Adjusted - Predicted) ΔRT_{NDT} (°F)
S-2: Capsule X Plant-Specific RVSP Material (LT)	0.10	0.52	65.0	534.9	0.297	0.668	59	54.3	51	8
S-2: Capsule X Plant-Specific RVSP Material (TL)	0.10	0.52	65.0	534.9	0.297	0.668	49	44.3	51	-2
S-2: Capsule V Plant-Specific RVSP Material (LT)	0.10	0.52	65.0	540.1	1.89	1.174	79	79.5	90	-11
S-2: Capsule V Plant-Specific RVSP Material (TL)	0.10	0.52	65.0	540.1	1.89	1.174	64	64.5	90	-26
S-2: Capsule Y* Plant-Specific RVSP Material (LT)	0.10	0.52	65.0	543.7	2.73	1.268	114	118.1	97	17
S-2: Capsule Y* Plant-Specific RVSP Material (TL)	0.10	0.52	65.0	543.7	2.73	1.268	107	111.1	97	10
Surv. Avg.	0.10	0.52	65.0	539.6						

* Capsule has been tested since January 1999

where ***Predicted*** ΔRT_{NDT} ***= (Slope$_{best\ fit}$) * (Fluence Factor)*** and

Slope$_{best\ fit}$ = best fit line relating Adjusted ΔRT_{NDT} ***to the Fluence Factor***
(i.e., 76.6)

These data points are not credible since the scatter is greater than ±17°F for one surveillance point.

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Table 4.4.9-2. Base Metal Heat Number C4339-1 Chemistry Factor Calculation

Capsule Designation	Table Chem. Factor (Surv. Avg.)	Capsule Fluence Factor	Adjusted ΔRT_{NDT} (°F)	Predicted ΔRT_{NDT} (°F)	(Adjusted – Predicted) ΔRT_{NDT} (°F)
S-2: Capsule X Plant-Specific RVSP Material (LT)	65.0	0.668	54.3	43.4	10.9
S-2: Capsule X Plant-Specific RVSP Material (TL)	65.0	0.668	44.3	43.4	0.9
S-2: Capsule V Plant-Specific RVSP Material (LT)	65.0	1.174	79.5	76.3	3.2
S-2: Capsule V Plant-Specific RVSP Material (TL)	65.0	1.174	64.5	76.3	-17.9
S-2: Capsule Y Plant-Specific RVSP Material (LT)	65.0	1.268	118.1	82.4	35.7
S-2: Capsule Y Plant-Specific RVSP Material (TL)	65.0	1.268	111.1	82.4	28.7

The above assessment results indicate that the generic Table chemistry factor for the surveillance data grossly over-predicts the adjusted measured data. Therefore, the Table chemistry factor calculated using the base metal heat best-estimate copper and nickel contents is considered conservative.

4.4.10 Base Metal Heat Number 123S266

Table 4.4.10-1. Credibility Assessment for Base Metal Heat Number 123S266

Capsule Designation	Cu wt%	Ni wt%	Chem. Factor	Irrad. Temp. (°F)	Fluence ($x10^{19}$n/cm^2)	Fluence Factor	Meas. ΔRT_{NDT} (°F)	Predicted ΔRT_{NDT} from Best Fit Line (°F)	(Adjusted - Predicted) ΔRT_{NDT} (°F)
TP-3: Capsule S Plant-Specific RVSP Material (LT)	0.08	0.68	51.0	546	1.720	1.149	42	55	-13
TP-3: Capsule V Plant-Specific RVSP Material (LT)	0.08	0.68	51.0	546	1.530	1.118	55	54	1
TP-3: Capsule X* Plant-Specific RVSP Material (LT)	0.08	0.68	51.0	546	2.90	1.283	72	61	11
Surv. Avg.	0.080	0.680	51.0	546					

* Capsule has been tested since January 1999

where ***Predicted ΔRT_{NDT} = (Slope$_{best\ fit}$) * (Fluence Factor)*** and

Slope$_{best\ fit}$ = best fit line relating Adjusted ΔRT_{NDT} to the Fluence Factor
(i.e., 47.9)

These data points are credible since the scatter is less than ±17°F for all surveillance points.

Table 4.5.10-2. Base Metal Heat Number 123S266 Chemistry Factor Calculation

Capsule Designation	Cu wt%	Ni wt%	Chem. Factor	Irrad. Temp. (°F)	Fluence Factor	Meas. ΔRT_{NDT} (°F)
TP-3: Capsule S Plant-Specific RVSP Material (LT)	0.08	0.68	51.0	546	1.149	42
TP-3: Capsule V Plant-Specific RVSP Material (LT)	0.08	0.68	51.0	546	1.118	55
TP-3: Capsule X* Plant-Specific RVSP Material (LT)	0.08	0.68	51.0	546	1.283	72
Vessel Best-Estimate	0.08	0.68	51.0	546		

$CF_{Surv.\ data}$ = best fit line relating Measured ΔRT_{NDT} to the Fluence Factor

(i.e., $CF_{Surv.\ data}$ = 47.9)

5. References

1. M. J. Devan, *"Response to Request for Additional Information (RAI) Regarding Reactor Pressure vessel Integrity; B&W Owner's Group – Reactor Vessel Working Group,"* BAW-2325, Revision 1, AREVA NP Inc., Lynchburg, Virginia, January 1999.*

2. K. E. Moore and A. S. Heller, *"Chemistry of 177-FA B&W Owner's Group Reactor Vessel Beltline Welds,"* BAW-1500, AREVA NP Inc., Lynchburg, Virginia, September 1978.*

3. K. E. Moore and A. S. Heller, *"B&W 177-FA Reactor Vessel Beltline Weld Chemistry Study,"* BAW-1799, AREVA NP Inc., Lynchburg, Virginia, July 1983.*

4. L. B. Gross, *"Chemical Composition of B&W Fabricated Reactor Vessel Beltline Welds,"* BAW-2121P, AREVA NP Inc., Lynchburg, Virginia, April 1991.*

5. Code of Federal Regulations, Title 10, *"Domestic Licensing of Production and Utilization Facilities,"* Part 50.61, *"Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock,"* Federal Register, December 19, 1995.

6. American Society of Mechanical Engineers, Boiler and Pressure Vessel Code, Section III, Nuclear Power Plant Components, Subsection NB, Class 1 Components.

7. K. K. Yoon, *"Initial RTNDT of Linde 80 Weld Materials,"* BAW-2308, Revision 1-A, AREVA NP Inc., Lynchburg, Virginia, August 2005.

8. Surry Power Station Units 1 & 2, Update to NRC Reactor Vessel Integrity Database and Exemption Request for Alternative Material Properties Basis Per 10 CFR 50.60(b), June 2006, NRC public document number ML061650080.

9. WCAP-16001, Revision 0, "Analysis of Capsule Y from Dominion Surry Unit 2 Reactor Vessel Radiation Surveillance Program," Attachment 1, Appendix A and B, February 2003, ML030990253.

10. WCAP-15916, "Analysis of Capsule X from the Florida Power and Light Company Turkey Point Unit 3 Reactor Vessel Radiation Surveillance Program," September 2002, NRC public document number ML022940497.

11. U. S. Nuclear Regulatory Commission, *"Radiation Damage to Reactor Vessel Material,"* Regulatory Guide 1.99, Revision 2, May 1988.

* Available from AREVA NP Inc., Lynchburg, Virginia.

12. W. H. Mackay, L. B. Gross, M. A. Rinckel, and R. L. Starkey, *"Demonstration of the Management of Aging Effects for the Reactor Vessel,"* BAW-2251A, AREVA NP Inc., Lynchburg, Virginia, August 1999.*

13. NUREG-1743, Safety Evaluation Report Related to License and Renewal of Arkansas One, Unit 1, May 2001, NRC public document number ML011640217.

14. Arkansas Nuclear One Unit 1, Issuance of Amendment 188, Changing Reactor Coolant System Pressure/Temperature Limits to Incorporate Updated Parameters and Requirements, March 1997, NRC public document number ML021270228.

15. Crystal River Unit 3 – Pressure/Temperature Limits Report, Revision 4, July 2003, NRC public document number ML032040061.

16. Davis Besse Station, License Amendment 199, Amendment Revises TS 3/4.4.9.1 Pressure-Temperature Limits, Reactor Coolant System, July 1995, NRC public document number ML021200482.

17. U. S. Nuclear Regulatory Commission, *"License Renewal Application for Oconee Nuclear Station, Units 1, 2, and 3,"* July 1998.

18. NUREG-1723, Safety Evaluation Report Related to the License Renewal of Oconee Nuclear Station, Units 1, 2, and 3, March 2000, NRC public document number ML003697717.

19. U. S. Nuclear Regulatory Commission, *"License Renewal Application for Point Beach Nuclear Plant, Units 1 and 2,"* February 2004.

20. NUREG-1839, Safety Evaluation Report Related to the License Renewal of Point Beach Nuclear Plant, Units 1 & 2, December 2005, NRC public document number ML053420137.

21. Request for Exemption to 10 CFR 50.61, Appendices G and H to 10 CFR 50, and Approval of PTS Application for PBNP Unit 2 and Proposed Heatup and Cooldown Limit Curves for PBNP Units 1 & 2, March 2003, NRC public document number ML030710699.

22. Three Mile Island, Unit 1- Submittal of Changes to Technical Specification Bases, April 2006, NRC public document number ML061290050.

23. NUREG-1766, Safety Evaluation Report, Related to License Renewal of North Anna Power Station, Units 1 & 2, & Surry Power Station, Units 1 & 2, December 2002, NRC public document number ML030160848.

* Available from AREVA NP Inc., Lynchburg, Virginia.

24. WCAP-15092, Revision 3, "Turkey Point Units 3 and 4 WOG Reactor Vessel 60-Year Evaluation Minigroup Heatup and Cooldown Limit Curves for Normal Operation," May 2000, NRC public document number ML003732201.

25. NUREG-1759, Safety Evaluation Report Related to License Renewal of Turkey Point Nuclear Plant, Units 3 & 4, April 2002, NRC public document number ML021280532.

26. WCAP-15916, "Analysis of Capsule X from the Florida Power and Light Company Turkey Point Unit 3 Reactor Vessel Radiation Surveillance Program," September 2002, NRC public document number ML022940497.

27. BAW-2350, "Test Results of W1 Capsule, B&WOG Owner's Group, Master Integrated Reactor Vessel Surveillance Program," AREVA NP Inc., April 1999.*

28. BAW-2360, "Analysis of A5 Capsule, B&WOG Owner's Group, Master Integrated Reactor Vessel Surveillance Program," AREVA NP Inc., June 1999.*

29. BAW-2400, "Analysis of the B&W Owner's Group Capsule L1, Nuclear Management Company, Reactor Vessel Surveillance Program," AREVA NP Inc., March 2002.*

30. BAW-2412, "Analysis of the B&W Owner's Group Capsule A3, Master Integrated Reactor Vessel Surveillance Program," AREVA NP Inc., April 2002.*

31. BAW-2439, Analysis of the B&W Owner's Group Capsule TMI2-LG2, AREVA NP Inc., May 2003, NRC public document number ML031610830.

32. BAW-2486, "Analysis of the B&W Owner's Group Capsule DB1-LG2," AREVA NP Inc., December 2005.*

33. E. P. Lippincott, *"Westinghouse Surveillance Capsule Neutron Fluence Reevaluation,"* WCAP-14044, Westinghouse Electric Corporation, Pittsburgh, Pennsylvania, April 1994.*

* Available from AREVA NP Inc., Lynchburg, Virginia.

6. Certification

This report accurately updates the request for additional information regarding reactor pressure vessel integrity for the PWR Owner's Group.

7/24/07
S. B. Davidsaver, Engineer II Date
Materials and Structural Analysis Unit

This report has been reviewed for technical content and accuracy.

7-24-07
J. B. Hall, Principal Engineer Date
Materials and Structural Analysis Unit

Verification of independent review.

7/24/07
B. R. Grambau, Manager Date
Materials and Structural Analysis Unit

This report is approved for release.

7/25/07
W. R. Gray Date
Program Manager

AREVA