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**THE
B&W OWNERS GROUP**

MATERIALS COMMITTEE

**SUPPLEMENT 1
MASTER INTEGRATED
REACTOR VESSEL
SURVEILLANCE PROGRAM**

**BW B&W NUCLEAR
SERVICE COMPANY**

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SUPPLEMENT TO THE
MASTER INTEGRATED REACTOR VESSEL
SURVEILLANCE PROGRAM

by

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Prepared for

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INTRODUCTION

BAW-1543, Revision 4 reports the essential features of a master integrated reactor vessel surveillance program for all operating B&W 177-FA plants and those Westinghouse plants having B&W-fabricated reactor vessels. This supplementary document to BAW-1543, Revision 4, contains surveillance capsule insertion and withdrawal schedules and status summaries for B&W and Westinghouse surveillance capsules. The following describes the information found within each table.

Tables I and II are listings of plant-specific surveillance capsules and directs the reader to the appendices of BAW-1543, Revision 4, where additional information can be found on material and capsule specifications. These tables also provide a listing of surveillance capsule reports. Table I provides information for B&W plant-specific capsules and Table II provides information for Westinghouse plant-specific capsules. Table I was previously listed as Table 3-5 in BAW-1543, Revision 3,¹ and Table II was previously listed as Table 3-9.

Tables III and IV provide capsule insertion and withdrawal schedules for B&W host plants Crystal River Unit 3 and Davis-Besse Unit 1, respectively. The tables were previously listed as Tables 3-19 and 3-20 in BAW-1543, Revision 3.

Table V provides capsule insertion and withdrawal schedules for the participating Westinghouse-designed plants. The table was previously listed as Table 3-21 in BAW-1543, Revision 3.

Tables VI and VII summarize the status of all MIRVP capsules for B&W and Westinghouse plants, respectively. The tables were previously listed as Tables E-1 and E-2 in BAW-1543, Revision 3. These tables state whether the capsules have been withdrawn or are still being irradiated. For capsules that have been withdrawn, the fluence that the capsule received is listed along with the appropriate surveillance capsule report number. For those capsules that are being irradiated, or are being held in storage, the target and expected fluences are listed along with the insertion and/or withdrawal date.

Table VIII shows the conformance of the plant-specific surveillance programs to the requirements of ASTM E 185. The table was previously listed as Table E-3 in BAW-1543, Revision 3.

Table IX lists licensing dates and anticipated peak end-of-life fluences. Table IX was previously located on page F-3 of BAW-1543, Revision 3.

Tables X-1 through X-16 provide estimated end-of-life reference temperature and upper-shelf energy information for each participating plant. The tables were previously listed in Appendix F of BAW-1543, Revision 3. The bases for the tabular information are presented below.

Material Identification - All weld numbers and locations were verified by reviewing B&W Mt. Vernon QA records. The materials included conform to the beltline definition of 10CFR50, Appendix G.² Welds in Westinghouse-designed vessels that were not fabricated by B&W are so noted.

Chemical Composition - The listed weld metal compositions for B&W-designed plants were obtained from BAW-1820³ and BAW-2121P.⁴ For Westinghouse-designed plants the weld metal compositions were obtained from BAW-2150⁵ and BAW-2121P. The atypical weld composition was obtained from BAW-10144A.⁷⁷

Inside Surface Neutron Fluence - The peak end-of-life IS fluences are listed in Table IX of this document. For the B&W-designed vessels, the fluences were obtained from plant specific reactor vessel fluence analysis reports compiled in BAW-2108, Revision 1.⁶ For the Westinghouse-design vessels, the fluences were obtained from applicable Westinghouse reactor vessel fluence reports or determinations by the Owner; this is footnoted in the tables. Fluence attenuation to the quarter-thickness location was performed in accordance with the rules of Regulatory Guide 1.99, Revision 2.⁷

Initial RT_{NDT} - The initial RT_{NDT} values were obtained from BAW-1803, Revision 1,⁸ unless otherwise noted.

Adjusted RT_{NDT} - In accordance with the rules of Regulatory Guide 1.99, Revision 2, the estimates of end-of-life adjusted RT_{NDT} were obtained by taking the sum of the initial RT_{NDT} , the ΔRT_{NDT} , and the margin. The ΔRT_{NDT} is calculated by multiplying the fluence factor (a function of the fluence) by the chemistry factor (a function of the copper and nickel contents). In the instance of the atypical welds, the adjusted RT_{NDT} was determined in accordance with Position 2 of Regulatory Guide 1.99, Revision 2.

Upper-Shelf Energy - The estimated end-of-life quarter-thickness upper-shelf energy was calculated in accordance with the rules of Regulatory Guide 1.99, Revision 2, and the method of BAW-1803, Rev. 1. Initial upper-shelf energy is estimated in accordance with BAW-1803,⁹ unless otherwise noted.

Table I. B&W 177-FA Plant-Specific Reactor Vessel
Surveillance Program - Detailed Summary

<u>Capsule ID Type</u>	<u>Table of Mat'l Specs*</u>	<u>Table of Capsule Specs**</u>	<u>Report Date</u>	<u>Applicable Report</u>
<u>Oconee Unit 1</u>				
A I	A-1	D-1	Aug 84	BAW-1837 ¹⁰
B II	A-1	D-1	---	
C I	A-1	D-1	Oct 88	BAW-2050 ¹¹
D II	A-1	D-1	---	
E I	A-1	D-1	Sept 77	SAW-1436 ¹²
F II	A-1	D-1	Sept 75	BAW-1421, Rev. 1 ¹³

Topical Report BAW-10006A, Rev. 3¹⁴

Oconee Unit 2

A I	A-2	D-2	Dec 81	BAW-1653 ¹⁵
B II	A-2	D-2	---	
C I	A-2	D-2	May 77	BAW-1437 ¹⁶
D II	A-2	D-2	---	
E I	A-2	D-2	Oct 88	BAW-2051 ¹⁷
F II	A-2	D-2	---	

Topical Report BAW-10006A, Rev. 3

Oconee Unit 3

A V	A-3	D-3	July 77	BAW-1438 ¹⁸
B VI	A-3	D-3	Oct 81	BAW-1697 ¹⁹
C V	A-3	D-3	---	
D VI	A-3	D-3	May 92	BAW-2128, Rev. 1 ²⁰
E V	A-3	D-3	---	
F VI	A-3	D-3	---	

Topical Report BAW-10100A^{21***}

Three Mile Island Unit 1

A I	A-4	D-4	Untested	BAW-2042 ²²
B II	A-4	D-4	---	
C I	A-4	D-4	March 86	BAW-1901 ²³
D II	A-4	D-4	---	
E I	A-4	D-4	June 76	BAW-1439 ²⁴
F II	A-4	D-4	---	

Topical Report BAW-10006A, Rev. 3

*Refer to BAW-1543, Rev. 4, Appendix A.

**Refer to BAW-1543, Rev. 4, Appendix D.

***The OC-3 capsules were fabricated before BAW-10100A was published; however, it is the OC-3 program that is described in BAW-10100A.

Table I. B&W 177-FA Plant-Specific Reactor Vessel
Surveillance Program - Detailed Summary (Cont'd)

Capsule ID Type	Table of Mat'l Specs*	Table of Capsule Specs**	Report Date	Applicable Report
<u>Crystal River Unit 3</u>				
A III	A-5	D-5	---	
B IV	A-5	D-5	June 82 & March 82	BAW-1679, Rev. 1 ²⁵ and BAW-1718 ²⁶
C III	A-5	D-5	March 86	BAW-1898 ²⁷
D IV	A-5	D-5	March 86 & April 86	BAW-1899 ²⁸ and BAW-1914 ²⁹
E III	A-5	D-5	---	
F IV	A-5	D-5	Sept 88	BAW-2049 ³⁰
Topical Report BAW-10100A				
<u>Arkansas Nuclear One Unit 1</u>				
A I	A-6	D-6	July 84	BAW-1836 ³¹
B II	A-6	D-6	Nov 81	BAW-1698 ³²
C I	A-6	D-6	Oct 89	BAW-2075, Rev. 1 ³³
D II	A-6	D-6	---	
E I	A-6	D-6	April 77	BAW-1440 ³⁴
F II	A-6	D-6	---	
Topical Report BAW-10006A, Rev. 3				
<u>Rancho Seco Unit 1</u>				
A III	A-7	D-7	---	
B IV	A-7	D-7	Feb 82 & March 82	BAW-1702 ³⁵ and BAW-1720 ³⁶
C III	A-7	D-7	---	
D IV	A-7	D-7	Oct 83 Oct 83	BAW-1792 ³⁷ and BAW-1793P ³⁸
E III	A-7	D-7	---	
F IV	A-7	D-7	April 89	BAW-2074 ³⁹
Topical Report BAW-10100A				
<u>Davis-Besse Unit 1</u>				
A III	A-8	D-8	June 89	BAW-1882, Rev. 1 ⁴⁰
B IV	A-8	D-8	May 84 & June 85	BAW-1834 ⁴¹ and BAW-1867 ⁴²
C III	A-8	D-8	---	
D IV	A-8	D-8	Dec 90	BAW-2125 ⁴³
E III	A-8	D-8	---	
F IV	A-8	D-8	Jan 82 & March 82	BAW-1701 ⁴⁴ and BAW-1719 ⁴⁵
Topical Report BAW-10100A				

*Refer to BAW-1543, Rev. 4, Appendix A.

**Refer to BAW-1543, Rev. 4, Appendix D.

Table II. Westinghouse Plant-Specific Reactor Vessel
Surveillance Program - Detailed Summary

<u>Capsule ID Type</u>	<u>Table of Mat'l Specs*</u>	<u>Table of Capsule Specs**</u>	<u>Report Date</u>	<u>Applicable Report</u>
<u>R. E. Ginna Unit 1</u>				
N II	A-9	D-9	---	
P II	A-9	D-9	---	
R I	A-9	D-9	Nov 74	WCAP-8421 ⁴⁶
S II	A-9	D-9	---	
T I	A-9	D-9	April 82	WCAP-10086 ⁴⁷
V I	A-9	D-9	March 73	W Report ⁴⁸
<u>Point Beach Unit 1</u>				
N IV	A-10	D-10	---	
P IV	A-10	D-10	---	
R III	A-10	D-10	Aug 78	WCAP-9357 ⁴⁹
S IV	A-10	D-10	Nov 76	WCAP-8739 ⁵⁰
T III	A-10	D-10	Dec 84	WCAP-10736 ⁵¹
V III	A-10	D-10	June 73	BCL Report ⁵²
<u>Point Beach Unit 2</u>				
N IV	A-11	D-11	---	
P IV	A-11	D-11	---	
R V	A-11	D-11	Dec 79	WCAP-9635 ⁵³
S V	A-11	D-11	Aug 91	BAW-2140 ⁵⁴
T IV	A-11	D-11	Aug 78	WCAP-9331 ⁵⁵
V V	A-11	D-11	June 75	BCL Report ⁵⁶
<u>Surry Unit 1</u>				
S VI	A-12	D-12	---	
T VII	A-12	D-12	June 75	BCL Report ⁵⁷
U VI	A-12	D-12	---	
V VII	A-12	D-12	Feb 87	WCAP-11415 ⁵⁸
W VI	A-12	D-12	March 79	BCL-585-8R ⁵⁹
X VII	A-12	D-12	---	
Y VI	A-12	D-12	---	
Z VII	A-12	D-12	---	
<u>Surry Unit 2</u>				
S VIII	A-13	D-13	---	
T VIII	A-13	D-13	---	
U VIII	A-13	D-13	---	
V VIII	A-13	D-13	June 87	WCAP-11499 ⁶⁰
W VIII	A-13	D-13	Feb 81	BCL-585-026 ⁶¹
X VIII	A-13	D-13	Sept 75	BCL Report ⁶²
Y IX	A-13	D-13	---	
Z IX	A-13	D-13	---	

*Refer to BAW-1543, Rev. 4, Appendix A.
 **Refer to BAW-1543, Rev. 4, Appendix D.

Table II. Westinghouse Plant-Specific Reactor Vessel
Surveillance Program - Detailed Summary (Cont'd)

Capsule ID Type	Table of Mat'l Specs*	Table of Capsule Specs**	Report Date	Applicable Report
<u>Turkey Point Unit 3</u>				
S VI	A-14	D-14	May 79	SWRI-02-5131 ⁶³
T VII	A-14	D-14	Dec 75	WCAP-8631 ⁶⁴
U VI	A-14	D-14	---	
V VII	A-14	D-14	Aug 86	SWRI-06-8575 ⁶⁵
W VI	A-14	D-14	---	
X VII	A-14	D-14	---	
Y VI	A-14	D-14	---	
Z VI	A-14	D-14	---	
<u>Turkey Point Unit 4</u>				
S VI	A-15	D-15	May 79	SWRI-02-5380 ⁶³
T VII	A-15	D-15	June 76	SWRI-02-4221 ⁶⁶
U VI	A-15	D-15	---	
V VII	A-15	D-15	---	
W VI	A-15	D-15	---	
X VII	A-15	D-15	---	
Y VI	A-15	D-15	---	
Z VI	A-15	D-15	---	
<u>Zion Unit 1</u>				
S VIII	A-16	D-16	---	
T VIII	A-16	D-16	March 78	BCL-585-4 ⁶⁷
U VIII	A-16	D-16	March 81	WCAP-9890 ⁶⁸
V VIII	A-16	D-16	---	
W VIII	A-16	D-16	---	
X VIII	A-16	D-16	March 84	SWRI-06-7484- 001 ⁶⁹
Y IX	A-16	D-16	March 90	BAW-2082 ⁷⁰
Z IX	A-16	D-16	---	
<u>Zion Unit 2</u>				
S VIII	A-17	D-17	---	
T VIII	A-17	D-17	July 83	SWRI Report ⁷¹
U VIII	A-17	D-17	March 78	BCL-585-4 ⁷²
V VIII	A-17	D-17	---	
W VIII	A-17	D-17	---	
X VIII	A-17	D-17	---	
Y IX	A-17	D-17	Sept 89	WCAP-12396 ⁷³
Z IX	A-17	D-17	---	

*Refer to BAW-1543, Rev. 4, Appendix A.

**Refer to BAW-1543, Rev. 4, Appendix D.

Table III. Capsule Insertion and Withdrawal Schedule
for Crystal River Unit 3

Holder Tube	Location in Holder Tube	Withdraw	Insert	Capsule Status
<u>Installed at Initial Fuel Load</u>				
XW	Top		CR3-B (WC)	
XW	Bottom		CR3-D (WC)	
<u>End of First Fuel Cycle (1A)</u>				
WZ	Top		CR3-LG1 (WC)	
WZ	Bottom		CR3-LG2 (WC)	
ZY	Top		CR3-C (W)	
ZY	Bottom		CR3-A (W)	
YZ	Top		OC2-A (W)	
YZ	Bottom		OC1-A (W)	
YX	Top		OC2-E (W)	
YX	Bottom		OC3-D (W)	
XW	Top	CR3-B (WC)	CR3-E (W)	Tested
WX	Top		OC3-B (W)	
WX	Bottom		CR3-F (WC)	
<u>End of First Fuel Cycle (1B)</u>				
No changes				
<u>End of Second Fuel Cycle</u>				
YZ	Top	OC2-A (W)	OC1-C (W)	Tested
WX	Top	OC3-B (W)	TMI1-C (W)	Tested
<u>End of Third Fuel Cycle</u>				
No changes				
<u>End of Fourth Fuel Cycle</u>				
YZ	Bottom	OC1-A (W)	OC1-B	Tested
WZ	Top	CR3-LG1 (WC)	None	Tested
WZ	Bottom	CR3-LG2 (WC) (WZ now empty)	None	Stored
<u>End of Fifth Fuel Cycle</u>				
WX	Top	TMI1-C (W)	OC3-C (W)	Tested
XW	Bottom	CR3-D (WC)	TMI1-B	Tested
ZY	Top	CR3-C (W)	OC3-F (W)	Tested
WZ	Top	None	OC2-B	
WZ	Bottom	None (WZ no longer empty)	CR3-LG2 (WC)	

Table III. Capsule Insertion and Withdrawal Schedule
for Crystal River Unit 3 (Cont'd)

<u>Holder Tube</u>	<u>Location in Holder Tube</u>	<u>Withdraw</u>	<u>Insert</u>	<u>Capsule Status</u>
<u>End of Sixth Fuel Cycle</u>				
YX	Top	OC2-E (W)	TMI2-D*	Tested
WX	Bottom	CR3-F (WC)	TMI1-F	Tested
YZ	Top	OC1-C (W)	TMI2-LG1 (WC)	Tested
YZ	Bottom	OC1-B	TMI2-LG2 (WC)	Stored
<u>End of Seventh Fuel Cycle</u>				
XW	Bottom	TMI1-B	TMI2-D* from YX top	Stored
YX	Top	TMI2-D* to XW bottom	A2 (WC)	Tested
YX	Bottom	OC3-D (W)	A4 (WC)	
WZ	Top	OC2-B	OC3-E (W)	Stored
<u>End of Eighth Fuel Cycle</u>				
ZY	Bottom	CR3-A (W)	OC1-D	Stored
XW	Top	CR3-E (W)	None	Stored
XW	Bottom	TMI2-D*	None	Stored
WX	Top	OC3-C (W)	OC2-F	Stored
WX	Bottom	TMI1-F (XW now empty)	TMI1-D	Stored
<u>End of Ninth Fuel Cycle</u>				
YZ	Top	TMI2-LG1 (WC)	OC2-D	1
WZ	Bottom	CR3-LG2 (WC)	TMI2-D*	1
<u>End of Tenth Fuel Cycle</u>				
No changes				
<u>End of Eleventh Fuel Cycle</u>				
WX	Top	OC2-F	None	2
WX	Bottom	TMI1-D (WX now empty)	None	2

Table III. Capsule Insertion and Withdrawal Schedule
for Crystal River Unit 3 (Cont'd)

<u>Holder Tube</u>	<u>Location in Holder Tube</u>	<u>Withdraw</u>	<u>Insert</u>	<u>Capsule Status</u>
<u>End of Twelfth Fuel Cycle</u>				
YZ	Top	OC2-D	None	2
YZ	Bottom	TM12-LG2 (WC)	None	1
WZ	Top	OC3-E (W)	None	2
WZ	Bottom	TM12-D* (YZ and WZ now empty)	None	2
<u>End of Thirteenth Fuel Cycle</u>				
ZY	Top	OC3-F (W)	None	2
ZY	Bottom	OC1-D (ZY now empty)	None	2
<u>End of Fourteenth through Sixteenth Fuel Cycle</u>				
No changes				
<u>End of Seventeenth Fuel Cycle</u>				
YX	Top	A2 (WC)	None	1
YX	Bottom	A4 (WC) (All holder tubes now empty)	None	1

(W) - Capsule contains weld metal specimens.

(WC) - Capsule contains weld metal compact fracture toughness specimens.

* - Dummy capsule.

1 - Capsule to be removed, specimens will be tested, dosimetry evaluated, and thermal monitors evaluated.

2 - Capsule to be removed and placed in storage. Dosimetry may be evaluated at this time.

Table IV. Capsule Insertion and Withdrawal Schedule
for Davis-Besse Unit 1

Holder Tube	Location in Holder Tube	Withdraw	Insert	Capsule Status
<u>Installed at Initial Fuel Load</u>				
WZ	Top		AN1-B	
WZ	Bottom		RS1-B (WC)	
ZY	Top		TE1-B (WC)	
ZY	Bottom		TE1-F (WC)	
YZ	Top		AN1-A (W)	
YZ	Bottom		AN1-C (W)	
YX	Top		RS1-D (WC)	
YX	Bottom		TE1-C (W)	
XW	Top		TE1-D (WC)	
XW	Bottom		RS1-C (W)	
WX	Top		TE1-A (W)	
WX	Bottom		RS1-F (WC)	
<u>End of First Fuel Cycle</u>				
WZ	Top	AN1-B	DB1-LG1 (WC)	Tested
WZ	Bottom	RS1-B (WC)	RS1-E (W)	Tested
ZY	Bottom	TE1-F (WC)	DB1-LG2 (WC)	Tested
<u>End of Second Fuel Cycle</u>				
YX	Top	RS1-D (WC)	RS1-A (W)	Tested
<u>End of Third Fuel Cycle</u>				
YZ	Top	AN1-A (W)	AN1-D	Tested
ZY	Top	TE1-B (WC)	TE1-E (W)	Tested
<u>End of Fourth Fuel Cycle</u>				
YX	Top	RS1-A (W)	AN1-F	Stored
WZ	Top	DB1-LG1 (WC)	RS1-F from WX bottom	Tested
WX	Top	TE1-A (W)	None	Tested
WX	Bottom	RS1-F to WZ top (WX now empty)	None	
<u>End of Fifth Fuel Cycle</u>				
WZ	Top	RS1-F (WC)	None	Tested
WZ	Bottom	RS1-E (W)	None	Stored
YZ	Top	AN1-D to XW bottom	TM12-C**	
YZ	Bottom	AN1-C (W)	TM12-E**	Tested
XW	Bottom	RS1-C (W) (WZ now empty)	AN1-D from YZ top	Stored

Table IV. Capsule Insertion and Withdrawal Schedule
for Davis-Besse Unit 1 (Cont'd)

Holder Tube	Location in Holder Tube	Withdraw	Insert	Capsule Status
<u>End of Sixth Fuel Cycle</u>				
XW	Top	TE1-D (WC)	None	Tested
XW	Bottom	AN1-D	None	Stored
YZ	Top	TMI2-C**	A3 (WC)	
YZ	Bottom	TMI2-E**	A1 (WC)	
WZ	Top		L2 (WC)	
WZ	Bottom		L1 (WC)	
	(XW now empty)			
<u>End of Seventh Fuel Cycle</u>				
YX	Top	AN1-F	Industry Capsule**	Stored
YX	Bottom	TE1-C (W)	A5	Stored
WX	Top		IBSP-1**	
WX	Bottom		IBSP-2**	
	(WX** is now full)			
<u>End of Eighth through Tenth Fuel Cycles</u>				
No changes				
<u>End of Eleventh Fuel Cycle</u>				
ZY	Top	TE1-E (W)	None	2
ZY	Bottom	DB1-LG2 (WC)	None	1
	(ZY now empty)			
<u>End of Twelfth Fuel Cycle</u>				
YX	Top	Industry Capsule**	Dummy	
YZ	Top	A3 (WC)	L2 (WC) from WZ top	1
WZ	Top	L2 (WC) to YZ top*	None	
WZ	Bottom	L1 (WC)	None	1
WX	Top	IBSP-1**	None	
WX	Bottom	IBSP-2**	None	
	(WX** and WZ now empty)			
<u>End of Thirteenth Fuel Cycle</u>				
YX	Top	Dummy	None	
YX	Bottom	A5 (WC)	None	1
	(YX now empty)			

Table IV. Capsule Insertion and Withdrawal Schedule
for Davis-Besse Unit 1 (Cont'd)

<u>Holder Tube</u>	<u>Location in Holder Tube</u>	<u>Withdraw</u>	<u>Insert</u>	<u>Capsule Status</u>
<u>End of Fourteenth Fuel Cycle</u>				
No changes				
<u>End of Fifteenth Fuel Cycle</u>				
YZ	Top	L2 (WC)	Dummy	1
<u>End of Sixteenth Fuel Cycle</u>				
No changes				
<u>End of Seventeenth Fuel Cycle</u>				
YZ	Top	Dummy	None	1
YZ	Bottom	A1 (WC)	None	
(All holder tubes now empty)				

(W) - Capsule contains weld metal specimens.

(WC) - Capsule contains weld metal compact fracture toughness specimens.

* - L2 to be annealed before reinsertion.

** - Not part of the Integrated Program.

1 - Capsule to be removed, specimens will be tested, dosimetry evaluated, and thermal monitors evaluated.

2 - Capsule to be removed and placed in storage. Dosimetry may be evaluated at this time.

Table V. Capsule Insertion and Withdrawal Schedule for the Westinghouse Plant-Specific RVSPs

<u>Nuclear Plant</u>	<u>Capsule Location*</u>	<u>Capsule Identification</u>	<u>Withdraw</u>	<u>Insert</u>	<u>Capsule Status</u>
Point Beach Unit 1	13°	V (WC)	EOC-1		Tested
	13°	R (WC)	EOC-5		Tested
	23°	T (WC)	EOC-11		Tested
	33°	S (W)	EOC-3		Tested
	23°	P (W)	EOC-21		2,5
	33°	N (W)	EOL		2,4,5
Point Beach Unit 2	13°	V (WC)	EOC-1		Tested
	13°	R (WC)	EOC-5		Tested
	23°	T (W)	EOC-3		Tested
	33°	S (WC)	EOC-16		Tested
	23°	P (W)	EOC-22		2,5
	33°	N (W)	EOL		2,4,5
R. E. Ginna	13°	V (WC)	EOC-1		Tested
	13°	R (WC)	EOC-3		Tested
	23°	T (WC)	EOC-9		Tested
	23°	P (WC)	EOC-29		1,5
	33°	S (WC)	EOC-22		1
	33°	N (WC)	EOC-27		2,5
Surry Unit 1	15°	T (WC)	EOC-1		Tested
	15°	V (WC)	EOC-8		Tested
	35°	W	EOC-4		Tested**
	25°	S	EOL****		2****
	25°	X (WC)	EOC-12		3
	15°	X (WC)	EOC-14	EOC-12	1
	25°	Z (WC)	EOC-12		3
	15°	Z (WC)	EOL	EOC-12	2,4,5
	35°	Y	EOC-14		3
	15°	Y		EOC-14	4,5
	45°	U	EOC-12		3
	25°	U		EOC-12	4,5

Table V. Capsule Insertion and Withdrawal Schedule for
the Westinghouse Plant-Specific RVSPs (Cont'd)

<u>Nuclear Plant</u>	<u>Capsule Location*</u>	<u>Capsule Identification</u>	<u>Withdraw</u>	<u>Insert</u>	<u>Capsule Status</u>
Surry Unit 2	15°	X (W)	EOC-1		Tested
	15°	V (W)	EOC-8		Tested
	25°	W (W)	EOC-4		Tested**
	25°	Y (WC)	EOC-12		3
	25°	Y (WC)	EOC-17	EOC-12	1
	25°	U (W)	EOC-22		2,5
	35°	Z (WC)	EOC-12		3
	25°	Z (WC)		EOC-12	4,5
	35°	T (W)	EOC-17		3
	15°	T (W)		EOC-17	4,5
	45°	S (W)	EOC-13		6
	15°	W1 (WC)***	EOC-14	EOC-10	1
Turkey Point Unit 3	0°	T (WC)	EOC-1		Tested
	10°	S	EOC-4		Tested
	20°	V (WC)			Tested
	0°	X (WC)	EOC-21		1
	30°	U			4
	30°	Y			4
	40°	W			4
	40°	Z			4
Turkey Point Unit 4	0°	T (WC)	EOC-1		Tested
	10°	S	EOC-3		Tested
	0°	X (WC)	EOC-27		2,5
	20°	V (WC)			4
	30°	U			4
	30°	Y			4
	40°	W			4
	40°	Z			4

Table V. Capsule Insertion and Withdrawal Schedule for the Westinghouse Plant-Specific RVSPs (Cont'd)

<u>Nuclear Plant</u>	<u>Capsule Location*</u>	<u>Capsule Identification</u>	<u>Withdraw</u>	<u>Insert</u>	<u>Capsule Status</u>
Zion Unit 1	40°	T (W)	EOC-1		Tested
	40°	U (W)	EOC-4		Tested
	40°	X (W)	EOC-6		Tested
	40°	Y (WC)	EOC-10		Tested
	4°	S (W)	EOC-26		2,5
	4°	V (W)	EOC-26		2,5
	4°	W (W)	EOC-13		3
	40°	W (W)	EOC-18	EOC-13	2,5
	4°	Z (WC)	EOC-13		3
	40°	Z (WC)	EOC-22	EOC-13	2,5
Zion Unit 2	40°	U (W)	EOC-1		Tested
	40°	T (W)	EOC-4		Tested
	40°	Y (WC)	EOC-10		Tested
	4°	Z (WC)	EOC-13		3
	40°	Z (WC)	EOC-18	EOC-13	1
	4°	S (W)	EOC-27		2,5
	4°	V (W)	EOC-27		2,5
	4°	W (W)	EOC-27		2,5
	40°	X (W)	EOC-15		2,5

W - Capsule contains weld metal specimens

WC - Capsule contains weld metal WOL specimens

* - Capsule locations are relative symmetrical positions and not absolute, e.g. 0° is equivalent to 90°, 180°, or 270°.

** - Only dosimetry was evaluated.

*** - HUPCAP, not a plant-specific capsule.

**** - Capsule to be withdrawn at EOC-17 and evaluated for dosimetry only if cavity dosimetry is not installed.

1 - Capsule to be removed, specimens will be tested, dosimetry evaluated, and thermal monitors evaluated.

Table V. Capsule Insertion and Withdrawal Schedule for
the Westinghouse Plant-Specific RVSPs (Cont'd)

- 2 - Capsule to be removed and placed in storage. Dosimetry may be evaluated at this time.
- 3 - Capsule to be reinserted in higher lead factor location.
- 4 - Capsule to be maintained in location to EOL.
- 5 - Standby capsule to be removed at 1-2 times the vessel EOL fluence.
- 6 - Capsule to be evaluated for dosimetry and placed in storage.

Table VI. Summary Status of the B&W Surveillance Capsules

Capsule ID	Weld Metal/ Compacts	Status/ Location	Fluence		Estimated Time of Removal	Comments
			Target	Expected/ Received		
OC1-F	No/No	Tested	--	5.7E17	--	Reported in BAW-1421, Rev. 1 ¹³ Fluence corrected in BAW-1436 ¹²
OC1-E	Yes/No	Tested	--	1.5E18	--	Reported in BAW-1436 ¹²
OC1-B	No/No	Removed	--	--	--	Held in storage
OC1-A	Yes/No	Tested	--	9.0E18	--	Reported in BAW-1837 ¹⁰
OC1-C	Yes/No	Tested	--	9.9E18	--	Reported in BAW-2050 ¹¹
OC1-D	No/No	CR3-ZY	9.0E18	1.2E19	End of Cycle 13	---
OC2-C	Yes/No	Tested	--	1.0E18 [#]	--	Reported in BAW-1437 ¹⁶
OC2-A	Yes/No	Tested	--	3.4E18	--	Reported in BAW-1699 ¹⁵
OC2-B	No/No	Removed	--	5.6E18	--	Held in storage, fluence reported in BAW-2108 ⁸⁹
OC2-E	Yes/No	Tested	--	1.2E19	--	Reported in BAW-2051 ¹⁷
OC2-D	No/No	Holding	9.6E18	8.0E18	End of Cycle 12	Insert in CR3 at EOC-9
OC2-F	No/No	CR3-WX	9.6E18	8.0E18	End of Cycle 11	---
OC3-A	Yes/No	Tested	--	8.1E17 [#]	--	Reported in BAW-1438 ¹⁸
OC3-B	Yes/No	Tested	--	3.1E18	--	Reported in BAW-1697 ¹⁹
OC3-C	Yes/No	Removed	--	7.8E18	--	Held in storage, fluence reported in BAW-2108, Rev. 1 ⁶
OC3-D	Yes/No	Tested	--	1.5E19	--	Reported in BAW-2128, Rev. 1 ²⁰
OC3-E	Yes/No	CR3-WZ	1.6E19	1.3E19	End of Cycle 12	---
OC3-F	Yes/No	CR3-ZY	1.6E19	1.7E19	End of Cycle 13	---
TM11-E	Yes/No	Tested	--	1.1E18 [#]	--	Reported in BAW-1439 ²⁴
TM11-B	No/No	Removed	--	4.4E18	--	Held in storage, fluence reported in BAW-2108 ⁸⁹
TM11-C	Yes/No	Tested	--	8.7E18	--	Reported in BAW-1901 ²³
TM11-A	Yes/No	Removed	--	1.6E18	--	Held in storage - reported in BAW-2042 ²²
TM11-D	No/No	CR3-WX	9.0E18	8.2E18	End of Cycle 11	---
TM11-F	No/No	Removed	--	6.3E18	--	Held in storage, fluence reported in BAW-2108, Rev. 1 ⁶

Table VI. Summary Status of the B&W Surveillance Capsules (Cont'd)

Capsule ID	Weld Metal/Compacts	Status/Location	Fluence		Estimated Time of Removal	Comments
			Target	Expected/Received		
CR3-B	Yes/Yes	Tested	--	1.0E18	--	Reported in BAW-1679, Rev. 1 ²⁵ and BAW-1718 ²⁶
CR3-C	Yes/No	Tested	--	6.6E18	--	Reported in BAW-1898 ²⁷
CR3-D	Yes/Yes	Tested	--	7.5E18	--	Reported in BAW-1899 ²⁸ and BAW-1914 ²⁹
CR3-F	Yes/Yes	Tested	--	1.1E19	--	Reported in BAW-2049 ³⁰
CR3-A	Yes/No	Removed	--	1.2E19	--	Held in storage, fluence reported in BAW-2108, Rev. 1 ⁶
CR3-E	Yes/No	Removed	--	1.2E19	--	Held in storage, fluence reported in BAW-2108, Rev. 1 ⁶
AN1-E	Yes/No	Tested	--	7.3E17	--	Reported in BAW-1440 ³⁴
AN1-B	No/No	Tested	--	4.3E18	--	Reported in BAW-1698 ³²
AN1-A	Yes/No	Tested	--	1.0E19	--	Reported in BAW-1836 ³¹
AN1-C	Yes/No	Tested	--	1.5E19	--	Reported in BAW-2075, Rev. 1 ³³
AN1-D	No/No	Removed	--	7.6E18	--	Held in storage, fluence reported in BAW-2108 ⁸⁹
AN1-F	No/No	Removed	--	7.8E18	--	Held in storage, fluence reported in BAW-2108, Rev. 1 ⁶
RS1-B	Yes/Yes	Tested	--	4.0E18	--	Reported in BAW-1702 ³⁵ and BAW-1720 ³⁶
RS1-A	Yes/No	Removed	--	--	--	Held in storage
RS1-D	Yes/Yes	Tested	--	6.6E18	--	Reported in BAW-1792 ³⁷ and BAW-1793P ³⁸
RS1-F	Yes/Yes	Tested	--	1.4E19	--	Reported in BAW-2074 ³⁹
RS1-C	Yes/No	Removed	--	--	--	Held in storage
RS1-E	Yes/No	Removed	--	--	--	Held in storage
TE1-F	Yes/Yes	Tested	--	2.0E18	--	Reported in BAW-1701 ⁴⁴ and BAW-1719 ⁴⁵
TE1-B	Yes/Yes	Tested	--	5.9E18	--	Reported in BAW-1834 ⁴¹ and BAW-1867 ⁴²
TE1-A	Yes/No	Tested	--	1.3E19	--	Reported in BAW-1882, Rev. 1 ⁴⁰
TE1-D	Yes/Yes	Tested	--	9.6E18	--	Reported in BAW-2125 ⁴³
TE1-C	Yes/No	Removed	--	1.8E19	--	Held in storage, fluence reported through EOC-6 in BAW-2108, ⁸⁹ extrapolated through EOC-7
TE1-E	Yes/No	DB1-ZY	1.1E19	1.3E19	End of Cycle 11	---

Table VI. Summary Status of the B&W Surveillance Capsules (Cont'd)

Capsule ID	Weld Metal/ Compacts	Status/ Location	Fluence		Estimated Time of Removal	Comments
			Target	Expected/ Received		
CR3-LG1	--	Tested	--	6.1E18	--	Reported in BAW-1910P ⁷⁴
CR3-LG2	--	CR3-WZ	1.7E19	1.6E19	End of Cycle 9	---
DB1-LG1	--	Tested	--	8.3E18	--	Reported in BAW-1920P ⁷⁵
DB1-LG2	--	DB1-ZY	1.7E19	1.6E19	End of Cycle 11	---
TMI2-LG1	--	CR3-YZ	8.0E18	8.3E18	End of Cycle 9	---
TMI2-LG2	--	CR3-YZ	1.7E19	1.5E19	End of Cycle 12	---
A1	--	DB1-YZ	3.0E19	2.4E19	End of Cycle 17	---
A2	--	CR3-YX	3.0E19	2.4E19	End of Cycle 17	---
A3	--	DB1-YZ	1.7E19	1.3E19	End of Cycle 12	---
A4	--	CR3-YX	3.0E19	2.4E19	End of Cycle 17	---
A5	--	DB1-YX	1.7E19	1.6E19	End of Cycle 13	---
L1	--	DB1-WZ	1.7E19	1.3E19	End of Cycle 12	---
L2	--	DB1-WZ	1.7E19	2.0E19	End of Cycle 15	Transfer to YZ at EOC-12

*Fluence was not evaluated upon capsule removal.

#Fluence values indicated are revised values and are referenced in BAW-1803, Rev. 1.⁸

Table VII. Summary Status of the Westinghouse Surveillance Capsules

Capsule ID	Weld Metal/WOL's	Current* Location	Fluence		Estimated Time of Removal	Comments
			Target	Expected/Received		
REG-N	Yes/Yes	33°	4.1E19	4.1E19	End of Cycle 27	---
REG-P	Yes/Yes	23°	4.9E19	4.9E19	End of Cycle 29	---
REG-R	Yes/Yes	Tested	--	1.0E19 [#]	--	Reported in WCAP-8421, ⁴⁶ WCAP-13272 ⁷⁶
REG-S	Yes/Yes	33°	3.4E19	3.4E19	End of Cycle 22	---
REG-T	Yes/Yes	Tested	--	1.8E19	--	Reported in WCAP-10086, ⁴⁷ WCAP-13272 ⁷⁶
REG-V	Yes/Yes	Tested	--	6.5E18 [#]	--	Reported in W report dated March/73, ⁴⁸ WCAP-13272 ⁷⁶
PB1-N	Yes/Yes	33°	4.5E19	4.5E19	End of Life	Standby
PB1-P	Yes/No	23°	3.2E19	3.2E19	End of Cycle 21	Standby
PB1-R	Yes/Yes	Tested	--	2.1E19 [#]	--	Reported in WCAP-9357, ⁴⁹ WCAP-10736 ⁵¹
PB1-S	Yes/No	Tested	--	7.6E18	--	Reported in WCAP-8739, ⁵⁰ WCAP-10736 ⁵¹
PB1-T	Yes/Yes	Tested	--	2.1E19	--	Reported in WCAP-10736 ⁵¹
PB1-V	Yes/Yes	Tested	--	6.2E18 [#]	--	Reported in BCL report dated June/73 ⁵² and WCAP-10736 ⁵¹
PB2-N	Yes/No	33°	5.0E19	5.0E19	End of Life	Standby
PB2-P	Yes/No	23°	3.4E19	3.4E19	End of Cycle 22	Standby
PB2-R	Yes/Yes	Tested	--	2.2E19 [#]	--	Reported in WCAP-9635 ⁵³
PB2-S	Yes/Yes	Tested	--	3.5E19	--	Reported in BAW-2140 ⁵⁴
PB2-T	Yes/No	Tested	--	8.4E18 [#]	--	Reported in WCAP-9331 ⁵⁵
PB2-V	Yes/Yes	Tested	--	6.1E18 [#]	--	Reported in BCL report dated June/75 ⁵⁶
S1-S	No/No	25°	3.9E19	3.9E19	Remain for Lifex	Standby**
S1-T	Yes/Yes	Tested	--	2.9E18 [#]	--	Reported in BCL report dated June/75 ⁵⁷
S1-U	No/No	45°	3.0E19	3.0E19	Remain for Lifex	Standby, transfer to 25° at EOC-12
S1-V	Yes/Yes	Tested	--	1.9E19	--	Reported in WCAP-11415 ⁵⁸
S1-W	No/No	Dosimetry	--	4.0E18	--	Reported in BCL-585-8R ⁵⁹
S1-X	Yes/Yes	25°	2.4E19	2.4E19	End of Cycle 14	Transfer to 15° at EOC-12
S1-Y	No/No	35°	4.3E19	4.3E19	Remain for Lifex	Standby, transfer to 15° at EOC-14
S1-Z	Yes/Yes	25°	5.2E19	5.2E19	End of Life	Standby, transfer to 15° at EOC-12

Table VII. Summary Status of the Westinghouse Surveillance Capsules (Cont'd)

Capsule ID	Weld Metal/WOL's	Current* Location	Fluence		Estimated Time of Removal	Comments
			Target	Expected/Received		
S2-S	Yes/No	45°	1.2E19	1.2E19	End of Cycle 13	Dosimetry only
S2-T	Yes/No	35°	3.8E19	3.8E19	End of Life	Standby, transfer to 15° at EOC-17
S2-U	Yes/No	25°	3.6E19	3.6E19	End of Cycle 22	Standby
S2-V	Yes/No	Tested	--	1.9E19	--	Reported in WCAP-11499 ⁶⁰
S2-W	Yes/No	Dosimetry	--	6.0E18	--	Reported in BCL-585-026 ⁶¹
S2-X	Yes/No	Tested	--	3.0E18	--	Reported in BCL report dated September, 1975 ⁶²
S2-Y	Yes/Yes	25°	3.2E19	3.2E19	End of Cycle 17	Transfer to 15° at EOC-12
S2-Z	Yes/Yes	35°	3.4E19	3.4E19	Remain for Lifex	Standby, transfer to 25° at EOC-12
TP3-S	No/No	Tested	--	1.4E19	--	Reported in SWRI-02-5131 ⁶³
TP3-T	Yes/Yes	Tested	--	7.0E18 [#]	--	Reported in WCAP-8631 ⁶⁴
TP3-U	No/No	30°	--	---	End of Life	Standby
TP3-V	Yes/Yes	Tested	--	1.2E19	--	Reported in SWRI-06-8575 ⁶⁵
TP3-W	No/No	40°	--	---	End of Life	Standby
TP3-X	Yes/Yes	0°	2.6E19	2.6E19	End of Cycle 21	---
TP3-Y	No/No	30°	--	---	--	Standby
TP3-Z	No/No	40°	--	---	--	Standby
TP4-S	No/No	Tested	--	1.3E19	--	Reported in SWRI-02-5380 ⁶³
TP4-T	Yes/Yes	Tested	--	7.5E18 [#]	--	Reported in SWRI-02-4221 ⁶⁶
TP4-U	No/No	30°	--	---	End of Life	Standby
TP4-V	Yes/Yes	20°	--	---	End of Life	Standby
TP4-W	No/No	40°	--	---	End of Life	Standby
TP4-X	Yes/Yes	0°	3.7E19	3.7E19	End of Cycle 27	Standby
TP4-Y	No/No	30°	--	---	End of Life	Standby
TP4-Z	No/No	40°	--	---	End of Life	Standby

Table VII. Summary Status of the Westinghouse Surveillance Capsules (Cont'd)

Capsule ID	Weld Metal/ WOL's	Current* Location	Fluence		Estimated Time of Removal	Comments
			Target	Expected/ Received		
Z1-S	Yes/No	4°	1.7E19	1.7E19	End of Cycle 26	Standby
Z1-T	Yes/No	Tested	--	2.5E18 [#]	--	Reported in BCL-585-4 ⁶⁷
Z1-U	Yes/No	Tested	--	8.5E18 [#]	--	Reported in WCAP-9890 ⁶⁸
Z1-V	Yes/No	4°	1.7E19	1.7E19	End of Cycle 26	Standby
Z1-W	Yes/No	4°	1.7E19	1.7E19	End of Cycle 18	Standby, transfer to 40° at EOC-13
Z1-X	Yes/No	Tested	--	1.3E19 [#]	--	Reported in SWRI-06-7484-001 ⁶⁹
Z1-Y	Yes/Yes	Tested	--	1.6E19	--	Reported in BAW-2082 ⁷⁰
Z1-Z	Yes/Yes	4°	2.6E19	2.6E19	End of Cycle 22	Standby, transfer to 40° at EOC-13
Z2-S	Yes/No	4°	1.7E19	1.7E19	End of Cycle 27	Standby
Z2-T	Yes/No	Tested	--	8.0E18 [#]	--	Reported in SWRI report dated July/83 ⁷¹
Z2-U	Yes/No	Tested	--	2.6E18 [#]	--	Reported in BCL-585-4 ⁷²
Z2-V	Yes/No	4°	1.7E19	1.7E19	End of Cycle 27	Standby
Z2-W	Yes/No	4°	1.7E19	1.7E19	End of Cycle 27	Standby
Z2-X	Yes/No	40°	2.5E19	2.5E19	End of Cycle 15	Standby
Z2-Y	Yes/Yes	Tested	--	1.5E19	--	Reported in WCAP-12396 ⁷³
Z2-Z	Yes/Yes	4°	1.7E19	1.7E19	End of Cycle 18	Transfer to 40° at EOC-13
S2-Wi	--	15°	1.0E19	1.0E19	End of Cycle 14	HU ⁷⁴ CAP

*All location are shown as relative symmetrical positions and are not always absolute, eg. 0° is equivalent to 90°, 180°, or 270°.

**To be withdrawn at EOC-17 if cavity dosimetry is not installed.

[#]Fluence values indicated are revised values and are referenced in BAW-1803, Rev. 1.⁸

Table VIII. Comparison of the Plant-Specific Surveillance Capsules with ASTM E 185 Requirements

Plant	ASTM E 185-82 6 Capsule Program Requirement				
	1.5 EFY or Fluence > 5E18 R ₁₀₀ = 50 F	3 EFY or Fluence Midway First and Third	6 EFY or 1/4 EOL Fluence	15 EFY or 1S EOL Fluence	Standby (1-2 Times 1S EOL Fluence)
Oconee-1	F-1/T (5.7E17)	E-1/T (1.5E18)	A-1/T (9.0E18)	C-1/T (9.9E18)	D-4
Oconee-2	C-1/T (1.0E18)	A-1/T (3.4E18)	B-1/NT (5.8E18)	E-1/T (1.2E19)	F-R
Oconee-3	A-1/T (8.1E17)	B-1/T (3.1E18)	C-1/NT (7.8E18)	D-1/T (1.5E19)	F-R
TMI-1	E-1/T (1.1E18)	C-1/T (8.7E18)	F-1/NT (6.3E18)	D-R	A-1/NT (1.6E18)
Crystal River-3	B-1/T (1.0E18)	C-1/T (6.6E18)	D-1/T (7.5E18)	F-1/T (1.1E19)	B-1/NT (4.2E18)
ANO-1	E-1/T (7.3E17)	B-1/T (4.3E18)	A-1/T (1.0E19)	C-1/T (1.5E19)	E-1/NT (1.2E19)
Rancho Seco	B-1/T (4.0E18)	A-1/NT (*)	D-1/T (6.6E18)	F-1/T (1.4E19)	F-1/NT (7.8E18)
Davis-Besse	F-1/T (2.0E18)	B-1/T (5.9E18)	A-1/T (1.3E19)	D-1/T (9.6E18)	E-1/NT (*)
R.E. Ginna	V-1/T (6.5E18)	R-1/T (1.0E19)	T-1/T (1.8E19)	P-R	E-R
Point Beach-1	V-1/T (6.2E18)	S-1/T (7.6E18)	T-1/T (2.1E19)	R-1/T (2.1E19)	N-R
Point Beach-2	V-1/T (6.1E18)	T-1/T (8.4E18)	R-1/T (2.2E19)	S-1/T (3.5E19)	P-R
Surry-1	T-1/T (2.9E18)	W-1/T (4.0E18)**	V-1/T (1.9E19)	K-R	S, U-R
Surry-2	K-1/T (3.0E18)	W-1/T (6.0E18)**	V-1/T (1.9E19)	Y-R	S, T-R
Turkey Point-3	T-1/T (7.0E18)	V-1/T (1.2E19)	S-1/T (1.4E19)	X-R	U, Z-R
Turkey Point-4	T-1/T (7.5E18)	S-1/T (1.3E19)	X-R	V-R	Y, Z-R
Zion-1	T-1/T (2.5E18)	U-1/T (8.5E18)	X-1/T (1.3E19)	X-1/T (1.6E19)	Y, Z-R
Zion-2	U-1/T (2.6E18)	T-1/T (8.0E18)	Y-1/T (1.5E19)	Z-R	S, V-R
					W, X-R

Legend: A - X/Y (BE19)

A = Capsule ID

X/Y = 1/T (Irradiated/Tested); 1/NT (Irradiated/Not Tested); R (In-Reactor)

(BE19) = Fluence at time of capsule withdrawal

* Fluence was not evaluated

** Only dosimetry evaluated

Table IX. Peak End-of-Life Inside Surface Fluences and Significant Licensing Dates

Plant	Date Construction Permit Issued	Date Operating License Issued	License Expiration	Peak EOL (32 EFPY) IS Fluence, n/cm ² (E > 1 MeV)
Oconee-1	November 6, 1967	February 6, 1973	November 6, 2007	9.04E18
Oconee-2	November 6, 1967	October 6, 1973	November 6, 2007	9.57E18
Oconee-3	November 6, 1967	July 19, 1974	November 6, 2007	9.39E18
TMI-1	May 18, 1968	April 19, 1974	May 18, 2008	8.97E18
Crystal River-3	September 25, 1968	December 3, 1976	September 25, 2008	8.56E18
ANO-1	December 6, 1968	May 21, 1974	December 6, 2008	9.79E18
Davis-Besse	March 24, 1971	April 22, 1977	April 22, 2017*	1.07E19
R. E. Ginna	April 25, 1966	September 19, 1969	April 25, 2006	3.35E19
Point Beach-1	July 19, 1967	October 5, 1970	October 5, 2010*	2.68E19
Point Beach-2	July 25, 1968	May 25, 1972	March 8, 2013*	2.92E19
Surry-1	June 25, 1968	May 25, 1972	June 25, 2008	3.96E19**
Surry-2	June 25, 1968	January 29, 1973	June 25, 2008	3.43E19**
Turkey Point-3	April 27, 1967	July 19, 1972	April 27, 2007	2.64E19
Turkey Point-4	April 27, 1967	April 10, 1973	April 27, 2007	2.53E19
Zion-1	December 26, 1968	April 6, 1973	December 26, 2008	1.73E19
Zion-2	December 26, 1968	November 14, 1973	December 26, 2008	1.69E19

*License expiration dates are revised for Point Beach Units 1 and 2, and Davis-Besse Unit 1 as License Amendments No. 107 and No. 151 have been approved, respectively.

**Surry Unit 1 fluence is calculated at 28.8 EFPY and Surry Unit 2 is calculated at 29.4 EFPY.

Table X-1. Reactor Vessel Weld End-of-Life (32 EFPY) Fracture Toughness Evaluation Data Summary for ANO Unit 1

Weld Number	Weld Location	Chemical Composition (wt%) ^(a)		Neutron Fluence (n/cm ²)		Initial RT _{Not} (°F) ^(b)	Adjusted EOL RT _{Not} (°F) ^(b)		Initial USE ^(c) (ft-lb)	Estimated T/4 EOL-USE (ft-lb)	
		Cu	Ni	Inside Surface ^(d)	T/4 ^(d)		Inside Surface	T/4		RG 1.99, R2 ^(e)	BAW-1803/R1 ^(f,g)
WF-182-1	NB/US	0.24	0.63	8.62E18	5.17E18	-5	234	210	70	47	57
WF-112	US/LS	0.31	0.59	9.40E18	5.64E18	-5	257	229	70	43	52
WF-18	US-Longitudinal (both)	0.20	0.55	7.05E18	4.23E18	-5	201	180	70	51	60
WF-18	LS-Longitudinal (both)	0.20	0.55	6.95E18	4.17E18	-5	201	180	70	51	60
SA-1788	LS/Dutchman	0.25	0.54	5.48E16	3.29E16	-5	---	---	70	---	---

^(a)BAW-2108, Revision 1.^(h)

^(b)Regulatory Guide 1.99, Revision 2.⁽ⁱ⁾

^(c)BAW-2121P,^(k) BAW-1500,^(m) and BAW-1820.⁽ⁿ⁾

^(d)BAW-1803, Revision 1.^(o)

^(e)Mean value.

^(f)BAW-1803.^(p)

Table X-2. Reactor Vessel Weld End-of-Life (32 EPY) Fracture Toughness Evaluation Data Summary for Crystal River Unit 3

Weld Number	Weld Location	Chemical Composition (wt%) ^(a)		Neutron Fluence (10 ¹⁹ /cm ²)		Initial RT ₁₉₉ (°F) ^(b)	Adjusted EOL RT ₁₉₉ (°F) ^(c)		Initial USE ^(d) (ft.-lb)	Estimated T/4 EOL USE ^(e) (ft.-lb)	
		Cu	Ni	Inside	Surface		Inside	Surface		RG 1.99, R2 ^(f)	BAW-1803/R1 ^(g)
WF-169-1	NB/US (Outside 60%)	0.18	0.63	---	---	-5	---	---	70	---	---
SA-1769	NB/US (Inside 40%)	0.26	0.61	7.53E18	4.52E18	-5	231	206	70	46	56
WF-70	U/LS	0.35	0.59	8.22E18	4.93E18	18 ^(h)	285	256	70	43	49
WF-154	LS/Dutchman	0.31	0.59	4.79E16	2.87E16	-5	---	---	70	---	---
WF-8	US-Longitudinal	0.20	0.55	7.96E18	4.78E18	-5	207	184	70	50	60
WF-18	US-Longitudinal	0.20	0.55	7.96E18	4.78E18	-5	207	184	70	50	60
SA-1580	LS-Longitudinal (both)	0.20	0.55	6.96E18	4.19E18	-5	201	180	70	51	60
Atypical	US/LS	0.41 ⁽ⁱ⁾	0.10 ⁽ⁱ⁾	8.22E18	4.93E18	90 ⁽ⁱ⁾	234 ⁽ⁱ⁾	216 ⁽ⁱ⁾	79 ⁽ⁱ⁾	49	---

^(a)BAW-2108, Revision 1.^(a)

^(b)Regulatory Guide 1.99, Revision 2.^(b)

^(c)BAW-2121P^(c) and BAW-1820.^(c)

^(d)BAW-1803, Revision 1.^(d)

^(e)BAW-10144A.^(e)

^(f)Mean value.

^(g)BAW-2100.^(g)

^(h)Based on Regulatory Guide 1.99, Revision 2, Position 2.

⁽ⁱ⁾BAW-1803.⁽ⁱ⁾

Table X-3. Reactor Vessel Weld End-of-Life (32 EFPY) Fracture Toughness Evaluation Data Summary for Davis-Besse Unit 1

Weld Number	Weld Location	Chemical Composition (wt%) ^(a)		Neutron Fluence {n/cm ² }		Initial RT _{50F} (°F) ^(b)		Adjusted EOL RT _{50F} (°F) ^(c)	Initial USE ^(d) [ft-lb]	Estimated T/4 EOL USE [ft-lb]	
		Cu	Ni	Inside Surface ^(e)	T/4 ^(f)	Inside Surface	T/4			RG 1.99, P2 ^(g)	BAW-1803/R1 ^(h)
WF-232	NB/US (Inside 9%)	0.18	0.64	1.50E18	---	---	---	---	70	---	---
WF-233	NB/US (Outside 91%)	0.29	0.68	---	9.00E17	---	143	---	70	53	57
WF-182-1	US/LS	0.24	0.63	1.07E19	6.42E18	2 ⁽ⁱ⁾	215	---	81 ^(j)	53	56
WF-232	LS/Dutchman (Inside 12%)	0.18	0.64	6.00E16	---	---	---	---	70	---	---
WF-233	LS/Dutchman (Outside 88%)	0.29	0.68	---	3.60E16	---	---	---	70	---	---

^(a)BAW-2108, Revision 1.^(k)

^(b)BAW-2121P.^(k)

^(c)BAW-1820.^(k)

^(d)BAW-1803, Revision 1.^(k)

^(e)Mean value.

^(f)BAW-1803.^(k)

^(g)Regulatory Guide 1.99, Revision 2.^(k)

Table X-4. Reactor Vessel Weld End-of-Life (32 EFFY) Fracture Toughness Evaluation Data Summary for Oconee Unit 1

Weld Number	Weld Location	Chemical Composition (wt%) ^(a)		Neutron Fluence [n/cm ²]		Initial RT _{50F} ^(b) [-F] ^(c)	Adjusted EOL RT _{50F} ^(b) [-F] ^(c)		Estimated T/4 EOL-USE [ft-lb]	
		Cu	Ni	Inside Surface ^(d)	T/4 ^(e)		Inside Surface	T/4	RT _{50F} 1.99, R ₂ ^(f)	BAW-1803/R ₁ ^(g)
SA-1135	NB/IS	0.25	0.54	1.18E18	7.08E17	-5	140	123	54	60
SA-1229	IS/US (Inside 61%)	0.26	0.61	7.96E18	4.78E18	-5	235	208	46	55
WF-25	IS/US (Outside 39%)	0.35	0.68	---	---	-5	---	---	---	---
SA-1585	US/LS	0.21	0.59	8.68E18	5.21E18	-5	210	197	49	59
WF-9	LS/Dutchman	0.21	0.59	5.06E16	3.04E16	-5	---	44	---	---
SA-1073	IS-Longitudinal (both)	0.21	0.64	6.28E18	3.77E18	-5	213	188	51	59
SA-1493	US-Longitudinal (both)	0.20	0.55	7.23E18	4.34E18	-5	203	181	51	60
SA-1430	LS-Longitudinal	0.20	0.55	7.29E18	4.37E18	-5	203	181	51	60
SA-1426	LS-Longitudinal	0.20	0.55	7.29E18	4.37E18	-5	203	181	51	60

^(a)BAW-2108, Revision 1.^(h)

^(b)Regulatory Guide 1.99, Revision 2.⁽ⁱ⁾

^(c)PAW-2121P^(h) and BAW-1820.^(h)

^(d)BAW-1803, Revision 1.^(h)

^(e)BAW-1803.^(h)

^(f)Mean value.

Table X-5. Reactor Vessel Weld End-of-Life (32 EFPY) Fracture Toughness Evaluation Data Summary for Oconee Unit 2

Weld Number	Weld Location	Chemical Composition (wt%) ^(a)		Neutron Fluence (n/cm ²)		Initial RT _{NDT} (°F) ^(b)	Adjusted EOL RT _{NDT} (°F) ^(b)		Initial USE ^(c) (ft-lb)	Estimated T/4 EOL-USE (ft-lb)	
		Cu	Ni	Inside Surface ^(d)	T/4 ^(d)		Inside Surface	T/4		RG 1.99, R2 ^(e)	BAW-1803/R1 ^(f)
WF-154	NB/US	0.31	0.59	8.42E18	5.05E18	-5	251	224	70	44	52
WF-25	US/LS	0.35	0.68	9.19E18	5.51E18	-5	264	250	70	43	49
WF-112	LS/Dutchman	0.31	0.59	5.36E16	3.22E16	-5	---	---	70	---	---

^(a)BAW-2108, Revision 1.^(b)

^(b)Regulatory Guide 1.99, Revision 2.^(c)

^(c)BAW-2121P^(d) and BAW-1820.^(d)

^(d)BAW-1803, Revision 1.^(e)

^(e)BAW-1803.^(f)

^(f)Mean value.

Table X-6. Reactor Vessel Weld End-of-Life (32 EFPY) Fracture Toughness Evaluation Data Summary for Oconee Unit 3

Weld Number	Weld Location	Chemical Composition (wt%) ^(a)		Neutron Fluence (n/cm ²)		Initial RT _{NDT} (°F) ^(b)	Adjusted EOL RT _{NDT} (°F) ^(b)		Initial USE ^(c) (ft-lb)	Estimated T/4 EOL-USE (ft-lb)	
		Cu	Ni	Inside Surface ^(d)	T/4 ^(d)		Inside Surface	T/4		RG 1.99, R ₀ ^(e)	BAW-1803/R1 ^(f,g)
WF-200	NB/US	0.24	0.63	8.26E18	4.96E18	-5	233	206	70	47	57
WF-67	US/LS (Inside 75%)	0.24	0.60	9.01E18	5.41E18	-5	232	208	70	47	57
WF-70	US/LS (Outside 25%)	0.35	0.59	---	---	18 ^(d)	---	---	70	---	---
WF-169-1	LS/Dutchman	0.18	0.63	5.26E18	3.16E18	-5	---	---	70	---	---

^(a)BAW-2108, Revision 1.^(h)

^(b)Regulatory Guide 1.99, Revision 2.^(h)

^(c)BAW-2121P^(h) and BAW-1820.^(h)

^(d)BAW-1803, Revision 1.^(h)

^(e)Mean value.

^(f)BAW-1803.^(h)

^(g)BAW-2100.^(h)

Table X-7. Reactor Vessel Weld End-of-Life (32 EFPY) Fracture Toughness Evaluation Data Summary for TMI Unit 1

Weld Number	Weld Location	Chemical Composition (wt%) ^(a)		Neutron Fluence (n/cm ²)		Initial RT _{NDT} [°F] ^(m)	Adjusted EOL RT _{NDT} [°F] ⁽ⁿ⁾		Initial USE ^(o) (ft-lb)	Estimated T/4 EOL-USE (ft-lb)	
		Cu	Ni	Inside Surface ^(p)	T/4 ^(q)		Inside Surface	T/4		RG 1.99, R2 ^(r)	BAW-1803/R1 ^(s)
WF-70	NB/US	0.35	0.59	7.89E18	4.73E18	18 ^(m)	283	254	70	43	49
WF-25	US/LS	0.35	0.68	8.61E18	5.17E18	-5	279	248	70	43	49
WF-70	LS/Dutchman (Outside 50%)	0.35	0.59	---	---	18 ^(m)	---	---	70	---	---
WF-67	LS/Dutchman (Inside 50%)	0.24	0.60	5.02E16	3.01E16	-5	---	---	70	---	---
WF-8	US-Longitudinal (both)	0.20	0.55	8.97E18	5.39E18	-5	211	190	70	50	59
SA-1494	LS-Longitudinal (Outside 63%)	0.18	0.63	---	---	-5	---	---	70	---	---
SA-1526 ^(b)	LS-Longitudinal (Inside 37%)	0.35	0.68	7.76E18	4.66E18	5	272	241	70	43	49
Atypical	US/LS	0.41 ^(c)	0.10 ^(d)	7.89E18	4.73E18	90 ^(m)	232 ⁽ⁿ⁾	215 ⁽ⁿ⁾	79 ^(m)	49	---

^(a)BAW-2108, Revision 1.^(m)

^(b)Regulatory Guide 1.99, Revision 2.^(m)

^(c)BAW-2121P^(d) and BAW-1820.⁽ⁿ⁾

^(d)BAW-1803, Revision 1.^(m)

^(e)BAW-10144A.^(m)

^(f)Mean value.

^(g)BAW-2100.^(m)

^(h)Based on Regulatory Guide 1.99, Revision 2, Position 2.

⁽ⁱ⁾BAW-1803.^(m)

^(j)The other LS-Longitudinal weld is 100% SA-1526, inside surface and 1/4T properties do not change.

Table X-8. Reactor Vessel Weld End-of-Life (32 EFPY) Fracture Toughness Evaluation Data Summary for Point Beach Unit 1

Weld Number	Weld Location	Chemical Composition (wt%) ^(a)		Neutron Fluence (n/cm ²)		Initial RT _{NDT} (°F) ^(b)	Adjusted EOL RT _{NDT} (°C/192°F) ^(c)		Initial USE ^(d) (ft-lb)	Estimated T/4 EOL-USE (ft-lb)	
		Cu	Ni	Inside Surface ^(e)	T/4 ^(f)		Inside Surface	T/4		RG 1.99, R2 ^(g)	BAW-1803/R1 ^(h)
SA-1426	NB/IS	0.20	0.55	3.22E18	2.19E18	-5	169	154	70	54	61
SA-812	IS-Longitudinal (Inside 27%)	0.17	0.52	1.71E19	1.16E19	-5	223	208	70	48	60
SA-775	IS-Longitudinal (Outside 73%)	0.19	0.63	---	---	-5	---	---	---	---	---
SA-1101	IS/LS	0.26	0.60	2.33E19	1.58E19	10 ⁽ⁱ⁾	287	269	65 ^(k)	39	53
SA-847	LS-Longitudinal	0.25	0.54	1.56E19	1.06E19	-5	252	235	70	42	54
SA-1101	LS/Dutchman	0.26	0.60	---	---	10 ⁽ⁱ⁾	---	---	65 ^(k)	---	---

^(a)BAW-2121P⁽ⁱ⁾ and BAW-2150.⁽ⁱ⁾

^(b)Regulatory Guide 1.99, Revision 2.^(j)

^(c)WCAP-12794, Revision 1.^(m)

^(d)BAW-1803, Revision 1.⁽ⁿ⁾

^(e)WCAP-7656.^(o)

^(f)Mean value.

^(g)BAW-1803.^(p)

^(h)EPRI NP-373.^(q)

Table X-9. Reactor Vessel Weld End-of-Life (32 EFPY) Fracture Toughness Evaluation Data Summary for Point Beach Unit 2

Weld Number	Weld Location	Chemical Composition (wt%) ^(b)		Neutron Fluence (n/cm ²)		Initial RT _{NDT} (°F)	Adjusted EOL RT _{NDT} (°F) ^(c)		Initial USE (ft-lb)	Estimated T/4 EOL-USE (ft-lb)	
		Cu	Ni	Inside Surface ^(d)	T/4 ^(e)		Inside Surface	T/4		RG 1.99, R2 ^(f)	BAW-1803/R1 ^(g)
CE ^(a)	NB/IS	0.27	0.90	3.65E18	2.48E18	-56 ^(h)	181	157	100 ⁽ⁱ⁾	70	---
SA-1484	IS/LS	0.24	0.60	2.56E19	1.74E19	-5 ^(h)	280	263	70 ^(h)	40	54
---	LS/Dutchman	---	---	---	---	-56 ^(h)	---	---	---	---	---

^(a)Weld fabricated by Combustion Engineering, Chattanooga, TN.

^(b)BAW-2121P^(a) and BAW-2150.^(a)

^(c)Estimated on basis of data for reactor vessels fabricated by Combustion Engineering at about the same time.

^(d)WCAP-12795, Revision 1.^(a)

^(e)Regulatory Guide 1.99, Revision 2.^(f)

^(f)BAW-1803, Revision 1.^(g)

^(h)Mean value.

⁽ⁱ⁾10CFR50, Section 50.61.^(a)

^(g)BAW-1803.^(a)

Table X-10. Reactor Vessel Weld End-of-Life (32 EFPY) Fracture Toughness Evaluation Data Summary for R. L. Ginna Unit 1

Weld Number	Weld Location	Chemical Composition (wt%) ^(a)		Neutron Fluence (n/cm ²)		Initial RT _{wor} (°F) ^(b)	Adjusted EOL RT _{wor} (°F) ^(b)		Initial USE ^(c) (ft-lb)	Estimated T/4 EOL-USE (ft-lb)	
		Cu	Ni	Inside Surface ^(d)	T/4 ^(d)		Inside Surface	T/4		RG 1.99, R2 ^(e)	BAW-1803/R1 ^(f)
SA-1101	NS/IS	0.26	0.60	3.69E18	2.51E18	10 ^(g)	196	178	65 ^(h)	46	57
SA-847	IS/LS	0.25	0.54	3.35E19	2.28E19	-5	286	269	70	37	53
SA-848	LS/Dutchman	0.25	0.54	---	---	-5	---	---	70	---	---

^(a)WCAP-13272.^(b)

^(b)WCAP-7656.^(b) (Turkey Point Unit 3 Surveillance Data)

^(c)BAW-2121P^(d) and BAW-2150.^(e)

^(d)Regulatory Guide 1.99, Revision 2.^(f)

^(e)BAW-1803, Revision 1.^(g)

^(g)BAW-1803.^(h)

^(h)EPRI NP-373.⁽ⁱ⁾

⁽ⁱ⁾Mean value.

Table X-11. Reactor Vessel Weld End-of-Life (32 EFPY) Fracture Toughness Evaluation Data Summary for Surry Unit 1

Weld Number	Weld Location	Chemical Composition (wt%) ^(a)		Neutron Fluence (n/cm ²)		Initial RT _{NDT} (°F) ^(b)	Adjusted EOL RT _{NDT} (°F) ^(c)		Initial USE ^(d) (ft-lb)	Estimated T/4 EOL USE (ft-lb)	
		Cu	Ni	Inside Surface ^(e)	T/4 ^(f)		Inside Surface	T/4		RG 1.99, R2 ^(g)	BAW-1803/R1 ^(h)
J726 ^(a)	NB/IS	0.33	0.10	5.27E18	3.32E18	0 ^(b)	194	175	90 ^(c)	58	---
SA-1494	IS-Longitudinal (both)	0.18	0.63	7.08E18	4.46E18	-5	207	186	70	52	61
SA-1585	IS/LS (Inside 40%)	0.21	0.59	4.39E18	2.77E18	-5	288	270	70	40	55
SA-1650	IS/LS (Outside 60%)	0.21	0.59	---	---	-5	---	---	70	---	---
SA-1494	IS-Longitudinal	0.18	0.63	7.08E18	4.46E18	-5	207	186	70	52	61
SA-1526	IS-Longitudinal	0.35	0.68	7.08E18	4.46E18	-5	266	236	70	44	49

^(a)Weld fabricated by De Rotterdamse Droogdok, Rotterdam, Netherlands.

^(b)BAW-2121^(b) and BAW-2150.^(b)

^(c)Estimated value.

^(d)WCAP-11015, Revision 1.^(d)

^(e)Regulatory Guide 1.99, Revision 2.^(e)

^(f)BAW-1803, Revision 1.^(f)

^(g)Mean value.

^(h)BAW-1803.^(h)

⁽ⁱ⁾BAW-1909, Revision 1.⁽ⁱ⁾

Table X-12. Reactor Vessel Weld End-of-Life (32 EFPY) Fracture Toughness Evaluation Data Summary for Surry Unit 2

Weld Number	Weld Location	Chemical Composition (wt%) ^(a)		Neutron Fluence (n/cm ²)		Initial RT _{NDT} (°F) ^(b)	Adjusted EOL RT _{NDT} (°F) ^(c)		Initial USE ^(d) (ft-lb)	Estimated T/4 EOL-USE (ft-lb)	
		Cu	Ni	Inside Surface ^(e)	T/4 ^(f)		Inside Surface	T/4		RG 1.99, R2 ^(g)	BAW-1803/R1 ^(h)
L737 ^(a)	NB/IS	0.35	0.10	4.45E18	2.80E18	0 ⁽ⁱ⁾	193	173	90 ^(j)	58	---
SA-1585	IS-Longitudinal	0.21	0.59	7.75E18	4.88E18	-5	215	194	70	50	58
SA-1585	IS-Longitudinal (Inside 50%)	0.21	0.59	7.75E18	4.88E18	-5	215	194	70	50	58
WF-4	IS-Longitudinal (Outside 50%)	0.20	0.55	---	---	-5	---	---	70	---	---
R300B ^(a)	IS/LS	0.19	0.56	3.71E19	2.34E19	0 ⁽ⁱ⁾	271	255	90 ^(j)	55	---
WF-4	LS-Longitudinal	0.20	0.55	7.75E18	4.88E18	-5	205	186	70	50	60
WF-4	LS-Longitudinal (Inside 63%)	0.20	0.55	7.75E18	4.88E18	-5	205	186	70	50	60
WF-8	LS-Longitudinal (Outside 37%)	0.20	0.55	---	---	-5	---	---	70	---	---

^(a)Weld fabricated by De Rotterdamische Drogdok, Rotterdam, Netherlands

^(b)BAW-2121P^(a) and BAW-2150.^(b)

^(c)Estimated Value.

^(d)WCAP-11015, Revision 1.^(a)

^(e)Regulatory Guide 1.99, Revision 2.^(c)

^(f)BAW-1803, Revision 1.^(b)

^(g)Mean value.

^(h)BAW-1803.^(b)

⁽ⁱ⁾BAW-1909, Revision 1.^(b)

Table X-13. Reactor Vessel Weld End-of-Life (32 EFPY) Fracture Toughness Evaluation Data Summary for Turkey Point Unit 3

Weld Number	Weld Location	Chemical Composition (wt%) ^(a)		Neutron Fluence (n/cm ²)		Initial RT _{NDR} (°F) ^(b)	Adjusted EOL RT _{NDR} (°F) ^(c)		Initial USE ^(d) (ft-lb)	Estimated T/4 EOL-USE (ft-lb)	
		Cu	Ni	Inside Surface ^(e)	T/4 ^(f)		Inside Surface	T/4		RG 1.99, R2 ^(g)	BAW-1803/R1 ^(h)
SA-1484	NB/IS	0.24	0.60	3.30E18	2.08E18	-5	185	164	70	51	59
SA-1101	IS/LS	0.26	0.60	2.64E19	1.66E19	10 ^(b)	293	271	65 ^(b)	36	53
SA-1135	LS/Dutchman	0.25	0.54	---	---	-5	---	---	70	---	---

^(a)BAW-2121P^(a) and BAW-2150.^(b)

^(b)Docket Nos. 50-250 and 50-251, 10CFR50.61 Report.^(c)

^(c)Regulatory Guide 1.99, Revision 2.^(d)

^(d)BAW-1803, Revision 1.^(e)

^(e)WCAP-7656.^(f)

^(f)Mean value.

^(g)BAW-1803.^(h)

^(h)EPRI NP-373.⁽ⁱ⁾

Table X-14. Reactor Vessel Weld End-of-Life (32 EFPY) Fracture Toughness Evaluation Data Summary for Turkey Point Unit 4

Weld Number	Weld Location	Chemical Composition (wt%) ^(a)		Neutron Fluence (n/cm ²)		Initial RT ₁₉₉ [F] ^(d)	Adjusted EOL RT ₁₉₉ (%) ^(e)		Initial USE ^(f) [ft-lb]	Estimated 1/4 EOL USE [ft-lb]
		Cu	Ni	Inside Surface ^(a)	1/4 ^(a)		Inside Surface	1/4		
WF-70	NB/15 (Outside 33%)	0.35	0.59	---	---	18 ^(b)	---	---	70	---
WF-67	NB/15 (Inside 67%)	0.24	0.60	3.16E18	1.99E18	-5	182	163	70	59
SA-1101	IS/LS	0.26	0.60	2.53E19	1.59E19	10 ^(b)	291	269	65 ^(g)	53
SA-1135	LS/Outchman	0.25	0.54	---	---	-5	---	---	70	---

^(a)BAW-2121P^(h) and BAW-2150.^(h)

^(b)Docket Nos. 50-250 and 50-251, 10CFR50.61 Report.^(h)

^(c)Regulatory Guide 1.99, Revision 2.^(h)

^(d)BAW-1803, Revision 1.^(h)

^(e)WCAP-7656.^(h)

^(f)Mean value.

^(g)BAW-2100.^(h)

^(h)BAW-1803.^(h)

⁽ⁱ⁾EPRI NP-373.^(h)

Table X-15. Reactor Vessel Weld End-of-Life (32 EPY) Fracture Toughness Evaluation Data Summary for Zion Unit 1

Weld Number	Weld Location	Chemical Composition (wt%) ^(a)		Neutron Fluence [n/cm ²]		Initial RT _{NDT} [°F] ^(b)		Adjusted EOL RT _{NDT} [°F] ^(c)		Initial USE ^(d) [ft.-lb.]		Estimated T/4 EOL-USE [ft.-lb.]	
		Cu	Ni	Inside Surface ^(e)	1/4" ^(f)	Inside Surface	1/4"	Inside Surface	1/4"	Inside Surface	1/4"	PG 1.39, R2 ^(g)	BAW-1803/R1 ^(h)
WF-154	NB/1S (Inside 82%)	0.31	0.59	1.21E19	7.26E18	-5	271	243	70	41	51	---	---
SA-1769	NB/1S (Outside 18%)	0.26	0.61	---	---	-5	---	---	70	---	---	---	---
WF-4	IS-Longitudinal	0.20	0.55	6.29E18	3.77E18	-5	196	175	70	52	60	---	---
WF-4	IS-Longitudinal (Outside 61%)	0.20	0.55	---	---	-5	---	---	70	---	---	---	---
WF-8	IS-Longitudinal (Inside 39%)	0.20	0.55	6.29E18	3.77E18	-5	196	175	70	52	60	---	---
WF-70	IS/LS	0.35	0.59	1.73E19	1.04E19	18 ⁽ⁱ⁾	330	306	70	40	48	---	---
WF-8	LS-Longitudinal (both)	0.20	0.55	6.29E18	3.77E18	-5	196	175	70	52	60	---	---
Atypical	IS/LS	0.41 ^(k)	0.10 ^(k)	1.73E19	1.04E19	90 ^(l)	259 ^(m)	242 ⁽ⁿ⁾	79 ^(o)	45	---	---	---

^(a)BAW-2121p^(d) and BAW-2150.^(d)

^(b)WCAP-10962, Revision 2.^(d)

^(c)BAW-1807, Revision 1.^(d)

^(d)BAW-10144A.^(d)

^(e)Regulatory Guide 1.99, Revision 2.^(d)

^(f)Mean value.

^(g)BAW-2100.^(d)

^(h)Based on Regulatory Guide 1.39, Revision 2, Position 2.

⁽ⁱ⁾BAW-1803.^(d)

Table X-16. Reactor Vessel Weld End-of-Life (32 EFPY) Fracture Toughness Evaluation Data Summary for Zion Unit 2

Weld Number	Weld Location	Chemical Composition (wt%) ^(a)		Neutron Fluence (n/cm ²)		Initial RT _{NDT} (°F) ^(c)	Adjusted EOL RT _{NDT} (°F) ^(e)		Initial USE ^(b) (ft-lb)	Estimated T/4 EOL-USE (ft-lb)	
		Cu	Ni	Inside Surface ^(b)	T/4 ^(d)		Inside Surface	T/4		RG 1.99, R2 ^(e)	BAW-1803/R1 ^(c,m)
WF-200	NB/IS	0.24	0.63	1.30E19	7.80E18	-5	254	229	70	45	56
WF-70	IS-Longitudinal (both)	0.35	0.59	6.04E18	3.62E18	18 ^(b)	268	239	70	44	50
SA-1769	IS/LS	0.26	0.61	1.69E19	1.01E19	-5	271	246	70	42	54
WF-29	LS-Longitudinal (both)	0.23	0.63	6.04E18	3.62E18	-5	214	189	70	49	58
Atypical	IS-Longitudinal (both)	0.41 ^(d)	0.10 ^(d)	6.04E18	3.62E18	90 ^(d)	224 ^(g)	207 ^(g)	79 ^(d)	50	---

^(a)BAW-2121P⁽⁴⁾ and BAW-2150.⁽⁵⁾

^(b)WCAP-10962, Revision 2.^(6,7)

^(c)BAW-1803, Revision 1.⁽⁸⁾

^(d)BAW-10144A.⁽⁷⁷⁾

^(e)Regulatory Guide 1.99, Revision 2.⁽⁷⁾

^(f)Mean value.

^(g)Based on Regulatory Guide 1.99, Revision 2, Position 2.

^(h)BAW-2100.⁽⁷⁸⁾

⁽ⁱ⁾BAW-1803.⁽⁹⁾

CERTIFICATION

This supplement to BAW-1543, Revision 4, is an accurate description of the capsule irradiation plan for the Master Integrated Reactor Vessel Surveillance Program.

L. S. Harbison 1-25-93
L.S. Harbison, Engineer II Date
Materials and Structural Analysis Unit

This report has been reviewed for accuracy and completeness.

L.B. Gross 1/25/93
L.B. Gross, Advisory Engineer Date
Reactor Vessel Integrity Program

Verification of independent review.

K.E. Moore 1-26-93
K.E. Moore, Manager Date
Materials and Structural Analysis Unit

This report has been approved for release.

D.L. Howell 1/28/93
D.L. Howell Date
Program Manager

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