

BAW-1543A, Rev. 2, Addendum 1
November 1987

**THE
B&W OWNERS GROUP**

MATERIALS COMMITTEE

**INTEGRATED REACTOR VESSEL MATERIAL
SURVEILLANCE PROGRAM
(Addendum)**

Babcock & Wilcox

a McDermott company

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BAW-1543A, Rev. 2
Addendum 1
November 1987

INTEGRATED REACTOR VESSEL MATERIAL
SURVEILLANCE PROGRAM
(ADDENDUM)

by

L. B. Gross

Prepared for

B&W Owners Group Materials Committee
Arkansas Power & Light Company
Duke Power Company
Florida Power Corporation
GPU Nuclear Corporation
Sacramento Municipal Utility District
Toledo Edison Company

B&W Document No. 77-1168618-01
(See section 3 for document signatures)

Prepared by

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

September 18, 1987

J. H. Taylor
SEP 25 1987

Mr. J. H. Taylor
Manager, Licensing Service
Babcock & Wilcox
3315 Old Forest Road
P.O. Box 10935
Lynchburg, Virginia 24506-0935

SUBJECT: REVIEW OF PROPOSED REVISION TO THE BABCOCK & WILCOX OWNERS' GROUP
INTEGRATED REACTOR VESSEL MATERIAL SURVEILLANCE PROGRAM.

The NRC staff has completed its review of the proposed changes to the Babcock & Wilcox Owners Group (BWOG) integrated reactor vessel material surveillance program which was submitted in letters from you to T. E. Murley dated August 6, 1987 and August 27, 1987. The enclosed safety evaluation contains the results of the NRC staff's review which concludes that the proposed changes are acceptable.

If you have any questions regarding this evaluation please contact Byron Siegel the NRC staff's coordinator for the BWOG programs at (301) 492-7764.

A handwritten signature in cursive script that reads "Byron Siegel".

Byron Siegel, Lead Project Manager
for BWOG Programs

Enclosure: As stated

ENCLOSURE

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REVIEW OF A PROPOSED REVISION TO THE B&W OWNER'S GROUP

INTEGRATED SURVEILLANCE PROGRAM

TAC NO. # 65927

MATERIALS ENGINEERING BRANCH

DIVISION OF ENGINEERING AND SYSTEMS TECHNOLOGY

Background

The Babcock & Wilcox (B&W) Owners Group proposed an integrated reactor vessel surveillance program for Oconee, Units 1, 2 and 3; Arkansas Nuclear One, Unit 1; Ranch Seco; Three Mile Island, Unit 1; Three Mile Island, Unit 2; Midland, Unit 1; Davis Besse, Unit 1; and Crystal River, Unit 3 plants. In this program, reactor vessel surveillance capsules from all the participating owners, except Consumers Power Co., were to be irradiated inside the reactor vessels at Davis Besse and Crystal River. The integrated surveillance program was documented in Report BAW-1543, Rev. 2, February 1984, "Integrated Reactor Vessel Material Surveillance Program." The staff's review of the integrated program is documented in a letter from C.O. Thomas to J. H. Taylor, dated March 15, 1985. The staff approved the integrated program for all participating plants, except Three Mile Island, Unit 2 and Midland, Unit 1.

The regulatory requirements for an integrated material surveillance program are documented in 10 CFR 50, Appendix H. This appendix indicates that the material surveillance program is required to monitor changes in the fracture toughness properties of ferritic reactor vessel beltline materials resulting from exposure of these materials to neutron irradiation and the thermal environment.

Discussion

In letters to T. E. Murley dated August 6, 1987 and August 27, 1987, B&W, acting for the owners group proposed changes to the owners group integrated reactor vessel surveillance program. The changes include a revised surveillance capsule insertion and withdrawal schedule and deletion of Capsule TMI-1A from the program.

The changes to the capsule withdrawal schedule were needed because of changes to the end-of-life calculated neutron exposures of the participating vessels and the calculated neutron exposures at the capsule holder positions. Changes in calculated neutron exposures result from plants using low leakage cores and more accurate neutron fluence determinations. Except for TMI-1, end of life neutron fluence values were previously reported in Report BAW-1895,

"Pressurized Thermal Shock Evaluation in Accordance with 10 CFR 50.61 for Babcock & Wilcox Owners Group Reactor Pressure Vessels." TMI-1 values were modified consistent with the results of Report BAW-1901, "Analysis of Capsule TMI-1C GPU Nuclear Three Mile Island Nuclear Station Unit 1," March 1986. The B&W method of calculating neutron fluence and owners group plants end of life neutron fluence values were reviewed by the staff in its evaluation of the PTS issue and owners group surveillance capsules.

The Owners Group proposes that Capsule TMI-1A be destructively examined to requalify the TMI-2 B&W Owners Group surveillance capsules. TMI-1A was one of six capsules removed from the TMI-2 reactor. Capsules TMI-1A and TMI-2 LG2 (both in the ZY holder tube location) represent the "worse case" capsules based on the condition of the temperature monitors obtained by radiography. These two capsules experienced a similar thermal environment, which appears to be hotter than the other holder tube locations. The TMI-1A capsule contains Charpy V notch and tensile specimen. Since the TMI-2 LG2 capsule contains Charpy V notch, tensile and compact fracture toughness specimens, the TMI-2 LG2 capsule will provide substantially more useful fracture toughness data than the TMI-1A capsule.

Capsule TMI-1A contains weld metal WF-25, which is one of the materials in the beltline region of TMI-1. In addition to capsules TMI-1C and TMI-1E, weld metal WF-25 is also contained in Owners Group Capsules CR3-LG1, TMI-2LG2 and TMI-2LG1. The Owners Group capsules also contain weld metal SA-1526, which was made with the same heat of filler wire used to fabricate WF 25 weldments. The filler wire contributes residual elements to the weldment. Staff studies indicate that the residual elements in the filler wire contribute to the neutron irradiation damage to the weldment. Since SA-1526 and WF-25 weldments were made with the same filler wire, the SA-1526 surveillance welds will provide data on the effect of neutron irradiation on WF-25 weld metal. Although the weld metal in TMI-1A will not be irradiated and tested, as planned, the owners group program contains other sources of weld metal, which can be used to replace the TMI-1A capsule weld metal.

Conclusions

1. Since Owners Group capsules can provide more useful fracture toughness data than the TMI-1A capsule and the effect of neutron irradiation on TMI-1A weld metal can be evaluated from material in other surveillance capsules, the TMI-1A capsule may be used to requalify the TMI-2 Owners Group surveillance capsules.
2. The integrated reactor vessel materials surveillance program documented in Report BAW-1543A, Rev. 2 and revised in accordance with B&W letters dated August 6, 1987 and August 27, 1987 will be capable of monitoring the effect of neutron irradiation and the thermal environment on the fracture toughness of the ferritic reactor vessel beltline materials in the plants participating in the integrated material surveillance program.
3. Based on conclusions 1 and 2 above, the changes to the integrated surveillance program documented in B&W letters dated August 6, 1987 and August 27, 1987 are acceptable.

Babcock & Wilcox

a McDermott company

Nuclear Power Division

October 20, 1987

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Mr. D. N. Miskiewicz
Florida Power Corporation
P.O. Box 14042
St. Petersburg, FL 33733

Subject: Capsule Identification for Insertion in CR-3 During
Cycle 6 Refueling Outage

Reference: BAW-1543, Rev. 02, "Integrated Reactor Vessel
Material Surveillance Program (Addendum), dated
July 1987.

Dear Mr. Miskiewicz:

As you know the capsule withdrawal schedule was changed this year, thus BAW-1543 was revised with the issuance of the Addendum, referenced above. The NRC approved this change in capsule insertion in their SER of Sept 21, 1987 with a change needed to requalify the capsules removed from the TMI-2 vessel, that being the deletion of TMI1-A from the schedule.

Thus, the capsules to be withdrawn and inserted during CR-3 cycle six outage are as per Table 2-1, page 2-2 of BAW-1543, Addendum 1, with the following exception. This removal of TMI1-A capsule from the schedule was included in the SER released by NRC. Capsule TMI1-A was opened to provide data to requalify the B&WOG research capsules for re-insertion. Thus a replacement capsule was needed to fill the remaining space in capsule holder YX TOP. Capsule TMI2-D was selected to be used as the filler or dummy capsule for insertion in YX TOP and is not considered to be a capsule needed for the Integrated Surveillance Program.

If there are questions please call me at 804-385-2208.

Very truly yours,

Franks Walters

J. F. Walters
Project Manager
Owners Group Engineering Services

cc: Scott Stuart - CR Site
R. J. Finnin - CR B&W Site

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1. INTRODUCTION

This addendum to BAW-1543, Rev. 2, provides a revised insertion and withdrawal schedule for surveillance capsules in the Crystal River-3 and Davis-Besse reactors. Extensive changes are made in the irradiation schedule starting with the next refueling outages:

- Crystal River-3, end-of-cycle 6, fall 1987
- Davis-Besse, end-of-cycle 5, spring 1988

The changes in schedule were required to provide for the following changes:

- Recalculation of neutron exposure of the vessels.
- Recalculation of neutron exposure of the capsules.

The end-of-life calculated neutron exposures of the participating vessels that are the bases for the schedule are shown in Table 1-1. The calculated neutron exposure of the capsule holder positions (beyond the current cycle) are shown in Table 1-2. Changes from the previously used values are due to more accurate determinations as a result of actual fluence determinations and a number of plants using low leakage fuel cycles. Except for TMI-1, these end-of-life fluence values are identical to that reported in BAW-1895, "Pressurized Thermal Shock Evaluations in Accordance with 10CFR50.61 for Babcock & Wilcox Owners Group Reactor Pressure Vessels." TMI-1 values were modified consistent with the results of BAW-1901, "Analysis of Capsule TM11-C GPU Nuclear Three Mile Island Nuclear Station - Unit 1," March 1986.

The revised schedules are shown in section 2 of this report. These revised schedules will also be presented in BAW-1543, Rev. 3, which is currently in preparation.

Table 1-1. Reactor Vessel Neutron Exposure

<u>Nuclear Plant</u>	<u>Calculated Peak Inside Surface Fluence at End-of-Life (32 EFPY), n/cm²</u>
Oconee-1	1.16E19
Oconee-2	1.20E19
TMI-1	0.80E19
Crystal River-3	0.96E19
ANO-1	1.10E19
Oconee-3	1.56E19
Rancho Seco	0.91E19
Davis-Besse	1.70E19

Table 1-2. RVSP Capsule Neutron Exposure

Fuel Cycle	Fluence, n/cm ² /cycle			
	<u>Crystal River-3</u>		<u>Davis-Besse</u>	
	<u>High Flux (10.9⁰) Locations</u>	<u>Low Flux (26.9⁰) Locations</u>	<u>High Flux (10.9⁰) Locations</u>	<u>Low Flux (26.9⁰) Locations</u>
1A	1.74E18	1.13E18	3.19E18	2.08E18
1B	1.16E18	0.76E18	NA	NA
2	1.13E18	0.74E18	3.16E18	2.06E18
3	2.20E18	1.43E18	2.92E18	1.90E18
4	2.29E18	1.49E18	3.76E18	2.45E18
5	3.29E18	2.15E18	3.41E18	2.22E18
6 and beyond	2.22E18	1.45E18	3.27E18	2.13E18

2. INTEGRATED REACTOR VESSEL SURVEILLANCE PROGRAM

The revised insertion and withdrawal schedule for irradiation capsules in Crystal River-3 is presented in Table 2-1 and Figure 2-1. The revised insertion and withdrawal schedule for irradiation capsules in Davis-Besse is presented in Table 2-2 and Figure 2-2. A summary of the status of all irradiation capsules currently in the integrated reactor vessel surveillance program is presented in Table 2-3.

Table 2-1. Capsule Insertion and Withdrawal Schedule for
Crystal River Unit 3

<u>Holder Tube</u>	<u>Location in Holder Tube</u>	<u>Remove</u>	<u>Insert</u>
<u>Installed at Initial Fuel Load</u>			
XW	Top		CR3-B (WC)
XW	Bottom		CR3-D (WC)
<u>End of First Fuel Cycle, First Part (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)
WX	Top		OC3-B (W)
WX	Bottom		CR3-F (WC)
<u>End of First Fuel Cycle, Second Part (1B)</u>			
No change.			
<u>End of Second Cycle</u>			
YZ	Top	OC2-A (W)	OC1-C (W)
WX	Top	OC3-B (W)	TMI1-C (W)
<u>End of Third Cycle</u>			
No change.			
<u>End of Fourth Cycle</u>			
WZ	Top	CR3-LG1 (WC)	None
WZ	Bottom	CR3-LG2 (WC)	None
YZ	Bottom	OC1-A (W)	OC1-B
<u>End of Fifth Cycle</u>			
WZ	Top	None	OC2-B
WZ	Bottom	None	CR3-LG2 (WC)
ZY	Top	CR3-C (W)	OC3-F (W)
XW	Bottom	CR3-D (WC)	TMI1-B
WX	Top	TMI1-C (W)	OC3-C (W)
<u>End of Sixth Cycle</u>			
YZ	Top	OC1-C (W)	TMI2-LG1 (WC)(b)
YZ	Bottom	OC1-B (a)	TMI2-LG2 (WC)(b)
YX	Top	OC2-E (W)	TMI1-A (W)(b)
WX	Bottom	CR3-F (WC)	TMI1-F

Table 2-1. Capsule Insertion and Withdrawal Schedule for
Crystal River Unit 3 (Cont'd)

<u>Holder Tube</u>	<u>Location in Holder Tube</u>	<u>Remove</u>	<u>Insert</u>
<u>End of Seventh Cycle</u>			
XW	Bottom	TMI1-B (a)	OC2-D
<u>End of Eighth Cycle</u>			
WZ	Top	OC2-B (a)	OC3-E (W)
ZY	Bottom	CR3-A (W) (a)	OC2-F
YX	Bottom	OC3-D (W)	OC1-D
<u>End of Ninth Cycle</u>			
WZ	Top	OC3-E (W)	None
WZ	Bottom	CR3-LG2 (WC)	None
YZ	Top	TMI2-LG1 (WC)(b)	TMI1-D
YX	Top	TMI1-A (W)(b)	OC3-E (W) from WZ top
WX	Top	OC3-C (W)(a)	TMI2-B (WC)(b)
<u>End of Tenth Cycle</u>			
No change.			
<u>End of Eleventh Cycle</u>			
XW	Top	CR3-E (W)	TMI2-B (WC)(b) from WX top
WX	Top	TMI2-B (WC)(a)(b)	None
WX	Bottom	TMI1-F (a)	None
<u>End of Twelfth Cycle</u>			
YZ	Top	TMI1-D	None
YZ	Bottom	TMI2-LG2 (WC)(b)	None
<u>End of Thirteenth Cycle</u>			
No change.			
<u>End of Fourteenth Cycle</u>			
YX	Bottom	OC1-D (a)	TMI1-D
XW	Top	TMI2-B (WC)(a)(b)	None
XW	Bottom	OC2-D (a)	None
<u>End of Fifteenth Cycle</u>			
No change.			

Table 2-1. Capsule Insertion and Withdrawal Schedule for
Crystal River Unit 3 (Cont'd)

<u>Holder Tube</u>	<u>Location in Holder Tube</u>	<u>Remove</u>	<u>Insert</u>
<u>End of Sixteenth Cycle</u>			
ZY	Top	OC3-F (W)(a)	None
ZY	Bottom	OC2-F (a)	None
YX	Top	OC3-E (W)(a)	None
YX	Bottom	TMI1-D (a)	None

LEGEND

- (a) Capsule may not be tested upon removal.
- (b) Requalified from TMI-2 irradiation.
- (W) Capsule contains weld metal specimens.
- (WC) Capsule contains weld metal compact fracture toughness specimens.

Table 2-2. Capsule Insertion and Withdrawal Schedule for Davis-Besse

<u>Holder Tube</u>	<u>Location in Holder Tube</u>	<u>Remove</u>	<u>Insert</u>
<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 Cycle</u>			
WZ	Top	AN1-B	DB1-LG1 (WC)
WZ	Bottom	RS1-B (WC)	RS1-E (W)
ZY	Bottom	TE1-F (WC)	DB1-LG2 (WC)
<u>End of Second Cycle</u>			
YX	Top	RS1-D (WC)	RS1-A (W)
<u>End of Third Cycle</u>			
ZY	Top	TE1-B (WC)	TE1-E (W)
YZ	Top	AN1-A (W)	AN1-D
<u>End of Fourth Cycle</u>			
YX	Top	RS1-A (W)(a)	AN1-F
WZ	Top	DB1-LG1 (WC)	RS1-F from WX bottom
WX	Top	TE1-A (W)	None
WX	Bottom	RS1-F to WZ top	None
<u>End of Fifth Cycle</u>			
WZ	Top	RS1-F (WC)	None
WZ	Bottom	RS1-E (W)(a)	None
YZ	Top	AN1-D	None
YZ	Bottom	AN1-C (W)	None
XW	Bottom	RS1-C (W)(a)	AN1-D from YZ top
<u>End of Sixth Cycle</u>			
No change.			
<u>End of Seventh Cycle</u>			
No change.			

Table 2-2. Capsule Insertion and Withdrawal Schedule
for Davis-Besse (Cont'd)

<u>Holder Tube</u>	<u>Location in Holder Tube</u>	<u>Remove</u>	<u>Insert</u>
<u>End of Eighth Cycle</u>			
ZY	Bottom	DB1-LG2 (WC)	AN1-D from XW bottom
YX	Top	AN1-F (a)	None
YX	Bottom	TE1-C (W)(a)	None
XW	Top	TE1-D (WC)	None
XW	Bottom	AN1-D	None
<u>End of Ninth Cycle</u>			
No change.			
<u>End of Tenth Cycle</u>			
No change.			
<u>End of Eleventh Cycle</u>			
ZY	Top	TE1-E (W)(a)	None
ZY	Bottom	AN1-D (a)	None

LEGEND

- (a) Capsule may not be tested upon removal.
- (W) Capsule contains weld metal specimens.
- (WC) Capsule contains weld metal compact fracture toughness specimens.

Table 2-3. Summary Status of Surveillance Capsules

Capsule ID	Weld Metal/Compacts	Current Location	Desired	Expected/Received	Time of Removal	Comments
OC1-F	No/No	Tested	---	5.7E17	---	Reported in BAW-1421, Rev. 1
OC1-E	Yes/No	Tested	---	1.5E18	---	Reported in BAW-1436
OC1-B	No/No	CR3-YZ	4.4E18	7.0E18	CR3-cycle 6	---
OC1-A	Yes/No	Tested	---	9.0E18	---	Reported in BAW-1837
OC1-C	Yes/No	CR3-YZ	1.2E19	1.2E19	CR3-cycle 6	---
OC1-D	No/No	Holding	1.2-2.3E19	1.5E19	CR3-cycle 14	---
OC2-C	Yes/No	Tested	---	9.4E17	---	Reported in BAW-1437
OC2-A	Yes/No	Tested	---	3.4E18	---	Reported in BAW-1699
OC2-B	No/No	CR3-WZ	6.7E18	7.6E18	CR-3 cycle 8	---
OC2-E	Yes/No	CR3-YX	1.2E19	1.3E19	CR-3 cycle 6	---
OC2-D	No/No	Holding	1.2-2.4E19	1.1E19	CR3-cycle 14	---
OC2-F	No/No	Holding	1.2-2.4E19	1.2E19	CR3-cycle 16	---
OC3-A	Yes/No	Tested	---	7.4E17	---	Reported in BAW-1438
OC3-B	Yes/No	Tested	---	3.1E18	---	Reported in BAW-1697
OC3-C	Yes/No	CR3-WX	8.7E18	9.6E18	CR3-cycle 9	---
OC3-D	Yes/No	CR3-YX	1.6E19	1.8E19	CR3-cycle 8	---
OC3-E	Yes/No	Holding	1.6-3.1E19	1.8E19	CR3-cycle 16	---
OC3-F	Yes/No	CR3-ZY	1.6-3.1E19	1.7E19	CR3-cycle 16	---
TM11-E	Yes/No	Tested	---	1.1E18	---	Reported in BAW-1439
TM11-B	No/No	CR3-XW	4.9E18	4.0E18	CR3-cycle 7	---
TM11-C	Yes/No	Tested	---	8.7E18	---	Reported in BAW-1901
TM11-A	Yes/No	Holding	0.8E19	0.8E19	CR3-cycle 9	Retrieved from TMI-2
TM11-D	No/No	Holding	0.8-1.6E19	1.2E19	CR3-cycle 16	---
TM11-F	No/No	Holding	0.8-1.6E19	1.2E19	CR3-cycle 11	---
CR3-B	Yes/Yes	Tested	---	1.1E18	---	Reported in BAW-1679 and BAW-1718
CR3-C	Yes/No	Tested	---	6.6E18	---	Reported in BAW-1898
CR3-D	Yes/Yes	Tested	---	7.5E18	---	Reported in BAW-1899 and BAW-1914
CR3-F	Yes/Yes	CR3-WX	1.0E19	1.2E19	CR3-cycle 6	---

Table 2-3. Summary Status of Surveillance Capsules (Cont'd)

Capsule ID	Weld Metal/Compacts	Current Location	Desired	Expected/Received	Time of Removal	Comments
CR3-A	Yes/No	CR3-ZY	1.0-1.9E19	1.1E19	CR3-cycle 8	---
CR3-C	Yes/No	CR3-XW	1.0-1.9E19	1.5E19	CR3-cycle 11	---
AN1-E	Yes/No	Tested	---	7.3E17	---	Reported in BAW-1440
AN1-B	No/No	Tested	---	4.3E18	---	Reported in BAW-1698
AN1-A	Yes/No	Tested	7.2E18	1.0E19	---	Reported in BAW-1836
AN1-C	Yes/No	DB-YZ	1.1E19	1.7E19	DB-cycle 5	---
AN1-D	No/No	DB-YZ	1.1-2.2E19	2.1E19	DB-cycle 11	---
AN1-F	No/No	DB-YX	1.1-2.2E19	1.4E19	DB-cycle 8	---
RS1-B	Yes/Yes	Tested	---	4.0E18	---	Reported in BAW-1702 and BAW-1720
RS1-A	Yes/No	Holding	---	7.2E18	---	Irradiation complete
RS1-D	Yes/Yes	Tested	---	6.6E18	---	Reported in BAW-1792 and BAW-1793P
RS1-F	Yes/Yes	DB-WZ	0.9E19	1.7E19	DB-cycle 5	---
RS1-C	Yes/No	DB-XW	0.9-1.8E19	1.1E19	DB-cycle 5	---
RS1-E	Yes/No	DB-WZ	0.9-1.8E19	1.4E19	DB-cycle 5	---
TE1-F	Yes/Yes	Tested	---	2.0E18	---	Reported in BAW-1701 and BAW-1719
TE1-B	Yes/Yes	Tested	---	5.9E18	---	Reported in BAW-1834 and BAW-1867
TE1-A	Yes/No	Tested	---	1.3E19	---	Reported in BAW-1882
TE1-D	Yes/Yes	DB-XW	1.7E19	1.7E19	DB-cycle 8	---
TE1-C	Yes/No	DB-YX	1.7-3.4E19	2.6E19	DB-cycle 8	---
TE1-E	Yes/No	DB-ZY	1.7-3.4E19	1.7E19	DB-cycle 11	---
CR3-LG1	---	Tested	---	6.1E18	---	Reported in BAW-1910P
CR3-LG2	---	CR3-WZ	1.4E19	1.6E19	CR3-cycle 9	---
DB1-LG1	---	Tested	---	8.3E18	---	Reported in BAW-1920P
DB1-LG2	---	DB-ZY	1.4E19	1.5E19	DB-cycle 8	---
TMI2-LG1	---	Holding	7.8E18	7.4E18	CR3-cycle 9	Retrieved from TMI-2
TMI2-LG2	---	Holding	1.4E19	1.4E19	CR3-cycle 12	Retrieved from TMI-2

Figure 2-1. Crystal River-3 IRVSP Schedule

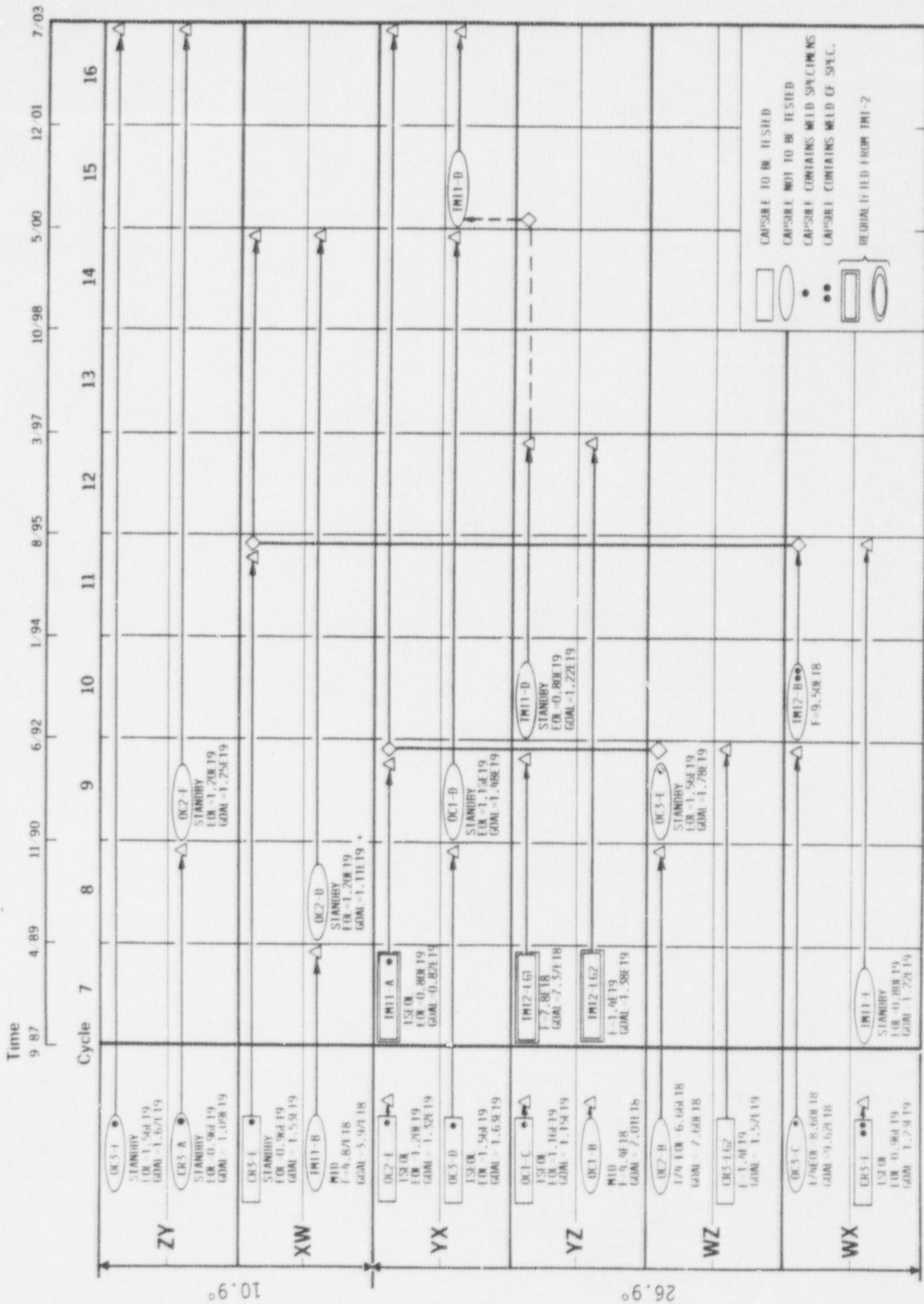
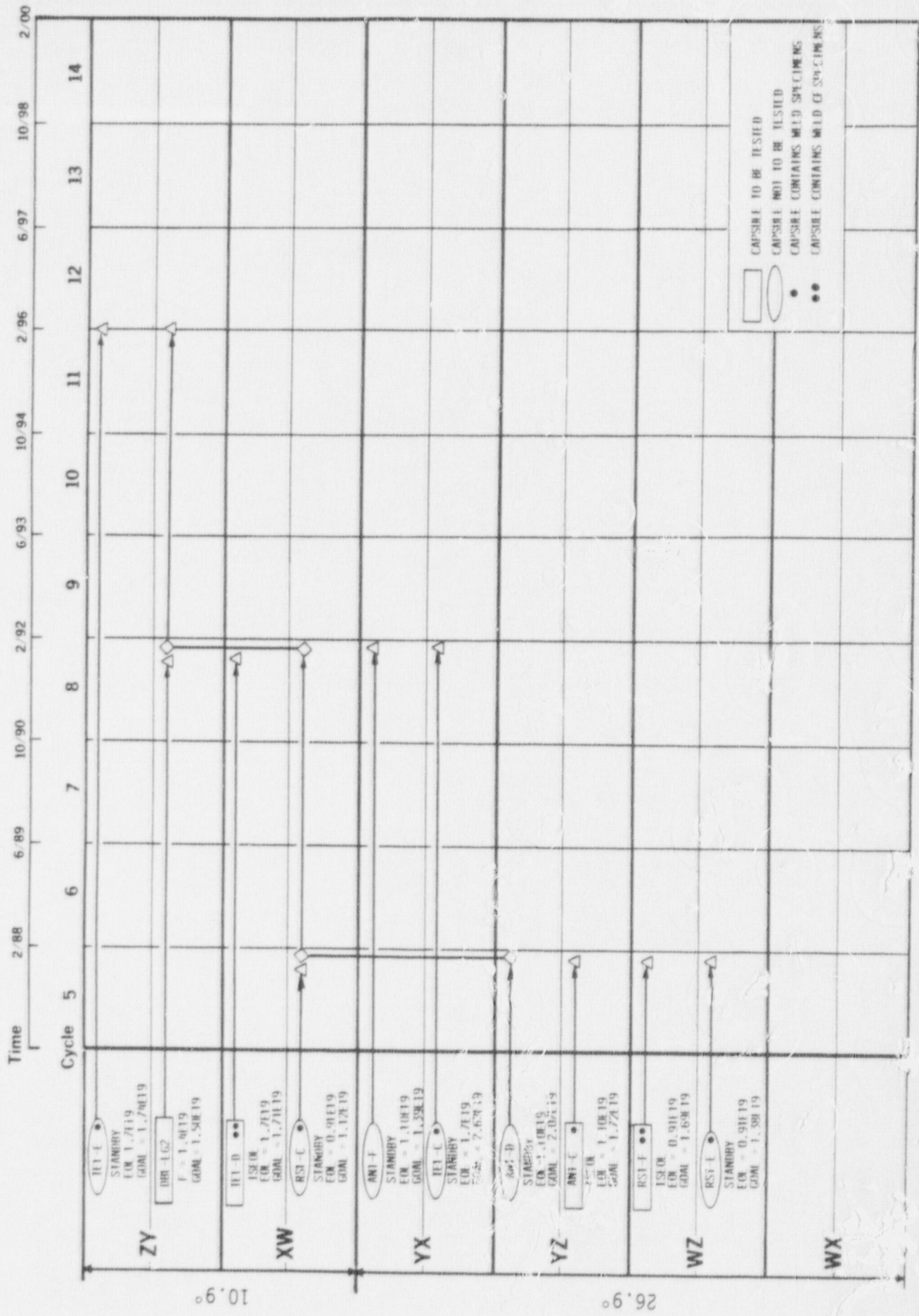


Figure 2-2. Davis-Besse IRVSP Schedule



3. CERTIFICATION

This report is an accurate description of the revised irradiation schedules for the integrated reactor vessel materials surveillance program designed in accordance with the requirements of 10 CFR 50, Appendixes G and H.

L. B. Gross, P.E. 8/3/87
L. B. Gross, Principal Engineer Date
Materials and Structural Analysis Unit

This report has been reviewed and is an accurate description of the revised irradiation schedules for the integrated reactor vessel materials surveillance program.

A. L. Lowe, Jr., P.E. 8/3/87
A. L. Lowe, Jr., Advisory Engineer Date
Materials and Structural Analysis Unit

Verification of independent review.

A. D. McKim 8/3/87
A. D. McKim, Manager Date
Materials and Structural Analysis Unit

This report has been approved for release.

C. J. Hudson 8/3/87
C. J. Hudson Date
Program Manager