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Director  
Nuclear Safety & Regulatory Affairs  
Waterford 3

W3F1-98-0120  
A4.05  
PR

June 30, 1998

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

Subject: Waterford 3 SES  
Docket No. 50-382  
License No. NPF-38  
Requests Associated with  
ASME Section XI, Table IWB-2500-1,  
Examination Category B-A, Item B1.10 and B1.30,  
Reactor Vessel Shell and Shell-to-Flange Welds

Gentlemen:

On June 4, 1998 via Letter W3F1-98-0109, Entergy Operations, Inc. provided additional information regarding the Second 10-year Interval Inservice Inspection (ISI) Plan for Waterford 3 Steam Electric Station. This information responded to a Request for Additional Information (RAI) in an NRC letter dated March 26, 1998. The RAI response indicated that the Augmented Reactor Pressure Vessel examinations were completed at Waterford 3 during the first inspection interval, and relief would be required due to less than 90% coverage of several welds. Accordingly, Requests ISI-018 and ISI-019 for relief are provided in Attachment 1 in accordance with the June 4, 1998 RAI response, 10CFR50.55a(g)(6)(ii)(A)(2), and ASME Section XI, Table IWB-2500-1, Examination Category B-A, Item Number B1.10. In addition, Request ISI-020 is provided in Attachment 2 for relief from ASME Section XI, Table IWB-2500-1, Examination Category B-A, Item Number B1.30 requirements.

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Requests Associated with ASME Section XI,  
Table IWB-2500-1, Examination Category B-A,  
Item B1.10 and B1.30, Reactor Vessel Shell and  
Shell-to-Flange Welds

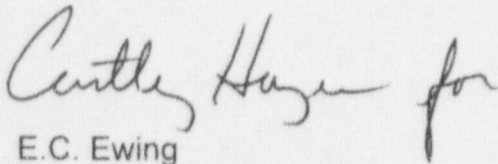
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If you have any questions concerning this submittal, please contact me at  
(504) 739-6242 or Kevin Hall at (504) 739-6423.

Very truly yours,

A handwritten signature in cursive script, appearing to read "E.C. Ewing for".

E.C. Ewing

Director

Nuclear Safety & Regulatory Affairs

ECE/PRS/rtk

Attachments

cc: (w/Attachments)  
E.W. Merschoff, NRC Region IV  
C.P. Patel, NRC-NRR  
NRC Resident Inspector

cc: (w/o Attachments)  
J. Smith, N.S. Reynolds

**ATTACHMENT 1 TO  
W3F1-98-0120**

**REQUESTS ISI-018 and ISI-019**



REQUEST NUMBER: ISI-018

COMPONENT IDENTIFICATION

Code Class: I  
References: 10CFR50.55a (g)(6)(ii)(A)(2)  
Examination Categories: B-A  
Item Numbers: B1.10  
Description: Alternative to obtaining essentially 100% examination coverage of each Reactor Pressure Vessel (RPV) Shell Weld

Component ID	Component Description	Item No	Limited Exam	Limitation
01-008	RPV BOTTOM HEAD ASSEMBLY TO LOWER SHELL CIRC. WELD	B1.11	62%	EXAM LIMITED DUE TO THE RADIAL SUPPORT AND FLOW SKIRT SUPPORT LUGS.
01-009	RPV LOWER SHELL COURSE LONG. WELD AT 90°	B1.12	67%	EXAM LIMITED DUE TO PROXIMITY OF SPECIMEN TUBE HOLDERS.
01-010	RPV LOWER SHELL COURSE LONG. WELD AT 210°	B1.12	No	
01-011	RPV LOWER SHELL COURSE LONG. WELD AT 330°	B1.12	No	
01-012	RPV LOWER SHELL TO MIDDLE SHELL CIRC. WELD	B1.11	85%	EXAM LIMITED DUE TO SPECIMEN TUBE HOLDERS.
01-013	RPV MIDDLE SHELL COURSE LONG. WELD AT 90°	B1.12	74%	EXAM LIMITED DUE TO PROXIMITY OF SPECIMEN TUBE HOLDERS.
01-014	RPV MIDDLE SHELL COURSE LONG. WELD AT 210°	B1.12	No	
01-015	RPV MIDDLE SHELL COURSE LONG. WELD AT 330°	B1.12	No	
01-016	RPV MIDDLE SHELL TO UPPER SHELL CIRC. WELD	B1.11	No	
01-017	RPV UPPER SHELL COURSE LONG. WELD AT 90°	B1.12	No	
01-018	RPV UPPER SHELL COURSE LONG. WELD AT 210°	B1.12	No	
01-019	RPV UPPER SHELL COURSE LONG. WELD AT 330°	B1.12	No	

CODE REQUIREMENTS

10CFR50.55a(g)(6)(ii)(A) requires licensees to implement an augmented examination of "essentially 100%" of the reactor pressure vessel shell welds, as specified in the 1989 Edition of the American Society of Mechanical Engineers (ASME) Code, Section XI, Table IWB-2500-1, Examination Category B-A, "Pressure Retaining Welds in Reactor Vessel," Item B1.10.

### **PROPOSED ALTERNATE EXAMINATION**

Waterford 3 completed the required reactor vessel shell weld examinations to the extent practical using the following techniques:

1. Vessel circumferential, longitudinal welds were ultrasonically examined using a 0 degree search unit to identify any laminar areas or flaws in the specified volume.
2. The 45 and 60 degree scans were also employed in four directions (clockwise, counterclockwise, up and down) for the purpose of detecting any planar or nonlaminar flaws.
3. The inner 25% of the vessel wall was examined in four directions using a 50/70 bi-modal transducer for the purpose of detecting any "near surface" or "underclad" flaws.
4. The 50/70 scans were also used to provide examination coverage in the area where the 45 and 60 degree scans were ineffective due to "near-zone" limitations.

### **BASIS FOR ALTERNATIVE**

10CFR50.55a(g)(6)(ii)(A)(2) defines "essentially 100%" as "more than 90% of the examination volume of each weld." EOI determined that four of the twelve Item Number B1.10 welds could not be examined essentially 100%. However, the total weld volume coverage for all Item B1.10 welds exceeds 90% (90.17). These examinations were performed from the inside diameter using a 0 degree search unit to identify any laminar areas or flaws in the specified volume, together with 45 and 60 degree scans employed in four directions (clockwise, counterclockwise, up and down) for the purpose of detecting any planar or nonlaminar flaws. Additionally, the inner 25% of the vessel wall was examined in four directions using a 50/70 bi-modal transducer for the purpose of detecting any "near surface" or "underclad" flaws and the 50/70 scans were also used to provide examination coverage in the area where the 45 and 60 degree scans were ineffective due to "near-zone" limitations.

Examination from the outside diameter (OD) surface is not possible for the affected areas of 01-009, 01-012, and 01-013 due to the close proximity of the concrete biological shield. Examination from the OD could possibly allow Waterford 3 to meet the "essentially 100%" requirement for 01-008. However, geometrical obstructions which prevented full coverage from the inside diameter may interfere with an OD examination. In addition, full compliance with the augmented requirements of 10CFR50.55a from the OD surface of the RPV would result in significant personnel time and exposure.

The cumulative total volume of the Waterford 3 RPV shell welds was 90.17%. Furthermore, the only indication was determined to be a small laminar reflector in 01-009, which was acceptable without analytical evaluation. Therefore, it is unlikely that the unexamined sections would not be acceptable for continued service. Although this cumulative total cannot be used to meet the RPV augmented requirements, this percentage supports the fact that the invessel examination covered a significant volume and provides an acceptable level of quality and safety.

Therefore, pursuant to 10CFR50.55a(g)(6)(ii)(A)(5), EOI requests NRC approval of the examination as an alternative to "essentially 100%" exam based on the acceptable level of quality and safety.

### **APPLICABLE TIME PERIOD**

Application of the alternative criteria is requested for the augmented requirements contained in 10CFR50.55a(g)(6)(ii)(A) conducted during the first ten-year interval of the Inservice Inspection Program for Waterford 3.

**REQUEST NUMBER: ISI-019**

**COMPONENT IDENTIFICATION**

Code Class: 1  
References: IWB-2500, Table IWB-2500-1  
Examination Categories: B-A  
Item Numbers: B1.10  
Description: Alternative to obtaining essentially 100% examination coverage of each Reactor Pressure Vessel (RPV) Shell Welds

Component ID	Component Description	Item No	Limited Exam	Limitation
01-008	RPV BOTTOM HEAD ASSEMBLY TO LOWER SHELL CIRC. WELD	B1.11	62%	EXAM LIMITED DUE TO THE RADIAL SUPPORT AND FLOW SKIRT SUPPORT LUGS.
01-009	RPV LOWER SHELL COURSE LONG. WELD AT 90°	B1.12	67%	EXAM LIMITED DUE TO PROXIMITY OF SPECIMEN TUBE HOLDERS.
01-010	RPV LOWER SHELL COURSE LONG. WELD AT 210°	B1.12	No	
01-011	RPV LOWER SHELL COURSE LONG. WELD AT 330°	B1.12	No	
01-012	RPV LOWER SHELL TO MIDDLE SHELL CIRC. WELD	B1.11	85%	EXAM LIMITED DUE TO SPECIMEN TUBE HOLDERS.
01-013	RPV MIDDLE SHELL COURSE LONG. WELD AT 90°	B1.12	74%	EXAM LIMITED DUE TO PROXIMITY OF SPECIMEN TUBE HOLDERS.
01-014	RPV MIDDLE SHELL COURSE LONG. WELD AT 210°	B1.12	No	
01-015	RPV MIDDLE SHELL COURSE LONG. WELD AT 330°	B1.12	No	
01-016	RPV MIDDLE SHELL TO UPPER SHELL CIRC. WELD	B1.11	No	
01-017	RPV UPPER SHELL COURSE LONG. WELD AT 90°	B1.12	No	
01-018	RPV UPPER SHELL COURSE LONG. WELD AT 210°	B1.12	No	
01-019	RPV UPPER SHELL COURSE LONG. WELD AT 330°	B1.12	No	

**CODE REQUIREMENTS**

ASME Section XI, Table IWB-2500-1, Examination Category B-A requires essentially 100% volumetric examination of reactor vessel shell welds once each ten-year inspection interval.



### **PROPOSED ALTERNATE EXAMINATION**

Waterford 3 completed the required reactor vessel shell weld examinations to the extent practical using the following techniques:

1. Vessel circumferential, longitudinal welds were ultrasonically examined using a 0 degree search unit to identify any laminar areas or flaws in the specified volume.
2. The 45 and 60 degree scans were also employed in four directions (clockwise, counterclockwise, up and down) for the purpose of detecting any planar or nonlaminar flaws.
3. The inner 25% of the vessel wall was examined in four directions using a 50/70 bi-modal transducer for the purpose of detecting any "near surface" or "underclad" flaws.
4. The 50/70 scans were also used to provide examination coverage in the area where the 45 and 60 degree scans were ineffective due to "near-zone" limitations.

### **BASIS FOR ALTERNATIVE**

Code Case N-460 allows a reduction in examination coverage on any Class 1 weld provided the reduction in coverage for that weld is less than 10%. EOI determined that four of the twelve Item Number B1.10 welds could not be examined essentially 100%. However, the total weld volume coverage for all Item B1.10 welds exceeds 90% (90.17). These examinations were performed from the inside diameter using a 0 degree search unit to identify any laminar areas or flaws in the specified volume, together with 45 and 60 degree scans employed in four directions (clockwise, counterclockwise, up and down) for the purpose of detecting any planar or nonlaminar flaws. Additionally, the inner 25% of the vessel wall was examined in four directions using a 50/70 bi-modal transducer for the purpose of detecting any "near surface" or "underclad" flaws and the 50/70 scans were also used to provide examination coverage in the area where the 45 and 60 degree scans were ineffective due to "near-zone" limitations.

Examination from the outside diameter (OD) surface is not possible for the affected areas of 01-009, 01-012, and 01-013 due to the close proximity of the concrete biological shield. Examination from the OD could possibly allow Waterford 3 to meet the "essentially 100%" requirement for 01-008. However, geometrical obstructions which prevented full coverage from the inside diameter may interfere with an OD examination. In addition, full compliance with the augmented requirements of 10CFR50.55a from the OD surface of the RPV would result in significant personnel time and exposure.

The cumulative total volume of the Waterford 3 RPV shell welds was 90.17%. Furthermore, the only indication was determined to be a small laminar reflector in 01-009, which was acceptable without analytical evaluation. Therefore, it is unlikely that the unexamined sections would not be acceptable for continued service. Although this cumulative total cannot be used to meet the Code requirements, this percentage supports the fact that the invessel examination covered a significant volume and provides an acceptable level of quality and safety.

Therefore, pursuant to 10CFR50.55a(a)(3)(i), EOI requests NRC approval of the examination as an alternative to "essentially 100%" exam based on the acceptable level of quality and safety.

### **APPLICABLE TIME PERIOD**

Application of the alternative criteria is requested for the first ten-year interval of the Inservice Inspection Program for Waterford 3.

ATTACHMENT 2 TO  
W3F1-98-0120

REQUESTS ISI-020



**REQUEST NUMBER: ISI-020**

**COMPONENT IDENTIFICATION**

Code Class: 1  
References: IWB-2500, Table IWB-2500-1  
Examination Categories: B-A  
Item Numbers: B1.30  
Description: Relief from obtaining essentially 100% examination coverage of the Reactor Pressure Vessel (RPV) Upper Shell-to-Flange Weld

Component ID	Component Description	Item No	Limited Exam	Limitation
01-020	RPV UPPER SHELL-TO FLANGE WELD	B1.30	79%	EXAM LIMITED DUE TO SURFACE TAPER

**CODE REQUIREMENTS**

ASME Section XI, Table IWB-2500-1, Examination Category B-A requires essentially 100% volumetric examination of reactor vessel shell-to-flange weld once each ten-year inspection interval.

**PROPOSED ALTERNATE EXAMINATION**

Waterford 3 performed a best-effort ultrasonic examination to achieve as much code coverage as possible.

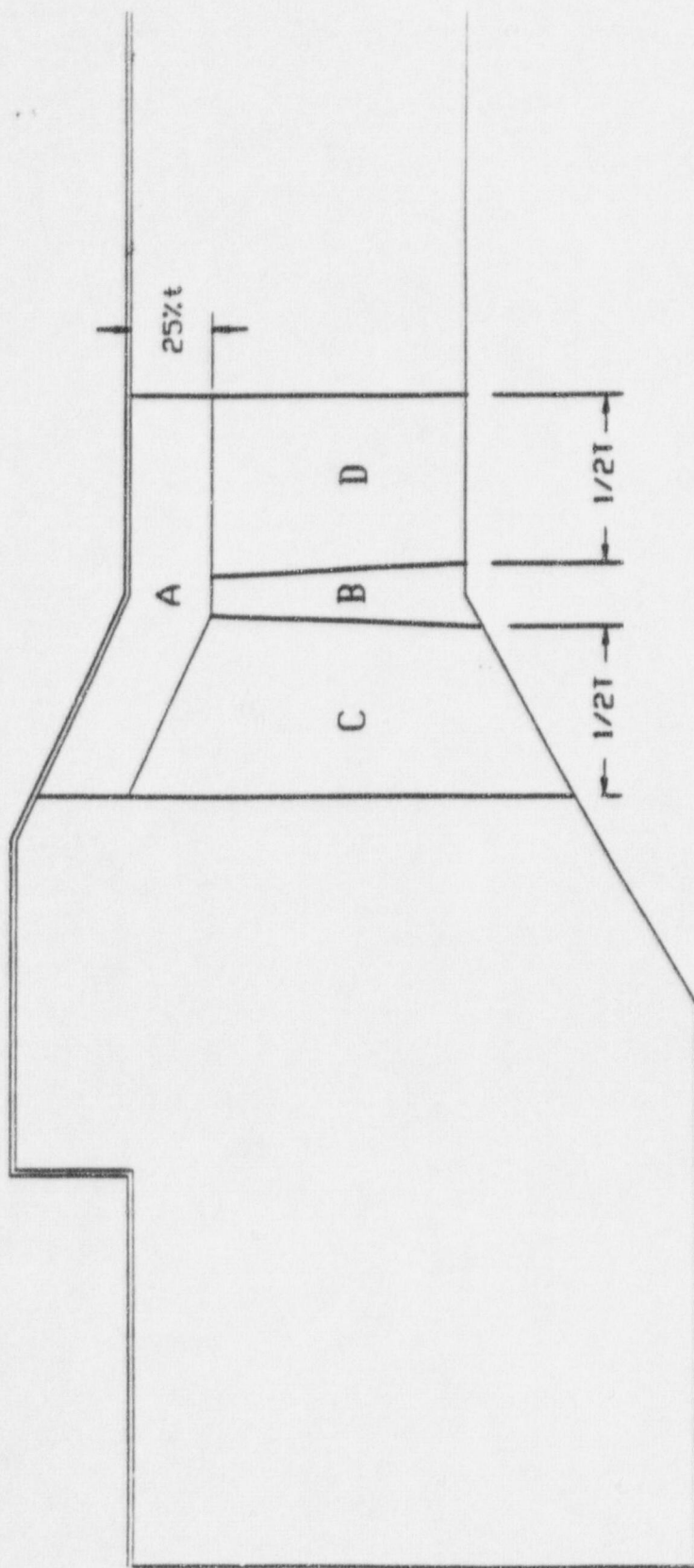
**BASIS FOR RELIEF**

The design configuration of the flange precludes full ultrasonic examination of the RPV Upper Shell-to-Flange Weld, 01-020. The weld volume was examined from the vessel wall and the flange face using 5 different transducers. However due to the taper of the flange (See Page 2) the transverse scans were limited in Volume "A" to 48% and Volumes "B", "C", and "D" to 54%, limiting total examination coverage to 79%. In order to examine the weld in accordance with the Code requirement, the reactor vessel would require extensive design modifications. Consequently, the design restriction makes the Code-required examination impractical. Waterford believes that the significant coverage obtained would have detected any generic degradation, if present, and therefore provides reasonable assurance of structural integrity.

Pursuant to 10CFR50.55a(g)(6)(i), EOI requests relief from the Code-required essentially 100% volumetric examination of reactor vessel shell-to-flange weld.

**APPLICABLE TIME PERIOD**

Application of the alternative criteria is requested for the first ten-year interval of the Inservice Inspection Program for Waterford 3.



Vessel-to-Flange