

TECHNICAL EVALUATION SUMMARY OF THE
FIRST 10-YEAR INTERVAL INSERVICE INSPECTION
RELIEF REQUESTS FOR
WASHINGTON PUBLIC POWER SUPPLY SYSTEM
WPPSS NUCLEAR PROJECT, UNIT 2
DOCKET NUMBER 50-397

1.0 INTRODUCTION

The licensee, Washington Public Power Supply System (WPPSS), submitted revised Relief Request 2-ISI-001 and new Relief Request 2-ISI-010, in a letter dated June 24, 1993, for the WPPSS Nuclear Project No. 2 (WNP-2) first 10-year inservice inspection (ISI) interval ending in December 1994. Additionally, the licensee submitted a proposed ISI program revision regarding American Society of Mechanical Engineers (ASME) Class 1 valve body examinations in a letter dated August 26, 1993. The Idaho National Engineering Laboratory (INEL) has evaluated the subject requests for relief and proposed program revision in the following sections.

2.0 EVALUATION

The Code of record for the WNP-2 first 10-year ISI interval is the 1980 Edition through Winter 1980 Addenda of the ASME Code Section XI. The information provided by the licensee in support of the requests for relief has been evaluated and the bases for the INEL evaluations are documented below.

A. Revised Relief Request for Relief No. 2-ISI-001, ASME Section XI, Table IWB-2500-1, Examination Category B-A, Reactor Pressure Vessel Shell Welds

Code Requirement: Table IWB-2500-1, Examination Category B-A requires a volumetric examination of essentially 100% of all pressure-retaining welds in the reactor pressure vessel (RPV) during the first 10-year inspection interval.

Licensee's Code Relief Request: The licensee requested relief from the Code requirement to perform a volumetric examination of essentially 100% of circumferential shell Weld AB in the active core region of the RPV.

Licensee's Stated Basis for Requesting Relief:

"Relief is required from ASME Section XI examination requirements on the basis of partial inaccessibility of the weld due to plant design. The design and access provisions complied with earlier Codes which did not require 100% examination. Per 10 CFR 50.55a(g)(4), access is not required to be upgraded to the Inservice Inspection Code.

"Weld AB received 79.7% examination volume coverage at [refueling outage] R-8. This examination was restricted due to the weld taper going from the 9-7/16" shell course 1 plate to the 6-2/16" shell course 2 plate. This weld is located about one foot above the bottom of the active core.

This coverage exceeded the 52% that was obtained using the original inspection system.

"The main restriction to 100% examination in the belt line region is the taper on weld AB."

Licensee's Proposed Examination: The licensee proposed to examine the accessible portion of each weld in accordance with ASME Section XI as augmented by Regulatory Guide 1.150, Revision 1, Appendix A.

Evaluation: The licensee previously requested relief from the Code requirement to examine essentially 100% of the RPV welds in Relief Request No. 2-ISI-001. This relief was granted in a safety evaluation dated March 27, 1987. However, the August 1992 issue of 10 CFR 50.55a included augmented examination requirements and revoked all existing relief requests concerning Examination Category B-A, Item B1.10, RPV shell welds. The licensee opted to implement the augmented examination during the current (first) 10-year interval, as confirmed during a telecon on December 14, 1993.

This rule (10 CFR 50.55a) requires that licensees implement augmented examinations of all RPV shell welds because (1) recent results from irradiation surveillance capsules indicate that reactor vessel materials undergo greater radiation damage than previously anticipated, (2) operational data on boiling-water reactor (BWR) reactor vessel internals indicate that stress corrosion cracking of BWR reactor vessels may be more likely than originally believed, and (3) service-induced cracking has occurred in large vessels (pressurizers and steam generators) that were designed and fabricated to the ASME Code. The rule also clarifies the Code term of "essentially 100%," which is defined as examination coverage greater than 90% of the Code-required volume.

The rule included a provision to allow the licensee, when unable to completely satisfy the augmented examination requirements, to propose and use alternatives that provide an acceptable level of quality and safety, when these alternatives are authorized by the NRC Office of Nuclear Reactor Regulation (NRR). The licensee has not discussed alternative examinations that could be performed in lieu of Code requirements, and it appears that the licensee has not fully investigated possible options for examining the Code-required volume, e.g., by accessing the weld from the vessel inside diameter.

The NRC recognizes that, to perform "essentially 100%" of all RPV shell welds, it may be necessary for licensees to implement a combination of internal and external examinations. During the original licensing process, serious questions were raised about the BWR design with respect to 10 CFR 50, Appendix A, General Design Criterion (GDC) 32, "Inspection of Reactor Coolant Pressure Boundary." At that time, it was determined that, while inconvenient and expensive, access could be provided to examine the shell welds. For this reason, it was found that conformance to GDC 32 was possible and that BWR plants could be licensed.

Furthermore, the NRC Regulatory Analysis of the augmented examination rule concludes that the new requirements will result in a substantial increase in the overall protection of the public health and safety and that the cost of implementation is justified in view of this increase. For the reasons stated above, the licensee's request should be denied pending submittal and NRC review and approval of alternative examination methods that could be performed in lieu of regulatory requirements.

B. Relief Request No. 2-ISI-010, Table IWB-2500-1, Examination Category B-D, Item B3.90, Reactor Pressure Vessel Nozzle Welds

Code Requirement: Table IWB-2500-1, Examination Category B-D, Item B3.90 requires that essentially 100% of RPV nozzle welds, as defined in Figure IWB-2500-7(b), be volumetrically examined.

Licensee's Code Relief Request: The licensee requested relief from the Code-required 100% volumetric examination for the 27 RPV nozzle welds listed below.

Licensee's Stated Basis for Requesting Relief:

"Relief is required from ASME Section XI examination requirements on the basis of partial inaccessibility of the weld due to configuration. The design of the vessel to nozzle weld prevents examination of 100% of the volume defined in Figure IWB-2500-7(b) with today's available equipment."

Table of Weld Coverage

Nozzle Number	Description	Number of Nozzles	% Volume Examined, 45 Degree	% Volume Examined, 60 Degree
N1	Reactor Recirculation Outlet	2	75	81
N2	Reactor Recirculation Inlet	10	75	81
N3	Main Steam	4	86	90
N4	Feedwater	6	71	79
N5	Low Pressure Core Spray	1	86	90
N6	Low Pressure Core Injection (RHR)	3	72	79
N16	High Pressure Core Spray	1	72	80

Licensee's Proposed Examination: The licensee proposed to examine the accessible portion of each nozzle weld in accordance with ASME Code Section XI as augmented by Regulatory Guide 1.150, Revision 1, Appendix A.

Evaluation: The licensee's efforts have resulted in examination of a significant percentage of the Code-required examination volumes (see table above) for the subject nozzle welds. These volumetric examinations were completed from the outside diameter (OD) of the vessel using either remote automated examination equipment or manual techniques.

The geometrical configuration of the nozzles, as shown in drawings provided by the licensee, permits only limited volumetric examinations from the OD of the vessel. In addition, no commercially available inspection equipment allows access to the nozzle welds from the vessel inside diameter. For these reasons, it is impractical for the licensee to complete 100% of the examination volume required by ASME Section XI for the RPV nozzle welds at WNP-2. The completed portion of these welds is considered to be a statistically significant and representative examination sample, which reasonably assures the continued integrity of the nozzles. Therefore, pursuant to 10 CFR 50.55a(g)(6)(i), it is recommended that the licensee's request be granted.

C. Licensee's Proposed ISI Program Revision

The licensee proposed a revision to the current ISI program concerning ASME Section XI, Examination Category B-M-2, Item B12.40 valve body examinations. This revision entails updating the program from the current Code of record (ASME Section XI, 1980 Edition, Winter 1980 Addenda) to ASME Section XI, 1989 Edition for Class 1 valve body internal examinations. The only significant technical change between these two Code editions involves the frequency, or timing, of the VT-3 visual examinations. Earlier editions of ASME Section XI required the internal examinations to be performed on a periodic basis, as described in Table IWB-2500-1. However, the 1989 Code Edition allows licensees to defer these examinations until the valve(s) are disassembled for other maintenance activities.

The 1989 Edition of ASME Section XI was accepted for use by reference in the August 1992 revision of 10 CFR 50.55a(b). Further, 10 CFR 50.55a(g)(4)(iv) states that subsequent editions and addenda of ASME Section XI, which have been incorporated for use by 10 CFR 50.55a(b), may be used for inservice examination of components provided that all related requirements of the later editions or addenda are met, subject to NRC approval. The licensee has committed to implementing all related requirements from the 1989 Edition for the subject valve body examinations; therefore, the proposed revision should be approved.

3.0 CONCLUSIONS

The licensee's revised Relief Request No. 2-ISI-001, concerning less-than-100% volumetric examination of one RPV shell weld, should not be authorized

because the licensee has not proposed a reasonable alternative to the augmented examinations required by 10 CFR 50.55a. Relief Request No. 2-ISI-010, which is related to inaccessibility for volumetric examination of RPV nozzle welds, should be granted, pursuant to 10 CFR 50.55a(g)(6)(i), on the basis of impracticality. Finally, the proposed ISI Program revision, which updates to ASME Section XI, 1989 Edition, for Class 1 valve body internal examinations, should be approved based on the licensee's commitment to implement all related requirements from the later Code.

Reviewer: Mike Anderson
INEL

Date: April 12, 1994