TECHNICAL LETTER REPORT
ON THE THIRD 10-YEAR INTERVAL INSERVICE INSPECTION
REQUESTS FOR RELIEF
FOR
NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT UNIT 1
DOCKET NUMBER: 50-220

1. INTRODUCTION

By letter dated October 30, 1999, the licensee, Niagara Mohawk Power Corporation, submitted requests for relief from the requirements of the ASME Code, Section XI, for Nine Mile Point Unit 1. These relief requests are for the third 10-year inservice inspection (ISI) interval. The licensee provided additional information (including revised versions of Requests for Relief ISI-5, 6, and 10) in response to an NRC request in a letter dated May 12, 2000. The Idaho National Engineering and Environmental Laboratory (INEEL) staff's evaluation of the subject requests for relief is in the following section.

2. EVALUATION

The information provided by Niagara Mohawk Power Corporation in support of the requests for relief from Code requirements has been evaluated and the bases for disposition are documented below. The Code of record for the Nine Mile Point Unit 1, third 10-year ISI interval, which began December 26, 1999, is the 1989 Edition of Section XI of the ASME Boiler and Pressure Vessel Code.

2.1 Request for Relief No. ISI-1, Alternatives For Examination of Reactor Pressure Vessel Shell Welds

Note: Pursuant to 10 CFR 50.55a(a)(3)(i) this request for relief was authorized previously by the USNRC in a letter dated April 7, 1999. This authorization is effective from the date of the letter (April 7, 1999) until the expiration date of the current operating license (August 22, 2009).

2.2 Request for Relief No. ISI-2, Examination Category B-A, Items B1.21, B1.22, B1.30, and B1.40, Pressure-Retaining Welds in Reactor Vessels

Code Requirement: Examination Category B-A, Items B1.21 and B1.22 require 100% volumetric examination of the accessible portion of all circumferential and meridional head welds, as defined by Figure IWB-2500-3. Item B1.30 requires 100% volumetric examination of the shell-to-flange welds, as defined by Figure IWB-2500-4. Item B1.40 requires 100% volumetric and surface examination of the head-to-flange weld, as defined by Figure IWB-2500-5.

Licensee's Code Relief Request: In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code-required 100% volumetric examination of the welds listed below.

Comp. ID	Component Description	ASME Category	Item Number	Coverage	Limitation
RV-WD-001	Head to Flange Weld	B-A	B1.40	67%	Obstructed by nozzles, insulation lugs, lifting lugs and configuration of head to flange weld.
RV-WD-002	Closure Head Dollar Plate Circ. Weld	B-A	B1.21	68%	Obstructed by nozzles and the close proximity to steel platform.
RV-WD-004	CH Meridional Weld	B-A	B1.22	70%	Obstructed by Nozzle N7C and N7P
RV-WD-010	CH Meridional Weld	B-A	B1.22	80%	Obstructed by Nozzle N7M and N7N
RV-WD-099	Shell to Flange Weld	B-A	B1.30	83.3%	Obstructed by Guide Rod, MS Nozzle Plug hoses
RV-WD-147	BH Dollar Plate Weld	B-A	B1.21	0%	Inaccessible due to CRD Nozzles and In Core Flux Monitors
RV-WD-148	BH Meridional Weld	B-A	B1.21	0%	Inaccessible due to CRD Nozzles and In Core Flux Monitors
RV-WD-149	BH Meridional Weld	B-A	B1.21	0%	Inaccessible due to CRD Nozzles and In Core Flux Monitors
RV-WD-150	BH Meridional Weld	B-A	B1.21	0%	Inaccessible due to CRD Nozzles and In Core Flux Monitors
RV-WD-151	BH Meridional Weld	B-A	B1.21	0%	Inaccessible due to CRD Nozzles and In Core Flux Monitors
RV-WD-152	BH Meridional Weld	B-A	B1.21	0%	Inaccessible due to CRD Nozzles and In Core Flux Monitors
RV-WD-153	BH Meridional Weld	B-A	B1.21	0%	Inaccessible due to CRD Nozzles and In Core Flux Monitors
RV-WD-154	BH Meridional Weld	B-A	B1.21	0%	Inaccessible due to CRD Nozzles and In Core Flux Monitors
RV-WD-155	BH Meridional Weld	B-A	B1.21	0%	Inaccessible due to CRD Nozzles and In Core Flux Monitors
RV-WD-156	BH Meridional Weld	B-A	B1.21	0%	Inaccessible due to CRD Nozzles and In Core Flux Monitors

Comp. ID	Component Description	ASME Category	Item Number	Coverage	Limitation
RV-WD-157	BH Meridional Weld	B-A	B1.21	0%	Inaccessible due to CRD Nozzles and In Core Flux Monitors
RV-WD-158	BH Meridional Weld	B-A	B1.21	0%	Inaccessible due to CRD Nozzles and In Core Flux Monitors
RV-WD-159	BH Meridional Weld	B-A	B1.21	0%	Inaccessible due to CRD Nozzles and In Core Flux Monitors
RV-WD-160	BH Meridional Weld	B-A	B1.21	0%	Inaccessible due to CRD Nozzles and In Core Flux Monitors
RV-WD-161	BH Meridional Weld	B-A	B1.21	0%	Inaccessible due to CRD Nozzles and In Core Flux Monitors
RV-WD-162	BH Circ. Weld	B-A	B1.21	0%	Inaccessible due to CRD Nozzles and In Core Flux Monitors

Licensee's Basis for Requesting Relief (as stated):

"NMP1, a BWR/2, has a Reactor Pressure Vessel that was designed and fabricated to the rules of ASME Sections I and VIII, including Nuclear Code Case 1270N and 1273N. Early vintage plants of this type were designed, fabricated and erected prior to examination requirements of ASME Section XI. Specific ultrasonic (UT) examination criteria was not required by ASME I, III, or VIII for preservice inspection of the vessel and was not factored into plant design.

"The NMP1 Reactor Pressure Vessel design precludes essentially 100% examination of the weld lengths due to the following:

Closure Head

"The Closure Head Dollar Plate Weld RV-WD-002, limits essentially 100% examination of weld length due to the physical location of six (6) nozzles and the close proximity of a steel platform. See attached sketch[1].

"The Closure Head Meridional Welds (8 each) RV-WD-003, 004, 005, 006, 007, 008, 009 and 010, limits essentially 100% examination of the weld length due to the physical location of eighteen (18) nozzles and insulation lugs.

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1. [redacted]

"The Closure Head to Flange Weld RV-WD-001, limits essentially 100% examination of the weld length due to the configuration of the weld being a one sided exam. See attached sketch.

Bottom Head

"All Bottom Head circumferential welds two (2)RV-WD-147, RV-WD-162 and Bottom Head Meridional Welds fourteen (14) RV-WD-148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160 and 161 are inaccessible due to one hundred twenty-nine (129) Control Rod Drive nozzles and sixty-four (64) In-core Flux Nozzles.

Reactor Vessel Shell to Flange Weld

"The Reactor Vessel Shell to Flange Weld RV-WD-099 limits 100% examination of the weld length due to Guide Rods located at the 0 and 180 degree position and the Main Steam Nozzle Plug hoses.

"In addition to the above external access to the reactor pressure vessel bottom head welds is constrained due to inadequate clearances between the bio-shield wall and vessel insulation.

"RV-WD-099(A), (B), (C) and (D), Reactor Pressure Vessel Shell to Flange Weld from the flange side, was divided into four (4), equal 90 degree segments during the First Inservice Inspection Interval and the remainder of the weld was examined from the vessel inside surface at the end of the interval. During the preparation of the Second Inspection Interval the same division process was included in the inspection plan in order to stay consistent with the First Interval. NMP1 performed the shell to flange weld in the same sequence as conducted in the first interval with the exception of segment D, which was performed from the shell side. With the completion of refueling outage 15, weld RV-WD-099 will have been examined to the extent practical.

"Compliance with the ASME Section XI examination requirements would require a redesign of the Reactor Pressure vessel, which would provide an undue hardship on NMPC without a compensating increase in the quality and safety of the unit."

Licensee's Proposed Alternative Examination (as stated):

"No alternate examinations of the Closure Head Dollar Plate Weld RV-WD-002. Examine to the extent practical.

"No alternate examinations of the Closure Head Meridional Welds (8 each) RV-WD-003, 004, 005, 006, 007, 008, 009 and 010. Examine to the extent practical.

"No alternate examinations of the Closure Head to Flange Weld RV-WD-001. Examine to the extent practical 1/3 each period.

"No alternate examinations of the Reactor Vessel Shell to Flange Weld RV-WD-099. Examine to the extent practical.

"No alternate examinations of the Bottom Head circumferential welds two (2)RV-WD-147, RV-WD-162 and Bottom Head Meridional Welds fourteen (14) RV-WD-148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160 and 161, as they are inaccessible."

Evaluation: Examination Category B-A, Items B1.21and B 1.22 require 100% volumetric examination of the accessible portion of all circumferential head welds and meridional head welds. Items B1.30 and B1.40 require 100% volumetric and surface examination of RPV shell-to-flange, and head-to-flange welds. The licensee provided drawings showing the layouts and limitations of the subject welds; these are summarized below.

As stated by the licensee and as evidenced by the sketches provided, complete examination coverage is limited by physical interferences from nozzles, steel platforms, insulation lugs, and flange configurations. In addition, control rod drive nozzles and in-core flux nozzles limit examination coverages. These conditions make 100% volumetric examination impractical for these welds. To gain access for examination, the RPV would require design modifications. Imposition of this requirement would create a significant burden on the licensee.

The licensee has examined a significant portion of the head-to-flange weld, closure head dollar plate circumferential weld, closure head meridional welds and the shell-to-flange weld. Examination volumes for these welds range from 67% to 83.3%. In addition, 100% of the required surface examination of the subject head-to-flange weld was performed. The bottom head dollar plate weld, and bottom head meridional welds received no examination coverage due to significant interferences. Based on the volumetric and surface coverages obtained, it is concluded that any existing patterns of degradation would have been detected by the examinations that were completed and reasonable assurance of structural integrity has been provided.

Therefore based on the impracticality of meeting the Code examination coverage requirements for the subject welds, and the reasonable assurance provided by the examinations that were completed, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

2.3 Request for Relief No. ISI-3, Examination Category B-D, Full Penetration Welds of Nozzles in Vessels

Code Requirement: Examination Category B-D, Items B3.90 and B3.100, require 100% volumetric examination of nozzle-to-reactor vessel welds and nozzle inside radius sections, as defined by Figure IWB-2500-7.

Licensee's Code Relief Request: In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code-required 100% volumetric examination of the reactor vessel nozzle welds listed below.

Component ID	Component Description	Estimated % of CRV Achieved	Description of Limitation
01-WD-001	N3A Nozzle to Vessel	87.0%	Adjacent nozzle, Bio-shield wall
01-WD-001-IR	N3A Noz. Inner Radius	54.0%	Adjacent nozzle, Bio-shield wall
01-WD-033	N3B Nozzle to Vessel	91% 80.1%	Manual Adjacent nozzle, Bio-shield wall
01-WD-033-IR	N3B Noz. Inner Radius	79.0%	Adjacent nozzle, Bio-shield wall
31 -WD-021	N4B Nozzle to Vessel	78.0%	Adjacent nozzle, Bio-shield wall
31-WD-021-IR	N4B Noz. Inner Radius	47.0%	Adjacent nozzle, Bio-shield wall
31-WD-030	N4A Nozzle-Vessel	42.1%	Adjacent nozzle, Bio-shield wall
31-WD-030-IR	N4A Noz. Inner Radius	82.0%	Adjacent nozzle, Bio-shield wall
31-WD-051	N4C Nozzle to Vessel	84.0%	Adjacent nozzle, Bio-shield wall
31-WD-051-IR	N4C Noz. Inner Radius	86.0%	Adjacent nozzle, Bio-shield wall
31-WD-060	N4D Nozzle to Vessel	85.0%	Bio-shield wall
31-WD-060-IR	N4D Noz. Inner Radius	59.0%	Bio-shield wall
32-WD-001	N1A Nozzle-Vessel	33.8%	Lug, Adjacent Nozzle, Bio-shield wall
32-WD-001-IR	N1A Noz. Inner Radius	73.0%	Adjacent nozzle, Bio-shield wall
32-WD-043	N2A Nozzle to Vessel	75.0%	Bottom Head Taper of Shell Thickness
32-WD-043-IR	N2A Noz. Inner Radius	82.0%	Bottom Head Taper of Shell Thickness
32-WD-044	N1B Nozzle to Vessel	67.9%	Bio-shield wall
32-WD-044-IR	N1B Noz. Inner Radius	73.0%	Bio-shield wall
32-WD-083	N2B Nozzle to Vessel	75.4%	Bottom Head Taper of Shell Thickness
32-WD-083-IR	N2B Noz. Inner Radius	82.0%	Bottom Head Taper of Shell Thickness
32-WD-084	N1C Nozzle to Vessel	67.8%	Bottom Head Taper of Shell Thickness
32-WD-084-IR	N1C Noz. Inner Radius	73.0%	Lug, Adjacent Nozzle, Bio-shield Wall
32-WD-123	N2C Nozzle to Vessel	75.4%	Bottom Head Taper of Shell Thickness
32-WD-123-IR	N2C Noz. Inner Radius	82.0%	Bottom Head Taper of Shell Thickness
32-WD-124	N1D Nozzle to Vessel	68.0%	Bio-shield wall
32-WD-124-IR	N1D Noz. Inner Radius	73.0%	Bio-shield wall
32-WD-165	N2D Nozzle to Vessel	75.4%	Bottom Head Taper of Shell Thickness
32-WD-165-IR	N2D Noz. Inner Radius	82.0%	Bottom Head Taper of Shell Thickness
32-WD-166	N1E Nozzle to Vessel	33.8%	Lug, Thermocouple, Bio-shield wall
32-WD-166-IR	N1E Noz. Inner Radius	73%	Lug, Adjacent Nozzle, Bio-shield Wall

Component ID	Component Description	Estimated % of CRV Achieved	Description of Limitation
32-WD-209	N2E Nozzle to Vessel	74.5%	Bottom Head Taper of Shell Thickness
32-WD-209-IR	N2E Noz. Inner Radius	82%	Bottom Head Taper of Shell Thickness
39-WD-001	N5A Nozzle to Vessel	65%	Adjacent Nozzle, Bio-shield Wall
39-WD-001-IR	N5A Noz. Inner Radius	55%	Lug, Adjacent Nozzle, Bio-shield Wall
39-WD-089	N5B Nozzle to Vessel	52.5%	Adjacent Nozzle, Bio-shield Wall
39-WD-089-IR	N5B Noz. Inner Radius	79.3%	Adjacent Nozzle, Bio-shield Wall
40-WD-040	N6A Nozzle to Vessel	65.8%	Adjacent Nozzle, Bio-shield Wall
40-WD-040-IR	N6A Noz. Inner Radius	89.5%	Adjacent Nozzle, Bio-shield Wall
40-WD-081	N6B Nozzle to Vessel	57.3%	Adjacent Nozzle, Bio-shield Wall
40-WD-081-IR	N6B Noz. Inner Radius	78.1%	Adjacent Nozzle, Bio-shield Wall
44.1-WD-018	N9 Nozzle to Vessel	46.2%	Bio-shield wall
44.1-WD-018-IR	N9 Noz. Inner Radius	48%	Bio-shield wall

Licensee's Basis for Requesting Relief (as stated):

"NMP1, a BWR/2, has an Reactor Pressure Vessel that was designed and fabricated to the rules of ASME Sections I and VIII, including Nuclear Code Case 1270N and 1273N. Early vintage plants of this type were designed, fabricated and erected prior to examination requirements of ASME Section XI. Specific ultrasonic (UT) examination criteria was not required by ASME I, III, or VIII for preservice inspection of the vessel and was not factored into plant design.

"The NMP1 Reactor Pressure Vessel design of the nozzles precludes essentially 100% examination of the Code required volume due to the following conditions:

1. Nozzle locations (close proximity to each other), doesn't allow enough scan distance between nozzles to interrogate the entire Code required volume.

2. Nozzle configurations and shell tapers do not provide parallel surface, therefore providing areas of non scanning.

3. Lifting lugs and insulation lugs limit the scan distances required to interrogate portions of Code volume.

4. Limited access for examination personnel between the reactor pressure vessel and the biological shield limits the maximum search unit scanning distance for each nozzle.

"Compliance with the ASME Section XI examination requirements would require a redesign of the Reactor Pressure vessel, which would provide an undue hardship on NMPC without a compensating increase in the quality and safety of the unit."

Licensee's Proposed Alternative Examination (as stated):

"No alternate examinations proposed. Examine each nozzle to vessel weld and inner radius section to the extent practical.

"The extent of examination performed on the Reactor Pressure Vessel Nozzles will assure an acceptable level of quality and safety."

Evaluation: The Code requires 100% volumetric examination of the subject RPV nozzle-to-vessel welds and inside radius sections. However, examinations of these nozzles are limited by their proximity to other nozzles, shell taper, lifting lugs, insulation lugs and restricted access due to the biological shield wall. These limitations make 100% volumetric examinations impractical. To gain access for examination, the RPV and/or nozzles would require design modifications. Imposition of this requirement would create an undue burden on the licensee.

The licensee has examined a significant portion of these welds, obtaining 33% to 91% coverage for each of the nozzle-to-vessel welds and nozzle inside radius sections. Based on the coverages obtained it is concluded that any existing patterns of degradation would have been detected by the examinations that were completed and reasonable assurance of the structural integrity has been provided.

Based on the impracticality of meeting the Code coverage requirements for the subject nozzle-to-vessel welds and inside radius sections, and the reasonable assurance provided by the examinations that were completed, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

2.4 Request for Relief No. ISI-4, Use of Code Case N-526, *Alternative Requirements for Successive Inspections of Class 1 and 2 Vessels.*

Code Requirement: Examination Category B-A, Item B1.12 requires 100% volumetric examination of RPV longitudinal shell welds, as defined by Figures IWB-2500-1 and 2. Item B1.30 requires 100% volumetric examination of the shell-to-flange welds, as defined by Figure IWB-2500-4. In addition Subarticle IWB-2420, "Successive Inspections," paragraph (b) states:

> "If flaw indications or relevant conditions are evaluated in accordance with IWB-3132.4 or IWB-3142.4, respectively, and the component qualifies as acceptable for continued service, the areas containing such flaw indications or relevant conditions shall be re-examined during the next three inspection periods listed in the schedules of inspection programs of IWB-2410."

Licensee's Proposed Alternative: In accordance with 10 CFR 50.55a(a)(3)(i), the licensee proposed to reexamine the flaws when the Code required examinations are performed later in the inspection interval. The licensee stated:

"No alternate examinations proposed. Reexamine the flaws along with the Code required examinations for welds RV-WD-140 and RV-WD-099 as currently scheduled in the ISI Program.

"The extent of examination performed on the Reactor Pressure Vessel will assure an acceptable level of quality and safety.

"ASME Code Case N-526, Alternative Requirements for Successive Inspections of Class 1 and 2 Vessels, Section XI, Division 1, (attached), provides an alternate to the reexamination required by IWB-2420(b)."

Licensee's Basis for Proposed Alternative (as stated):

"During the automated ultrasonic examinations of the Reactor Pressure Vessel shell welds, several sub-surface indications were observed that exceeded the acceptance criteria of IWB-3000 on welds RV-WD-099 and RV-WD-140.

"Weld RV-WD-099 identified six (6) unacceptable flaws, located in the region of the weld fusion lines and were attributed to lack of fusion and thin film slag deposits left from the fabrication process.

"Weld RV-WD-140 identified two (2) unacceptable flaws, located in the region of the weld fusion lines and were attributed to lack of fusion and thin film slag deposits left from the fabrication process.

"Review of the construction radiographs (RT) provided a correlation with the ultrasonic indications.

"An analytical evaluation was performed in accordance with IWB-3600 and the welds were found to be acceptable for continued service. These evaluations took into consideration flaw growth that is unlikely to occur with fabrication related flaws. The flaws were found to be acceptable for continued service until the intended end of plant life.

"ASME Code Case N-526, Alternative Requirements for Successive Inspections of Class 1 and 2 Vessels, Section XI, Division 1, (attached), provides an-alternate to the reexamination required by IWB-2420(b).

"Compliance with the ASME Section XI reexamination requirements would provide an undue hardship on NMPC, without a compensating increase in the quality and safety of the unit."

Evaluation: Examination Category B-A, Item B1.12 requires 100% volumetric examination of RPV longitudinal shell welds, as defined by Figures IWB-2500-1 and -2.

Item B1.30 requires 100% volumetric examination of the shell-to-flange welds, as defined by Figure IWB-2500-4. In addition Subarticle IWB-2420, "Successive Inspections," paragraph (b) states:

> "If flaw indications or relevant conditions are evaluated in accordance with IWB-3132.4 or IWB-3142.4, respectively, and the component qualifies as acceptable for continued service, the areas containing such flaw indications or relevant conditions shall be re-examined during the next three inspection periods listed in the schedules of inspection programs of IWB-2410."

During automated ultrasonic examinations of the RPV shell welds, the licensee identified multiple sub-surface indications that exceeded the acceptance criteria of IWB-3000. The licensee performed an analytical evaluation in accordance with IWB-3600. Consequently, the welds were deemed acceptable for continued service. The licensee determined that the indications are located in the region of the weld fusion lines and were identified as lack of fusion and slag deposits left from the fabrication process (not service related). In addition, the licensee reviewed radiographs from construction. The radiographs results corroborated the findings of the ultrasonic examinations. However, since the indications exceeded the allowable acceptance criteria, the licensee is now required by the Code to re-examine the indications for the next three inspection periods. It appears from the drawings submitted by the licensee, that in order for the licensee to perform the subject reexaminations on the indications, the reactor would likely have to be de-fueled and core internals removed to obtain access to the subject welds. Performance of these activities would result in a substantial radiation exposure to plant personnel and generation of an excessive amount of solid radwaste. Therefore, performance of these activities for the sole purpose of reexamination would result in a considerable hardship.

The licensee has proposed the use of Code Case N-526, *Alternative Requirements for Successive Inspections of Class 1 and 2 Vessels.* The conditions associated with Code Case N-526 are:

(A) The flaw is characterized as subsurface in accordance with Fig.1[2].
(B) The NDE technique and evaluation that detected and characterized the flaw, with respect to both sizing and location, shall be documented in the flaw evaluation report.
(C) The vessel containing the flaw is acceptable for continued service in accordance with IWB-3600, and the flaw is demonstrated acceptable for the intended service life of the vessel.

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The NRC Staff has permitted the use of Code Case N-526 at other plants[3] provided all conditions of the Code Case are satisfied. It appears from the licensee's submittal that all conditions of the Code Case have been met. It is concluded that the licensee's proposed alternative to implement the use of Code Case N-526 provides reasonable assurance of the structural integrity of the reactor vessel. Therefore, it is recommended that the licensee's proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(i). The use of the Code Case should be authorized for the current interval or until such time as the Code Case is published in a future revision of 10 CFR 50.55a (previously Reg. Guide 1.147). At that time, if the licensee intends to continue to implement this Code Case, the licensee should follow all provisions in the subject Code Case with limitations (if any) issued in the regulations.

2.5 Request for Relief No. ISI-5 Revision 1[4], Examination Category B-K, Item B10.10, Integrally Welded Support Attachments for Class 1 Vessels, Piping, Pumps and Valves

Code Requirement: Code Case N-509 (adopted by the licensee), Examination Category B-K, Item B10.10 requires 100% surface or volumetric examination, as applicable, of the integrally welded attachments for Class 1 vessels as defined by Figures IWB-2500-13, -14, and/or -15. In Regulatory Guide 1.147, Revision 12, dated May 1999, ASME Code Case N-509 is acceptable to the USNRC provided that in addition to those conditions specified in the Code Case: a minimum 10% sample of integrally welded attachments for each item in each Code class per interval is examined.

Licensee's Code Relief Request: In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code (Code Case N-509) required surface examinations.

Licensee's Basis for Requesting Relief (as stated):

"NMP1, a BWR/2, has an Reactor Pressure Vessel (RPV) that was designed and fabricated to the rules of ASME Sections I and VIII, including Nuclear Code Case 1270N and 1273N (See Figure 1 for RPV drawing). Early vintage plants of this type were designed, fabricated and erected prior to examination requirements of ASME Section XI.

"Of the (6) integral attachments subject to examination, four (4) are the earthquake stabilizer brackets and two (2) are the reactor pressure vessel support skirt integral attachment, which is broken down into inside surface and outside surface.

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EARTHQUAKE STABILIZER BRACKET ATTACHMENTS

“The four (4) alloy steel Reactor Vessel earthquake stabilizer attachments brackets are located at 22.5, 112.5, 202.5 and 292.5 degree (Figure 1) axis points around the outer circumference of the vessel approximately eleven (11) feet and eight (8) inches below the vessel flange. (See Figures 1 and 2 for locations). Access for examination purposes only allows a maximum of 50% of the attachment weld length to be examined on all four (4) stabilizer bracket integral attachments.

REACTOR VESSEL SUPPORT SKIRT

“The Reactor Vessel support skirt is divided within the examination plan into two (2) separate items (Figure 3), these being the inside surface of the attachment weld and the outside surface of the attachment weld. Access to the support skirt is limited to the outside surface geometry of the attachment weld only (Figure 4). The inside surface of the attachment weld is inaccessible (Figure 3).

“The Code Case requires that a surface examination be performed in accordance with Figures IWB-2500-13 and IWB-2500-15.

“The earthquake stabilizer bracket (Figure IWB-2500-15) attachment require the weld plus 0.50" on each side of the weld and essentially 100% of the weld length to be examined by the surface (Magnetic Particle or Liquid Penetrant Method).

“The reactor vessel skirt weld (Figure IWB-2500-13) attachment requires the weld plus 0.50" on each side of the weld and essentially 100% of the weld length to be examined by the surface (Magnetic Particle or Liquid Penetrant Method).

“The use of the ultrasonic examination method in lieu of the surface exam is not appropriate due to the access provision would be the same as that for the surface examination. In addition the ultrasonic examination of the outside surface of the vessel skirt (Figure 4) from one side would be inappropriate due to the design and geometry of the skirt being non-parallel surfaces on the forging knuckle. The additional areas achieved would be negligible.

“The 10% sample requirements for the (6) Code Item Number B10.10 integral attachments would require a redesign of the Reactor Vessel integral attachments, which would impose an undue hardship on NMPC without a compensating increase in the quality and safety of the unit.”

Licensee’s Proposed Alternative Examination (as stated):

“NMPC proposes to perform the following examinations:

“Schedule two of the four Earthquake stabilizer brackets for surface examination to the extent practical. The anticipated Code Required Area to be achieved will be 50% on each integral attachment, which would be equivalent to completing essentially one bracket.

"In addition to the stabilizer attachment, NMPC proposes to perform to the extent practical a surface examination on the outside surface of the Reactor Vessel Support skirt only.

"The extent of examination performed on the Reactor Pressure Vessel Integral Attachment will assure an acceptable level of quality and safety."

Evaluation: The Code/Code Case N-509 requires that 10% of the subject Class 1 earthquake stabilizer bracket attachments and the reactor vessel support skirt receive 100% surface examination each inspection interval. Review of the figures provided by the licensee show that the subject components are partially inaccessible due to location of internal welds within the support skirt and to the geometry of the reactor pressure vessel. In order for access to be obtained major modifications to the support skirt and reactor pressure vessel would be required. This would result in a significant burden on the licensee. The 100% surface examination of the subject components is therefore, impractical to perform to the extent required by the Code.

The licensee will perform a partial surface examination (50%) on two of the earthquake stabilizer brackets attachments in lieu of 100% surface examination of one (10%) of the earthquake stabilizer brackets attachments as is required by Code Case N-509. In addition 50% surface examination (accessible from the outside diameter) coverage of the reactor vessel support skirt will be performed. Therefore, based on the extent of surface coverage obtainable, it is concluded that existing patterns of degradation, if present, will be detected and reasonable assurance of inservice structural integrity is maintained. Therefore, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

2.6 Request for Relief No. ISI-6 Revision 1[5], Examination Category B-O, Item Number B14.10, Welds in CRD Housing

Code Requirement: Examination Category B-O, Item B14.10 requires volumetric or surface examination on 10% of peripheral CRD housing welds, as defined by Figure IWB-2500-18, each inspection interval.

Licensee's Code Relief Request: In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code-required surface or volumetric examination of the required peripheral CRD housing welds.

Licensee's Basis for Requesting Relief (as stated):

"NMP1, a BWR/2, has an Reactor Pressure Vessel that was designed and fabricated to the rules of ASME Sections I and Ill, including Nuclear Code Case

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[illegible]

1270N and 1273N. Early vintage plants of this type were designed, fabricated and erected prior to examination requirements of ASME Section XI.

"There are one hundred twenty-nine (129) Control Rod Drive Housings located on the bottom head. Thirty-two (32) are peripheral CRD Housing for which 10% or a minimum of 4 are required to be examined during the interval.

"A sector of approximately 180 degrees of each CRD peripheral housing circumference is obstructed by the adjacent CRD housings and their hydraulic lines. See attached drawing."

Licensee's Proposed Alternative Examination (as stated):

"NMPC proposes to perform surface examinations on eight (8) of the peripheral control rod drive housing in lieu of the 4 required. The additional 4 housing examinations will result in the same weld length being examined, thereby meeting the intent of the Code requirement.

"This approach was previously granted per USNRC Safety Evaluation, TAC No. M83099, dated April 6,1994.

"The extent of examination performed on the Control Rod Drive Housings will assure an acceptable level of quality and safety."

Evaluation: The Code requires 100% volumetric or surface examination of the welds on 10% of the peripheral CRD housings. Review of the licensee's documentation shows that there are 32 peripheral CRDMs on the reactor vessel head. Therefore, the licensee is required to examine four of the peripheral CRD housings. Drawings submitted by the licensee reveal that portions (180 degrees) of the subject CRD housings are inaccessible for surface examinations due to adjacent CRD housings and their hydraulic lines. In order for access to be obtained, major modifications to the reactor pressure vessel CRDMs would be required. This would result in a significant burden on the licensee. The 100% surface examination of the entire circumferential weld length of the subject components is therefore, impractical to perform to the extent required by the Code.

The licensee has proposed to perform a 50% surface examination on eight CRD housings in lieu of 100% surface examination on four CRD housings. Therefore, the total length of welds to be examined would be equivalent to that required by the Code. Based upon the surface examination coverage that can be obtained on eight of the CRD housings, and considering that the overall examination coverage is equivalent to that required by the code, it is reasonable to conclude that existing patterns of degradation, if present, will be detected and reasonable assurance of inservice structural integrity is maintained. Therefore, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

2.7 Request for Relief No. ISI-7, Examination Category C-G, Item C6.10, Pump Casing Welds

Code Requirement: Examination Category C-G, Item C6.10 requires 100% surface examination of welds in all components (pumps) in each piping run to be examined under Examination Category C-F.

Licensee's Proposed Alternative: In accordance with 10 CFR 50.55a(a)(3)(ii), the licensee proposed an alternative to the Code-required surface examinations of the following pump casing welds:

Systems affected	Pump Affected	Welds Affected	Reason Affected
80.0 Reactor Containment Spray	121	80-03-WD-009 80-03-WD-012 80-03-WD-014 80-03-WD-010 80-03-WD-011	Embedded in Concrete Embedded in Concrete Embedded in Concrete When disassembled When disassembled
81.0 Reactor Core Spray	121	81-03-WD-009 81-03-WD-012 81-03-WD-014 81-03-WD-010 81-03-WD-011	Embedded in Concrete Embedded in Concrete Embedded in Concrete When disassembled When disassembled

The licensee stated:

"NMPC proposes to the extent practical, and only when the pump is disassembled for maintenance, repair and or replacement to perform the surface examinations on welds 80-WD-03-010, 011 and 81-03-WD-010, 011 as required by Examination Category C-G.

"On welds 80-03-WD-009, 012, 014, and 81-03-WD-009, 012, 014, NMPC proposes to the extent practical and only when disassembled for maintenance, repair and or replacement to perform a Visual examination of the interior surface of the pump casing embedded in concrete.

"The examination performed on accessible welds, coupled with the proposed examinations and the system pressure test will provide an acceptable level of quality and safety."

Licensee's Basis for Proposed Alternative (as stated):

"Reactor Containment Spray Pumps, Figure ISI-PUMP-002 (attached), provided a typical drawing of the pump 80-03, 80-04, 80-23 and 80-24. This drawing identifies sixteen (16) welds on each pump subject to examination. Of the 16 welds ten (10) are subject to Examination Category C-G surface examinations. Of the ten (10) welds subject to surface examination, three (3) are embedded in concrete, and two (2) can only be examined when the pump is disassembled.

"Reactor Core Spray Pumps, Figure ISI-PUMP-003 (attached), provided a typical drawing of the pump 81-03, 81-04, 81-23 and 81-24. This drawing identifies

sixteen (16) welds on each pump subject to examination. Of the 16 welds ten (10) are subject to Examination Category C-G surface examinations. Of the ten (10) welds subject to surface examination, three (3) are embedded in concrete, and two (2) can only be examined when the pump is disassembled.

"All the pumps in each system provide the same limitations as previously discussed above, therefore, the five (5) welds in question on the selected pump can not be substituted for five (5) welds on another pump.

"NMPC considered selecting an alternate five (5) welds on another pump within each system to substitute for those welds that are inaccessible. This consideration was dismissed as the information provided would not provide meaningful information relating to the inaccessible welds.

"Two (2) of the five (5) inaccessible welds on each pump are accessible when the pump is disassembled, welds 80-03-WD-010, 011 and 81-03-WD-010, 011. Table IWB-2500-1, footnote (2) allows the examination to be performed either from the inside or outside surface of the pump. Therefore these welds would be required to be examined when and if the pump is disassembled.

"The three (3) weld on each pump that are embedded within concrete are inaccessible from the outside surface, but even if the pump was disassembled would provide some accessibility problems from the inside surface. NMPC feels that the welds imbedded (sic) in the concrete would provide an (sic) greater acceptable level of safety over and above the limited surface examinations required by the Examination Category C-G."

Evaluation: The Code requires that Class 2 pump casing welds receive a 100% surface examination from either the inside or outside surface of the component. Review of the sketches provided by the licensee show that three (3) reactor spray pump casing welds and three (3) reactor core spray pump casing welds are inaccessible due to being encased in concrete. In addition, two (2) reactor spray pump casing welds and two (2) reactor core spray pump casing welds are accessible only when the pumps are disassembled. Disassembly of the pumps is quite involved and poses a significant risk of damage to the pump's components (shaft deformation, vibration damage, etc). Disassembly of the pumps solely for the purpose of additional surface examinations would result in a considerable hardship without a compensating increase in safety for the licensee.

Each of the subject pumps has 10 welds required to be examined. The licensee is able to perform 100% of the required surface examinations on five of the ten required welds on each of the subject pumps. In addition, the licensee will perform surface examinations on two welds on each of the subject pumps to the extent practical when the pumps are disassembled for maintenance and or repair/replacement activities. Also, a visual examination to the extent practical of the interior surface of three welds on each of the pump casings embedded in concrete will be performed when disassembled for maintenance and or repair/replacement activities. Consequently, the INEEL staff believes that the surface examinations performed on the accessible welds, coupled with examinations performed when the pumps are disassembled, will detect significant patterns of degradation that may be present and will provide reasonable assurance of

the continued structural integrity of the subject pump casings. Therefore, it is recommended that the licensee's proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

2.8 Request for Request for Relief No. ISI-8, Use of Code Case N-532, *Alternative Requirements to Repair and Replacement Documentation Requirements and Inservice Summary Report Preparation and Submission as Required by IWA-4000 and IWA-6000, Section XI, Division 1*

Code Requirement: Article IWA-6000 requires the Owner to prepare and submit the Owners Report for Inservice Inspection, Form NIS-1, and the Owners Report for Repair or Replacements, Form NIS-2.

Licensee's Proposed Alternative: Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee proposes to implement the alternative requirements outlined in ASME Code Case N-532, *Alternative Requirements to Repair and Replacement Documentation Requirements and Inservice Summary Report Preparation and Submission as Required by IWA-4000 and IWA-6000*, in lieu of those specified in Article IWA-6000, 1989 Edition. The licensee stated:

"As an alternate to the requirements of IWA-4800, IWA-6000, and IWA-7528(8), NMPC will implement ASME Code Case N-532, "Alternative Requirements to Repair and Replacement Documentation Requirements and Inservice Summary Report Preparation and Submission as Required by IWA-4000 and IWA-6000[1], Division 1 (Note: 1 - ASME 1992 Edition Section XI)."

Licensee's Basis for Proposed Alternative (as stated):

"NMPC feels that the summary report required by IWA-6000 does not contain the information necessary to assure compliance with Code requirements, and therefore does not provide a compensation increase in the quality and/or safety at NMP1.

"The summary report does not furnish evidence of compliance with the ASME Boiler and Pressure Vessel Code, Section XI, Inspection Program B, percentage requirements as mandated by IWB-2412, IWC-2412, and IWD-2412.

"Class 3 components are excluded from the summary report submittal.

"Both a Final Report and Summary Report must be prepared, reviewed and approved in order to comply with Sub-articles IWA-6220 and IWA-6310 respectively.

"The preparation, review, approval and certification of each record and report, within the time frame of 90 days following completion of each refueling outage, increases substantially the costs associated with inservice inspection activities, and puts an unreasonable time constraint on NMPC without an increase in assurance of Code compliance.

"Code Case N-532, "Alternative Requirements to Repair and Replacement Documentation requirements and Inservice Summary Report Preparation and Submission as Required by IWA-4000 and IWA-6000, Section XI Division 1", has not been published in Regulatory Guide 1.147, dated May 1999 "Inservice Inspection Code Case Acceptability ASME Section XI, Division 1", however, the USNRC staff has approved it's use at other nuclear stations.

"The information provided in the documentation pertaining to the use of Code Case N-532, can be used in the same manner to assess the safety implications of Code activities performed during the outage. A review using the information as prescribed by the Code Case will, therefore, provide the same or improved level of quality and safety as reviews that may be conducted using the Code reporting requirements."

Evaluation: The INEEL staff reviewed the proposed alternative documentation requirements of Code Case N-532 and determined that although the required forms have changed, the information required by the Code remains available for review. Code Case N-532 requires preparation of the Repair/Replacement Certification Record, Form NIS-2A. The completed Form NIS-2A shall be certified by an Authorized Nuclear Inservice Inspector (ANII) as defined in ASME Code, Section XI, IWA-2130 and shall be maintained by the Owner. Furthermore, the Owner's Activity Report Form, OAR-1 shall be prepared and certified by an ANII upon completion of each refueling outage. The OAR-1 form shall contain an abstract of applicable examinations and tests, a list of item(s) with flaws or relevant conditions that require evaluation to determine acceptability for continued service, and an abstract of repairs, replacements and corrective measures performed as a result of unacceptable flaws or relevant conditions. Hence, the information provided in the documentation required by Code Case N-532 can be used to assess the safety implications of Code activities performed during an outage.

A review using the information as prescribed by the Code Case will, therefore, provide the same or improved level of quality and safety as reviews that may be conducted using the Code reporting requirements. In addition, more detailed information pertaining to a specific concern may be identified and requested by the NRC staff if it is deemed necessary. Therefore, it is recommended that the use of this alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the third-ten year inspection interval, or until Code Case N-532 is approved for general use by reference in 10 CFR 50.55a (previously Regulatory Guide 1.147). After that time, the licensee must follow the conditions, if any, specified in the regulation.

2.9 Request for Relief No. ISI-10 Revision 1[6], Use of Code Case N-573, *Transfer of Procedure Qualification Records Between Owners, Section XI, Division 1*

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[6] [redacted]

Code Requirement: Paragraph IWA-4400(a) requires welding (including brazing) to be performed in accordance with welding procedure specifications (WPS) that have been qualified by the Owner or repair organization in accordance with the requirements of the codes specified in the repair program in accordance with paragraph IWA-4120.

Licensee's Proposed Alternative: Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee has requested relief from the Code's requirements applicable to the welding and brazing procedure qualification records for Class 1, 2, and 3 components and proposed to implement Code Case N-573, *Transfer of Procedure Qualification Records Between Owners, Section XI, Division 1*. The licensee stated:

"The following alternative testing requirements will be implemented as defined by ASME Section XI Code Case N-573, Transfer of Procedure Qualification Records Between Owners, Section XI, Division 1.

(a) The Owner that performed the procedure qualification test shall certify, by signing the PQR, that testing was performed in accordance with Section IX.

(b) The Owner that performed the procedure qualification test shall certify, in writing, that the procedure qualification was conducted in accordance with a Quality Assurance Program that satisfies the requirements of IWA-1400.

(c) The Owner accepting the completed PQR shall accept responsibility for obtaining any additional supporting information needed for WPS development.

(d) The Owner accepting the completed PQR shall document, on each resulting WPS, the parameters applicable to welding. Each WPS shall be supported by all necessary PQR's.

(e) The Owner accepting the completed PQR shall accept responsibility for the PQR. Acceptance shall be documented by the Owner's approval of each WPS that references the PQR.

(f) The Owner accepting the completed PQR shall demonstrate technical competence in application of the received PQR by completing a performance qualification test using the parameters of a resulting WPS.

(g) The Owner may accept and use a PQR only when it is received directly from the Owner that certified the PQR.

(h) Use of this Case shall be shown on the NIS-2 form documenting welding or brazing."

Licensee's Basis for Proposed Alternative (as stated):

"The basis for this relief is to implement ASME Code Case N-573, which eliminates the redundancy currently required by the Code for each organization

to independently qualify all welding procedures even though they have met the qualification process at another facility. Code Case N-573 recognizes and addresses this fact and proposes an alternative which maintains an acceptable level of quality and safety."

Evaluation: IWA-4400(a) requires that all welding be performed in accordance with Welding Procedure Specifications (WPS) that have been qualified by the Owner or repair organization in accordance with the requirements of the codes specified in the Repair Program, per IWA-4120. The licensee has proposed the use of Code Case N-573, *Transfer of Procedure Qualification Records Between Owners*. This Code Case essentially allows the use of a welding or brazing procedure qualification record (PQR) qualified by one Owner to be used by another Owner for the development of the WPS. The specific requirements listed in Code Case N-573 shall be met by the Owner that performed the procedure qualification, and by the Owner intending to use the PQR.

It is the opinion of the staff that qualification of a procedure for the purpose of joining materials by either welding or brazing may be performed by any Owner provided the applicable requirements for procedure qualification are maintained. Furthermore, Owners may use procedures qualified by other Owners provided the conditions/requirements listed in Code Case N-573 are met. The licensee has committed to comply with requirements specified in Code Case N-573. Therefore, the proposed alternative provides an acceptable level of quality and safety and the use of this alternative should be authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the third inspection interval at NMP1, or until Code Case N-573, *Transfer of Procedure Qualification Records Between Owners*, Section XI, Division 1, is approved for general use by reference in 10 CFR 50.55a (previously Regulatory Guide 1.147). After that time, the licensee must follow the conditions, if any, specified in the regulation.

2.10 Request for Relief No. ISI-11, Examination Category B-G-1, Item B6.10, Reactor Vessel Closure Head Nuts

Code Requirement: Examination B-G-1, Item B6.10 requires 100% surface examination of the reactor vessel closure head nuts.

Licensee's Proposed Alternative: In accordance with 10 CFR 50.55a(a)(3)(i), the licensee proposed an alternative to performing 100% surface examination of the reactor vessel closure head nuts. The licensee stated:

"NMPC proposes to utilize the Visual VT-1 examination requirements and acceptance criteria of the 1989 Addenda of Section XI for Reactor Vessel Closure Head Nuts, in lieu of the surface examination requirements of the 1989 Edition with no acceptance criteria.

"The extent of examination performed will provide an acceptable level of quality and safety."

Licensee's Basis for Proposed Alternative (as stated):

"Due to the closure head nuts distinct size and geometric configuration, surface (magnetic particle) examination methods as required by IWB-2500-1 (89

Edition), added considerable costs associated with removal, preparation (both post and pre-cleaning), and examination time with little or no compensating increase in the quality and safety of the plant.

"The 1989 Edition of Section XI does not provide acceptance criteria for the mandated surface examination of Table IWB-2500-1.

"ASME Section XI Subcommittee recognized this minimal increase in quality by mandating a surface examination over a visual examination. The 1989 Addenda, Table IWB-2500-1 was changed by requiring a Visual (VT-1) examination of the Reactor Vessel Closure Head Nuts, which also referenced acceptance criteria for VT-1 examination of bolting greater than 2 inches.

"Both the visual and magnetic particle examination address the examination on the surface of the component. The additional subsurface depth of the magnetic particle examination over the visual examination of the surface does not provide a substantial increase in the level of quality and safety."

Evaluation: The Code requires 100% surface examination of RPV closure head nuts. As an alternative, the licensee has proposed to perform a VT-1 visual examination of RPV closure head nuts in lieu of the Code-required surface examination. All Items in Examination Category B-G-1 except the RPV closure head nuts and the closure studs (when removed) require VT-1 visual examinations and/or volumetric examination (as applicable).

Typical conditions that would require corrective action prior to putting closure head nuts back into service would include corrosion, deformed or sheared threads, deformation, and degradation (i.e., boric acid attack). Surface examination procedures are typically qualified for the detection of linear flaws (cracks) and have acceptance criteria specifying only rejectable linear flaw lengths. Acceptance criteria for surface examinations are not provided in the 1989 Edition of the Code, Item B6.10, as they were in the course of preparation when the Code was published. Without clearly defined acceptance criteria, conditions that require corrective measures may not be adequately addressed. The 1989 Addenda of Section XI addresses these problems by changing the requirement for the subject reactor pressure vessel closure head nuts from surface to VT-1 visual examination and providing appropriate acceptance criteria.

Article IWB-3000, Acceptance Standards, IWB-3517.1, Visual Examination, VT-1, describes conditions that require corrective action prior to continued service for bolting and associated nuts. One of these requirements is to compare crack-like flaws to the flaw standards of IWB-3515 for acceptance. The VT-1 visual examination acceptance criteria includes evaluation of crack-like indications and other conditions requiring corrective action, such as deformed or sheared threads, localized corrosion, deformation of part, and other degradation mechanisms. Therefore, the VT-1 visual examination provides a comprehensive assessment of the condition of the closure head nut. As a result, the INEEL staff believes that VT-1 visual examination provides an acceptable level of quality and safety.

Based on the comprehensive assessment that the VT-1 visual examination provides, and considering that the 1989 Addenda and later editions of the Code require only a

VT-1 visual examination on reactor pressure vessel closure head nuts, it is concluded that an acceptable level of quality and safety will be provided by the proposed alternative. Therefore, it is recommended that the proposed VT-1 visual examination be authorized pursuant to 10 CFR 50.55a(a)(3)(i).

3. CONCLUSION

The INEEL staff evaluated the licensee's submittal and concluded that certain inservice examinations cannot be performed to the extent required by the Code at the Nine Mile Point Unit 1. For Requests for Relief ISI-1, ISI-4, ISI-8, ISI-10, Revision 1 and ISI-11, the licensee's proposed alternative to the Code requirements provides an acceptable level of quality and safety. Therefore, it is recommended that the proposed alternatives be authorized pursuant to 10 CFR 50.55a(a)(3)(i).

For Request for Relief ISI-7, it is concluded that the Code requirements would result in a hardship without a compensating increase in the level of quality and safety. Therefore, it is recommended that these proposed alternatives be authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

For Requests for Relief ISI-2, ISI-3, ISI-5 Revision 1, and ISI-6, Revision 1, it is concluded that the Code requirements are impractical for the subject welds. Therefore, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).