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10 CFR 50.55a

RS-08-156
December 3, 2008

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Clinton Power Station, Unit 1
Facility Operating License No. NPF-62
NRC Docket No. 50-461

Subject: Proposed Alternative to 10 CFR 50.55a Examination Requirements for Reactor Pressure Vessel Weld Inspections

In accordance with 10 CFR 50.55a, "Codes and standards," paragraph (a)(3)(i), AmerGen Energy Company, LLC (AmerGen), requests NRC approval of the proposed alternative to American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, Sub Article IWB-2500 to allow reduced requirements for nozzle-to-vessel weld and inner radius examinations. This alternative is requested for the second 10-year interval of the Inservice Inspection Program for the Clinton Power Station (CPS).

The details of the 10 CFR 50.55a proposed alternative are enclosed as Attachment 1, and the components affected by this request are tabulated in Attachment 2. The NRC provided a Safety Evaluation approving the generic technical basis and acceptability criteria for application of ASME Code Case N-702, "Alternative Requirements for Boiling Water Reactor (BWR) Nozzle Inner Radius and Nozzle-to-Shell Welds, Section XI, Division 1," on December 19, 2007, which AmerGen has followed as detailed in the attached request. The responses to plant specific applicability that this Safety Evaluation requires are included in Attachment 3.

AmerGen requests approval of this request by December 3, 2009, to support planning for the twelfth refueling outage (C1R12) scheduled for January 2010. This letter contains no new regulatory commitments.

If you have any questions concerning this letter, please contact Mr. Timothy A. Byam at (630) 657-2804.

Respectfully,

Patrick R. Simpson
Manager – Licensing

Attachment 1: 10 CFR 50.55a Request Number 4214
Attachment 2: Table of ASME Code Components Affected
Attachment 3: Responses to NRC Plant Specific Applicability

ATTACHMENT 1
10 CFR 50.55a Request
Regarding Alternative Provides Acceptable Level Of Quality And Safety
(10 CFR 50.55a(a)(3)(i))

10 CFR 50.55a Request Number 4214

1. ASME Code Component(s) Affected

Code Class:	1
Component Numbers:	Nozzles N1, N2, N3, N5, N6, N7, N8, N9, and N16 (See Attachment 2 for specific nozzle identification numbers)
Examination Category:	B-D
Item Number:	B3.90 and B3.100
Description:	Alternative to Table IWB-2500-1 (Inspection Program B)

2. Applicable Code Edition and Addenda

Clinton Power Station (CPS) is currently in its second 10-year inspection interval and complies with the 1989 Edition of Section XI of the ASME Code. Additionally, for ultrasonic examinations, Section XI, Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems," of the 1995 Edition, with the 1996 Addenda, is implemented as required and modified by 10 CFR 50.55a(b)(2)(xv).

3. Applicable Code Requirement

Class 1 nozzle-to-vessel weld and nozzle inner radii examination requirements are given in Subsection IWB, Table IWB-2500-1, "Examination Category B-D Full Penetration Welds of Nozzles in Vessels – Inspection Program B," Item Numbers B3.90 and B3.100, respectively. The method of examination is volumetric. All nozzles with full penetration welds to the vessel shell (or head) and integrally cast nozzles must be examined each interval. All of the nozzles identified in Attachment 2 are full penetration welds.

4. Reason for Request

The Class 1 nozzle-to-vessel weld and nozzle inner radii examinations are scheduled for examination prior to the end of the current inspection interval at CPS. The proposed alternative provides an acceptable level of quality and safety and the reduction in scope will provide for a dose savings of about 25 Rem.

5. Proposed Alternative and Basis for Use

Proposed Alternative:

Pursuant to 10 CFR 50.55a(a)(3)(i), relief is requested from performing the required examinations on 100% of the identified nozzles. Alternatively, in accordance with Code Case N-702 (Reference 2), CPS proposes to examine a minimum of 25% of the nozzle

inner radii and nozzle-to-vessel welds, including at least one nozzle from each system and nominal pipe size. For each of the identified nozzles, both the inner radius and the nozzle-to-shell weld would be examined. As a minimum, the following nozzles would be selected for examination: one of the two 20" recirculation outlet nozzles (i.e., N1); three of the ten 10" recirculation inlet nozzles (i.e., N2); one of the four 24" main steam nozzles (i.e., N3); one of the two 12" core spray nozzles (i.e., N5); one of the three 10" low pressure coolant injection nozzles (i.e., N6); one of the two 6" head spray nozzles (i.e., N7 and N8); one of the two 4" jet pump instrumentation nozzles (i.e., N9); and the vibration instrumentation nozzle (i.e., N16).

Code Case N-702 proposes that visual examination (i.e., VT-1) may be used in lieu of volumetric examination for the nozzle inner radii (i.e., Item B3.100). Note, however, that CPS is not currently using ASME Code Case N-648-1 on enhanced magnification visual examination and has no plans of using this Code Case in the future. CPS will continue to perform volumetric examinations of all required nozzle inner radii.

Basis for Use:

The Electric Power Research Institute (EPRI) Technical Report 1003557, "BWRVIP-108: BWR Vessel and Internals Project, Technical Basis for the Reduction of Inspection Requirements for the Boiling Water Reactor Nozzle-to-Vessel Shell Welds and Nozzle Blend Radii," (Reference 1) provides the basis for Code Case N-702. The EPRI report found that failure probabilities due to a low temperature overpressure event at the nozzle blend radius region and nozzle-to-vessel shell weld are very low (i.e., $< 1 \times 10^{-6}$ for 40 years) with or without any inservice inspection.

On December 19, 2007, the NRC issued a Safety Evaluation (SE) approving the use of BWRVIP-108 as a basis for using Code Case N-702 (Reference 3). In Reference 3, Section 5.0, "Plant Specific Applicability," it states that licensees who plan to request relief from the ASME Code Section XI requirements for RPV nozzle-to-vessel shell welds and nozzle inner radius sections may reference the BWRVIP-108 report as the technical basis for the use of ASME Code Case N-702 as an alternative. However, each licensee should demonstrate the plant-specific applicability of the BWRVIP-108 report to their units in the relief request by showing that the general and nozzle-specific criteria addressed below are satisfied:

(1) The maximum Reactor Pressure Vessel (RPV) heatup/cooldown rate is limited to less than 115 °F/hour;

(2) For the Recirculation Inlet Nozzles, the following criteria must be met:

a. $(pr/t)/C_{RPV} < 1.15$

b. $[p(ro^2+ri^2)/(ro^2-ri^2)]/C_{NOZZLE} < 1.15$

(3) For the Recirculation Outlet Nozzles, the following criteria must be met:

a. $(pr/t)/C_{RPV} < 1.15$

b. $[p(ro^2+ri^2)/(ro^2-ri^2)]/C_{NOZZLE} < 1.15$

Demonstration of how CPS meets the NRC plant-specific applicability is provided in Attachment 3 to this letter. Based upon all RPV nozzle-to-vessel shell welds and nozzle inner radii sections meeting the NRC plant-specific criteria, Code Case N-702 is applicable to CPS.

Therefore, use of Code Case N-702 provides an acceptable level of quality and safety pursuant to 10 CFR 50.55a(a)(3)(i) for all RPV nozzle-to-vessel shell welds and nozzle inner radii sections.

6. Duration of Proposed Alternative

The proposed alternative is requested to be utilized for the remainder of the CPS second 10-year inspection interval.

7. Precedents

A similar request was approved for use at Duane Arnold Energy Center on August 29, 2008 (Reference 4).

8. References

1. EPRI Technical Report 1003557, "BWRVIP-108: BWR Vessel and Internals Project Technical Basis for the Reduction of Inspection Requirements for the Boiling Water Reactor Nozzle-to-Vessel Shell Welds and Nozzle Blend Radii," dated October 2002
2. ASME Boiler and Pressure Vessel Code, Code Case N-702, "Alternative Requirements for Boiling Water Reactor (BWR) Nozzle Inner Radius and Nozzle-to-Shell Welds, Section XI, Division 1," dated February 20, 2004
3. Letter from Matthew A. Mitchell (NRR), to Rick Libra, BWRVIP Chairman, "Safety Evaluation of Proprietary EPRI Report, 'BWR Vessel and Internals Project, Technical Basis for the Reduction of Inspection Requirements for the Boiling Water Reactor Nozzle-to-Vessel Shell Welds and Nozzle Inner Radius (BWRVIP-108),'" dated December 19, 2007
4. Letter from Lois James (NRR) to Richard L. Anderson (Duane Arnold Energy Center), "Duane Arnold Energy Center – Safety Evaluation for Request for Alternative to Reactor Pressure Vessel Nozzle to Vessel Weld and Inner Radius Examinations (TAC NO. MD8193)," dated August 29, 2008

Attachment 2
Table of ASME Code Components Affected
Page 1 of 2

IDENTIFICATION NUMBER	WELD DESCRIPTION	Code Category	Item Number
N1A	20" Recirculation Outlet Nozzle N1A to Vessel Weld	B-D	B3.90
N1A-IRS	20" Recirculation Outlet Nozzle N1A Inner Radius	B-D	B3.100
N1B	20" Recirculation Outlet Nozzle N1B to Vessel Weld	B-D	B3.90
N1B-IRS	20" Recirculation Outlet Nozzle N1B Inner Radius	B-D	B3.100
N2A	10" Recirculation Inlet Nozzle N2A to Vessel Weld	B-D	B3.90
N2A-IRS	10" Recirculation Inlet Nozzle N2A Inner Radius	B-D	B3.100
N2B	10" Recirculation Inlet Nozzle N2B to Vessel Weld	B-D	B3.90
N2B-IRS	10" Recirculation Inlet Nozzle N2B Inner Radius	B-D	B3.100
N2C	10" Recirculation Inlet Nozzle N2C to Vessel Weld	B-D	B3.90
N2C-IRS	10" Recirculation Inlet Nozzle N2C Inner Radius	B-D	B3.100
N2D	10" Recirculation Inlet Nozzle N2D to Vessel Weld	B-D	B3.90
N2D-IRS	10" Recirculation Inlet Nozzle N2D Inner Radius	B-D	B3.100
N2E	10" Recirculation Inlet Nozzle N2E to Vessel Weld	B-D	B3.90
N2E-IRS	10" Recirculation Inlet Nozzle N2E Inner Radius	B-D	B3.100
N2F	10" Recirculation Inlet Nozzle N2F to Vessel Weld	B-D	B3.90
N2F-IRS	10" Recirculation Inlet Nozzle N2F Inner Radius	B-D	B3.100
N2G	10" Recirculation Inlet Nozzle N2G to Vessel Weld	B-D	B3.90
N2G-IRS	10" Recirculation Inlet Nozzle N2G Inner Radius	B-D	B3.100
N2H	10" Recirculation Inlet Nozzle N2H to Vessel Weld	B-D	B3.90
N2H-IRS	10" Recirculation Inlet Nozzle N2H Inner Radius	B-D	B3.100
N2J	10" Recirculation Inlet Nozzle N2J to Vessel Weld	B-D	B3.90
N2J-IRS	10" Recirculation Inlet Nozzle N2J Inner Radius	B-D	B3.100
N2K	10" Recirculation Inlet Nozzle N2K to Vessel Weld	B-D	B3.90

IDENTIFICATION NUMBER	WELD DESCRIPTION	Code Category	Item Number
N2K-IRS	10" Recirculation Inlet Nozzle N2K Inner Radius	B-D	B3.100
N3A	24" Main Steam Nozzle N3A to Vessel Weld	B-D	B3.90
N3A-IRS	24" Main Steam Nozzle N3A Inner Radius	B-D	B3.100
N3B	24" Main Steam Nozzle N3B to Vessel Weld	B-D	B3.90
N3B-IRS	24" Main Steam Nozzle N3B Inner Radius	B-D	B3.100
N3C	24" Main Steam Nozzle N3C to Vessel Weld	B-D	B3.90
N3C-IRS	24" Main Steam Nozzle N3C Inner Radius	B-D	B3.100
N3D	24" Main Steam Nozzle N3D to Vessel Weld	B-D	B3.90
N3D-IRS	24" Main Steam Nozzle N3D Inner Radius	B-D	B3.100
N5A	12" Core Spray Nozzle N5A to Vessel Weld	B-D	B3.90
N5A-IRS	12" Core Spray Nozzle N5A Inner Radius	B-D	B3.100
N5B	12" Core Spray Nozzle N5B to Vessel Weld	B-D	B3.90
N5B-IRS	12" Core Spray Nozzle N5B Inner Radius	B-D	B3.100
N6A	10" Low Pressure Core Injection Nozzle N6A to Vessel Weld	B-D	B3.90
N6A-IRS	10" Low Pressure Core Injection Nozzle N6A Inner Radius	B-D	B3.100
N6B	10" Low Pressure Core Injection Nozzle N6B to Vessel Weld	B-D	B3.90
N6B-IRS	10" Low Pressure Core Injection Nozzle N6B Inner Radius	B-D	B3.100
N6C	10" Low Pressure Core Injection Nozzle N6C to Vessel Weld	B-D	B3.90
N6C-IRS	10" Low Pressure Core Injection Nozzle N6C Inner Radius	B-D	B3.100
N7	6" Top Head Spray Nozzle N7 to Vessel Weld	B-D	B3.90
N7-IRS	6" Top Head Spray Nozzle N7 Inner Radius	B-D	B3.100
N8	6" Top Head Spare Nozzle N8 to Vessel Weld	B-D	B3.90
N8-IRS	6" Top Head Spare Nozzle N8 Inner Radius	B-D	B3.100
N9A	4" Jet Pump Instrumentation Nozzle N9A to Vessel Weld	B-D	B3.90
N9A-IRS	4" Jet Pump Instrumentation Nozzle N9A Inner Radius	B-D	B3.100
N9B	4" Jet Pump Instrumentation Nozzle N9B to Vessel Weld	B-D	B3.90
N9B-IRS	4" Jet Pump Instrumentation Nozzle N9B Inner Radius	B-D	B3.100
N16	Vibration Instrumentation Nozzle to Vessel Weld	B-D	B3.90
N16-IRS	Vibration Instrumentation Nozzle Inner Radius	B-D	B3.100

Attachment 3
Responses to NRC Plant Specific Applicability

1. The maximum Reactor Pressure Vessel (RPV) heatup/cooldown rate is limited to less than 115 °F/hour.

   This criterion is met by adherence to Clinton Power Station Technical Specification 3.4.11, "Reactor Coolant System Pressure/Temperature Limits," Surveillance Requirement 3.4.11.1 which requires verification that the Reactor Coolant System heatup and cooldown rates are limited to less than or equal to 100 °F in any one hour period and, less than or equal to 20 °F in any one hour period during RPV pressure testing.

2. For the Reactor Recirculation Inlet (N2) Nozzles $(pr/t)/C_{RPV}$ must be less than 1.15, where:

p = normal RPV pressure =	1025 psig
r = RPV inner radius =	110.19 inches
t = RPV wall thickness =	6.1 inches
C_{RPV} =	19332

   Result: $(pr/t)/C_{RPV} = 0.96$

3. For the Reactor Recirculation Outlet (N1) Nozzles, $(pr/t)/C_{RPV}$ must be less than 1.15, where:

p = normal RPV pressure =	1025 psig
r = RPV inner radius =	110.19 inches
t = RPV wall thickness =	6.1 inches
C_{RPV} =	16171

   Result: $(pr/t)/C_{RPV} = 1.14$

4. For the Reactor Recirculation Inlet (N2) Nozzles $[p(ro^2+ri^2)/(ro^2-ri^2)]/C_{NOZZLE}$ must be less than 1.15, where:

p = normal RPV pressure =	1025 psig
ro = nozzle outlet radius =	11.69 inches
ri = nozzle inner radius =	5.81
C_{NOZZLE} =	1637

   Result: $[p(ro^2 + ri^2)/(ro^2 - ri^2)]/C_{NOZZLE} = 1.04$

5. For the Reactor Recirculation Outlet (N1) Nozzles $[p(ro^2+ri^2)/(ro^2-ri^2)]/C_{NOZZLE}$ must be less than 1.15, where:

p = normal RPV pressure =	1025 psig
ro = nozzle outlet radius =	16.3125 inches
ri = nozzle inner radius =	9.0 inches
C_{NOZZLE} =	1977

   Result: $[p(ro^2 + ri^2)/(ro^2 - ri^2)]/C_{NOZZLE} = 0.97$