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10 CFR 50.55a

February 1, 2010

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

Limerick Generating Station, Units 1 and 2
Facility Operating License Nos. NPF-39 and NPF-85
NRC Docket Nos. 50-352 and 50-353

Subject: Submittal of Relief Request I3R-14 Concerning Nozzle-to-Vessel Weld and Inner Radii Examinations

In accordance with 10 CFR 50 55a, "Codes and standards," paragraph (a)(3)(i), Exelon Generation Company, LLC (EGC), is requesting relief from the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components." Relief Request I3R-14 proposes an alternative to the requirements contained in Table IWB-2500-1 concerning nozzle-to-vessel weld and nozzle inner radii examination requirements.

This relief applies to the third 10-year Inservice Inspection (ISI) interval. The third interval for Limerick Generating Station (LGS), Units 1 and 2 began on February 1, 2007 and will conclude January 31, 2017. The third 10-year ISI interval complies with the ASME B&PV Code, Section XI, 2001 Edition through 2003 Addenda.

We request your review and approval by February 1, 2011.

No regulatory commitments are contained in this letter.

Should you have any questions concerning this letter, please contact Tom Loomis at (610) 765-5510.

Sincerely,

Pamela B. Cowan
Director – Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Attachment: Relief Request I3R-14

cc: USNRC Region I, Regional Administrator
USNRC Senior Resident Inspector, LGS
USNRC Project Manager, LGS
R. R. Janati, Bureau of Radiation Protection

Attachment

Relief Request I3R-14

1.0 ASME CODE COMPONENTS AFFECTED

Code Class:	1
Component Numbers:	Reactor Vessel Nozzles: N2, N3, N5, N6, N7, N8, and N17 (See Enclosure 1 for complete list of nozzle identifications)
Examination Category:	B-D (Inspection Program B)
Item Number:	B3.90 and B3.100
Description:	Alternative to ASME Section XI, Table IWB-2500-1

2.0 APPLICABLE CODE EDITION AND ADDENDA

The third 10-year Inservice Inspection (ISI) Program at Limerick Generating Station (LGS), Units 1 and 2 is based on the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI, 2001 Edition through the 2003 Addenda. Additionally, for ultrasonic examinations, ASME Section XI, Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems," of the 2001 Edition is implemented, as required and modified by 10 CFR 50.55a(b)(2)(xv).

3.0 APPLICABLE CODE REQUIREMENTS

The applicable requirements are contained in Table IWB-2500-1, "Examination Category B-D, Full Penetration Welded Nozzle in Vessels – Inspection Program B." Class 1 nozzle-to-vessel weld and nozzle inner radii examination requirements are delineated in Item Number B3.90, "Nozzle-to-Vessel Welds," and B3.100, "Nozzle Inside Radius Section." The required method of examination is volumetric. All nozzles with full penetration welds to the vessel shell (or head) and integrally cast nozzles are examined each interval.

All of the nozzle assemblies identified in Enclosure 1 are full penetration welds.

4.0 REASON FOR REQUEST

Enclosure 1 provides a complete listing of the applicable Reactor Pressure Vessel (RPV) nozzles for LGS, Units 1 and 2.

The proposed alternative provides an acceptable level of quality and safety, and the reduction in scope could provide a dose savings of as much as 24.1 Person-Rem for Unit 1 and 11.9 Person-Rem for Unit 2 over the remainder of the interval.

5.0 PROPOSED ALTERNATIVE AND BASIS FOR USE

In accordance with 10 CFR 50.55a(a)(3)(i), relief is requested from performing the required examinations on 100 percent of the nozzle assemblies identified in Tables 5-1 and 5-2 below (see Enclosure 1 for complete list of RPV Nozzles). As an alternative for all welds and inner radii identified in Tables 5-1 and 5-2, Exelon Generation Company, LLC

(EGC) proposes to examine a minimum of 25 percent of the LGS, Units 1 and 2 nozzle-to-vessel welds and inner radii sections, including at least one nozzle from each system and nominal pipe size, in accordance with Code Case N-702 ("Alternative Requirements for Boiling Water Reactor (BWR) Nozzle Inner Radius and Nozzle-to-Shell Welds Section XI, Division 1"). For the nozzle assemblies identified in Enclosure 1, this would mean 25 percent from each of the groups identified below:

Table 5-1
LGS, Unit 1 Summary

Group	Total Number	Minimum Number to be Examined	Comments*
Recirculation Inlet (N2)	10	3	Two (2) nozzles inspected this interval (two (2) completed in 1R12 (2008))
Main Steam (N3)	4	1	One (1) nozzle inspected this interval (one (1) completed in 1R12 (2008))
Core Spray (N5)	2	1	Two (2) nozzles inspected this interval (two (2) completed in 1R12 (2008))
Nozzles On Top Head (N6 and N7)	3	1	No nozzles have been inspected this interval
Jet Pump Instrument (N8)	2	1	No nozzles have been inspected this interval
Residual Heat Removal (N17)	4	1	One (1) nozzle inspected this interval (one (1) completed in 1R12 (2008))

* The nozzle-to-vessel weld and inner radius examinations are performed together.

Table 5-2
LGS, Unit 2 Summary

Group	Total Number	Minimum Number to be Examined	Comments*
Recirculation Inlet (N2)	10	3	Five (5) nozzles inspected this interval (two (2) completed in 2R09 (2007), and three (3) completed in 2R10 (2009))
Main Steam (N3)	4	1	Two (2) nozzles inspected this interval (two (2) completed in 2R09 (2007))
Core Spray (N5)	2	1	One (1) nozzle inspected this interval (one (1) completed in 2R09 (2007))
Nozzles On Top Head (N6 and N7)	3	1	No nozzles have been inspected this interval
Jet Pump Instrument (N8)	2	1	Two (2) nozzles inspected this interval (Two (2) completed in 2R10 (2009))
Residual Heat Removal (N17)	4	1	Two (2) nozzles inspected this interval (one (1) completed in 2R09 (2007), and one (1) completed in 2R10 (2009))

* The nozzle-to-vessel weld and inner radius examinations are performed together.

The exams in Tables 5-1 and 5-2 will be scheduled in accordance with Table IWB-2412-1, Inspection Program B.

Code Case N-702 stipulates that a VT-1 examination may be used in lieu of the volumetric examination for the inner radii (i.e., Item No. B3.100, "Nozzle Inside Radius Section"). This VT-1 examination is outlined in Code Case N-648-1 ("Alternative Requirements for Inner Radius Examinations of Class 1 Reactor Vessel Nozzles Section XI, Division 1"). However, EGC is not currently using Code Case N-648-1 at LGS for the identified components utilizing enhanced magnification visual examination, and has no plans of using Code Case N-648-1 on those components in the future. Volumetric examinations of all nozzle inside radius sections will be completed.

Electric Power Research Institute (EPRI) Technical Report 1003557, "BWRVIP-108: Boiling Water Reactor 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," provides the basis for Code Case N-702. The evaluation found that failure probabilities at the nozzle blend radius region and nozzle-to-vessel shell weld due to a Low Temperature Overpressure event are very low (i.e., $<1 \times 10^{-6}$ for 40 years) with or without inservice inspection. The report concludes that inspection of 25 percent of each nozzle type is technically justified.

This EPRI report was approved by the NRC in a Safety Evaluation (SE) dated December 19, 2007 (i.e., ADAMS Accession No. ML073600374). Section 5.0, "Plant-Specific Applicability," of the SE indicates that each licensee who plans to request relief from ASME Code, Section XI requirements for RPV nozzle-to-vessel shell welds and nozzle inner radii 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 criteria from the BWRVIP-108 report to its units in the relief request by showing that all the general and nozzle-specific criteria addressed below are satisfied (i.e., as described in Enclosure 2).

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

LGS, Units 1 and 2 Technical Specification (TS) 3.4.6.1, "Pressure/Temperature Limits," provides a limiting condition for operation (LCO) of 100°F in any 1-hour period. The heatup/cooldown rate is referenced in the LGS operating procedures. This heatup/cooldown rate is also described in the LGS Updated Final Safety Analysis Report (UFSAR), Section 5.3.3.6, "Operating Conditions."

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

a. $(pr/t)/C_{RPV}<1.15$; the calculation for the LGS, Units 1 and 2 N2 Nozzle results in 1.064, which is less than 1.15.

b. $[p(r_o^2 + r_i^2)/(r_o^2 - r_i^2)]/C_{NOZZLE}<1.15$; the calculation for the LGS, Units 1 and 2 N2 Nozzle results in 0.976, which is less than 1.15.

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

a. $(pr/t)/C_{RPV} < 1.15$; the calculation for the LGS, Units 1 and 2 N1 Nozzle results in 1.272, which is higher than 1.15.

b. $[p(r_o^2+r_i^2)/(r_o^2-r_i^2)]/C_{NOZZLE} < 1.15$; the calculation for the LGS, Units 1 and 2 N1 Nozzle results in 1.044, which is less than 1.15.

Based upon the above information, all LGS RPV nozzle-to-vessel shell full penetration welds and nozzle inner radii sections, with the exception of the Recirculation Outlet Nozzles, meet the general and nozzle-specific criteria in BWRVIP-108. Therefore, Code Case N-702 is applicable.

Therefore, use of Code Case N-702 provides an acceptable level of quality and safety in accordance with 10 CFR 50.55a(a)(3)(i) for all the RPV nozzle-to-vessel shell full penetration welds and nozzle inner radii sections, with the exception of the Recirculation Outlet Nozzles.

6.0 DURATION OF PROPOSED ALTERNATIVE

The third interval for LGS, Units 1 and 2 began on February 1, 2007, and will conclude January 31, 2017. The proposed alternative will be used for the remainder of the third 10-year interval of the LGS ISI Program.

7.0 PRECEDENTS

1. Letter from L. James (U.S. Nuclear Regulatory Commission) to R. 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.

2. Letter from R. Gibbs (U.S. Nuclear Regulatory Commission) to M. B. Bezilla (FirstEnergy Nuclear Operating Company), "Perry Nuclear Power Plant, Unit No. 1 – Request for Relief Related to Inservice Inspection Relief Request IR-054 (TAC NO. MD8458)," dated December 29, 2008.

Enclosure 1
Applicable LGS, Unit 1 Nozzles
Page 1 of 2

Component ID	Category Number	Item Number	System	Nominal Pipe Size	Comments
N2A Nozzle	B-D	B3.90	Recirc Inlet	12"	PDI examination 1R12 (2008)
N2A IRS*	B-D	B3.100	Recirc Inlet	12"	PDI examination 1R12 (2008)
N2B Nozzle	B-D	B3.90	Recirc Inlet	12"	
N2B IRS	B-D	B3.100	Recirc Inlet	12"	
N2C Nozzle	B-D	B3.90	Recirc Inlet	12"	
N2C IRS	B-D	B3.100	Recirc Inlet	12"	
N2D Nozzle	B-D	B3.90	Recirc Inlet	12"	
N2D IRS	B-D	B3.100	Recirc Inlet	12"	
N2E Nozzle	B-D	B3.90	Recirc Inlet	12"	
N2E IRS	B-D	B3.100	Recirc Inlet	12"	
N2F Nozzle	B-D	B3.90	Recirc Inlet	12"	PDI examination 1R12 (2008)
N2F IRS	B-D	B3.100	Recirc Inlet	12"	PDI examination 1R12 (2008)
N2G Nozzle	B-D	B3.90	Recirc Inlet	12"	
N2G IRS	B-D	B3.100	Recirc Inlet	12"	
N2H Nozzle	B-D	B3.90	Recirc Inlet	12"	
N2H IRS	B-D	B3.100	Recirc Inlet	12"	
N2J Nozzle	B-D	B3.90	Recirc Inlet	12"	
N2J IRS	B-D	B3.100	Recirc Inlet	12"	
N2K Nozzle	B-D	B3.90	Recirc Inlet	12"	
N2K IRS	B-D	B3.100	Recirc Inlet	12"	
N3A Nozzle	B-D	B3.90	Main Steam	26"	
N3A IRS	B-D	B3.100	Main Steam	26"	
N3B Nozzle	B-D	B3.90	Main Steam	26"	
N3B IRS	B-D	B3.100	Main Steam	26"	
N3C Nozzle	B-D	B3.90	Main Steam	26"	
N3C IRS	B-D	B3.100	Main Steam	26"	
N3D Nozzle	B-D	B3.90	Main Steam	26"	PDI examination 1R12 (2008)
N3D IRS	B-D	B3.100	Main Steam	26"	PDI examination 1R12 (2008)
N5A Nozzle	B-D	B3.90	Core Spray	10"	PDI examination 1R12 (2008)
N5A IRS	B-D	B3.100	Core Spray	10"	PDI examination 1R12 (2008)
N5B Nozzle	B-D	B3.90	Core Spray	10"	PDI examination 1R12 (2008)
N5B IRS	B-D	B3.100	Core Spray	10"	PDI examination 1R12 (2008)
N6A Nozzle	B-D	B3.90	Head Spray	6"	
N6A IRS	B-D	B3.100	Head Spray	6"	
N6B Nozzle	B-D	B3.90	Head Spray	6"	
N6B IRS	B-D	B3.100	Head Spray	6"	
N7A Nozzle	B-D	B3.90	Head Vent	6"	
N7A IRS	B-D	B3.100	Head Vent	6"	
N8A Nozzle	B-D	B3.90	Jet Pump Instrumentation	6"	
N8A IRS	B-D	B3.100	Jet Pump Instrumentation	6"	
N8B Nozzle	B-D	B3.90	Jet Pump Instrumentation	6"	
N8B IRS	B-D	B3.100	Jet Pump Instrumentation	6"	

* IRS - Inner Radius Section

Enclosure 1
Applicable LGS, Unit 1 Nozzles
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Component ID	Category Number	Item Number	System	Nominal Pipe Size	Comments
N17A IRS	B-D	B3.100	RHR	12"	
N17A Nozzle	B-D	B3.90	RHR	12"	
N17B IRS	B-D	B3.100	RHR	12"	PDI examination 1R12 (2008)
N17B Nozzle	B-D	B3.90	RHR	12"	PDI examination 1R12 (2008)
N17C IRS	B-D	B3.100	RHR	12"	
N17C Nozzle	B-D	B3.90	RHR	12"	
N17D IRS	B-D	B3.100	RHR	12"	
N17D Nozzle	B-D	B3.90	RHR	12"	

* IRS - Inner Radius Section

Enclosure 1
Applicable LGS, Unit 2 Nozzles
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Component ID	Category Number	Item Number	System	Nominal Pipe Size	Comments
N2A Nozzle	B-D	B3.90	Recirc Inlet	12"	PDI examination 2R10 (2009)
N2A IRS	B-D	B3.100	Recirc Inlet	12"	PDI examination 2R10 (2009)
N2B Nozzle	B-D	B3.90	Recirc Inlet	12"	
N2B IRS	B-D	B3.100	Recirc Inlet	12"	
N2C Nozzle	B-D	B3.90	Recirc Inlet	12"	
N2C IRS	B-D	B3.100	Recirc Inlet	12"	
N2D Nozzle	B-D	B3.90	Recirc Inlet	12"	PDI examination 2R10 (2009)
N2D IRS	B-D	B3.100	Recirc Inlet	12"	PDI examination 2R10 (2009)
N2E Nozzle	B-D	B3.90	Recirc Inlet	12"	
N2E IRS	B-D	B3.100	Recirc Inlet	12"	
N2F Nozzle	B-D	B3.90	Recirc Inlet	12"	
N2F IRS	B-D	B3.100	Recirc Inlet	12"	
N2G Nozzle	B-D	B3.90	Recirc Inlet	12"	
N2G IRS	B-D	B3.100	Recirc Inlet	12"	
N2H Nozzle	B-D	B3.90	Recirc Inlet	12"	PDI examination 2R09 (2007)
N2H IRS	B-D	B3.100	Recirc Inlet	12"	PDI examination 2R09 (2007)
N2J Nozzle	B-D	B3.90	Recirc Inlet	12"	PDI examination 2R09 (2007)
N2J IRS	B-D	B3.100	Recirc Inlet	12"	PDI examination 2R09 (2007)
N2K Nozzle	B-D	B3.90	Recirc Inlet	12"	PDI examination 2R10 (2009)
N2K IRS	B-D	B3.100	Recirc Inlet	12"	PDI examination 2R10 (2009)
N3A Nozzle	B-D	B3.90	Main Steam	26"	
N3A IRS	B-D	B3.100	Main Steam	26"	
N3B Nozzle	B-D	B3.90	Main Steam	26"	
N3B IRS	B-D	B3.100	Main Steam	26"	
N3C Nozzle	B-D	B3.90	Main Steam	26"	PDI examination 2R09 (2007)
N3C IRS	B-D	B3.100	Main Steam	26"	PDI examination 2R09 (2007)
N3D Nozzle	B-D	B3.90	Main Steam	26"	PDI examination 2R09 (2007)
N3D IRS	B-D	B3.100	Main Steam	26"	PDI examination 2R09 (2007)
N5A Nozzle	B-D	B3.90	Core Spray	10"	
N5A IRS	B-D	B3.100	Core Spray	10"	
N5B Nozzle	B-D	B3.90	Core Spray	10"	PDI examination 2R09 (2007)
N5B IRS	B-D	B3.100	Core Spray	10"	PDI examination 2R09 (2007)
N6A Nozzle	B-D	B3.90	Head Spray	6"	
N6A IRS	B-D	B3.100	Head Spray	6"	
N6B Nozzle	B-D	B3.90	Head Spray	6"	
N6B IRS	B-D	B3.100	Head Spray	6"	
N7A Nozzle	B-D	B3.90	Head Vent	6"	
N7A IRS	B-D	B3.100	Head Vent	6"	
N8A Nozzle	B-D	B3.90	Jet Pump Instrumentation	6"	PDI examination 2R10 (2009)
N8A IRS	B-D	B3.100	Jet Pump Instrumentation	6"	PDI examination 2R10 (2009)
N8B Nozzle	B-D	B3.90	Jet Pump Instrumentation	6"	PDI examination 2R10 (2009)
N8B IRS	B-D	B3.100	Jet Pump Instrumentation	6"	PDI examination 2R10 (2009)

* IRS - Inner Radius Section

Enclosure 1
Applicable LGS, Unit 2 Nozzles
Page 2 of 2

Component ID	Category Number	Item Number	System	Nominal Pipe Size	Comments
N17A IRS	B-D	B3.100	RHR	12"	
N17A Nozzle	B-D	B3.90	RHR	12"	
N17B IRS	B-D	B3.100	RHR	12"	PDI examination 2R10 (2009)
N17B Nozzle	B-D	B3.90	RHR	12"	PDI examination 2R10 (2009)
N17C IRS	B-D	B3.100	RHR	12"	
N17C Nozzle	B-D	B3.90	RHR	12"	
N17D IRS	B-D	B3.100	RHR	12"	PDI examination 2R09 (2007)
N17D Nozzle	B-D	B3.90	RHR	12"	PDI examination 2R09 (2007)

* IRS - Inner Radius Section

Enclosure 2
Plant Specific Applicability

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

LGS, Units 1 and 2 Technical Specification (TS) 3.4.6.1, "Pressure/Temperature Limits," provides a limiting condition for operation (LCO) of 100°F in any 1-hour period. The heatup/cooldown rate is referenced in the LGS operating procedures. This heatup/cooldown rate is also described in the LGS Updated Final Safety Analysis Report (UFSAR), Section 5.3.3.6, "Operating Conditions."

For Recirculation Inlet Nozzles (N2)

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

p=RPV Normal Operating Pressure	1045 psi
r=RPV inner radius	126.6875 in.
t=RPV wall thickness	6.4375 in.
C_{RPV}=	19332

$(pr/t)/C_{RPV} = 1.064 < 1.15$

(3) $[p(r_o^2 + r_i^2)/(r_o^2 - r_i^2)]/C_{NOZZLE} < 1.15$

p=RPV Normal Operating Pressure	1045 psi
r_o=nozzle outer radius	13.125 in.
r_i=nozzle inner radius	6 in.
C_{NOZZLE}	1637

$[p(r_o^2 + r_i^2)/(r_o^2 - r_i^2)]/C_{NOZZLE} = 0.976 < 1.15$

For Recirculation Outlet Nozzles (N1)

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

p=RPV Normal Operating Pressure	1045 psi
r=RPV inner radius	126.6875 in.
t=RPV wall thickness	6.4375 in.
C_{RPV}=	16171

$(pr/t)/C_{RPV} = 1.272 > 1.15$

(5) $[p(r_o^2 + r_i^2)/(r_o^2 - r_i^2)]/C_{NOZZLE} < 1.15$

p=RPV Normal Operating Pressure	1045 psi
r_o=nozzle outer radius	22.875 in.
r_i=nozzle inner radius	13.1 in.
C_{NOZZLE}	1977

$[p(r_o^2 + r_i^2)/(r_o^2 - r_i^2)]/C_{NOZZLE} = 1.044 < 1.15$