Michael P. Gallagher
Vice President
License Renewal

Exelon Nuclear
200 Exelon Way
Kennett Square, PA 19348

Telephone 610.765.5958
Fax 610.765.5658
www.exeloncorp.com
michaelp.gallagher@exeloncorp.com

Exelon Nuclear

10 CFR 50
10 CFR 51
10 CFR 54

May 7, 2012

U. S. Nuclear Regulatory Commission
Attention: 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: Responses to NRC Requests for Additional Information, dated April 30, 2012, related to the Limerick Generating Station License Renewal Application

Reference: 1. Exelon Generation Company, LLC letter from Michael P. Gallagher to NRC Document Control Desk, "Application for Renewed Operating Licenses", dated June 22, 2011
2. Letter from Robert F. Kuntz (NRC) to Michael P. Gallagher (Exelon), "Requests for Additional Information for the review of the Limerick Generating Station, Units 1 and 2, License Renewal Application (TAC Nos. ME6555, ME6556)", dated April 30, 2012

In the Reference 1 letter, Exelon Generation Company, LLC (Exelon) submitted the License Renewal Application (LRA) for the Limerick Generating Station, Units 1 and 2 (LGS). In the Reference 2 letter, the NRC requested additional information to support the staffs' review of the LRA.

Enclosed are the responses to these requests for additional information.

This letter and its enclosures contain no new or revised regulatory commitments.

If you have any questions, please contact Mr. Al Fulvio, Manager, Exelon License Renewal, at 610-765-5936.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 5-7-2012

Respectfully,

Michael P. Gallagher
Vice President - License Renewal Projects
Exelon Generation Company, LLC

Enclosure: Responses to Requests for Additional Information

cc: Regional Administrator – NRC Region I
NRC Project Manager (Safety Review), NRR-DLR
NRC Project Manager (Environmental Review), NRR-DLR
NRC Project Manager, NRR- DORL Limerick Generating Station
NRC Senior Resident Inspector, Limerick Generating Station
R. R. Janati, Commonwealth of Pennsylvania

Enclosure

Responses to Requests for Additional Information related to various sections of the LGS License Renewal Application (LRA)

RAI 3.1.1.97-1
RAI 3.1.1.97-2

RAI 3.1.1.97-1

Background

License renewal application (LRA) item number 3.1.1-97 addresses cracking due to stress corrosion cracking (SCC) and Intergranular stress corrosion cracking (IGSCC) of stainless steel and nickel alloy piping, piping components, and piping elements greater than or equal to 4 nominal pipe size (NPS). SRP-LR, Table 3.1-1, ID 97 and GALL Report, item IV.C1.R-21 recommend GALL AMP XI.M7, "BWR Stress Corrosion Cracking," and GALL AMP XI.M2, "Water Chemistry," to manage the aging effect of these components.

In comparison, LRA Table 3.1.2-1 (Page 3.1-37) relates nickel alloy piping, piping components, and piping elements to LRA item number 3.1.1-97, indicating that these components are subject to cracking due to SCC and IGSCC and the aging effect is managed by the One-Time Inspection program and the Water Chemistry program.

Issue

The LRA credits the One-Time Inspection Program rather than the BWR Stress Corrosion Cracking program to manage cracking due to SCC and IGSCC of the nickel alloy components. The staff noted that the One-Time Inspection program does not include periodic inspections that are included in the BWR Stress Corrosion Cracking program. In addition, the staff found a need to clarify whether or not any of these nickel alloy components is included in the scope of the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program, which includes periodic inspections. The LRA does not clearly indicate whether or not any of these nickel alloy components addressed under LRA Item Number 3.1.1-97 (LRA Page 3.1-37) is included in the scope of the BWR Stress Corrosion Cracking program or the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD program.

Request

1. Provide information to clarify why any of these nickel alloy components are not included in the scope of the BWR Stress Corrosion Cracking program or the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD program, which includes periodic inspections (for example, describe pipe size, location and ASME Code Classes of the components and the coolant temperature to which the components are exposed).

2. Justify why the One-Time Inspection program, which does not include periodic inspections, is adequate to manage cracking due to SCC and IGSCC of the nickel alloy components.

   As part of the response, clarify whether or not SCC or IGSCC has been observed in these components in order to demonstrate that LGS operating experience supports the adequacy of the One-Time Inspection program to manage the aging effect.

Exelon Response

1. The only nickel alloy components described in LRA Table 3.1.1, item number 3.1.1-97 are tubing sections within the HPCI steam supply flow elements. These tubing sections are 7/8-inch OD and are completely contained within the flow element housings. A carbon steel welding reducer is installed within the housing penetration to facilitate transition from the tubing/housing to instrumentation piping. These flow elements are within the ASME Code Class 1 section of the HPCI steam supply piping. The nickel alloy tubing is exposed to a reactor coolant environment at nominal 1035 psig and 550 degrees F. Since the tubing is

internal to the flow element housings, it is not a pressure-retaining component within the context of ASME Section XI, and is not within the scope of the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD program. The tubing sections are also less than 4-inch NPS, which also precludes them from being within the scope of the BWR Stress Corrosion Cracking program.

2. GALL Report AMP XI.M32, One-Time Inspection, Element 1, Scope of Program states that the program includes systems and components that are subject to aging management using the GALL AMP XI.M2, "Water Chemistry", and for which no aging effects have been observed or for which the aging effect is occurring very slowly and does not affect the component's intended function during the period of extended operation. The nickel alloy tubing sections within the HPCI steam supply flow elements are exposed to a reactor coolant environment within the scope of the Water Chemistry program. Review of LGS operating experience did not identify any indication of aging (cracking or loss of material) of the nickel alloy tubing within these flow elements. GALL Report AMP XI.M32 Element 4, Detection of Aging Effects, indicates that the One-Time Inspection program includes inspection and testing techniques that have a demonstrated history of effectiveness in managing aging effects including cracking and loss of material. The LGS Water Chemistry and One-Time Inspection programs are consistent with GALL Report AMPs XI.M2 and XI.M32, respectively, as described in LRA Sections B.2.1.2 and B.2.1.22. Therefore, the One-Time Inspection program in conjunction with the Water Chemistry program is adequate to manage cracking of the nickel alloy tubing sections within the HPCI steam supply flow elements.

RAI 3.1.1.97-2

Background

LRA item number 3.1.1-97 addresses cracking due to stress corrosion cracking (SCC) and intergranular stress corrosion cracking (IGSCC) of stainless steel and nickel alloy piping, piping components, and piping elements greater than or equal to 4 nominal pipe size (NPS). SRP-LR, Table 3.1-1, ID 97 and GALL Report, item IV.C1.R-21 recommends GALL AMP XI.M7, "BWR Stress Corrosion Cracking," and GALL AMP XI.M2, "Water Chemistry," to manage the aging effect of these components.

More specifically, LRA Table 3.1.2-1 (Page 3.1-40) relates the cast austenitic stainless steel (CASS) valve body to LRA Item Number 3.1.1-97, indicating that this component type is subject to cracking due to SCC and IGSCC and the aging effect is managed by the Water Chemistry program and the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD program.

Table IWB-2500-1 of the 2001 edition of the ASME Code Section XI with 2002 and 2003 addenda requires that the valve body welds of valves, NPS 4 or larger should be examined using volumetric examination in accordance with Examination Category B-M-1, Item No. B12.40.

Appendix VIII, Supplement 9 of the 2001 edition of the ASME Code Section XI, Division 1 with 2002 and 2003 addenda indicates that the qualification requirements for ultrasonic examination of cast austenitic piping welds are in the course of preparation. In addition, the "detection of aging effects" program element of GALL Report, AMP XI.M12, "Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS)," addresses inspection methods for CASS components by stating that current ultrasonic testing (UT) methodology cannot detect and size cracks in

CASS components; thus, enhanced visual examination (EVT-1) is used until qualified UT methodology for CASS can be established. GALL Report, AMP XI.M12 further states that a description of EVT-1 is found in Boiling Water Reactor Vessel and Internals Project (BWRVIP) -03 (Revision 6).

Issue

LRA Table 3.1.2-1 (Page 3.1-40) indicates that cracking due to SCC and IGSCC of CASS valve bodies is managed by the Water Chemistry program and the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD program. However, the LRA does not provide the following information that is necessary to determine the inspection method in accordance with the ASME Code Section XI: (1) the size of the CASS valve bodies and (2) whether or not the valve bodies have a weld. In addition, the LRA does not describe which inspection method(s) will be used to manage cracking due to SCC and IGSCC of these CASS valve bodies.

Request

1. Provide the following information to determine the inspection method in accordance with the ASME Code Section XI: (1) the size of the CASS valve bodies (for example, NPS 4 or larger than NPS 4), and (2) whether or not the valve bodies have a weld.

2. If the valve bodies contain welds, and in view that currently there is no qualified UT methodology for the detection of cracks in CASS piping welds, describe the inspection method that will be used to detect and manage cracking in these components and justify why the inspection method is adequate to detect and manage cracking due to SCC and IGSCC.

Exelon Response

1. The following valves associated with LRA Table 3.1.2-1 (Page 3.1-40) and discussed in LRA Table 3.1-1, Item Number 3.1.1-97 have CASS valve bodies.

Plant System	Valve Numbers	Size
Recirculation System	HV-043-1(2)F023A(B)	28-inch
Recirculation System	HV-043-1(2)F031A(B)	28-inch
Reactor Water Cleanup System	HV-044-1(2)F001	6-inch
Reactor Water Cleanup System	HV-044-1(2)F004	6-inch
Reactor Water Cleanup System	HV-044-1(2)F105	6-inch
Reactor Water Cleanup System	044-1(2)F027	6-inch
Residual Heat Removal	HV-051-1(2)F015A(B	12-inch
Residual Heat Removal	HV-051-1(2)F050A(B)	12-inch
Residual Heat Removal	051-1(2)F060A(B)	12-inch
Residual Heat Removal	051-1(2)F077	20-inch
Core Spray	HV-052-1(2)08	12-inch

All of the CASS valve bodies are greater than NPS 4-inch. None of these valve bodies have welds as described in ASME Code Section XI Table IWB-2500-1, Examination Category B-M-1 and referenced Figure IWB-2500-17.

2. Since none of the CASS valve bodies have welds, inspection per ASME Section XI, Table IWB-2500-1, Examination Category B-M-1, Item No. B12.40 is not required.