UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

December 29, 2016

Mr. Bryan C. Hanson
President and Chief Nuclear Officer
Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: SAFETY EVALUATION OF RELIEF REQUEST I4R-01 FOR THE FOURTH 10-YEAR INTERVAL OF THE INSERVICE INSPECTION PROGRAM FOR LIMERICK GENERATING STATION, UNITS 1 AND 2 (CAC NOS. MF7585 AND MF7586)

Dear Mr. Hanson:

By letter dated April 13, 2016, as supplemented by letters dated May 11, 2016; July 12, 2016; and September 19, 2016, Exelon Generation Company, LLC submitted Relief Requests I4R-01, I4R-02, I4R-05, I4R-06, I4R-07, I4R-08, I4R-09, I4R-10, I4R-11, I4R-12, and I4R-13, which proposed alternatives to certain requirements specified in the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) for the Limerick Generating Station (LGS), Units 1 and 2. The subject relief requests are for the fourth 10-year interval of the inservice inspection (ISI) program at LGS.

The purpose of this letter is to provide the results of the U.S. Nuclear Regulatory Commission (NRC) staff's review of Relief Request I4R-01, as documented in the enclosed safety evaluation (SE). Our SE concludes that the proposed alternative will provide an acceptable level of quality and safety. Therefore, pursuant to Section 50.55a(z)(1) of Title 10 of the *Code of Federal Regulations*, the proposed alternative is authorized for the fourth 10-year ISI interval at LGS.

All other ASME Code, Section XI requirements for which relief was not specifically requested and approved remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

In a letter dated November 21, 2016 (Agencywide Documents Access Management System Accession No. ML16301A401), the NRC staff authorized Relief Requests I4R-02 and I4R-10. The staff will provide separate correspondence regarding the review for Relief Requests I4R-05, I4R-06, I4R-07, I4R-08, I4R-09, I4R-11, I4R-12, and I4R-13.

If you have any questions concerning this matter, please contact the LGS Project Manager, Dr. V. Sreenivas at (301) 415-2597, or V.Sreenivas@nrc.gov.

Sincerely,

Michael L. Marshall, Jr. for

Stephen S. Koenick, Acting Chief
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-352 and 50-353

Enclosure:
Safety Evaluation

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO RELIEF REQUEST I4R-01 FOR THE

FOURTH 10-YEAR INTERVAL OF THE INSERVICE INSPECTION PROGRAM

EXELON GENERATION COMPANY, LLC

LIMERICK GENERATING STATION, UNITS 1 AND 2

DOCKET NOS. 50-352 AND 50-353

1.0 INTRODUCTION

By letter dated April 13, 2016, as supplemented by letters dated May 11, 2016; July 12, 2016; and September 19, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML16104A122, ML16132A441, ML16194A230, and ML16263A218, respectively), Exelon Generation Company, LLC (Exelon, the licensee) submitted Relief Requests I4R-01, I4R-02, I4R-05, I4R-06, I4R-07, I4R-08, I4R-09, I4R-10, I4R-11, I4R-12, and I4R-13, which proposed alternatives to certain requirements specified in the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) for the Limerick Generating Station (LGS), Units 1 and 2. The subject relief requests are for the fourth 10-year interval of the inservice inspection (ISI) program at LGS. The fourth 10-year ISI interval for LGS, Units 1 and 2, starts on February 1, 2017, and ends on January 31, 2027.

The purpose of this safety evaluation (SE) is to provide the results of the U.S. Nuclear Regulatory Commission (NRC or Commission) review of Relief Request I4R-01. In an SE dated November 21, 2016 (ADAMS Accession No. ML16301A401), the NRC staff documented its review of Relief Requests I4R-02 and I4R-10. The NRC staff's review for Relief Requests I4R-05, I4R-06, I4R-07, I4R-08, I4R-09, I4R-11, I4R-12, and I4R-13, will be documented in separate SEs.

2.0 REGULATORY EVALUATION

The ISI of ASME Code Class 1, 2, and 3 components is performed in accordance with the latest edition and addenda of the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," as required by Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(g), except where specific relief has been granted by the NRC pursuant to 10 CFR 50.55a(g)(6)(i). Pursuant to 10 CFR 50.55a(z), alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if: (1) the proposed alternatives would provide an acceptable level of quality and safety, or (2) compliance with the specified requirements would result in hardship or unusual difficulty, without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) must meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in Section XI of the ASME Code, to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulation requires that inservice examination of components and system pressure tests conducted during the first 10-year interval, and subsequent intervals, comply with the requirements of the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(a), 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed in 10 CFR 50.55a(b). The applicable Code of Record for the fourth 10-year ISI interval for LGS, Units 1 and 2, is the ASME Code, Section XI, 2007 Edition through 2008 Addenda.

3.0 TECHNICAL EVALUATION

3.1 Background

In Relief Request I4R-01, the licensee requested approval to continue to use the LGS risk-informed ISI (RI-ISI) program as an alternative to the requirements of 10 CFR 50.55a for the fourth 10-year ISI interval. The RI-ISI program for the fourth interval, as well as prior RI-ISI programs at LGS, were developed in accordance with the methodology contained in the NRC-approved Electric Power Research Institute (EPRI) Topical Report (TR) 112657, Revision B-A, "Revised Risk-Informed Inservice Inspection Evaluation Procedure," dated December 1999 (ADAMS Accession No. ML013470102). The NRC staff approved the use of the RI-ISI program at LGS for the third 10-year interval by letter dated March 11, 2008 (ADAMS Accession No. ML080500584). The NRC staff approved the initial LGS RI-ISI program for the second 10-year interval by letter dated March 3, 2003 (ADAMS Accession No. ML030620491).

3.2 Applicable ASME Code Requirements

As discussed in the licensee's submittal dated April 13, 2016, the scope of the LGS RI-ISI program is limited to the inspection of ASME Code Class 1 and 2 pressure retaining piping welds, specifically Examination Categories B-F, B-J, C-F-1, and C-F-2, for Item Numbers B5.10, B5.20, B9.11, B9.21, B9.31, B9.32, B9.40, C5.11, C5.51, and C5.81. The examination requirements (e.g., examination methods, acceptance, standards, extent, and frequency of examinations) for these components are delineated in ASME Code Section XI, Tables IWB-2500-1 and IWC-2500-1.

Table IWB-2500-1, Examination Category B-F, requires volumetric and surface examinations on all welds for Item Number B5.10 and surface examinations on all welds for Item Number B5.20. Table IWB-2500-1, Examination Category B-J, requires volumetric and surface examinations on a sample of welds for Item Numbers B9.11 and B9.31, and surface examinations on a sample of welds for Item Numbers B9.21, B9.32, and B9.40. The weld population selected for inspection includes the following:

(1) All terminal ends in each pipe or branch run connected to vessels.

(2) All terminal ends and joints in each pipe or branch run connected to other components where the stress levels exceed either of the following limits under loads associated with specific seismic events and operational conditions:

a. Primary plus secondary stress intensity range of $2.4S_m$ for ferritic steel and austenitic steel.

b. Cumulative usage factor U of 0.4.

(3) All dissimilar metal welds not covered under Examination Category B-F.

(4) Additional piping welds so that the total number of circumferential butt welds, branch connections, or socket welds selected for examination equals 25 percent of the circumferential butt welds, branch connections, or socket welds in the reactor coolant piping system. This total does not include welds exempted by IWB-1220 or welds in Item Number B9.22. These additional welds may be located as follows (for boiling-water reactor plants):

a. One reactor coolant recirculation loop (where a loop or run branches, only one branch).

b. One branch run representative of an essentially symmetric piping configurations among each group of branch runs that are connected to a loop and that perform similar system functions.

c One steam line run representative of an essentially systematic piping configuration among the runs.

d. One feedwater line run representative of an essentially symmetric piping.

e. Each piping and branch exclusive of the categories of loops and runs that are part of the system piping of (a) through (d) above.

Table IWC-2500-1, Examination Categories C-F-1 and C-F-2, require volumetric and surface examinations on a sample of welds for Item Numbers C5.11 and C5.51, and surface examinations on a sample of welds for Item Number C5.81. The weld population selected for inspection includes the following:

(1) Welds selected for examination shall include 7.5 percent, but not less than 28 welds, of all dissimilar metal, austenitic stainless steel, or high alloy welds (Examination Category C-F-1) or of all carbon and low alloy steel welds (Examination Category C-F-2) not exempted by IWC-1220. Some welds not exempted by IWC-1220 are not required to be nondestructively examined per Examination Categories C-F-1 and C-F-2. These welds, however, shall be included in the total weld count to which the 7.5 percent sampling rate is applied. The examinations shall be distributed as follows:

a. Among the Class 2 systems prorated, to the degree practicable, on the number of nonexempt dissimilar metal, austenitic stainless steel or high alloy welds

(Examination Category C-F-1) or nonexempt carbon and low alloy steel welds (Examination Category C-F-2) in each system;

b. Within a system, per the applicable examination category, among terminal ends, dissimilar metal welds, and structural discontinuities prorated, to the degree practicable, on the number of nonexempt terminal ends, dissimilar metal welds, and structural discontinuities in that system; and

c. Within each system between line sizes prorated to the degree practical.

3.3 Proposed Alternative and Basis for Use

The licensee is proposing to continue to use the LGS RI-ISI program during the fourth 10-year ISI interval as an alternative to the current ASME Code, Section XI, 2007 Edition through the 2008 Addenda, examination requirements for Class 1 Examination Category B-F and B-J piping welds, and Class 2 Examination Category C-F-1 and C-F-2 piping welds. The licensee's proposed alternative for the LGS fourth 10-year ISI interval will begin on February 1, 2017.

The LGS third 10-year RI-ISI program was submitted to the NRC by letters dated March 6, 2007, and November 8, 2007 (ADAMS Accession Nos. ML070660108 and ML073170370, respectively) and approved for use in the third 10-year ISI interval by NRC letter dated March 11, 2008 (ADAMS Accession No. ML080500584). The licensee stated that its proposed RI-ISI program for the fourth 10-year ISI interval will be a continuation of the current RI-ISI program for the third 10-year ISI interval, and will provide an acceptable level of quality and safety as required by 10 CFR 50.55a(z)(1). The licensee stated that no changes to the evaluation methodology as currently implemented under EPRI TR-112657, Revision B-A, are required as part of the fourth ISI interval update.

The licensee further stated that the following two enhancements will continue to be implemented:

(1) In lieu of the evaluation and sample expansion requirements in EPRI TR-112657, Section 3.6.6.2, "RI-ISI Selected Examinations," LGS will utilize the requirements for paragraph-2430 of ASME Code Case N-578-1, "Additional Examinations." The alternative criteria for additional examinations contained in Code Case N-578-1 provide a more refined methodology for implementing necessary additional examinations. EPRI TR-112657 includes requirements for additional examinations based on service conditions, degradation mechanisms, and the performance of evaluations to determine the scope of additional examinations, which are at a high level. In contrast, ASME Code Case N-578-1 provides specific and clearer guidance for required additional examinations that are structured similar to those provided in ASME Section XI, IWB-2430 and IWC-2430. The licensee further stated that LGS intends to perform additional required examinations when flaws or relevant indications exceeding the acceptance standards are identified during the outage they are identified.

(2) To supplement the requirements listed in Table 4-1, "Summary of Degradation-Specific Inspection Requirements and Examination Methods," of EPRI TR-112657, LGS, Units 1 and 2, will utilize the provisions listed in Code Case N-578-1, Table 1, Examination

Category R-A, "Risk-Informed Piping Examinations," contained in Note 10 of this table, using paragraphs and figures from the 2007 Edition through the 2008 Addenda of ASME Code Section XI (LGS Code of Record for the fourth 10-year ISI Interval). Table 1 of Code Case N-578-1 will be used, as it provides a detailed breakdown for "Examination Method" and "Categorization of Parts to be Examined." Based on these provisions, the examination figures specified in Section 4 of EPRI TR-112657 will then be used to determine the examination volume/area based on the degradation mechanism and component configuration. For components that have no degradation mechanism, Note 1 of ASME Code Case N-578-1 will be applied, using the expanded examination volume.

Exelon stated that the LGS RI-ISI program requires that 25 percent of the elements that are categorized as "High" risk (i.e., Risk Categories 1, 2, and 3), and 10 percent of the elements that are categorized as "Medium" risk (i.e., Risk Categories 4 and 5) be selected for inspection.

The licensee also stated that regardless of the weld examinations performed under the RI-ISI program, all ASME Code piping components will continue to receive the ASME Code-required pressure testing as part of the current ASME Code, Section XI, ISI program at LGS. The VT-2 visual examinations will remain unaffected by the RI-ISI program.

Additionally, in the supplement dated May 11, 2016, Exelon provided the risk results from the risk impact assessment for LGS, and provided a comparison of the risk results of the proposed RI-ISI program to the initial ASME Code, Section XI requirements. A summary of the change (Delta) in core damage frequency (CDF) and large early release frequency (LERF) values, along with the applicable acceptance criteria of EPRI TR-112675, Revision B-A, are provided in tabulated form in the table below.

Change in Risk From LGS Pre RI-ISI ASME Code, Section XI, ISI To RI-ISI Program Fourth 10-Year Interval				
Unit Number	**Delta-CDF**	**Delta-CDF Criteria**	**Delta-LERF**	**Delta–LERF Criteria**
Unit 1	5.87E-08	1.00E-06	1.90E-09	1.00E-07
Unit 2	5.87E-08	1.00E-06	1.30E-09	1.00E-07

3.4 NRC Staff Evaluation of Relief Request I4R-01

The licensee is requesting relief to use the proposed RI-ISI program for the above-referenced examination categories for its fourth 10-year ISI interval in lieu of the ASME Code, Section XI requirements. An acceptable RI-ISI program plan is expected to meet the key principles discussed in the following documents:

- Regulatory Guide (RG) 1.178, Revision 1, "An Approach for Plant-Specific Risk-Informed Decisionmaking for Inservice Inspection of Piping," September 2003 (ADAMS Accession No. ML032510128);

- NUREG-0800, Chapter 3.9.8, "Standard Review Plan for the Review of Risk-Informed Inservice Inspection of Piping," September 2003 (ADAMS Accession No. ML032510135); and

- EPRI TR-112657, Revision B-A.

Specifically, the above documents discuss the following five key principles:

(1) The proposed change meets the current regulations, unless it is explicitly related to an alternative requested under 10 CFR 50.55a, a requested exemption, or a rule change.

(2) The proposed change is consistent with the defense-in-depth philosophy.

(3) The proposed change maintains sufficient safety margins.

(4) When proposed changes result in an increase in CDF or risk, the increases should be small and consistent with the intent of the Commission's Safety Goal Policy Statement (51 FR 30028; published August 21, 1986, effective August 4, 1986).

(5) The impact of the proposed change should be monitored by using performance measurement strategies.

Each of the five key principles is evaluated below for Relief Request I4R-01.

3.4.1 Key Principle 1 - Meets Current Regulations

The first principle is met because Relief Request I4R-01 is an alternative to the requirements in ASME Code, Section XI, as may be requested, consistent with the regulations in 10 CFR 50.55a(z).

3.4.2 Key Principles 2 and 3 - Defense-in-Depth and Safety Margins

The second and third principles require assurance that the alternative program is consistent with the defense-in-depth philosophy, and that sufficient safety margins are maintained, respectively. Assurance that the second and third principles are met is based on the application of the approved methodology and not on the particular inspection locations selected. The methodology used to develop the RI-ISI program for the fourth 10-year ISI interval is unchanged from the methodology approved for use in the second and third 10-year ISI intervals, and, therefore, the second and third principles are met.

3.4.3 Key Principle 4 - Risk Evaluation of Proposed Change

Development of an acceptable RI-ISI program is primarily achieved through the risk-ranking and inspection location selection processes. Estimate of the change in risk is a final phase that is intended to provide additional assurance that aggregate changes in risk will be acceptable. The NRC staff has developed the following documents to evaluate proposed RI-ISI programs:

- RG 1.174, Revision 2, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis" May 2011 (ADAMS Accession No. ML100910006),

- RG 1.178, Revision 1, "An Approach for Plant-Specific Risk-Informed Decisionmaking for Inservice Inspection of Piping," September 2003 (ADAMS Accession No. ML032510128); and

- RG 1.200, Revision 2, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities" March 2009 (ADAMS Accession No. ML090410014).

RG 1.174 provides guidance on the use of probabilistic risk assessment (PRA) findings and risk insights in support of licensee requests for changes to a plant's licensing basis. RG 1.178 describes an RI-ISI program as one that incorporates risk insights that can focus inspections on more important locations, while at the same time maintaining or improving public health and safety. RG 1.200 describes one acceptable approach for determining whether the quality of the PRA, in total or the parts that are used to support an application, is sufficient to provide confidence in the results such that the PRA can be used in regulatory decisionmaking.

The fourth principle requires an estimate of the change in risk. The NRC staff has previously determined that it is not necessary to develop a new deterministic ASME program for each new 10-year ISI interval, but instead, it is acceptable to compare the new proposed RI-ISI program with the last deterministic program. In its letter dated May 11, 2016, the licensee provided a comparison of the risk results of the proposed fourth ISI interval RI-ISI program at LGS with the initial ASME Code, Section XI requirements at LGS. A summary of the results is shown in the table in Section 3.3 of this SE. The results demonstrate that the delta CDF and delta LERF values for both LGS, Units 1 and 2, meet the acceptance criteria in EPRI TR-112675, Revision B-A, and RG 1.174.

The fourth principle also requires demonstration of the technical adequacy of the PRA. As discussed in RG 1.178, Revision 1, and RG 1.200, Revision 2, an acceptable change-in-risk evaluation (and risk-ranking evaluation used to identify the most risk significant locations) requires the use of a PRA of appropriate technical quality that models the as-built and as-operated plant.

The technical adequacy of the PRA used in developing LGS, Units 1 and 2, Relief Request I4R-01, is based on EPRI TR-1021467-A, "Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-Informed In-Service Inspection Programs," June 2012 (ADAMS Accession No. ML12171A450). As discussed in a letter from the NRC to EPRI dated January 18, 2012 (ADAMS Accession No. ML11325A375), the NRC staff found that TR-1021467 was acceptable for referencing in licensing applications for RI-ISI programs to the extent specified in the staff's SE enclosed with the letter (ADAMS Accession No. ML11325A340). This TR provides guidance on determining the technical adequacy of PRAs used to develop an RI-ISI program that utilizes the traditional methodology, as described in EPRI TR-112657, Revision B-A. EPRI TR-1021467-A uses the guidance in RG 1.200, Revision 2, which endorses, with clarifications and qualifications, ASME/American Nuclear Society (ANS) PRA Standard ASME/ANS RA-Sa-2009.

The following discusses the technical adequacy of the LGS internal events PRA:

- For the supporting requirements (SRs) in PRA Standard ASME/ANS RA-Sa-2009, there are three degrees of "satisfaction" referred to as capability categories (CCs) (i.e., I, II, and III), with I being the minimum, II considered widely acceptable, and III indicating the maximum achievable scope/level of detail, plant specificity, and realism. For many SRs, the CCs may

be combined (e.g., the requirement for meeting CC I may be combined with II), or the requirement may be the same across all CCs so that the requirement is simply met or not met. In general, facts and observations (F&Os) are written for any SR that is judged not to be met or does not fully satisfy CC II of the PRA standard, consistent with RG 1.200, Revision 2.

- Based on Attachment 1 of Relief Request I4R-01, as clarified by the response to request for additional information (RAI), APLA-RAI-02, in the licensee's letter dated September 19, 2016, a full-scope peer review was performed in October 2005 for the LGS internal events PRA against the SRs in ASME PRA Standard 2005, Addenda B, ballot version, to ASME RA-S-2002. In May 2008, a focused-scope peer review was performed for the LGS internal flooding PRA against the SRs in PRA Standard ASME/ANS RA-Sc-2007, and any clarifications and qualifications were provided in RG 1.200, Revision 1. Attachment 1 of Relief Request I4R-01 provides 21 F&Os characterized as not meeting the SRs or met SRs at CC I. In addition, the licensee dispositioned each F&O by either providing a description of how the F&O was resolved, or providing an assessment of the impact of resolution of the F&O on the internal events PRA and the results for this application. The NRC staff evaluated each F&O and the licensee's disposition to determine whether the F&O had any significant impact for the application. Considering the guidance in EPRI TR-1021467-A, the NRC staff concludes that all F&Os associated with the LGS internal events PRA model were properly assessed and dispositioned to support the internal events PRA technical adequacy for the licensee's submittal of Relief Request I4R-01.

- In accordance with Section 2.2 of RG 1.200, Revision 2, it is expected that the differences between the current version of the PRA standard (i.e., ASME/ANS RA-Sa-2009) and an earlier version of the standard used in the PRA peer review be identified and addressed. Attachment 1 of Relief Request I4R-01, as supplemented by the response to APLA-RAI-02, in the licensee's letter dated September 19, 2016, explains that a full-scope peer review was performed in October 2005 for the LGS internal events PRA against the SRs in ASME PRA Standard 2005, Addenda B, ballot version, to ASME RA-S-2002. Differences exist between the SRs in this PRA standard and the SRs in ASME/ANS RA-Sa-2009, as qualified by RG 1.200, Revision 2. In the response to APLA-RAI-02 in the licensee's letter dated September 19, 2016, the licensee provided a gap assessment of the internal events PRA against the requirements of ASME/ANS RA-Sa-2009, as qualified by RG 1.200, Revision 2, and found no significant gaps to exist in the internal events PRA.

- In accordance with Section 1-5.4 of PRA Standard ASME/ANS RA-Sa-2009, as qualified by RG 1.200, Revision 2, changes to the PRA that are considered upgrades shall receive a peer review according to the requirements of the standard. Based on Attachment 1 of Relief Request I4R-01, the licensee has made changes to the LGS internal events PRA since the full-scope peer review in October 2005. However, it was not clear whether the PRA changes were considered PRA upgrades and whether these upgrades, if any, have been peer reviewed. Therefore, it was uncertain whether the LGS internal events PRA used for this submittal met the PRA technical adequacy guidance in EPRI TR-1021467-A. In the response to APLA-RAI-01 in the licensee's letter dated September 19, 2016, the licensee described the changes made to the LGS internal events PRA since the full-scope peer review in 2005. With the exception of the upgrade of the internal flooding PRA to address the 2005 peer review comments, the changes to the internal events PRA are considered to

be "PRA maintenance," as defined in ASME/ANS Ra-Sa-2009, and, therefore, no additional peer reviews were required for the internal events PRA. Regarding the upgrade of the internal flooding PRA, this upgrade received a focused-scope peer review in May 2008, and the associated F&Os were provided in Attachment 1 of Relief Request I4R-01. These F&Os were related solely to the internal flooding analysis and are not relevant to this application, because LGS employed the traditional RI-ISI analysis in accordance with EPRI TR-112657, Revision B-A, which does not depend on the internal flooding analysis. Based on the discussion above, the NRC staff finds that the changes made to the LGS internal events PRA since the full-scope peer review were properly assessed to support the internal events PRA technical adequacy for Relief Request I4R-01.

As a result of its review of Relief Request I4R-01 and the licensee's responses to the staff's RAIs, the NRC staff concludes that the LGS internal events PRA has sufficient technical adequacy to support the risk impact assessment of Relief Request I4R-01, and is consistent with Regulatory Position 2.2, "Probabilistic Risk Assessment," of RG 1.178, Revision 1. Therefore, the NRC staff finds that the licensee's analysis provides reasonable assurance that the fourth key principle is met.

3.4.4 Key Principle 5 - Monitoring Using Performance Measurement Strategies

The fifth principle of risk-informed decisionmaking requires that the impact of the proposed change be monitored by using performance measurement strategies. As described in the relief request and the licensee's response to RAIs in its letter dated September 19, 2016, the RI-ISI program is a living program that requires periodic updating and that, as a minimum, risk-ranking of piping segments will be reviewed on an ASME period basis. In that letter, the licensee provided a summary of the updates since the prior implementation of the RI-ISI program. The updates include:

(1) Transition from the 2001 Edition through the 2003 Addenda of ASME Code, Section XI, to the 2007 Edition through the 2008 Addenda;

(2) Limited examination coverage resulted in modifications of locations from the third 10-year RI-ISI program to optimize examination coverage;

(3) Changes in selection due to plant and component modifications incorporated into the updated RI-ISI program;

(4) Changes in selection due to reclassification into different categories based on the latest revision to the LGS PRA model; and

(5) Update of the original risk impact assessment.

As a result of the changes and updates, the number of EPRI high-risk category weld examinations at LGS Unit 1 were revised from 62 to 57 and the number of EPRI medium-risk category examinations changed from 79 to 69, with a total of 126 weld locations selected for examination during the fourth 10-year ISI interval. For LGS Unit 2, the number of EPRI high-risk category weld examinations were revised from 63 to 57, while the number of EPRI medium-risk category examinations changed from 82 to 74, with a total of 131 weld locations selected for

examination during the fourth 10-year ISI interval. The analyses and changes demonstrate that the RI-ISI program is a living program that is being periodically updated, and, therefore, the NRC staff concludes that the fifth key principle, which provides that risk-informed applications should include performance monitoring and feedback provisions, is met.

3.4.5 Summary

Based on the discussion in SE Sections 3.4.1 through 3.4.4 above, the NRC staff finds that the five key principles of risk-informed decisionmaking are met by the licensee's proposed RI-ISI program for the fourth 10-year ISI interval. Therefore, the proposed program is acceptable.

4.0 CONCLUSION

Based on the above evaluation, the NRC staff concludes that the proposed alternative will provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(z)(1), the proposed alternative is authorized for the fourth 10-year ISI interval at LGS.

All other requirements of ASME Code, Section XI for which an alternative has not been specifically requested remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

Principal Contributors: T. Hilsmeier
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Date: December 29, 2016

If you have any questions concerning this matter, please contact the LGS Project Manager, Dr. V. Sreenivas at (301) 415-2597, or V.Sreenivas@nrc.gov.

Sincerely,

/RA MMarshall for/

Stephen S. Koenick, Acting Chief
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-352 and 50-353

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Safety Evaluation

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