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

February 25, 2019

Mr. David B. Hamilton
Site Vice President
FirstEnergy Nuclear Operating Company
Mail Stop A-PY-A290
P.O. Box 97, 10 Center Road
Perry, OH 44081-0097

SUBJECT: PERRY NUCLEAR POWER PLANT, UNIT NO. 1 - ISSUANCE OF AMENDMENT NO. 185 CONCERNING EXTENSION OF CONTAINMENT LEAKAGE TEST FREQUENCY (EPID L-2018-LLA-0055)

Dear Mr. Hamilton:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 185 to Facility Operating License No. NPF-58 for Perry Nuclear Power Plant, Unit No. 1. The amendment consists of changes to the technical specifications (TSs) in response to your application dated March 7, 2018, as supplemented by letter dated October 26, 2018.

The amendment revises TS 5.5.12, "Containment Leakage Rate Testing Program," by replacing the reference to Regulatory Guide 1.163, "Performance-Based Containment Leak-Test Program," with a reference to Nuclear Energy Institute (NEI) 94-01, Revision 3-A, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J," and the conditions and limitations specified in NEI 94-01, Revision 2-A, of the same name, dated October 2008. The amendment also deletes two of the four listed exceptions to program guidelines in TS 5.5.12.

A copy of our safety evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

Kimberly J. Green, Senior Project Manager
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-440

Enclosures:
1. Amendment No. 185 to NPF-58
2. Safety Evaluation

cc: via ListServ

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

FIRSTENERGY NUCLEAR OPERATING COMPANY

FIRSTENERGY NUCLEAR GENERATION, LLC

DOCKET NO. 50-440

PERRY NUCLEAR POWER PLANT, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 185
License No. NPF-58

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment filed by FirstEnergy Nuclear Operating Company, et al. (the licensee, FENOC), dated March 7, 2018, as supplemented by letter dated October 26, 2018, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-58 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 185, are hereby incorporated into the license. FENOC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of its issuance and shall be implemented within 30 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

David J. Wrona, Chief
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Facility Operating
License No. NPF-58 and
Technical Specifications

Date of Issuance: February 25, 2019

ATTACHMENT TO LICENSE AMENDMENT NO. 185

PERRY NUCLEAR POWER PLANT, UNIT NO. 1

FACILITY OPERATING LICENSE NO. NPF-58

DOCKET NO. 50-440

Replace the following pages of the Facility Operating License and Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

REMOVE	INSERT
License NPF-58	License NPF-58
- 4 -	- 4 -
TSs	TSs
5.0-15	5.0-15
5.0-15a	5.0-15a

C. This license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

FENOC is authorized to operate the facility at reactor core power levels not in excess of 3758 megawatts thermal (100% power) in accordance with the conditions specified herein.

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 185, are hereby incorporated into the license. FENOC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

(3) Antitrust Conditions

a. FirstEnergy Nuclear Generation, LLC

5.5 Programs and Manuals

5.5.10 Safety Function Determination Program (SFDP) (continued)

The SFDP identifies where a loss of safety function exists. If a loss of safety function is determined to exist by this program, the appropriate Conditions and Required Actions of the LCO in which the loss of safety function exists are required to be entered.

5.5.11 Technical Specifications (TS) Bases Control Program

This program provides a means for processing changes to the Bases for these TS.

a. Changes to the Bases of the TS shall be made under appropriate administrative controls and reviews.

b. Licensees may make changes to Bases without prior NRC approval provided the changes do not require either of the following:

1. a change in the TS incorporated in the license; or

2. a change to the USAR or Bases that requires NRC approval pursuant to 10 CFR 50.59.

c. The Bases Control Program shall contain provisions to ensure that the Bases are maintained consistent with the USAR.

d. Proposed changes that meet the criteria of Specification 5.5.11.b.1 or Specification 5.5.11.b.2 above shall be reviewed and approved by the NRC prior to implementation. Changes to the Bases implemented without prior NRC approval shall be provided to the NRC on a frequency consistent with 10 CFR 50.71(e).

5.5.12 Primary Containment Leakage Rate Testing Program

A program shall be established to implement the leakage rate testing of the primary containment as required by 10 CFR 50.54(o) and 10 CFR 50, Appendix J, Option B as modified by approved exemptions. This program shall be in accordance with the guidelines contained in NEI Topical Report NEI 94-01, Revision 3-A, with conditions and limitations in NEI 94-01, Revision 2-A, as modified by the following exceptions:

(continued)

5.5 Programs and Manuals

5.5.12 Primary Containment Leakage Rate Testing Program (continued)

- BN-TOP-1 methodology may be used for Type A tests.

- The containment isolation check valves in the Feedwater penetrations are tested per the INSERVICE TESTING PROGRAM.

The peak calculated primary containment internal pressure for the design basis loss of coolant accident is 6.40 psig. For conservatism P_a is defined as 7.80 psig.

The maximum allowable primary containment leakage rate, L_a, shall be 0.20% of primary containment air weight per day at the peak containment pressure (P_a).

Leakage rate acceptance criteria are:

a. Primary containment leakage rate acceptance criterion is $\leq 1.0\ L_a$. However, during the first unit startup following testing performed in accordance with this Program, the leakage rate acceptance criteria are $< 0.6\ L_a$ for the Type B and Type C tests, and $\leq 0.75\ L_a$ for the Type A tests;

b. Air lock testing acceptance criteria are:

   1) Overall air lock leakage rate is ≤ 2.5 scfh when tested at $\geq P_a$.

   2) For each door, leakage rate is ≤ 2.5 scfh when the gap between the door seals is pressurized to $\geq P_a$.

The provisions of SR 3.0.3 are applicable to the Primary Containment Leakage Rate Testing Program.

Nothing in these Technical Specifications shall be construed to modify the testing frequencies required by 10 CFR 50, Appendix J.

(continued)

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 185 TO FACILITY OPERATING LICENSE NO. NPF-58

FIRSTENERGY NUCLEAR OPERATING COMPANY

FIRSTENERGY NUCLEAR GENERATION, LLC

PERRY NUCLEAR POWER PLANT, UNIT NO. 1

DOCKET NO. 50-440

1.0 INTRODUCTION

By application dated March 7, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18066A648), as supplemented by letter dated October 26, 2018 (ADAMS Accession No. ML18299A293), FirstEnergy Nuclear Operating Company (FENOC or the licensee) requested changes to the technical specifications (TSs) for the Perry Nuclear Power Plant, Unit No. 1 (PNPP). The license amendment request (LAR) proposes changes to Technical Specification (TS) 5.5.12, "Containment Leakage Rate Testing Program," by replacing the TS 5.5.12 reference to Regulatory Guide (RG) 1.163, "Performance-Based Containment Leak-Test Program" (ADAMS Accession No. ML003740058), with a reference to Nuclear Energy Institute (NEI) 94-01, Revision 3-A, "Industry Guideline for Implementing Performance-Based Option of 10 CFR [Title 10 of the *Code of Federal Regulations*] Part 50, Appendix J," (ADAMS Accession No. ML12221A202), and the conditions and limitations specified in NEI 94-01, Revision 2-A, of the same name, dated October 2008 (ADAMS Accession No. ML100620847). More specifically, the proposed amendment would allow extension of the Type A test interval up to one test in 15 years and extension of the Type C test interval up to 75 months, based on acceptable performance history as defined in NEI 94-01, Revision 3-A. The LAR also proposes to revise TS 5.5.12 by deleting two of the four listed exceptions to program guidelines because they are no longer necessary.

The supplemental letter dated October 26, 2018, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the U.S. Nuclear Regulatory Commission (NRC or the Commission) staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on June 19, 2018 (83 FR 28460).

2.0 REGULATORY EVALUATION

2.1 Background

The PNPP has a General Electric Mark III design pressure suppression containment. As described in the Perry Updated Safety Analysis Report Section 6.2, the containment system includes a cylindrical reinforced concrete drywell structure with a removable steel head

enclosing the reactor pressure vessel, the reactor coolant recirculation loops and pumps, and other branch connections of the reactor primary system. A leaktight cylindrical steel containment vessel with a dome and flat bottom supported by a reinforced concrete foundation completely surrounds the drywell. A suppression pool at the bottom of the drywell outside the concrete weir or retaining wall is connected to the primary containment outside the drywell by a system of vent openings below the water surface. In the event of a process piping failure within the drywell, the increased pressure inside the drywell will force a mixture of air, steam, and water through the vents to the major volume of the suppression pool where the steam will be rapidly condensed. The noncondensible gases will escape into the free air volume inside the containment vessel where they will be contained. A cylindrical concrete shield building with a domed top completely encloses the primary containment vessel. The annular space between the shield building and the containment vessel is normally kept at a slightly negative pressure, relative to atmospheric pressure, so that any leakage through the containment vessel is into this space and is treated by the annulus exhaust gas treatment system through high-efficiency particulate air and charcoal filters and monitored for airborne radioactivity level before being released. The shield building structure provides shielding to minimize direct radiation to operating personnel and/or the public under normal operating and accident conditions. It also provides weather and external missile protection for the containment vessel.

2.2 Licensee's Proposed Changes

The proposed LAR would revise the TS 5.5.12 by:

- Replacing the reference to RG 1.163 with a reference to NEI 94-01, Revision 3-A, with conditions and limitations in NEI 94-01, Revision 2-A

- Deleting the exception that the corrections to NEI 94-01, which are identified on the Errata Sheet attached to the NEI letter, "Appendix J Workshop Questions and Answers," dated March 19, 1996, are considered an integral part of NEI 94-01, and

- Deleting the exception that the provisions of NEI 94-01, Section 9.2.3 are revised to allow the first Type A test performed after the Type A test completed on July 1, 1994, to be completed no later than June 29, 2009.

2.3 Regulatory Requirements

The LAR requested a change to the Facility Operating License for PNPP, in accordance with 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit."

The regulation, 10 CFR 50.36(c)(5), "Administrative controls," requires, in part, that TSs include administrative controls necessary to ensure operation of the facility in a safe manner. The LAR requested a change to "Administrative Controls" section of the PNPP TSs.

Paragraph (o) of 10 CFR 50.54, "Conditions of licenses," requires that primary reactor containments for water-cooled power reactors be subject to the requirements in 10 CFR Part 50, Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors." Appendix J contains two options: Option A – Prescriptive Requirements and Option B – Performance-Based Requirements, either of which can be used to meet Appendix J requirements.

The testing requirements of Options A or B in 10 CFR 50, Appendix J, ensure that: (a) leakage through primary reactor containments or systems and components penetrating these containments does not exceed allowable leakage rates specified in the TSs, and (b) integrity of the containment structure is maintained during the service life of the containment. PNPP adopted 10 CFR 50, Appendix J, Option B, for Type A (integrated leak-rate test (ILRT)), and Type B and Type C (local leak-rate test (LLRT)) by Amendment No. 86, dated September 9, 1997 (ADAMS Accession No. ML021840313).

Section V.B.3 of 10 CFR 50, Appendix J, Option B, requires the licensee to develop a performance-based leakage-testing program using the RG or other implementation document and referencing it in the plant TSs. The submittal for TS revisions must also contain justification, including supporting analyses, if the licensee deviates from methods approved by the NRC and endorsed in RG 1.163, "Performance-Based Containment Leak-Test Program," which includes guidance for acceptable leakage rate test methods, procedures and analyses.

Option B specifies performance-based requirements and criteria for preoperational and subsequent leakage rate testing. These requirements are met by:

1. Type A tests to measure the containment system overall integrated leakage rate,

2. Type B pneumatic tests to detect and measure local leakage rates across pressure retaining, leakage-limiting boundaries such as penetrations, and

3. Type C pneumatic tests to measure containment isolation valve leakage rates.

After the containment system has been completed and is ready for operation, Type A tests are conducted at periodic intervals based on the historical performance of the overall containment system to measure the overall integrated leakage rate. The leakage rate test results must not exceed the maximum allowable leakage (L_a) at design-basis loss-of-coolant accident (DBLOCA) pressure (P_a) with margin, as specified in the TSs. Option B also requires that a general visual inspection for structural deterioration of the accessible interior and exterior surfaces of the containment system, which may affect the containment leaktight integrity, be conducted prior to each Type A test and at a periodic interval between tests based on the performance of the containment system.

Type B and Type C tests are performed based on the safety significance and historical performance of each boundary and isolation valve to ensure integrity of the overall containment system as a barrier to fission product release.

Section 50.55a,"Codes and standards," of 10 CFR contains the containment inservice inspection (ISI) requirements, which, in conjunction with the requirements of 10 CFR Part 50, Appendix J, ensure the continued leaktight and structural integrity of the containment during its service life.

Section 50.65, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," paragraph (a)(1), states, in part, that the licensee:

> . . . shall monitor the performance or condition of structures, systems, or components, against licensee-established goals, in a manner sufficient to provide reasonable assurance that these structures, systems, and components . . . are capable of fulfilling their intended functions. These goals shall be established

commensurate with safety and, where practical, take into account industrywide operating experience.

Technical Specification 5.5.12.a requires that Types A, B, and C test results not exceed the maximum allowable primary containment leakage rate, L_a, with margin. Option B of Appendix J to 10 CFR Part 50 requires that a general visual inspection of the accessible interior and exterior surfaces of the containment system for structural deterioration, which may affect the containment leak-tight integrity, be conducted prior to each Type A test and at a periodic interval between tests, based on the performance of the containment system. A Type A ILRT is currently required to be performed once every 10 years. The LAR proposes extending the maximum Type A test interval to 15 years and the maximum Type C test interval to 75 months.

2.4 Regulatory Guidance

The guidance in NEI 94-01, Revision 0 (ADAMS Accession No. ML11327A025), provides methods for complying with the provisions of 10 CFR Part 50, Appendix J, Option B, and includes provisions that address the extension of the performance-based Type A test interval for up to 10 years, based upon two consecutive successful tests.

The final safety evaluation (SE) for NEI 94-01, Revision 2, "Industry Guideline For Implementing Performance-Based Option of 10 CFR Part 50, Appendix J," and Electric Power Research Institute (EPRI) Technical Report (TR)-1009325, Revision 2, August 2007, "Risk Impact Assessment of Extended Integrated Leak Rate Testing Intervals," dated June 25, 2008 (ADAMS Accession No. ML081140105), states that NEI 94-01, Revision 2, describes an acceptable approach for implementing the optional performance-based requirements of 10 CFR Part 50, Appendix J, Option B. The NRC staff concluded that NEI 94-01, Revision 2, is acceptable for referencing by licensees proposing to amend their containment leakage rate testing TSs, subject to the specific limitations and conditions listed in Section 4.0 of the SE. NEI 94-01, Revision 2-A, which incorporates the regulatory positions stated in RG 1.163, includes provisions for extending Type A test intervals up to 15 years.

The guidance in EPRI TR-1009325, Revision 2[1], provides a generic assessment of the risks associated with a permanent extension of the ILRT surveillance interval to 15 years, and a risk-informed methodology/template to be used to confirm the risk impact of the ILRT extension on a plant-specific basis. Probabilistic risk assessment (PRA) methods are used in combination with ILRT performance data and other considerations to justify the extension of the ILRT surveillance interval. This is consistent with guidance provided in RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis" (ADAMS Accession No. ML17317A256) and RG 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications" (ADAMS Accession No. ML100910008) to support changes to surveillance test intervals.

Regulatory Guide 1.200, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities," Revision 2 (ADAMS Accession No. ML090410014), describes one acceptable approach for determining whether the technical adequacy of the PRA, in total or the parts that are used to support an application, is sufficient to

[1] EPRI Report 1018243 is also identified as EPRI Report 1009325, Revision 2-A. This report is publicly available and can be found at www.epri.com by typing "1018243" in the search box.

provide confidence in the results, such that the PRA can be used in regulatory decision-making for light-water reactors.

The guidance in NEI 94-01, Revision 3-A, July 2012, provides guidance for extending Type C LLRT intervals beyond 60 months. The NRC published an SE with limitations and conditions for NEI 94-01, Revision 3, by letter dated June 8, 2012 (ADAMS Accession No. ML121030286). In the SE, the NRC concluded that NEI 94-01, Revision 3, describes an acceptable approach for implementing the optional performance-based requirements of Appendix J, Option B, and is acceptable for reference by licensees proposing to amend their containment leakage rate testing TSs, subject to two conditions, which are described below in Section 3.6 of this SE. The SE was incorporated into Revision 3 and subsequently issued as NEI 94-01, Revision 3-A, on July 31, 2012.

3.0 TECHNICAL EVALUATION

3.1 Type A ILRT

In LAR Table 3.2.2-1, "PNPP Type A Test History," the licensee presented the historical results of ILRT, which are summarized below.

Test Date	Leakage 95% Upper Confidence Level, wt. %/day	Leakage Rate (Primary Containment Percent Weight per Day, Performance Criterion is L_a, which is 0.200 weight percent per day)
1994	0.1063	Test performed prior to 10 CFR 50, Appendix J, Option B as-found reporting requirements. Peak accident pressure remained at 11.31 psig (pounds per square inch gauge) for this test.
2009	0.1195	Peak accident pressure (P_a) had been reduced from 11.31 psig to 7.80 psig with Amendment No. 57 issued on March 23, 1994 (ADAMS Accession No. ML021830439).

The NEI 94-01, Revision 3-A (and Revision 2-A), criterion for allowing the extended ILRT interval is that the past two consecutive tests meet the performance criterion by showing a leakage of L_a or less. The PNPP performance criterion is L_a (0.2 percent by weight of containment free air volume per day, the acceptance criterion for reactor restart is 0.75 L_a (0.15 weight percent per day). The ILRT result for 1994 shows an unadjusted upper 95 percent confidence value of 0.1063 which strongly suggests that the adjusted result for an as-found ILRT with Option B would have been acceptable, especially given that the test pressure was higher than in 2009. The 2009 as-found ILRT value was 0.1382, which is also less than the performance criterion of 0.200. The last two ILRT results from 1994 and 2009 show acceptable leakage less than L_a, and thus meet the NEI 94-01 requirement for interval extension.

3.2 Type B and Type C Leak Rate Testing Program

In LAR Table 3.4.5-1, "PNPP Type B and C LLRT Combined As-Found/As-Left Trend Summary," the licensee presented the historical results of the PNPP Types B and C test combined as-found minimum pathway leakage totals, which are summarized below.

Refuel Outage (RFO) and Year of Tests	As-Found Minimum Pathway Leakage Rate sccm (standard cubic centimeters per minute)	Percent of TS 5.5.12a Combined Types B and C Total Criterion (0.6 L_a, which equates to 51,700 sccm)
RFO 12, 2009	22,023.20	42.60
RFO 13, 2011	16,005.00	30.96
RFO 14, 2013	14,522.70	28.09
RFO 15, 2015	10,186.30	19.70
RFO 16, 2017	9,493.00	18.36

The PNPP TS 5.5.12.a criterion for Type B and C tests is 0.6 L_a. As detailed in NEI 94-01, the combined as-found minimum pathway Type B and Type C test results and the combined as-left maximum pathway Type B and Type C test results are evaluated with this criterion. The as-found minimum pathway total provides an assessment of the leakage testing and corrective action programs effectiveness for ensuring penetration leakage potential is kept acceptable throughout each operating cycle such that margin to L_a is maintained to accommodate some increase in non-penetration leakage potential between ILRTs. The as-left maximum pathway total criterion is a permissive for restoring primary containment operability and ensures margin is available to accommodate increases in leakage potential between outages were leakage testing is performed. The last five combined Type B and C testing totals show substantial margin to the applicable performance criterion suggesting that both the ILRT and LLRT performance criteria are unlikely to be exceeded by allowing PNPP ILRT maximum interval be extended to 15 years and also allowing the Type C testing maximum interval to be extended to 75 months.

3.3 Containment Inspection and Testing Programs

The LAR provides evaluations of other non-risk considerations related to the proposed amendment. This includes the inspection and testing programs that ensure the containment structure remains capable of meeting the design functions and identification of degraded conditions which may affect the containment capability.

3.3.1 Containment Inservice Inspection (CISI) Program

In the LAR, the licensee stated that PNPP's third inservice inspection interval commenced on May 18, 2009, and expires on May 17, 2019. The applicable edition of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, is the 2001 Edition through the 2003 Addenda. In accordance with 10 CFR 50.55a(g)(4)(ii), the inservice examination of components and system pressure tests shall be conducted during the successive 120-month inspection interval in compliance with the latest edition and addenda of the ASME Code incorporated by reference in 10 CFR 50.55a(b)(2) 12 months prior to the start of the interval. Table 1 provides the inspection period and interval dates for the third 10-year interval.

Table 1: Third Interval Refueling Outage Schedule
May 18, 2009 – May 17, 2019

Inspection Period	Refueling Outage	From	To
1	1R13	04/18/2011	06/07/2011
	1R14	03/18/2013	05/16/2013
2	1R15	03/09/2015	04/24/2015
	1R16	03/05/2017	04/03/2017
3	1R17	03/09/2019[1]	04/08/2019[1]

Note 1: The specified refueling outage month and day are approximate.

3.3.2 IWE/IWL (Class MC and CC) Examinations

The licensee also stated that IWE (Class MC) and IWL (Class CC) are inspected in accordance with the ASME Code as provided in Tables 2 and 3 below.

Table 2: IWE (Class MC) Examinations

Examination Item No.[1]	Area (Examination Method)
Examination Category E-A Containment Surfaces	
E1.11	Accessible Surface Areas (VT (visual test)-3M)
E1.11BC	Containment Bolted Connections (VT-3)[2]
E1.12	Wetted Surface of Submerged Areas (VT-3)
Examination Category E-C Containment Surfaces Requiring Augmented Examinations	
E4.11	Visible Surfaces (VT-1M)
E4.12	Surface Area Grid (Volumetric)

Notes: 1. Only those ASME Code item numbers that are applicable at PNPP
2. A VT-1 examination is required for bolted connections when flaws or degradation are identified.

Table 3: IWL (Class CC) Examinations

Examination Item No.[1]	Area (Examination Method)
Examination Category L-A Concrete Surfaces	
L1.11	All Accessible Areas (VT-3C)
L1.12	Suspect Areas (VT-1C)
Examination Category L-B Unbonded Post Tensioning System	
Not Applicable at PNPP	

Note: 1. Only those ASME Code item numbers that are applicable at PNPP

Exemptions

Per the provisions of Section XI, components may be exempt from specific examination requirements if they are within the exemption criteria. Listed below are the exemptions applicable to the Inservice Examination Plan.

1. The following components (or parts of components) are exempted from the examination requirements of IWE-2000:

   a. Vessels, parts and appurtenances that are outside the boundaries of the containment as defined in the design specifications;
   b. Embedded or inaccessible portions of containment vessels, parts, and appurtenances that met the requirements of the original construction code;
   c. Portions of containment vessels, parts, and appurtenances that become embedded in concrete or become inaccessible as a result of vessel repair or replacement activities if the conditions of IWE-1232 and IWE-5220 are met;
   d. Piping, pumps, and valves that are part of the containment system, or which penetrate or are attached to the containment vessel. These components shall be examined in accordance with the rules of IWB or IWC, as appropriate to the classification defined by the design specifications.

2. The following components (or parts of components) may be exempted from the examination requirements of IWL-2000:

   a. Tendon end anchorages that are inaccessible, subject to the requirements of IWL-2521.1;
   b. Portions of concrete surface that are covered by the liner foundation material, or backfill, or are otherwise obstructed by adjacent structures, components, parts or appurtenances.

Examination Selection Process:

For Examination Categories E-A, E-C, and L-A, ASME Code, Section XI, delineates criteria that are applied in selecting the areas to be examined.

1. E-A Containment Surfaces

   The criteria for selecting containment surfaces are:

   a. 3M examination of the accessible interior and exterior containment surfaces of Class MC containment, which include:

      - integral attachments and structures that are parts of reinforcing structure, such as stiffening rings, manhole frames, and reinforcement around openings;
      - Surfaces of attachment welds between structural attachments and the pressure retaining boundary or reinforcing structure, except for nonstructural or temporary attachments as defined in NE-4435 and minor permanent attachments as defined in CC-4543.4 of ASME Code Section XI.

   b. Pressure retaining bolted connections within the IWE boundary at least once per interval as required by 10 CFR 50.55a(b)(2)(ix)(G).

   c. At least 80 percent of the pressure-retaining boundary excluding attachments, structural reinforcement, and areas made inaccessible during construction.

   c. Including 100 percent of accessible wetted surfaces of submerged areas that are necessary, at least once per interval.

2. E-C Containment Surfaces Requiring Augmented Examinations

The criteria for selecting the areas to be examined are:

a. Interior and exterior containment surface areas that are subject to accelerated corrosion with no or minimal corrosion allowance or areas where the absence or repeated loss of protective coatings has resulted in substantial corrosion and pitting. Typical locations of such areas are those exposed to standing water, repeated wetting and drying, persistent leakage, and those with geometries that permit water accumulation, condensation, and microbiological attack. Such areas may include penetration sleeves, surfaces wetted during refueling, concrete-to-steel shell or liner interfaces, embedment zones, leak chase channels, drain areas, or sump liners.

b. Interior and exterior containment surface areas that are subject to excessive wear from abrasion or erosion that causes a loss of protective coatings, deformation, or material loss. Typical locations of such areas are those subject to substantial traffic, sliding pads or supports, pins or clevises, shear lugs, seismic restraints, surfaces exposed to water jets from testing operation or safety relief valve discharges, and areas that experience wear from frequent vibrations.

3. L-A Concrete Surfaces

100 percent of the accessible concrete surface area in the annulus shall be VT-3C visual examined for evidence of conditions indicative of damage or degradation each interval.

Based on its review of the licensee's CISI program, as summarized in the LAR, and as described above, the NRC staff finds that the licensee is properly implementing the ASME Code, Section XI, Subsection IWE and Subsection IWL programs, which provide reasonable assurance that the structural integrity of the primary containment will be maintained if the ILRT frequency is extended to 15 years.

3.4 NEI 94-01, Revision 2-A, Conditions

The PNPP containment is subject to the requirements set forth in 10 CFR 50, Appendix J, Option B, which allows that test intervals for Type A, Type B, and Type C, testing to be determined by using a performance-based approach. Currently, the Primary Containment Leakage Rate Testing Program in TS 5.5.12 is implemented in accordance with RG 1.163. The licensee proposed to revise TS 5.5.12 by replacing references to RG 1.163 with NEI 94-01, Revision 3-A, along with the conditions and limitations of NEI 94-01, Revision 2-A, to govern the test frequencies and the grace periods for Types A, B, and C, tests.

In the NRC SE dated June 25, 2008, the staff concluded that the guidance in NEI 94-01, Revision 2, is acceptable for reference by licensees proposing to amend their TSs in regard to containment leakage rate testing, subject to six conditions. The provisions of NEI 94-01 remained essentially the same as in the original version through Revision 2, except that the regulatory positions of RG 1.163 were incorporated and the maximum ILRT interval extended to 15 years. Section 3.8, specifically Table 3.8.1-1 of the LAR, describes the licensee's response to the six conditions identified in the SE dated June 25, 2008. The NRC staff evaluated these responses to determine whether the licensee adequately addressed these conditions.

Limitation and Condition 1

Limitation and Condition 1 specifies that for calculating the Type A leakage rate, the licensee should use the definition in NEI 94-01, Revision 2, in lieu of that in ANSI/ANS [American National Standards Institute/American Nuclear Society]-56.8-2002.

Licensee's Response to Limitation and Condition 1

In its LAR, the licensee stated that PNPP will utilize the definition in NEI 94-01, Revision 3-A, Section 5.0, and that this definition has remained unchanged from Revision 2-A to Revision 3-A of NEI 94-01.

Staff Assessment of Licensee's Response to Limitation and Condition 1

The NRC staff reviewed the definitions of "performance leakage rate" contained NEI 94-01, Revision 2, Revision 2-A, and Revision 3-A. The staff determined that the definitions contained in all three revisions are identical.

Therefore, the NRC staff concludes that because the definition found in Section 5.0 of NEI 94-01, Revision 2, for calculating the Type A leakage rate in the PNPP Primary Containment Leakage Rate Testing Program is identical to that in NEI 94-01, Revision 3-A, the licensee adequately addressed Limitation and Condition 1.

Limitation and Condition 2

Limitation and Condition 2 stipulates that the licensee submit a schedule of containment inspections to be performed prior to and between Type A tests.

Licensee's Response to Limitation and Condition 2

In Section 3.4.3 of the LAR, the licensee provided tables showing the third interval refueling outage schedule (May 2009 to May 2019) and the third containment inspection interval exam categories and associated inspection periods during which they would be performed.

In Section 3.4.4 of the LAR, the licensee stated that in accordance with the revised inspection requirements outlined in Sections 9.2.1 and 9.2.3.2 of NEI 94-01, Revision 3-A, it will revise its ASME Code, Section XI, IWE and IWL programs and implementing procedure to meet the specified intervals of containment inspection at PNPP.

Staff Assessment of Licensee's Response to Limitation and Condition 2

The licensee provided the schedule for containment inspections to be performed prior to and between Type A tests for the third interval, which currently ends in May 2019. For inspections beyond the current interval, the licensee stated that it would revise its IWE and IWL programs and implementing procedure to meet the revised inspection requirements in NEI 94-01, Revision 3-A. Therefore, the licensee adequately addressed Limitation and Condition 2.

Limitation and Condition 3

Limitation and Condition 3 stipulates that the licensee address the areas of the containment structure potentially subjected to degradation.

Licensee's Response to Limitation and Condition 3

In Section 3.4.3 of the LAR, the licensee identified the inspections that it performs and the corresponding regulatory requirements. The licensee stated that 100 percent of the accessible concrete surface area in the annulus shall be VT-3C visually examined, as required by the ASME Code, Section IX, for evidence of conditions indicative of damage or degradation each interval. Additionally, no containment surfaces require augmented examinations in accordance with ASME Code, Section XI, Table IWE 2500-1, Examination Category E-C, Item Nos. E4.11 and E4.12. In Section 3.5.6 of the LAR, the licensee recounted the results of recent containment inspections. In several areas of the containment interior, the licensee identified light or moderate surface rust on the containment, cracking or flaking of paint, and rust on attachment plates and welds. The licensee stated that there were no indications noted that would affect the structural integrity of the containment vessel. The rust was scraped away in a couple representative areas and there was either no noticeable material loss or where there was pitting, it was measured to be less than 1/16 inch.

Staff Assessment of Licensee's Response to Limitation and Condition 3

In evaluating the Limitation and Condition 3, the NRC staff finds that the licensee identified the containment structures that are potentially subjected to degradation. Currently, there is no unacceptable degradation in accordance with the ASME Code, Section XI. Therefore, the NRC staff finds that Limitation and Condition 3 has been satisfied.

Limitation and Condition 4

Limitation and Condition 4 specifies that the licensee address any tests and inspections performed following major modifications to the containment structure, as applicable.

Licensee's Response to Limitation and Condition 4

In the LAR, the licensee stated that there are no major modifications planned. Past containment modifications are discussed in Section 3.6 of the LAR.

Staff Assessment of Licensee's Response to Limitation and Condition 4

In evaluating the Limitation and Condition 4, the NRC staff notes that post maintenance testing of the equipment hatch in the spring 2015, due to damage caused by a crane coming in contact with the equipment hatch, was found to be acceptable (5.83 sccm < 250.00 sccm [allowable]). Because the licensee stated that there are no major modifications planned, the NRC staff finds that the licensee adequately addressed Limitation and Condition 4.

Limitation and Condition 5

Limitation and Condition 5 specifies that the normal Type A test interval should be less than 15 years. If a licensee has to utilize the provision of Section 9.1 of NEI 94-01, Revision 2, related

to extending the ILRT interval beyond 15 years, the licensee must demonstrate to the NRC staff that it is an unforeseen emergent condition.

Licensee's Response to Limitation and Condition 5

In the LAR, the licensee stated that in the event an extension beyond the 15 year interval is required at PNPP, it will demonstrate to the NRC staff that an unforeseen emergent condition exists. Additionally, the licensee stated that it will conduct the Type A tests within the approved 15-year interval without seeking extensions, and that if an unforeseen emergent condition should arise, extension of the Type A test interval will be addressed in accordance with NEI 94-01, Revision 2-A, the associated NRC SE, and Regulatory Issue Summary 2008-27, "Staff Position on Extension of the Containment Type A Test Interval Beyond 15 Years Under Option B of Appendix J to 10 CFR Part 50," up to and including seeking NRC approval through a license amendment if required.

Staff Assessment of Licensee's Response to Limitation and Condition 5

The licensee response in the LAR indicates it understands and accepts this NRC staff condition and limitation. Therefore, the licensee has adequately addressed Limitation and Condition 5.

Limitation and Condition 6

Limitation and Condition 6 specifies that for plants licensed under 10 CFR Part 52, applications requesting a permanent extension of the ILRT surveillance interval to 15 years should be deferred until after the construction and testing of containments for that design have been completed and applicants have confirmed the applicability of NEI 94-01, Revision 2, and EPRI TR-1009325, Revision 2, including the use of past containment ILRT data.

Licensee's Response to Limitation and Condition 6

The licensee stated that this condition is not applicable to PNPP because it was not licensed under 10 CFR Part 52.

NRC Staff Assessment of Licensee's Response to Limitation and Condition 6

The NRC staff finds that Limitation and Condition 6 is not applicable to PNPP because the plant was licensed in accordance with 10 CFR Part 50.

3.5 Conclusion Related to the Six Limitations and Conditions Listed in NEI 94-01, Revision 2-A, Section 4.1, of the NRC SE

The NRC staff evaluated each of the six limitations and conditions listed above and determined that the licensee adequately addressed all of the limitations and conditions identified in NEI 94-01, Revision 2-A, Section 4.1, of the NRC SE. Therefore, the NRC staff finds it acceptable for PNPP to adopt the "conditions and limitations" of NEI 94-01, Revision 2-A, SE Section 4.1, as part of the implementation documents listed in TS 5.5.12, and extend the ILRT surveillance interval to 15 years.

3.6 NEI 94-01, Revision 3-A, "Conditions"

The NRC published an SE with limitations and conditions for NEI 94-01, Revision 3, by letter dated June 8, 2012. In the SE, the NRC concluded that NEI 94-01, Revision 3, describes an acceptable approach for implementing the optional performance-based requirements of Appendix J, and is acceptable for reference by licensees proposing to amend their containment leakage rate testing TSs, subject to two conditions discussed below. The SE was incorporated into Revision 3 and subsequently issued as NEI 94-01, Revision 3-A, on July 31, 2012.

In the March 7, 2018, LAR, the licensee proposed to use NEI 94-01, Revision 3-A, as the implementation document for Type B and Type C LLRT program, and stated that it will meet the limitations and conditions in Section 4.0 of the SE for NEI 94-01, Revision 3-A.

Section 3.8.2 of the LAR describes the licensee's response to the two conditions identified in the SE dated June 8, 2012. The NRC staff evaluated these responses to determine whether the licensee adequately addressed these conditions.

Topical Report Condition 1

The June 8, 2012, NEI 94-01, Revision 3, SE, Section 4.0, Condition 1, stipulates that:

> NEI TR 94-01, Revision 3, is requesting that the allowable extended interval for Type C LLRTs be increased to 75 months, with a permissible extension (for non-routine emergent conditions) of nine months (84 months total). The staff is allowing the extended interval for Type C LLRTs be increased to 75 months with the requirement that a licensee's post-outage report include the margin between the Type B and Type C leakage rate summation and its regulatory limit. In addition, a corrective action plan shall be developed to restore the margin to an acceptable level. The staff is also allowing the non-routine emergent extension out to 84-months as applied to Type C valves at a site, with some exceptions that must be detailed in NEI 94-01, Revision 3. At no time shall an extension be allowed for Type C valves that are restricted categorically (e.g., BWR MSIVs [boiling-water reactor main steam isolation valves]), and those valves with a history of leakage, or any valves held to either a less than maximum interval or to the base refueling cycle interval. Only non-routine emergent conditions allow an extension to 84 months.

Condition 1 identifies three issues that are required to be addressed:

(1) The allowance of an extended interval for Type C LLRTs of 75 months requires that a licensee's post-outage report include the margin between the Type B and Type C leakage rate summation and its regulatory limit;

(2) A corrective action plan is to be developed to restore the margin to an acceptable level; and

(3) Use of the allowed 9-month extension for eligible Type C valves is only allowed for non-routine emergent conditions, but not for valves categorically restricted and other excepted valves.

Topical Report Condition 2

NRC SE dated June 8, 2012, Section 4.0, Condition 2, stipulates that:

> The basis for acceptability of extending the ILRT interval out to once per 15 years was the enhanced and robust primary containment inspection program and the local leakage rate testing of penetrations. Most of the primary containment leakage experienced has been attributed to penetration leakage and penetrations are thought to be the most likely location of most containment leakage at any time. The containment leakage condition monitoring regime involves a portion of the penetrations being tested each refueling outage, nearly all LLRT's being performed during plant outages. For the purposes of assessing and monitoring or trending overall containment leakage potential, the as-found minimum pathway leakage rates for the just tested penetrations are summed with the as-left minimum pathway leakage rates for penetrations tested during the previous 1 or 2 or even 3 refueling outages. Type C tests involve valves which, in the aggregate, will show increasing leakage potential due to normal wear and tear, some predictable and some not so predictable. Routine and appropriate maintenance may extend this increasing leakage potential. Allowing for longer intervals between LLRTs means that more leakage rate test results from farther back in time are summed with fewer just tested penetrations and that total used to assess the current containment leakage potential. This leads to the possibility that the LLRT totals calculated understate the actual leakage potential of the penetrations. Given the required margin included with the performance criterion and the considerable extra margin most plants consistently show with their testing, any understatement of the LLRT total using a 5-year test frequency is thought to be conservatively accounted for. Extending the LLRT intervals beyond 5 years to a 75-month interval should be similarly conservative provided an estimate is made of the potential understatement and its acceptability determined as part of the trending specified in NEI 94-01, Revision 3, Section 12.1.
>
> When routinely scheduling any LLRT valve interval beyond 60-months and up to 75-months, the primary containment leakage rate testing program trending or monitoring must include an estimate of the amount of understatement in the Type B & C total, and must be included in a licensee's post-outage report. The report must include the reasoning and determination of the acceptability of the extension, demonstrating that the LLRT totals calculated represent the actual leakage potential of the penetrations.

Condition 2 identifies two issues that are required to be addressed:

(1) Extending the Type C LLRT intervals beyond 5 years to a 75-month interval should be similarly conservative, provided an estimate is made of the potential understatement and its acceptability determined as part of the trending specified in NEI 94-01, Revision 3, Section 12.1; and

(2) When routinely scheduling any LLRT valve interval beyond 60-months and up to 75-months, the Primary Containment Leakage Rate Testing Program trending or monitoring must include an estimate of the amount of understatement in the Type B and Type C total, and must be included in a

licensee's post-outage report. The report must include the reasoning and determination of the acceptability of the extension, demonstrating that the LLRT totals calculated represent the actual leakage potential of the penetrations.

Licensee's Response to NEI 94-01, Revision 3-A, SE Conditions 1 and 2

The licensee indicated in the LAR that the PNPP post-outage reports will include the margin between the Type B and Type C minimum pathway leak rate summation value adjusted for understatement and the acceptance criterion. Should the Type B and C combined totals exceed an administrative limit of 0.5 L_a but be less than the TS acceptance value (performance criterion) of 0.6 L_a , then an analysis will be performed and a corrective action plan prepared to restore and maintain the leakage summation margin to less than the administrative limit. The LAR also stated that PNPP will apply the 9-month grace period only to eligible Type C tested components and only for non-routine emergent conditions.

NRC Staff Assessment of Licensee's Response to Conditions 1 and 2

The licensee acknowledges these two conditions and the likelihood that longer test intervals would increase the understatement of actual leakage potential given the method by which the totals are calculated. The licensee also indicated it will assign additional margin for monitoring acceptability of results via administrative limits and understatement contribution adjustments. Therefore, the NRC staff finds that the licensee addressed and satisfied Conditions 1 and 2 of NEI 94-01, Revision 3-A.

3.7 Conclusion Related to the Conditions Listed in NEI 94-01, Revision 3-A

The NRC staff evaluated the two conditions listed above and has determined that the licensee adequately satisfied the conditions identified in NEI 94-01, Revision 3, Section 4.0, of the NRC SE. Therefore, the NRC staff finds it acceptable for PNPP to adopt NEI 94-01, Revision 3-A, as part of the implementation documents listed in TS 5.5.12, and extend the Type C test interval up to 75-months.

3.8 Deletion of Exceptions in TS 5.5.12

The licensee requested deletion of the exception to use the corrections to NEI 94-01, which are identified on the errata sheet attached to the NEI letter, "Appendix J Workshop Questions and Answers," dated March 19, 1996. The NRC staff notes that the errata sheet corrects NEI 94-01, Revision 0.

The NRC staff reviewed the proposed change. The revision of NEI 94-01 being requested to be referenced in TS 5.5.12 is Revision 3-A, with the conditions and limitations in Revision 2-A. References to NEI 94-01 (Revision 0) and the errata sheet are no longer needed. The corrections identified in the errata sheet were incorporated into the later revisions to NEI 94-01. Therefore, the staff finds that the proposed change is acceptable.

The licensee also requested deletion of the exception to perform the first Type A test after the Type A test completed on July 1, 1994, be completed no later than June 29, 2009, from TS 5.5.12.

The NRC staff reviewed the proposed change and considers the change to be editorial in nature since the Type A test has already been performed. Because the requirement for the specific Type A test was already met in 2007 and is no longer necessary, the NRC staff finds that the proposed change is acceptable.

3.9 Probabilistic Risk Assessment of the Proposed Extension of the ILRT Test Intervals

3.9.1 Background

Section 9.2.3.1, "General Requirements for ILRT Interval Extensions beyond Ten Years," of NEI 94-01, Revision 2-A, states that plant-specific confirmatory analyses are required when extending the Type A ILRT interval beyond 10 years. Section 9.2.3.4, "Plant-Specific Confirmatory Analyses," of NEI 94-01 states that the assessment should be performed using the approach and methodology described in EPRI TR-1009325, Revision 2-A[2]. The analysis is to be performed by the licensee and retained in the plant documentation and records as part of the basis for extending the ILRT interval.

In the SE, dated June 25, 2008, the NRC staff found the methodology in EPRI TR-1009325, Revision 2, acceptable for referencing by licensees proposing to amend their TSs to permanently extend the ILRT interval to 15 years, provided certain conditions are satisfied. These conditions, set forth in Section 4.2 of the SE for EPRI TR-1009325, Revision 2, stipulate that:

1. The licensee submits documentation indicating that the technical adequacy of their [probabilistic risk assessment] PRA is consistent with the requirements of RG 1.200 relevant to the ILRT extension application.

2. The licensee submits documentation indicating that the estimated risk increase associated with permanently extending the ILRT surveillance interval to 15 years is small, and consistent with the clarification provided in Section 3.2.4.5[3] of this SE. Specifically, a small increase in population dose should be defined as an increase in population dose of less than or equal to either 1.0 person-rem per year or 1 percent of the total population dose, whichever is less restrictive. In addition, a small increase in [conditional containment failure probability] CCFP should be defined as a value marginally greater than that accepted in previous one-time 15-year ILRT extension requests. This would require that the increase in CCFP be less than or equal to 1.5 percentage point. While acceptable for this application, the NRC staff is not endorsing these threshold values for other applications.

3. The methodology in EPRI TR-1009325, Revision 2, is acceptable except for the calculation of the increase in expected population dose (per year of reactor operation). In order to make the methodology acceptable, the average leak rate for the pre-existing containment large leak rate accident case (accident case 3b) used by the licensees shall be 100 L_a instead of 35 L_a.

---

[2] It should be noted that EPRI TR-1009325, Revision 2-A, is also identified as EPRI TR-1018243. This report is publicly available and can be found at www.epri.com by typing "1018243" in the search field box.

[3]The SE for EPRI TR-1009325, Revision 2, indicates that the clarification regarding small increases in risk is provided in Section 3.2.4.5; however, the clarification is actually provided in Section 3.2.4.6.

4. A LAR is required in instances where containment over-pressure is relied upon for [emergency core cooling system] ECCS performance.

3.9.2 Plant-Specific Risk Evaluation

The licensee performed a risk impact assessment for extending the Type A containment ILRT interval from 10 years to 15 years. The risk analyses for PNPP was provided in Attachment 2 to the LAR dated March 7, 2018 (ADAMS Accession No. ML18066A648).

In Section 3.3.1 of the LAR, the licensee stated that the plant-specific risk assessment for PNPP follows the guidance in:

- NEI 94-01, Revision 3-A
- EPRI TR-104285, "Risk Impact Assessment of Revised Containment Leak Rate Testing Intervals," dated August 1994
- NEI document, "Interim Guidance for Performing Risk Impact Assessments in Support of One-Time Extensions for Containment Integrated Leakage Rate Test Surveillance Intervals," dated October 2001
- RG 1.200, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," Revision 2
- RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," Revision 3, January 2018 (ADAMS Accession No. ML17317A256)
- Calvert Cliffs Nuclear Plant (CCNP) liner corrosion analysis described in a letter to the NRC dated March 27, 2002 (ADAMS Accession No. ML020920100)
- EPRI TR-1009325, Revision 2-A (also known as EPRI TR-1018243)

The licensee addressed each of the four conditions for the use of EPRI TR-1009325, Revision 2-A, which are listed in Section 4.2 of the NRC SE. A summary of the licensee's bases for concluding that each condition has been met and the NRC staff's evaluation are provided in the sections below.

3.9.2.1 Technical Adequacy of PRA

The first condition stipulates that the licensee submits documentation indicating that the technical adequacy of their PRA is consistent with the requirements of RG 1.200 relevant to the ILRT extension application.

In Regulatory Issue Summary 2007-06, "Regulatory Guide 1.200 Implementation" (ADAMS Accession No. ML070650428), the NRC stated that for all risk-informed applications received after December 2007, the NRC staff will use Revision 1 of RG 1.200 (ADAMS Accession No. ML070240001) to assess technical adequacy of the PRA used to support risk-informed applications. For risk-informed applications received after March 2010, the NRC staff uses Revision 2 of RG 1.200. In Section 3.2.4.1 of the SE for EPRI TR-1009325, Revision 2, the NRC staff stated, in part, that:

> Licensee requests for a permanent extension of the ILRT surveillance interval to 15 years pursuant to NEI TR 94-01, Revision 2, and EPRI Report No. 1009325,

> Revision 2, will be treated by NRC staff as risk-informed license amendment requests. Consistent with information provided to industry in Regulatory Issue Summary 2007-06, "Regulatory Guide 1.200 Implementation" . . ., the NRC staff will expect the licensee's supporting Level 1/LERF PRA to address the technical adequacy requirements of RG 1.200, Revision 1. . . . Any identified deficiencies in addressing this standard shall be assessed further in order to determine any impacts on any proposed decreases to surveillance frequencies. If further revisions to RG 1.200 are issued which endorse additional standards, the NRC staff will evaluate any application referencing NEI TR 94-01, Revision 2, and EPRI Report No. 1009325, Revision 2, to examine if it meets the PRA quality guidance per the RG 1.200 implementation schedule identified by the NRC staff.

Also in Section 3.2.4.1 of the SE for EPRI TR-1009325, the NRC staff stated that Capability Category (CC) I of the ASME PRA standard shall be applied as the standard for assessing PRA quality for ILRT extension applications because approximate values of core damage frequency (CDF) and large early release frequency (LERF), and their distribution among release categories, are sufficient to support the evaluation of changes to ILRT frequencies.

As discussed in Section 5.1.2 of Attachment 2 to the LAR, the PNPP risk assessment performed to support the ILRT application uses the current Level 1 internal events PRA and LERF model results. The LERF model results are for internal events only, so the licensee used these results to estimate the LERF. In Section 3.3.2 of the LAR, the licensee describes the quality control process for ensuring that the model reflects the as-built and as-operated plant. The licensee has a process for PRA maintenance and updates, including procedures for tracking issues identified as potentially affecting the PRA model. The licensee performed a review of the plant modifications and concluded that there are no plant changes that have not been incorporated in the PRA models that would affect this amendment request.

As described in Section 3.3 of the LAR, the licensee performed a gap analysis self-assessment on the PNPP Level 1 internal events PRA in 2008 and had an independent assessment of the PNPP Level 1 internal events PRA performed. The internal flooding PRA had a focused peer review in 2012. The independent assessment was performed to verify compliance with the ASME/ANS PRA standard RA-Sa-2009, as clarified by RG 1.200, Revision 2. The independent assessment resulted in no new findings and ultimately the satisfaction (closure) of all outstanding findings identified in previous peer reviews associated with the PNPP internal events, internal flooding and LERF models was achieved. The NRC SE related to PNPP Amendment No. 171 (ADAMS Accession No. ML15307A349), states that in Enclosure B to the application dated March 25, 2014, the NRC staff confirmed that both the LERF and internal flooding portions of the model were peer reviewed against the currently endorsed PRA standard.

The NRC staff finds the licensee's independent assessment and closure of all outstanding findings identified in previous peer reviews associated with the PNPP internal events, internal flooding, and LERF models acceptable to support this amendment request because this satisfies the first condition for use of EPRI TR-1009325, Revision 2-A.

In Section 3.2.4.2 of the SE for NEI 94-01, Revision 2 and EPRI TR-1009325, Revision 2, the NRC staff states that:

> Although the emphasis of the quantitative evaluation is on the risk impact from internal events, the guidance in EPRI Report No. 1009325, Revision 2,

> Section 4.2.7, "External Events," states that: "Where possible, the analysis should include a quantitative assessment of the contribution of external events (e.g., fire and seismic) in the risk impact assessment for extended ILRT intervals." This section also states that: "If the external event analysis is not of sufficient quality or detail to directly apply the methodology provided in this document [(i.e., EPRI Report No. 1009325, Revision 2)], the quality or detail will be increased or a suitable estimate of the risk impact from the external events should be performed." This assessment can be taken from existing, previously submitted and approved analyses or other alternate method of assessing an order of magnitude estimate for contribution of the external event to the impact of the changed interval.

In Section 3.3.2.4, and in Section A.2 of Attachment 2 to the LAR, the licensee stated that for external events such as fire, seismic, extreme winds, and other external events, the risk assessments from the PNPP individual plant examination of external events (IPEEE) can be used for insights on changes to ILRT intervals. The NRC staff reviewed each of the PNPP external event evaluations, and the NRC's SE report for the PNPP IPEEE was transmitted to FENOC on March 9, 2001. Therefore, in reviewing the contribution of external events in this LAR, the NRC staff credits previously submitted and approved analyses that the NRC staff found to be acceptable. The licensee performed an analysis of the impact of external events in Section 5.3 of Attachment 2 to the LAR. The licensee's analysis of the acceptance criteria discussed in Section 3.9.2.2 of this SE reflected the contribution from the IPEEE fire PRA and IPEEE seismic margins analysis. FENOC estimated the change in LERF due to the ILRT frequency extension by scaling the internal events change in LERF by a multiplication factor, which was derived based on the CDF contribution from each hazard. As further discussed below, the licensee assessed that the contribution from other external hazards, such as high winds and external flooding, to be negligible for this LAR.

The licensee used the fire CDF estimated in the IPEEE to quantify a CDF impact by combining the frequency of fires and the probability of detection/suppression failure. The licensee used a systematic approach to identify critical fire areas where fires could fail safety functions and pose an increase in the CDF. The licensee provided a fire CDF estimate of 3.1×10^{-5} per year. Therefore, the NRC staff finds that the licensee's assessment of fire risk is acceptable because it provides a sufficient estimate to support the evaluation of the acceptance criteria as discussed in Section 3.9.2.2 of this SE.

The licensee stated that the IPEEE seismic margin assessment does not result in an estimate of CDF. Although a seismic PRA is under development, the licensee stated that it is not an effective model because it does not reflect the as-built, as operated facility yet. Therefore, to estimate the contribution of seismic risk to support this application, the licensee used the seismic CDF estimate based on a simple average approach using values for PNPP from the NRC staff's Generic Issue (GI)-199 study (ADAMS Accession No. ML100270582). The licensee estimated the PNPP seismic risk to be 1.11×10^{-5}/year. In response to Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident (ADAMS Accession No. ML111861807), the NRC staff previously concluded that a seismic risk evaluation is not merited for PNPP (ADAMS Accession No. ML15194A015). Therefore, the GI-199 analysis represents the most recent available estimate of the seismic risk for PNPP. Further, the NRC staff notes that consideration of the licensee's re-evaluated seismic hazard (ADAMS Accession No. ML14090A143) would not impact the order of magnitude estimate for seismic CDF necessary for this LAR. Based on its review, the NRC staff concludes that the use of the seismic CDF estimate based on the simple average approach from the GI-199 analysis

for PNPP provides an acceptable order of magnitude estimate of the seismic risk contribution for this LAR.

As stated in Section 5.3 of Attachment 2 to the LAR, the licensee evaluated other external events including high winds, floods, and other external hazards, based on the PNPP IPEEE analysis. The licensee concluded that there are no significant events of concern in estimation of the external events impact on the ILRT extension risk assessment. The NRC staff finds this acceptable because high winds, floods, and other external hazards are low contributors to total risk at PNPP.

In summary, the licensee has evaluated its internal events PRA against the currently endorsed ASME PRA standard (i.e., ASME/ANS RA-Sa-2009) and the currently implemented version of RG 1.200 (i.e., Revision 2), resolved or dispositioned the findings developed during the independent assessment of its internal events PRA for applicability to the ILRT interval extension, and included a quantitative assessment of the contribution of external events. The NRC staff reviewed the internal events PRA independent assessment and finds that the closure of outstanding findings have been adequately dispositioned for this application. Furthermore, the staff finds that the impact from external events is appropriately considered. Based on the above, the NRC staff concludes that the PRA used by the licensee is of sufficient technical adequacy to support the changes to the ILRT frequency. Accordingly, the first condition is met.

3.9.2.2 Estimated Risk Increase

The second condition stipulates that the licensee submit documentation indicating that the estimated risk increase associated with permanently extending the ILRT interval to 15 years is small, and consistent with the guidance in RG 1.174 and the clarification provided in Section 3.2.4.6 of the NRC SE for NEI 94-01, Revision 2-A. Specifically, a small increase in population dose should be defined as an increase in population dose of less than or equal to either 1.0 person-rem [roentgen equivalent man] per year or 1 percent of the total population dose, whichever is less restrictive. In addition, a small increase in CCFP should be defined as a value marginally greater than that accepted in previous one-time 15-year ILRT extension requests. This would require that the increase in CCFP be less than or equal to 1.5 percentage points. As discussed in Section 3.9.2.4 of this SE, PNPP does not credit containment over-pressure. Thus, for this application, the associated risk metrics include LERF, population dose, and CCFP.

The licensee reported the results of the plant-specific risk assessment in Section 3.3.3 of the LAR. Details of the risk assessment for PNPP is provided in Section 5.2 of Attachment 2 to the LAR. The reported risk impacts are risk impact from baseline, which estimates the impact of a change in test frequency from three tests in 10 years (the test frequency under 10 CFR 50 Appendix J, Option A) to one test in 15 years. The NRC staff identified the following information based on its review of the licensee's analysis associated with extending the Type A ILRT frequency:

1. The reported increase in LERF for internal events is 2.64×10^{-8} per year. The increase in LERF for combined internal and external events is 4.03×10^{-7} per year. The risk contribution from external events includes the effects of fires and seismic, as discussed in Section 3.9.2.1 of this SE. This change in risk is considered to be "small" (i.e., between 1×10^{-6} and 1×10^{-7} per year) per the acceptance guidelines in RG 1.174. An assessment of total baseline LERF is required to show that the total LERF is less than 1×10^{-5} per year. The licensee estimated the total LERF for internal and external events

as 2.52×10^{-6} per year. The total LERF, given the increase in ILRT interval, is below the acceptance criteria of 1×10^{-5} per year in RG 1.174 for a "small" change.

2. The increase in population dose risk from changing Type A ILRT frequency from three in 10 years to once in 15 years is reported as 3.18×10^{-2} person-rem/year or 0.591 percent. The reported increase in total population dose is below the values provided in EPRI TR-1009325, Revision 2-A, and defined in Section 3.2.4.6 of the NRC SE for NEI 94-01, Revision 2. Thus, this increase in the total population dose for the proposed change is considered very small and supportive of the proposed change.

3. The increase in CCFP due to change in test frequency from three in 10 years to once in 15 years is 0.875 percent for PNPP. This value is below the acceptance criteria of 1.5 percentage points for a small increase in CCFP in Section 3.2.4.6 of the NRC SE for NEI 94-01, Revision 2.

Based on the risk assessment results, the NRC staff concludes that for a permanent extension of the testing frequency to 15 years at PPNP, the increase in LERF is small and consistent with the acceptance guidelines of RG 1.174, and the increase in the total population dose and the magnitude of the change in the CCFP for the proposed change are very small and supportive of the proposed change. The defense-in-depth philosophy is maintained as the independence of barriers will not be degraded as a result of the requested change, and the use of quantitative risk metrics collectively ensures that the balance between prevention of core damage, prevention of containment failure, and consequence mitigation is preserved. Accordingly, the second condition is met.

3.9.2.3 Leak Rate for the Large Pre-Existing Containment Leak Rate Case

The third condition stipulates that in order to meet the guidance in EPRI TR-1009325, Revision 2, the average leak rate for the pre-existing containment large leak rate accident case (i.e., accident case 3b) used by the licensees shall be 100 L_a instead of 35 L_a.

As noted by the licensee in Section 3.3.1 of the LAR, PNPP incorporated the use of 100 L_a as the average leak rate for the pre-existing containment leak rate accident case, and this value has been used in the PNPP plant-specific risk assessments. Accordingly, the third condition is met.

3.9.2.4 Applicability if Containment Over-Pressure is Credited for ECCS Performance

The fourth condition stipulates that in instances where containment over-pressure is relied upon for ECCS performance, a LAR is required to be submitted. In Section 3.1 of the LAR, the licensee stated that PNPP does not rely upon containment over-pressure for ECCS performance. Because the licensee does not rely upon containment over-pressure for ECCS performance, the NRC staff finds that the fourth condition does not apply.

3.10 Technical Conclusion

Based on the preceding regulatory and technical evaluations, the NRC staff finds that the licensee has adequately implemented its existing primary containment leakage rate testing program consisting of ILRT and LLRT. The results of the recent ILRTs and of the LLRTs combined totals demonstrate acceptable performance and support a conclusion that the structural and leak-tight integrity of the primary containment is adequately managed and will

continue to be periodically monitored and managed effectively with the proposed changes. The NRC staff finds that the licensee has addressed the NRC conditions to demonstrate acceptability of adopting NEI 94-01, Revision 3-A, and the limitations and conditions identified in the staff SE incorporated in NEI 94-01, Revision 2-A. Therefore, the NRC staff finds that the proposed changes to PNPP TS 5.5.12 regarding the primary containment leakage rate testing program, which allows the extension of Type A test interval to one test in 15-years and extension of the Type C test interval up to 75-months, are acceptable and will allow TS 5.5.12 to continue to meet 10 CFR 50.36(c)(5) requirements. Lastly, the NRC finds that the PRA used by the licensee is of sufficient technical adequacy to support the evaluation of changes to ILRT frequency.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Ohio State official was notified of the proposed issuance of the amendment on January 17, 2019. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes the requirements with respect to installation or use of a facility's components located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration (83 FR 28460, dated June 19, 2018), and there has been no public comment on such finding. The amendment also changes a recordkeeping, reporting, or administrative procedures or requirements. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) and (c)(10). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: J. Bettle, NRR
D. Hoang, NRR
K. Tetter, NRR

Date of issuance: February 25, 2019

SUBJECT: PERRY NUCLEAR POWER PLANT, UNIT NO. 1 - ISSUANCE OF AMENDMENT NO. 185 CONCERNING EXTENSION OF CONTAINMENT LEAKAGE TEST FREQUENCY (EPID L-2018-LLA-0055) DATED FEBRUARY 25, 2019

DISTRIBUTION:
PUBLIC
RidsACRS_MailCTR Resource
RidsNrrDorlLpl3 Resource
RidsNrrDssStsb Resource
RidsNrrDssScpb Resource
RidsNrrDeEseb Resource
RidsNrrDraArcb Resource
RidsNrrPMPerry Resource
RidsNrrLASRohrer Resource
RidsRgn3MailCenter Resource
JBettle, NRR
DHoang, NRR
KTetter, NRR

ADAMS Accession No.: ML19022A324

OFFICE	NRR/DORL/LPL3/PM	NRR/DORL/LPL3/LA	NRR/DSS/SCPB/BC
NAME	KGreen	SRohrer	SAnderson
DATE	01/23/19	01/23/19	01/30/19
OFFICE	NRR/DE/ESEB/BC	NRR/DRA/ARCB/BC	NRR/DSS/STSB/BC
NAME	BWittick w/edits	KHsueh w/edit	VCusumano (MHamm for)
DATE	01/25/19	02/01/19	02/04/19
OFFICE	OGC	NRR/DORL/LPL3/BC	NRR/DORL/LPL3/PM
NAME	MYoung (NLO subject to noted revisions)	DWrona	KGreen
DATE	02/21/19	02/22/19	02/25/19

OFFICIAL RECORD COPY