FPL

L-2019-037
10 CFR 54.17

March 6, 2019

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

Re: Florida Power & Light Company
Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Turkey Point Units 3 and 4 Subsequent License Renewal Application
Safety Review Requests for Additional Information (RAI) Set 9 Responses

References:

1. FPL Letter L-2018-004 to NRC dated January 30, 2018, Turkey Point Units 3 and 4 Subsequent License Renewal Application (ADAMS Accession No. ML18037A812)
2. FPL Letter L-2018-082 to NRC dated April 10, 2018, Turkey Point Units 3 and 4 Subsequent License Renewal Application – Revision 1 (ADAMS Accession No. ML18113A134)
3. NRC RAI E-Mail to FPL dated February 6, 2019 – Requests for Additional Information for the Safety Review of the Turkey Point Subsequent License Renewal Application – Set 9 (EPID No. L-2018-RNW-0002) (ADAMS Accession Nos. ML19037A382 and ML19037A398)

Florida Power & Light Company (FPL) submitted a subsequent license renewal application (SLRA) for Turkey Point Units 3 and 4 to the NRC on January 30, 2018 (Reference 1) and SLRA Revision 1 on April 10, 2018 (Reference 2).

The purpose of this letter is to provide, as attachments to this letter, public and certain non-public (proprietary) responses to the safety review Set 9 RAIs issued by the NRC on February 6, 2019 (Reference 3), as well as a voluntary clarification regarding Aging Management Program (AMP) effectiveness reviews (Attachment 3). The RAI responses and corresponding attachments and associated information enclosures are indexed on page 2 of this letter. The attachments identify revisions amending the SLRA (if applicable).

Attachment 2P has been placed after Attachment 2 of this submittal and contains proprietary information (enclosed within brackets and/or marked 'Withhold from Public Disclosure Under 10 CFR 2.390') that FPL requests be withheld from public disclosure under 10 CFR 2.390(a)(4). The withholding request applications for this proprietary information are enclosed with Attachments 2 and 2P.

A084
NRR

If you have any questions, or need additional information, please contact me at 561-691-2294.

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

Executed on March 6, 2019.

Sincerely,

William Maher
Senior Licensing Director
Florida Power & Light Company

WDM/RFO

Attachments: 4 RAI Responses (refer to Letter Attachments Index)

Enclosures: 6 RAI Response Enclosures (refer to Letter Enclosures Index)

LETTER ATTACHMENTS INDEX			
Attachment	**NRC RAI**	**Attachment**	**NRC RAI**
1	B.2.3.28-1	3	N/A
2, 2P	B.2.3.7-F		

LETTER ENCLOSURES INDEX			
Attachment	**Enclosure**	**Attachment**	**Enclosure**
2, 2P	1	2, 2P	3
2, 2P	2		

cc: w/o Attachment 2P

Senior Resident Inspector, USNRC, Turkey Point Nuclear
Regional Administrator, USNRC, Region II
Project Manager, USNRC, Turkey Point Nuclear
Plant Project Manager, USNRC, SLRA
Plant Project Manager, USNRC, SLRA Environmental
Ms. Cindy Becker, Florida Department of Health

NRC RAI Letter Nos. ML19037A382 and ML19037A398 Dated February 6, 2019

1. Buried and Underground Piping and Tanks, GALL AMP XI.M41

RAI B.2.3.28-1

Background:

SLRA Section B.2.3.28, "Buried and Underground Piping and Tanks," states that the program will be consistent with the 10 elements of NUREG-2191, Rev. 0, "Generic Aging Lessons Learned for Subsequent License Renewal (GALL-SLR) Report," dated July 2017, Aging Management Program (AMP) XI.M41, "Buried and Underground Piping and Tanks," without exceptions or enhancements.

As amended by letter dated October 16, 2018, SLRA Section B.2.3.28 states the following:

a) "[b]ecause of operating experience (OE) related to past corrosion of buried pipe at PTN [Turkey Point], a cathodic protection system will be installed in accordance with the requirements of GALL-SLR Report AMP XI.M41, "Buried and Underground Piping and Tanks," at least 7 years prior to the subsequent period of extended operation (SPEO)."

b) "[p]reventive Action Category F has been initially selected for monitoring steel piping during the initial monitoring period."

c) "[t]urkey Point has experienced a number of pipe leaks and/or breaks in buried piping. Most of these pipe breaks have been in the piping for the fire water and service water systems. These breaks have been documented in the corrective action program (CAP). A review of the documentation in the CAP indicates that typically they have been caused by localized corrosion."

GALL-SLR Report AMP XI.M41 states that additional inspections, beyond those in Table XI.M41-2, "Inspection of Buried and Underground Piping and Tanks," may be appropriate if exceptions are taken to program element 2, "preventive actions," or in response to plant-specific operating experience.

During the audit the staff noted that several leaks and locations of localized external corrosion have occurred in buried service water and fire water system piping.

Issue:

1. The response to RAI B.2.3.28-1 stated that cathodic protection will be installed at least 7 years prior to the SPEO and GALL-SLR Report AMP XI.M41 recommends that cathodic protection is installed at least 5 years prior to the SPEO. Therefore, the staff's concern in Issue (a) of RAI B.2.3.28-1 is resolved.

2. Regarding Issue (b) of RAI B.2.3.28-1, the staff notes that GALL-SLR Report Table XI.M41-2 states that transitioning from Preventive Action Category E to Preventive Action Category F is dictated in part by plant-specific OE. GALL-SLR Report Table XI.M41-2 states that Preventive Action Category F is applicable when plant-specific OE identifies leaks in buried piping due to external corrosion, significant coating degradation, or significant metal loss. As recommended by AMP XI.M41, additional inspections, beyond those in Table XI.M41-2 may be appropriate in response to plant-specific OE. Although not explicitly stated in the table, the applicability of Preventive Action Category F is limited to instances where plant-specific OE identifies a few (i.e., as opposed to several) instances of leaks or significant degradation. Based on plant-specific OE not being limited to a few instances of leaks or significant degradation, additional inspections, beyond those in Table XI.M41-2, are appropriate.

Request:

State the basis for why additional inspections, beyond those in Table XI.M41-2, are not appropriate for buried steel piping during the 10 year period prior to the SPEO.

FPL Response:

The discussion in Issue 2 above alludes to a review of PTN operating experience (OE) that noted several leaks and locations of localized external corrosion of buried piping. This observation was based on the Action Requests (ARs) identified on page 28 of the NRC operating experience audit report (Reference 1). However, the plant-specific OE captured in these ARs as discussed below demonstrates that for buried piping in the scope of SLR at PTN there has not been significant degradation and only one minor (pin-hole) leak was identified.

1. AR 02066294 dated August 11, 2015 – This AR was associated with a buried service water pipe leak. Service water at PTN is domestic/potable water. This piping is not in the scope of subsequent license renewal (SLR), and the leak was located outside of the plant protected area. Thus, this OE is not related to the Inspection of Buried and Underground Piping and Tanks AMP.
2. AR 02014369 dated December 19, 2014 – This AR is associated with revision 0 to Turkey Point's Underground Piping and Tank Integrity Program's (UPTIP) Asset Management Plan, which is required by NEI 09-14 "Guideline for the Management of Underground Piping and Tank Integrity" (Reference 2). The Asset Management Plan is maintained as a living document for the Buried Piping Program at Turkey Point. This AR was issued to track future inspections to be performed under this program. Revision 1 to this document was issued on March 15, 2017. With regard to the scope of SLR, previous and future planned inspections of the safety related intake cooling water system are summarized in the document. Based on the most recent inspections, which included excavation, direct inspection of the external surface of the piping, and ultrasonic wall thickness measurements, minor graphitic corrosion is occurring and the piping is in good overall condition.

3. AR 01940055 dated February 11, 2014 – This AR was related to a drawing issue associated with a valve installed in a section of buried service water piping. Service water at PTN is domestic/potable water. This piping is not in the scope of SLR, and the drawing issue was for piping located outside of the plant protected area. Thus, this OE is not related to the Inspection of Buried and Underground Piping and Tanks AMP.
4. AR 00462055 dated January 29, 2009 – This AR was associated with external corrosion found on four areas of buried service water piping. Service water at PTN is domestic/potable water. This piping is not in the scope of SLR. Although the piping was corroded, minimum required wall thickness was maintained. Thus, this OE is not related to the Inspection of Buried and Underground Piping and Tanks AMP.
5. AR 00464785 dated October 8, 2009 – This AR was associated with external paint bubbling and corrosion at the air to ground interface of fire hydrant 10-HY-10 which is in the scope of SLR. Although the external surface of the fire hydrant was corroded, and a pin-hole leak was identified after excavation, the functionality assessment indicated that although there was reduced margin, the fire hydrant was considered "Functional" and above "Full Qualification".
6. AR 00485197 dated January 26, 2009 – This AR was associated with discovery of external corroded fire protection piping, which is in the scope of SLR, during excavation for a construction activity. Although the external surface of the piping was corroded, the lowest wall thickness measurement was still well above the minimum thickness required for the service conditions.
7. AR 01955813 dated April 7, 2014 – This AR documents the results inspections of the Unit 3 B header of the safety related intake cooling water system which is in the scope of SLR. The inspections included excavation, direct inspection of the external surface of approximately ten feet of the piping, and ultrasonic wall thickness measurements. The inspections found that minor graphitic corrosion was occurring and the piping was in good overall condition. Future inspections of the intake cooling water system buried piping will be performed within 18.75 years (approximately 2032) based on post-examination assessment conducted per NEI 09-14, Appendix C (Reference 2).
8. AR 00529702 dated November 7, 2009 – This AR was associated with fire main leakage between valves 10-PIV-5 and -6. This portion of the fire main is located on fossil unit side of the plant site and not in the scope of SLR. As such, this portion of the system is not subject to the requirements of the current PTN Fire Protection AMP. Thus, this OE is not related to the Inspection of Buried and Underground Piping and Tanks AMP.
9. AR 00460508 dated December 11, 2008 – This AR was associated with a leak in the buried service water piping supplying the construction shop on the South side of the plant site. Service water at PTN is domestic/potable water. This piping is not in the scope of SLR. Thus, this OE is not related to the Inspection of Buried and Underground Piping and Tanks AMP.

10. AR 02055286 dated June 19, 2015 – This AR is not related to aging. This AR documents a question that was raised regarding coating requirements on new stainless steel piping that was planned to be encased in concrete. Additionally, this piping is associated with the turbine plant cooling water supplemental cooling system, which is not in the scope of SLR. Thus, this OE is not related to the Inspection of Buried and Underground Piping and Tanks AMP.

The summaries of the plant-specific OE above demonstrate that for buried piping in the scope of SLR at PTN there has not been significant degradation and only one minor leak was identified (pin-hole leak). As a result, no additional inspections beyond those currently planned (see Attachment 27 to Reference 3 in response to NRC RAI B.2.3.28-3) are required for buried steel piping during the 10 year period prior to the SPEO.

References:

1. NRC letter dated July 23, 2018 entitled, Turkey Point Nuclear Generating Units 3 and 4 - Report for the Operating Experience Review Audit Regarding the Subsequent License Renewal Application Review (EPID No. L-2018-RNW-0002), transmitting "Audit Report Operating Experience Review Audit Regarding the Turkey Point Nuclear Generating Units 3 and 4, Subsequent License Renewal Application" (ADAMS Accession No. ML18183A445)
2. NEI 09-14, Rev. 4, Guideline for the Management of Underground Piping and Tank Integrity, December 2014
3. FPL Letter L-2018-166 to NRC dated October 16, 2018, Turkey Point Units 3 and 4 Subsequent License Renewal Application, Safety Review Requests for Additional Information (RAI) Set 3 Responses (ADAMS Accession No. ML18296A024)

Associated SLRA Revisions:

None

Associated Enclosures:

None

NRC RAI Letter Nos. ML19037A382 and ML19037A398 Dated February 6, 2019

2. Reactor Vessel Internals Aging Management Program, GALL AMP XI.M16A

Regulatory Basis

Title 10 of the *Code of Federal Regulation* (CFR) Section 54.21(a)(3) states that for each structure and component identified in paragraph (a)(1) of this section, the applicant shall demonstrate that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the current licensing basis (CLB) for the subsequent period of extended operation.

Background

For each structure and component identified in 10 CFR 54.21(a)(1), the applicant for subsequent license renewal (SLR) has the option to demonstrate compliance with 10 CFR 54.21(a)(3), by including in the SLR application (SLRA) an aging management program (AMP) that is consistent with the applicable AMP described in the GALL-SLR Report.

The Turkey Point SLRA Section B.2.3.7 states that the reactor vessel internals (RVI) AMP with enhancements will be consistent with GALL-SLR Report AMP XI.M16A. (Note: The AMP enhancements are unrelated to this RAI.) The GALL-SLR Report AMP XI.M16A specifies that for existing RVI AMPs that are based on implementation of MRP-227-A inspection and evaluation guidelines, the guidelines are supplemented through a "gap analysis" that identifies changes to the AMP that are needed to address an 80-year operating period. Further, the GALL-SLR Report AMP "Scope of Program" element specifies that if the SLRA AMP is based on MRP-227-A with a gap analysis, the scope of the program focuses on identification and justification of the following:

a. RVI components that screen in for additional aging degradation mechanisms (DMs) when assessed for the 60-to-80-year operating period (SPEO);

b. RVI components that previously screened in for certain DMs, and the severity of these 60-year DMs could significantly increase for the 60-to-80 year SPEO;

c. Changes to the existing MRP-227-A program characteristics, including but not limited to changes in inspection categories, inspection criteria, or primary-to-expansion component criteria and relationships.

RAI B.2.3.7-F

Issue

To address item (a) of the "Scope of Program" element for an 80-year operating period, the applicant's MRP-227-A gap analysis in SLRA Appendix C is based in part on an 80-year screening of the RVI components for the eight aging degradation mechanisms (DMs) and an associated failure modes, effects, and criticality analysis (FMECA) to determine the potential need for changes to RVI component inspection criteria for the SPEO. Neutron fluence and fatigue cumulative usage factor (CUF) are the two time-dependent input parameters with the potential to cause additional DMs to be screened in for the 80-year period. With respect to neutron fluence, Attachment 11 in Enclosure 5 of the SLRA provides Electric Power Research Institute (EPRI) Materials Reliability Program (MRP) Document, MRP 2017-038, "Transmittal of Preliminary Results from MRP-191 Expert Panel Review in Support of Subsequent License Renewal at U.S. PWR Plants," December 15, 2017. MRP 2017-038 includes the attachment, "Preliminary Fluence Table to Support MRP-191 Subsequent License Renewal (SLR) Expert Panel Review (EPRI Confidential Information)."

To support its review of the information in MRP 2017-038, the staff audited Westinghouse Document LTR-REA-17-168, Revision 0, "Comparison of Turkey Point Units 3 and 4 Subsequent License Renewal Reactor Internals Fluence to Representative EPRI MRP-191 3-Loop Plant," dated February 2, 2018, including the Attachment to this document. LTR-REA-17-168, Revision 0 describes EPRI MRP "representative reactor internals fluence projections for Westinghouse 3-loop plants."

Request:

Please provide a detailed discussion of the representative reactor internals neutron fluence model used to generate the projections cited in LTR-REA-17-168, Revision 0, and a detailed description of the methods used to obtain the projections. As part of this discussion, provide the following:

a) Confirmation that the fluence analysis methodologies used are consistent with what has been previously reviewed and approved by the NRC.

b) A description of how the nodal fluxes in the core are modeled in the representative model.

c) A discussion regarding differences between the fluence models used as a basis for the 60- and 80-year fluence projections and the assessments performed to establish fluence region classifications for each RVI component. As part of this discussion, address the apparent discrepancies in region classifications as shown in Attachment 1 to SLRA Appendix C (i.e., some components appear to have a lower fluence region classification for the 80-year projection than the 60-year projection). Sufficient information should be given for the staff to understand why the differences would be expected to cause the observed changes in region classifications.

FPL Response:

The representative reactor vessel internals (RVI) neutron fluence projections cited in LTR-REA-17-168, Revision 1 were determined for the Electric Power Research Institute (EPRI) Materials Reliability Program 191 (MRP-191) representative three-loop Westinghouse pressurized water reactor (PWR) using the three-dimensional fluence rate synthesis methodology described in WCAP-14040-A. The WCAP-14040-A methodology adheres to the guidance of Regulatory Guide 1.190.

The spatial variations of the neutron sources were obtained from a burnup-weighted average of the respective power distributions from individual fuel cycles for both the Turkey Point Units 3 and 4 reactors and representative three-loop Westinghouse PWR. These spatial distributions include pinwise gradients for all fuel assemblies located at the periphery of the core and uniform or flat distribution for fuel assemblies interior to the core.

The energy distribution of the source was determined by selecting a fuel burnup representative of conditions averaged over the irradiation period under consideration and an initial fuel assembly enrichment characteristic of the core designs used over the applicable period. From the assembly burnup and initial U-235 enrichment, a fission split by isotope including U-235, U-238, Pu-239, Pu-240, Pu-241, and Pu-242 was derived; and, from that fission split, composite values of energy release per fission, neutron yield per fission, and fission spectrum were determined. These composite values were then combined with the spatial distribution to produce the overall absolute neutron source for use in the transport calculations.

Discrete ordinates transport calculations were performed on a fuel-cycle-specific basis to determine the neutron and gamma ray environment within the reactor geometry of the Turkey Point Units 3 and 4 reactors and representative three-loop Westinghouse PWR. In the application of the WCAP-14040-A methodology to the fast neutron exposure evaluations, plant-specific forward transport calculations were carried out using the following two-dimensional/one-dimensional fluence rate synthesis technique for the reactor vessel:

$$\Phi(r,\Theta,z) = \Phi(r,\Theta) \times \Phi(r,z)/\Phi(r)$$

where $\Phi(r,\Theta,z)$ is the synthesized three-dimensional neutron fluence rate distribution, $\Phi(r,\Theta)$ is the transport solution in r,θ geometry, $\Phi(r,z)$ is the two-dimensional solution for a cylindrical reactor model using the actual axial core power distribution, and $\Phi(r)$ is the one-dimensional solution for a cylindrical reactor model using the same source per unit height as that used in the r,θ two-dimensional calculation.

Margins were applied to select inputs used to determine the representative RVI neutron fluence projections for the fleet of Westinghouse three-loop PWRs. For example, the representative reactor internals neutron fluence projections cited in LTR-REA-17-168, Revision 1 were determined with one of two axial power distributions: a flat distribution with a conservative multiplier of [ ]^{a,c} applied or a "realistic" distribution with a conservative multiplier of [ ]^{a,c} applied. For those RVI components listed in LTR-REA-17-168, Revision 1 that are located near/above the top or near/below the bottom of the active core, the flat distribution with the [ ]^{a,c} multiplier resulted in the more limiting projections. For RVI components located well below the top and well above the bottom of the active core, the "realistic" distribution with the [ ]^{a,c} multiplier tended to result in the more limiting projections. In all cases, however, the more limiting of the two representative RVI fluence projections was the one that was cited in LTR-REA-17-168, Revision 1.

The lettered responses below correspond with lettered requests above.

a) As discussed above, the analyses for both the Turkey Point RVI neutron fluence projections in LTR-REA-17-168, Revision 1 and the MRP-191 representative three-loop Westinghouse PWR used the fluence rate synthesis methodology described in WCAP-14040-A, which has been accepted and approved by the NRC.

b) For both models, the nodes located in the core were a homogenous mixture of fuel, cladding, moderator, and miscellaneous core structures such as fuel assembly grids, guide tubes, etc. Cycle-specific moderator temperature conditions were incorporated in the model to represent the density conditions of the moderator. For the MRP-191 Westinghouse representative three-loop PWR model, the core region was separated into an upper and lower region which provided a representative modeling of the temperature rise associated with the core region. For the Turkey Point model, a single core region was modeled.

c) The differences in the 60- and 80-year fluence projections are summarized as:

Component	60-yr dpa	80-yr dpa

a,c

These differences are due to both modelling and data interpretation and are based on several factors:

Modeled Geometry: As is typical with discrete ordinates neutron transport calculations, the core and reactor internal regions were modeled using a combination of homogenized regions (e.g. fuel assemblies, upper and lower core plate, etc.), and assumed solid regions (e.g. core barrel, formers, etc.). The 80-year projections used a more refined model that, for example, features more detail near the fuel assembly nozzles and core plates.

The 80-year model also featured greater detail and extended further above and below the active core region. This is consistent with industry-wide changes in response to NRC Regulatory Issue Summary 2014-11.

Moderator Density: Consistent with the geometry changes discussed above, moderator densities were updated. The most significant change was the treatment of the upper and lower halves of the core at different temperatures. The modeled temperatures provided a more refined representation of temperature rise in the core region.

Data Management: Data visualization tools have improved significantly in the 10+ years since the classification of components for 60 years. This has the practical impact of making the visualization of the various components and homogenized regions more accurate. Correspondingly, fluence results can be more precisely mapped to the transport model regions. Differences in the 60- and 80-year fluence projections can therefore occur due to the approximate nature of homogenized radiation transport models and the flux gradients observed in the reactor internals.

These factors as they apply to the differences in fluence projections in the table above are as follows:

Component	Apparent Reason for Difference

a,c

In addition to the above, enclosed (Enclosure 3) is LTR-REA-17-168-NP, Revision 1, "Comparison of Turkey Point Units 3 and 4 Subsequent License Renewal Reactor Internals Fluence to Representative EPRI MRP-191 3-Loop Plant" (Non-proprietary) which is provided as a reference to facilitate the NRC's review of the above RAI response.

References:

None

Associated SLRA Revisions:

None

Associated Enclosures:

1. Westinghouse Letter CAW-19-4865 dated February 19, 2019, Application for Withholding Proprietary Information from Public Disclosure.
2. Westinghouse Letter CAW-19-4857 dated January 21, 2019, Application for Withholding Proprietary Information from Public Disclosure.
3. LTR-REA-17-168-NP, Revision 1, "Comparison of Turkey Point Units 3 and 4 Subsequent License Renewal Reactor Internals Fluence to Representative EPRI MRP-191 3-Loop Plant" (Non-proprietary).

Enclosure 1

Westinghouse Letter CAW-19-4865 dated February 19, 2019

Application for Withholding Proprietary Information From Public Disclosure

Westinghouse Affidavit CAW-19-4865

Proprietary Information Notice and Copyright Notice

Regarding

LTR-REA-18-157-P, Rev. 0, "Recommended Response to Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI) B.2.3.7-F Related to the Turkey Point Subsequent License Renewal Application (SLRA)" (Proprietary)

Westinghouse Non-Proprietary Class 3

Westinghouse

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CAW-19-4865

February 19, 2019

APPLICATION FOR WITHHOLDING PROPRIETARY INFORMATION FROM PUBLIC DISCLOSURE

Subject: LTR-REA-18-157-P, Rev. 0, "Recommended Response to Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI) B.2.3.7-F Related to the Turkey Point Subsequent License Renewal Application (SLRA)" (Proprietary)

The Application for Withholding Proprietary Information from Public Disclosure is submitted by Westinghouse Electric Company LLC ("Westinghouse"), pursuant to the provisions of paragraph (b)(1) of Section 2.390 of the Nuclear Regulatory Commission's ("Commission's") regulations. It contains commercial strategic information proprietary to Westinghouse and customarily held in confidence.

The proprietary information for which withholding is being requested in the above-referenced report is further identified in Affidavit CAW-19-4865 signed by the owner of the proprietary information, Westinghouse. The Affidavit, which accompanies this letter, sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR Section 2.390 of the Commission's regulations.

Accordingly, this letter authorizes the utilization of the accompanying Affidavit by Florida Power and Light Company.

Correspondence with respect to the proprietary aspects of the Application for Withholding or the Westinghouse Affidavit should reference CAW-19-4865, and should be addressed to Camille Zozula, Manager, Facilities and Infrastructure Licensing, Westinghouse Electric Company, 1000 Westinghouse Drive, Suite 165, Cranberry Township, Pennsylvania 16066.

Camille T. Zozula
Infrastructure & Facilities Licensing

Enclosures:
1. Affidavit CAW-19-4865
2. Proprietary Information Notice and Copyright Notice
3. LTR-REA-18-157-P, Rev. 0, "Recommended Response to Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI) B.2.3.7-F Related to the Turkey Point Subsequent License Renewal Application (SLRA)" (Proprietary)

CAW-19-4865

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF BUTLER:

I, Camille T. Zozula, am authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC ("Westinghouse") and declare that the averments of fact set forth in this Affidavit are true and correct to the best of my knowledge, information, and belief.

Executed on: 19 Feb 2019

Camille T. Zozula
Infrastructure & Facility Licensing

(1) I am Manager, Infrastructure & Facilities Licensing, Westinghouse Electric Company LLC ("Westinghouse"), and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rule making proceedings, and am authorized to apply for its withholding on behalf of Westinghouse.

(2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.390 of the Nuclear Regulatory Commission's ("Commission's") regulations and in conjunction with the Westinghouse Application for Withholding Proprietary Information from Public Disclosure accompanying this Affidavit.

(3) I have personal knowledge of the criteria and procedures utilized by Westinghouse in designating information as a trade secret, privileged or as confidential commercial or financial information.

(4) Pursuant to the provisions of paragraph (b)(4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.

(i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse.

(ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitute Westinghouse policy and provide the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

(a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of

Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.

(b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage (e.g., by optimization or improved marketability).

(c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.

(d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.

(e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.

(f) It contains patentable ideas, for which patent protection may be desirable.

(iii) There are sound policy reasons behind the Westinghouse system which include the following:

(a) The use of such information by Westinghouse gives Westinghouse a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Westinghouse competitive position.

(b) It is information that is marketable in many ways. The extent to which such information is available to competitors diminishes the Westinghouse ability to sell products and services involving the use of the information.

(c) Use by our competitor would put Westinghouse at a competitive disadvantage by reducing his expenditure of resources at our expense.

(d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Westinghouse of a competitive advantage.

(e) Unrestricted disclosure would jeopardize the position of prominence of Westinghouse in the world market, and thereby give a market advantage to the competition of those countries.

(f) The Westinghouse capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.

(iv) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.390, is to be received in confidence by the Commission.

(v) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.

(vi) The proprietary information sought to be withheld in this submittal is that which is appropriately marked in LTR-REA-18-157-P, Rev. 0, "Recommended Response to Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI) B.2.3.7-F Related to the Turkey Point Subsequent License Renewal Application (SLRA)" (Proprietary), for submittal to the Commission, being transmitted by Florida Power & Light Company letter. The proprietary information as submitted by Westinghouse is that associated with the NRC request for docketing LTR-REA-18-157-P, Rev. 0, and may be used only for that purpose.

(a) This information is part of that which will enable Westinghouse to provide a technical justification for acceptability of reactor internals fluence projections for Turkey Point Units 3 and 4 in support of their subsequent license renewal program.

(b) Further, this information has substantial commercial value as follows:

(i) Westinghouse plans to sell the use of similar information to its customers for the purpose of supporting other subsequent license renewal programs.

(ii) Westinghouse can sell support and defense of industry guidelines and acceptance criteria for plant-specific applications.

(iii) The information requested to be withheld reveals the distinguishing aspects of a methodology which was developed by Westinghouse.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide similar technical evaluation justifications and licensing defense services for commercial power reactors without commensurate expenses. Also, public disclosure of the information would enable others to use the information to meet NRC requirements for licensing documentation without purchasing the right to use the information.

The development of the technology described in part by the information is the result of applying the results of many years of experience in an intensive Westinghouse effort and the expenditure of a considerable sum of money.

In order for competitors of Westinghouse to duplicate this information, similar technical programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended.

Further the deponent sayeth not.

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Enclosure 2

Westinghouse Letter CAW-19-4857 dated January 21, 2019

Application for Withholding Proprietary Information From Public Disclosure

Westinghouse Affidavit CAW-19-4857

Proprietary Information Notice and Copyright Notice

Regarding

LTR-REA-17-168-P, Rev. 1, "Comparison of Turkey Point Units 3 and 4 Subsequent License Renewal Reactor Internals Fluence to Representative EPRI MRP-191 3-Loop Plant" (Proprietary)

Westinghouse Non-Proprietary Class 3

Westinghouse

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CAW-19-4857

January 21, 2019

APPLICATION FOR WITHHOLDING PROPRIETARY
INFORMATION FROM PUBLIC DISCLOSURE

Subject: LTR-REA-17-168-P, Rev. 1, "Comparison of Turkey Point Units 3 and 4 Subsequent License Renewal Reactor Internals Fluence to Representative EPRI MRP-191 3-Loop Plant" (Proprietary)

The Application for Withholding Proprietary Information from Public Disclosure is submitted by Westinghouse Electric Company LLC ("Westinghouse"), pursuant to the provisions of paragraph (b)(1) of Section 2.390 of the Nuclear Regulatory Commission's ("Commission's") regulations. It contains commercial strategic information proprietary to Westinghouse and customarily held in confidence.

The proprietary information for which withholding is being requested in the above-referenced report is further identified in Affidavit CAW-19-4857 signed by the owner of the proprietary information, Westinghouse. The Affidavit, which accompanies this letter, sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR Section 2.390 of the Commission's regulations.

Accordingly, this letter authorizes the utilization of the accompanying Affidavit by Florida Power and Light Company.

Correspondence with respect to the proprietary aspects of the Application for Withholding or the Westinghouse Affidavit should reference CAW-19-4857, and should be addressed to Camille Zozula, Manager, Facilities and Infrastructure Licensing, Westinghouse Electric Company, 1000 Westinghouse Drive, Building 2 Suite 256, Cranberry Township, Pennsylvania 16066.

Camille T. Zozula
Infrastructure & Facilities Licensing

Enclosures:
1. Affidavit CAW-19-4857
2. Proprietary Information Notice and Copyright Notice
3. LTR-REA-17-168-P, Rev. 1, "Comparison of Turkey Point Units 3 and 4 Subsequent License Renewal Reactor Internals Fluence to Representative EPRI MRP-191 3-Loop Plant" (Proprietary)

CAW-19-4857

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF BUTLER:

I, Camille T. Zozula, am authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC ("Westinghouse") and declare that the averments of fact set forth in this Affidavit are true and correct to the best of my knowledge, information, and belief.

Executed on: 21 Jan 2019

Camille T. Zozula
Infrastructure & Facilities Licensing

(1) I am Manager, Infrastructure & Facilities Licensing, Westinghouse Electric Company LLC ("Westinghouse"), and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rule making proceedings, and am authorized to apply for its withholding on behalf of Westinghouse.

(2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.390 of the Nuclear Regulatory Commission's ("Commission's") regulations and in conjunction with the Westinghouse Application for Withholding Proprietary Information from Public Disclosure accompanying this Affidavit.

(3) I have personal knowledge of the criteria and procedures utilized by Westinghouse in designating information as a trade secret, privileged or as confidential commercial or financial information.

(4) Pursuant to the provisions of paragraph (b)(4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.

(i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse.

(ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitute Westinghouse policy and provide the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

(a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of

Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.

(b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage (e.g., by optimization or improved marketability).

(c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.

(d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.

(e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.

(f) It contains patentable ideas, for which patent protection may be desirable.

(iii) There are sound policy reasons behind the Westinghouse system which include the following:

(a) The use of such information by Westinghouse gives Westinghouse a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Westinghouse competitive position.

(b) It is information that is marketable in many ways. The extent to which such information is available to competitors diminishes the Westinghouse ability to sell products and services involving the use of the information.

(c) Use by our competitor would put Westinghouse at a competitive disadvantage by reducing his expenditure of resources at our expense.

(d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Westinghouse of a competitive advantage.

(e) Unrestricted disclosure would jeopardize the position of prominence of Westinghouse in the world market, and thereby give a market advantage to the competition of those countries.

(f) The Westinghouse capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.

(iv) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.390, is to be received in confidence by the Commission.

(v) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.

(vi) The proprietary information sought to be withheld in this submittal is that which is appropriately marked in LTR-REA-17-168-P, Rev. 1, "Comparison of Turkey Point Units 3 and 4 Subsequent License Renewal Reactor Internals Fluence to Representative EPRI MRP-191 3-Loop Plant" (Proprietary), for submittal to the Commission, being transmitted by Florida Power & Light Company letter. The proprietary information as submitted by Westinghouse is that associated with the NRC request for docketing LTR-REA-17-168-P, Rev. 1, and may be used only for that purpose.

(a) This information is part of that which will enable Westinghouse to provide a technical justification for acceptability of reactor internals fluence projections for Turkey Point Units 3 and 4 in support of their subsequent license renewal program.

(b) Further, this information has substantial commercial value as follows:

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Enclosure 3

Westinghouse Letter LTR-REA-17-168-NP, Revision 1 dated January 17, 2019

Comparison of Turkey Point Units 3 and 4 Subsequent License Renewal Reactor Internals Fluence to Representative EPRI MRP-191 3-Loop Plant

Westinghouse

To: John T. Ahearn
Cc:

Date: January 17, 2019

From: Radiation Engineering & Analysis
Phone: (412) 374-3905
Email: markivaj@westinghouse.com
Our Ref: **LTR-REA-17-168-NP, Revision 1**

Subject: **Comparison of Turkey Point Units 3 and 4 Subsequent License Renewal Reactor Internals Fluence to Representative EPRI MRP-191 3-Loop Plant**

Reference(s): 1. LTR-REA-17-168, Revision 0, "Comparison of Turkey Point Units 3 and 4 Subsequent License Renewal Reactor Internals Fluence to Representative EPRI MRP-191 3-Loop Plant," February 2018.

Attachment(s): 1. Summary Report for the Comparison of Turkey Point Units 3 and 4 Subsequent License Renewal Reactor Internals Fluence to Representative EPRI MRP-191 3-Loop Plant (13 pages)

Revision 1 of this letter is created in order to add proprietary markings to the summary report attached to LTR-REA-17-168, Revision 0 (Reference 1). With the exception of these proprietary markings, there are no changes made to the content of the Reference 1 summary report. Therefore, changes are not tracked by revision bars in the margin.

The summary report attached to this letter should be transmitted to NextEra.

Please contact the undersigned if there are any questions regarding this information.

Author: *(Electronically Approved)**
Alex J. Markivich
Radiation Engineering & Analysis

Reviewer: *(Electronically Approved)**
Andrew E. Hawk
Radiation Engineering & Analysis

Author: *(Electronically Approved)**
Jesse J. Klingensmith
Radiation Engineering & Analysis

Approver: *(Electronically Approved)**
Laurent P. Houssay
Radiation Engineering & Analysis

Attachment

Summary Report for the Comparison of Turkey Point Units 3 and 4 Subsequent License Renewal Reactor Internals Fluence to Representative EPRI MRP-191 3-Loop Plant

Turkey Point Units 3 and 4 intend to pursue a subsequent license renewal (SLR) for a plant lifetime of 80 years (72 effective full-power years [EFPY]). A concern with the SLR is the material degradation due to the radiation environment encompassing the reactor internals components. EPRI's Materials Reliability Program (MRP) is currently generating representative reactor internals fluence projections for Westinghouse 3-loop plants in order to show the feasibility of this aspect of SLR. However, the SLR for Turkey Point Units 3 and 4 is currently scheduled to be submitted to the Nuclear Regulatory Commission (NRC) prior to completion of the MRP-191 project. Therefore, NextEra has requested the projected 72 EFPY reactor internals fluences for Turkey Point Units 3 and 4 be compared to the representative Westinghouse 3-loop plant being considered in the MRP-191 project.

The evaluation compared reactor geometries, 72 EFPY fast neutron fluence (E > 1.0 MeV) results, and [ ]^{a,c} applicability criteria for both the representative Westinghouse 3-loop plant and Turkey Point Unit 3. Note that the comparison summarized herein, the conclusions of which are based on the geometry of and neutron fluence values determined for the Turkey Point Unit 3 reactor, is also applicable to Turkey Point Unit 4 for the following reasons:

- Turkey Point Units 3 and 4 have similar reactor internals geometries.
- Turkey Point Units 3 and 4 employ similar fuel management plans.
- Turkey Point Units 3 and 4 operate under similar conditions (e.g., reactor power, inlet temperature, outlet temperature, etc.).
- Turkey Point Units 3 and 4 share a combined surveillance program.

Reactor Geometry

In order to ensure that the Turkey Point Unit 3 reactor internals will behave in a similar manner to the representative Westinghouse 3-loop reactor, a comparison of key dimensions for the [r,θ] and [r,z] geometries are presented in Table 1 and Table 2 , respectively.

The Turkey Point Unit 3 reactor is ultimately based on a generic 3-loop model with [ ]^{a,c}-inch-thick baffle plates and a fully circumferential thermal shield. From Table 1 and Table 2, the [ ]^{a,c} Turkey Point Unit 3 and representative 3-loop reactor models. The [ ]^{a,c} would not have a significant impact on the fluence values calculated for the reactor internals. Also, [ ]^{a,c} would have some impact on the fluence values for the reactor internals, however, the impact is considered to be minor when considering the overall difference in fluence values presented later in this report.

The [r,θ] reactor geometries are presented in Figure 1 and Figure 2 for the representative 3-loop reactor and Turkey Point Unit 3, respectively. The [r,z] reactor geometries are presented in Figure 3 and Figure 4 for the representative 3-loop reactor and Turkey Point Unit 3, respectively.

Table 1: Comparison of Key Cylindrical Component Specifications

Component	**Dimension Relative to Core Center (cm)**	
	Turkey Point Unit 3	**Representative 3-Loop**

a,c

Table 2: Comparison of Key Axial Component Specifications

a,c

Parameter	Current Turkey Point Unit 3 Configuration	Representative 3-Loop

a,c

Figure 1: Representative Westinghouse 3-loop r,θ Reactor Geometry at Core Midplane

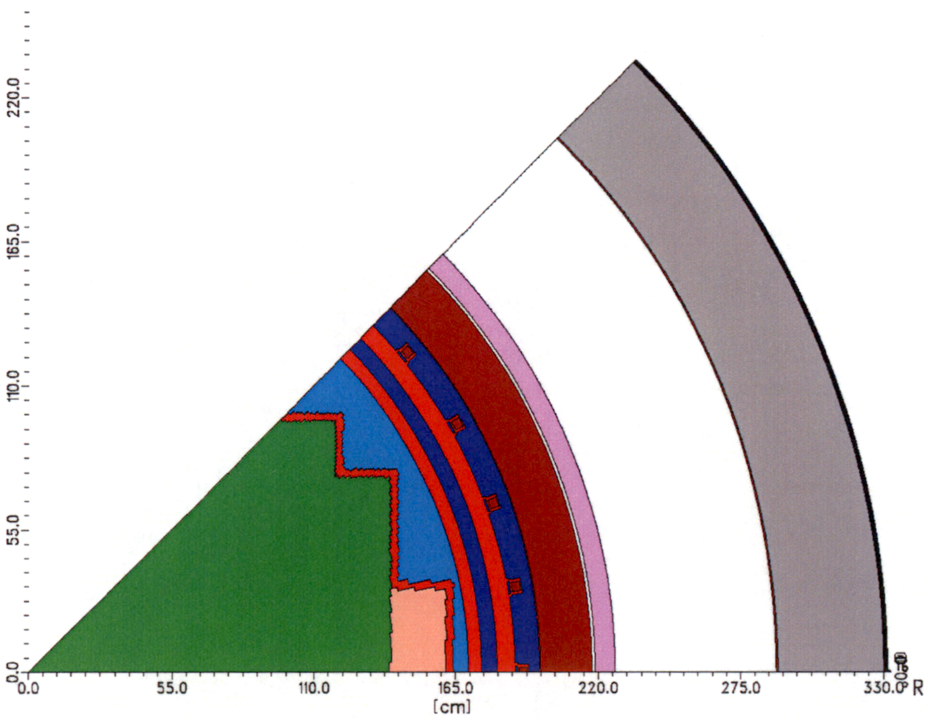

Figure 2: Turkey Point Unit 3 [r,θ] Reactor Geometry at the Core Midplane

a,c

Figure 3: Representative Westinghouse 3-Loop [r,z] Reactor Geometry

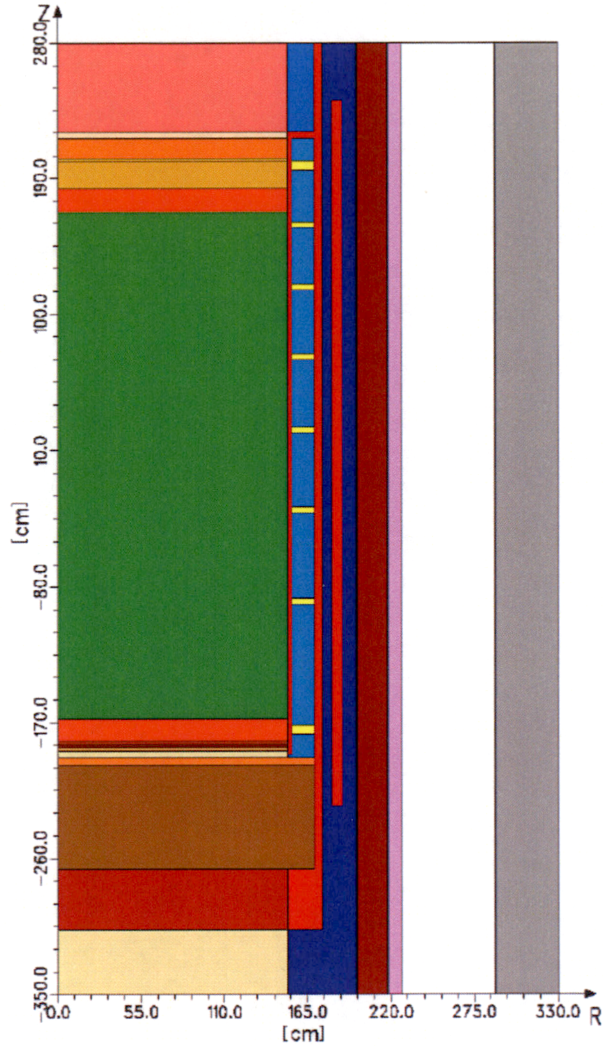

Figure 4: Turkey Point Unit 3 [r,z] Reactor Geometry

Fluence Results

Fast neutron fluence (E > 1.0 MeV) results were compared for the 80 year (72 EFPY) operation of Turkey Point Unit 3 and the MRP-191 representative Westinghouse 3-loop plant. Since the purpose of the project is to show that the projected reactor internals fluence values for the representative Westinghouse 3-loop plant are appropriately representative for Turkey Point Unit 3, the majority of the comparison locations were those surrounding the fuel region. This included locations along several reactor internals components: the [ ]^{a,c}. In addition, a progressive series of points extending to the [ ]^{a,c} was compared.

Also, consistent with the MRP-191 evaluation, the azimuthal position for the comparisons is limited to [ ]^{a,c}. Due to [ ]^{a,c} for the Turkey Point Unit 3 and representative Westinghouse 3-loop reactors, if it can be shown with sufficient margin that the [ ]^{a,c} azimuthal segment is representative, then it can be reasonably assumed that the remaining azimuthal segments would also remain representative.

Table 3, Table 4, and Table 5 present the fast neutron fluence (E > 1.0 MeV) results for the [ ]^{a,c}, respectively, for the Westinghouse representative 3-loop reactor and Turkey Point Unit 3. The ratio of representative Westinghouse 3-loop reactor neutron fluence results to the Turkey Point Unit 3 neutron fluence results is included in these tables to show the relative differences in results between the two models. The relative difference in results translates into the amount of margin between the results of the two models. As shown, the representative Westinghouse 3-loop reactor fluence is at least [ ]^{a,c} higher than the Turkey Point Unit 3 reactor, with the exception of several points located beyond the reactor internals locations ([ ]^{a,c} shown in Table 5). These points still show significant margin; however, they are not of consequence as the MRP-191 program is focused on reactor internals.

Table 3: Comparison of [ ]a,c Fluence Values				
Reactor Internal Component	Axial Point (cm)	Turkey Point Unit 3 Fluence (n/cm²)	Representative 3-Loop Reactor Fluence (n/cm²)	Ratio of Representative 3-Loop Reactor to Turkey Point Unit 3 Fluence
[ ]a,c	[ ]a,c	3.38E+20	[ ]a,c	[ ]a,c
		2.01E+21		
		9.41E+21		
		2.21E+22		
		3.02E+22		
		3.55E+22		
		3.76E+22		
		3.82E+22		
		4.27E+22		
		3.70E+22		
		3.65E+22		
		3.67E+22		
		4.24E+22		
		3.73E+22		
		3.81E+22		
		3.99E+22		
		4.06E+22		
		3.97E+22		
		4.02E+22		
		4.21E+22		
		3.98E+22		
		3.99E+22		
		4.03E+22		
		3.58E+22		
		3.16E+22		
		2.05E+22		
		9.83E+21		
		4.40E+21		
		8.78E+20		

Table 3: Comparison of [ ]a,c Fluence Values

Reactor Internal Component	Axial Point (cm)	Turkey Point Unit 3 Fluence (n/cm²)	Representative 3-Loop Reactor Fluence (n/cm²)	Ratio of Representative 3-Loop Reactor to Turkey Point Unit 3 Fluence
[ ]a,c	[ ]a,c	1.13E+20	[ ]a,c	[ ]a,c
		5.40E+20		
		1.82E+21		
		4.30E+21		
		6.06E+21		
		7.17E+21		
		7.65E+21		
		7.74E+21		
		7.43E+21		
		7.50E+21		
		7.52E+21		
		7.48E+21		
		7.25E+21		
		7.58E+21		
		7.81E+21		
		7.84E+21		
		7.93E+21		
		8.10E+21		
		8.02E+21		
		7.94E+21		
		8.09E+21		
		7.94E+21		
		7.52E+21		
		7.18E+21		
		6.05E+21		
		3.91E+21		
		2.17E+21		
		8.94E+20		
		2.30E+20		

Table 4: Comparison of [ ]a,c Fluence Values

Reactor Internal Component	Radial Point (cm)	Turkey Point Unit 3 Fluence (n/cm²)	Representative 3-Loop Reactor Fluence (n/cm²)	Ratio of Representative 3-Loop Reactor to Turkey Point Unit 3 Fluence
[ ]a,c	[ ]a,c	9.59E+20	[ ]a,c	[ ]a,c
		9.53E+20		
		9.57E+20		
		9.50E+20		
		9.93E+20		
		1.00E+21		
		8.98E+20		
		7.80E+20		
		6.57E+20		
		7.36E+20		
[ ]a,c		6.36E+21		
		6.29E+21		
		6.27E+21		
		6.30E+21		
		6.62E+21		
		6.73E+21		
		6.30E+21		
		5.80E+21		
		4.77E+21		
		3.78E+21		

Table 5: Comparison of [ ]a,c Fluence Values

Radial Point (cm)	Turkey Point Unit 3 Fluence (n/cm²)	Representative 3-Loop Reactor Fluence (n/cm²)	Ratio of Representative 3-Loop Reactor to Turkey Point Unit 3 Fluence
[ ]a,c	3.34E+21	[ ]a,c	[ ]a,c
	1.36E+21		
	4.92E+20		
	9.92E+19		

MRP-191 Applicability Criteria

In addition to determining the projected fluence at 72 EFPY, the projected core design for Turkey Point Unit 3 was evaluated against the acceptability criteria of the MRP-191 inspection sampling recommendations for managing aging, which [ ]^{a,c}. The following criteria were established for key reactor internals components for Westinghouse-designed reactors:

LOA1: Heat generation rate figure of merit, [ ]^{a,c}

LOA2: Average core power density [ ]^{a,c}

LOA3: Active fuel to fuel alignment plate distance [ ]^{a,c}

The plant-specific values calculated for comparison to the applicability criteria use [ ]^{a,c}, consistent with the neutron transport calculations that form the basis for the [ ]^{a,c} applicability criteria.

From the comparisons in Table 6, it is seen that the heat generation rate (HGR) figure of merit (FOM) is exceeded for the corner C1 locations for Turkey Point Unit 3. This is acceptable because plant-specific calculations show that the Turkey Point reactor internals components would still be subjected to lower neutron fluence values than those determined for the representative Westinghouse 3-loop reactor. The generic nature of the [ ]^{a,c} screening criteria introduces some conservatisms into the model that do not necessarily apply to every plant (for example, plant specific power, axial power shapes, etc.). Thus, the Turkey Point units may exceed a given criterion without exceeding the total fluence calculated for the reactor internals.

LOA1: Heat generation rate figure of merit, [ ]^{a,c}

Table 6 presents the determination of HGR-FOM values for the Turkey Point Unit 3 projection cycle design. Note that the projection cycle design is based on the average core power distributions and reactor operating conditions of Turkey Point Unit 3 Cycle 29, but includes a 1.2 bias on the peripheral and re-entrant corner assembly relative powers. The HGR-FOM calculations use the reactor power density, relative core power for the corner assembly locations, and the HGR weighting of the corner assembly locations based on guidance for [ ]^{a,c} evaluations.

As shown, the Corner C1 locations exceed the criteria of [ ]^{a,c} for Turkey Point Unit 3. Based on the results of Table 3, Table 4, and Table 5 which show that the projection cycle produces acceptable fluence results, the FOMs calculated in Table 6 are acceptable even though the generic [ ]^{a,c} applicability criteria is exceeded.

Table 6: Determination of the HGR-FOM for Turkey Point Unit 3

Corner C1-A Evaluation								
HGR Weight (W_I)		[ ]a,c	[ ]a,c	[ ]a,c	[ ]a,c	**ΣW_I*R_I**	**$PD*\Sigma W_I*R_I$ (W/cm^3)**	**Above Criterion**
Cycle	**PD (W/cm^3)**	**Relative Core Power (R_I)**						
		G1	**G2**	**F2**	**E2**			
Turkey Point Unit 3 Projection Cycle*	[ ]a,c	[ ]a,c**	[ ]a,c**	[ ]a,c**	[ ]a,c**	[ ]a,c	[ ]a,c	Yes
W 3-Loop Representative Cycle	[ ]a,c	[ ]a,c	[ ]a,c	[ ]a,c	[ ]a,c	[ ]a,c	[ ]a,c	No

Corner C1-B Evaluation								
HGR Weight (W_I)		[ ]a,c	[ ]a,c	[ ]a,c	[ ]a,c	**ΣW_I*R_I**	**$PD*\Sigma W_I*R_I$ (W/cm^3)**	**Above Criterion**
Cycle	**PD (W/cm^3)**	**Relative Core Power (R_I)**						
		B5	**B6**	**B7**	**A7**			
Turkey Point Unit 3 Projection Cycle*	[ ]a,c	[ ]a,c**	[ ]a,c**	[ ]a,c**	[ ]a,c**	[ ]a,c	[ ]a,c	Yes
W 3-Loop Representative Cycle	[ ]a,c	[ ]a,c	[ ]a,c	[ ]a,c	[ ]a,c	[ ]a,c	[ ]a,c	No

*Projection cycle is based on Cycle 29 core design.
**Includes 20% bias on the assemblies located on the core periphery.

Table 6 (continued): Determination of the HGR-FOM for Turkey Point Unit 3

Corner C2-A Evaluation							
HGR Weight (W_I)		[ ]^{a,c}	[ ]^{a,c}	[ ]^{a,c}		**PD*ΣWI*RI (W/cm^3)**	**Above Criterion**
Cycle	**PD (W/cm^3)**	**Relative Core Power (R_I)**					
		E2	**E3**	**D3**	**ΣWI*RI**		
Turkey Point Unit 3 Projection Cycle*	[ ]^{a,c}	[ ]^{a,c}**	[ ]^{a,c}**	[ ]^{a,c}**	[ ]^{a,c}	[ ]^{a,c}	No
W 3-Loop Representative Cycle	[ ]^{a,c}	[ ]^{a,c}	[ ]^{a,c}	[ ]^{a,c}	[ ]^{a,c}	[ ]^{a,c}	No
Corner C2-B Evaluation							
HGR Weight (W_I)		[ ]^{a,c}	[ ]^{a,c}	[ ]^{a,c}		**PD*ΣWI*RI (W/cm^3)**	**Above Criterion**
Cycle	**PD (W/cm^3)**	**Relative Core Power (R_I)**					
		D3	**D4**	**C4**	**ΣWI*RI**		
Turkey Point Unit 3 Projection Cycle*	[ ]^{a,c}	[ ]^{a,c}**	[ ]^{a,c}**	[ ]^{a,c}**	[ ]^{a,c}	[ ]^{a,c}	No
W 3-Loop Representative Cycle	[ ]^{a,c}	[ ]^{a,c}	[ ]^{a,c}	[ ]^{a,c}	[ ]^{a,c}	[ ]^{a,c}	No
Corner C2-C Evaluation							
HGR Weight (W_I)		[ ]^{a,c}	[ ]^{a,c}	[ ]^{a,c}		**PD*ΣWI*RI (W/cm^3)**	**Above Criterion**
Cycle	**PD (W/cm^3)**	**Relative Core Power (R_I)**					
		C4	**C5**	**B5**	**ΣWI*RI**		
Turkey Point Unit 3 Projection Cycle*	[ ]^{a,c}	[ ]^{a,c}**	[ ]^{a,c}**	[ ]^{a,c}**	[ ]^{a,c}	[ ]^{a,c}	No
W 3-Loop Representative Cycle	[ ]^{a,c}	[ ]^{a,c}	[ ]^{a,c}	[ ]^{a,c}	[ ]^{a,c}	[ ]^{a,c}	No

*Projection cycle is based on Cycle 29 core design.
**Includes 20% bias on the assemblies located on the core periphery.

LOA2: *Average core power density* [ ]^{a,c}

The power density for Turkey Point Unit 3 Cycle 29 is [ ]^{a,c} W/cm^3. This value is less than the [ ]^{a,c} acceptance criterion of [ ]^{a,c}.

LOA3: *Active fuel to fuel alignment plate distance* [ ]^{a,c}

For the Turkey Point Unit 3 projection cycle, the distance between the top of the fuel and the bottom of the upper core plate is [ ]^{a,c} inches. This is greater than the [ ]^{a,c} acceptance criterion of [ ]^{a,c}.

Conclusions

Based on the data and discussion presented herein, the following conclusions can be made:

- The Turkey Point Unit 3 [ ]^{a,c} the representative Westinghouse 3-loop reactor such that there would [ ]^{a,c} to the fluence distribution throughout the reactor internals between the two models.
- A comparison of fluence values for select reactor internals locations shows that the representative Westinghouse 3-loop reactor is appropriately representative for the Turkey Point Unit 3 reactor with at least [ ]^{a,c} margin for the reactor internals locations sampled.
- The [ ]^{a,c} comparison showed less than [ ]^{a,c} margin for locations closer to the reactor pressure vessel. However, significant margin is still maintained and it is emphasized that the focus of the MRP-191 program is on reactor internals components.
- The Turkey Point Unit 3 model projection cycle does not meet the [ ]^{a,c} HGR-FOM applicability criterion. In particular, and as shown in Table 6, the Turkey Point projection cycle Corner C1 locations exceed the [ ]^{a,c} HGR-FOM applicability criterion of [ ]^{a,c}. However, the comparison of fluence values at points surrounding the active core regions shows that, despite exceeding this criterion, the Turkey Point reactor internals components would still be subjected to lower neutron fluence values than those determined for the representative Westinghouse 3-loop reactor. This is due to the [ ]^{a,c} used for the representative Westinghouse 3-loop reactor neutron fluence calculations. Therefore, the Turkey Point projection cycle Corner C1 HGR-FOM of [ ]^{a,c} shown in Table 6 is considered acceptable with respect to the MRP-191 assessment described herein. In addition, this HGR-FOM may be credited when performing MRP-191-related checks of future Turkey Point core designs. Note that any such use of this HGR-FOM is contingent upon maintaining an average core power density that is less than or equal to [ ]^{a,c}.
- The comparison summarized herein, the conclusions of which are based on the geometry of and neutron fluence values determined for the Turkey Point Unit 3 reactor, is also applicable to Turkey Point Unit 4 for the following reasons:
  - Turkey Point Units 3 and 4 have similar reactor internals geometries.
  - Turkey Point Units 3 and 4 employ similar fuel management plans.
  - Turkey Point Units 3 and 4 operate under similar conditions (e.g., reactor power, inlet temperature, outlet temperature, etc.).
  - Turkey Point Units 3 and 4 share a combined surveillance program.

Therefore, it is concluded that the representative 3-loop reactor internals fluence values are representative of Turkey Point Units 3 and 4 for consideration of SLR for an 80-year plant life (approximately 72 EFPY).

Aging Management Program (AMP) Effectiveness Reviews

Discussion:

During discussion of the Turkey Point Subsequent License Renewal Application (SLRA) with the NRC staff, additional information was requested regarding the frequency at which SLRA AMP effectiveness reviews would be performed.

NUREG-2192 (Reference 1), Appendix A.4.2, provides guidance to ensure that the programmatic activities for the ongoing review of industry and site-specific operating experience (OE) are adequate for SLR, and identifies ten points for further review. Point 7 of Appendix A.4.2 states that assessments should be conducted on the effectiveness of the AMPs and OE programmatic activities. These assessments should be conducted on a periodic basis that is not to exceed once every 5 years.

Consistent with Appendix A.4.2, PTN will conduct AMP and OE programmatic assessments on a periodic basis that is not to exceed once every five years. SLRA Section B.1.4 is revised to specify this assessment frequency.

References:

1. NUREG-2192, Standard Review Plan for Review of Subsequent License Renewal Applications for Nuclear Power Plants, United States Nuclear Regulatory Commission, July 2017, ADAMS Accession No. ML16274A402.

Associated SLRA Revisions:

The second paragraph of SLRA Section B.1.4 ("Operating Experience") is amended as indicated by the following text deletion (strikethrough) and text addition (red underlined font) revision.

> The following information addresses NUREG-2192, Appendix A.4.2 points 1 and 7. Internal OE (also referred to as site-specific OE) and external OE (also referred to as industry OE) sources are captured and systematically reviewed on an ongoing basis in accordance with the FPL QA Program and the PTN OE program. Corrective actions being taken as a result of the License Renewal AMP Effectiveness Review performed in December 2017 and documented in Section B.1.1 will further ensure that Internal OE and external OE sources are captured and systematically reviewed on an ongoing basis. The PTN OE program meets the requirements of NUREG-0737 (Reference B.3.6), "Clarification of TMI Action Plan Requirements," Item I.C.5, "Procedures for Feedback of Operating Experience to Plant Staff." The PTN OE program also meets the requirements of NEI 14-12 (Reference B.3.84), "Aging Management Program Effectiveness" for periodic program assessments. **Consistent with NUREG-2192, Appendix A.4.2, the OE program procedure will be updated to specify a frequency for these assessments to not exceed once every five years.** The scope of the FPL QA program (Reference B.3.145) currently includes nonsafety-related SCs, as described in Section B.1.3.

The list of enhancements included on page B-10 of SLRA Section B.1.4 ("Operating Experience") is amended as indicated by the following text deletion (strikethrough) and text addition (red underlined font) revision.

5. **The PTN OE program performs AMP and OE programmatic assessments on a periodic basis. These assessments will not exceed once every five years.**

Commitment 51 of SLRA Table 17-3 is amended as indicated by the following text deletion (strikethrough) and text addition (red underlined font) revision.

No.	Aging Management Program or Activity (Section)	NUREG-2191 Section	Commitment	Implementation Schedule
51	Operating Experience Program (17.1.4)	Appendix B	**e)** **Update the OE program procedure to specify a frequency for the AMP and OE assessments to not exceed once every five years.**	No later than the date that the **renewed** ~~subsequent~~ operating license is ~~renewed~~**issued**.

Associated Enclosures:

None