L-2018-222
10 CFR 54.17

December 12, 2018

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 - November 13, 2018 Public Meeting Discussion Topic 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 Public Meeting Updated Agenda dated November 1, 2018, Telecon Between NRC and FPL to Discuss Items Associated with the Safety Review of the Turkey Point Subsequent License Renewal Application (ADAMS Accession No. ML 18315A003)

4. 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)

On April 10, 2018, Florida Power & Light Company (FPL) submitted to the NRC Revision 1 of the subsequent license renewal application (SLRA) for Turkey Point Units 3 and 4 (Reference 1), as well as supplemental information for the SLRA Environmental Report (ER) (Reference 2). On November 13, 2018, the NRC and FPL held a public meeting (teleconference) to discuss items associated the safety review of the SLRA for Turkey Point Units 3 and 4 (Reference 3).

The purpose of this letter is to provide, as attachments to this letter, responses to the discussion topic action items assigned to FPL during the referenced public meeting. These responses revise and supersede the corresponding responses submitted in Reference 4.

A001
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 December 12, 2018.

Sincerely,

William Maher
Senior Licensing Director
Florida Power & Light Company

WDM/RFO

Attachments: 2 RAI Response Revisions (refer to Letter Attachment Index)

LETTER ATTACHMENT INDEX			
Attachment	**NRC RAI**	**Attachment**	**NRC RAI**
1	Set 3: B.2.3.28-2	2	Set 3: B.2.3.21-3

cc:

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

NRC RAI Letter Nos. ML18243A006 and ML18243A007 dated September 17, 2018

RAI B.2.3.28-2

Background:

SLRA Tables 3.3.2-1, 3.3.2-9, and 3.3.2-15 state that steel piping, fire hydrants, bolting, and valve bodies exposed to soil will be managed for loss of material using the Buried and Underground Piping and Tanks program. In addition, SLRA Tables 3.3.2-9, 3.3.2-12, and 3.4.2-2 state loss of material will be managed for stainless steel piping exposed to soil using the Buried and Underground Piping and Tanks program. Stress corrosion cracking is not addressed as an applicable aging effect.

SRP SLR items 3.3.1-144 and 3.4.1-72 state that steel and stainless steel components exposed to soil are susceptible to stress corrosion cracking (steel in carbonate/bicarbonate environment only).

GALL-SLR Report AMP XI.M41 states that steel components can experience stress corrosion cracking when exposed to a carbonate/bicarbonate environment depending on cathodic polarization level, temperature, and pH. This is based on the staff's review of NACE SP0169 2013, "Control of External Corrosion on Underground or Submerged Metallic Piping Systems," Figure 2, "SCC [stress corrosion cracking] Range of Pipe Steel in Carbonate/Bicarbonate Environments."

During its review of soil corrosivity testing during the audit, the staff could not determine if the carbonate/bicarbonate environment is applicable at Turkey Point.

Issue:

a) The SLRA does not address stress corrosion cracking of stainless steel exposed to soil.

b) The SLRA does not address stress corrosion cracking of steel exposed to soil, which can occur in a carbonate/bicarbonate environment depending on cathodic polarization level, temperature, and pH. Based on the staff's review of soil corrosivity testing during the audit, it is unclear why stress corrosion cracking is not an aging effect requiring management for steel piping exposed to soil.

Request:

State the basis for why stress corrosion cracking is not an aging effect requiring management for steel and stainless steel piping exposed to soil.

FPL Revised Response:

This revised RAI response supersedes in its entirety the RAI response provided in Attachment 26 of Reference 1 discussed during the November 13, 2018 NRC public meeting with FPL (Reference 2). The Table 3.3.2-1 line item associated with carbon

steel piping exposed to a soil environment is deleted.

Stainless steel piping exposed to soil is susceptible to stress corrosion cracking. Based on 2010 soil testing results, the pH of the soil may indicate the presence of a carbonate/bicarbonate environment; thus, steel piping exposed to soil is also assumed to be susceptible to stress corrosion cracking. As stated in SLRA Section B.2.3.28, the Buried and Underground Piping and Tanks AMP manages the cracking aging effect for components exposed to soil. SLRA Tables 3.3.2-1, 3.3.2-9, and 3.3.2-15 are revised to include rows associated with steel components exposed to a soil environment that are susceptible to stress corrosion cracking. SLRA Tables 3.3.2-9, 3.3.2-12, and 3.4.2-2 are revised to include rows associated with stainless steel components in a soil environment susceptible to stress corrosion cracking. The associated SLRA Table 1 items 3.3-1, 144 and 3.4-1, 072 are also updated to reflect the revised Table 2 items.

References:

1. 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.
2. NRC Public Meeting updated agenda dated November 1, 2018, Telecon Between NRC and FPL to Discuss Items Associated with the Safety Review of the Turkey Point Subsequent License Renewal Application, ADAMS Accession No. ML18315A003.

Associated SLRA Revisions:

SLRA Tables 3.3-1, 3.4-1, 3.3.2-1, 3.3.2-9, 3.3.2-12, 3.3.2-15, and 3.4.2-2 are amended as indicated by the following text deletion (strikethrough) and text addition (red underlined font) revisions. These revisions supersede the revisions provided in L-2018-166 Attachment 26.

Revise SLRA Table 3.3-1 item 144 as follows:

Table 3.3-1: Summary of Aging Management Evaluation for the Auxiliary Systems

Item Number	Component	Aging Effect / Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3-1, 144	Stainless steel, steel, aluminum piping, piping components, tanks exposed to soil, concrete	Cracking due to SCC (steel in carbonate/bicarbonate environment only)	AMP XI.M41, "Buried and Underground Piping and Tanks"	No	Consistent with NUREG-2191. The Buried and Underground Piping and Tanks AMP is used to manage cracking in stainless steel piping exposed to concrete **and soil, carbon steel exposed to soil, and gray cast iron exposed to soil**.

Revise SLRA Table 3.4-1 item 072 as follows:

Table 3.4-1: Summary of Aging Management Evaluation for the Steam and Power Conversion Systems

Item Number	Component	Aging Effect / Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.4-1, 072	Stainless steel, steel, aluminum piping, piping components, tanks exposed to soil, concrete	Cracking due to SCC (steel in carbonate/bicarbonate environment only)	AMP XI.M41, "Buried and Underground Piping and Tanks"	No	~~Not used. The components exposed to soil or concrete in the Steam and Power Conversion Systems are addressed under item numbers 3.4-1, 030 and 3.4-1, 047.~~ **Consistent with NUREG-2191. The Buried and Underground Piping and Tanks AMP is used to manage cracking in stainless steel piping exposed to soil.**

Add the following rows to SLRA Table 3.3.2-1:

Table 3.3.2-1: Intake Cooling Water – Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-2191 Item	Table 1 Item	Notes
Bolting	**Pressure boundary**	**Carbon steel**	**Soil (ext)**	**Cracking**	**Buried and Underground Piping and Tanks**	**VII.I.A-425**	**3.3-1, 144**	**C**
Piping	**Pressure boundary**	**Gray cast iron**	**Soil (ext)**	**Cracking**	**Buried and Underground Piping and Tanks**	**VII.I.A-425**	**3.3-1, 144**	**A**

Add the following row to SLRA Table 3.3.2-9:

Table 3.3.2-9: Plant Air – Summary of Aging Management Evaluation								
Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-2191 Item	Table 1 Item	Notes
Piping	Pressure boundary	Carbon steel	Soil (ext)	Cracking	Buried and Underground Piping and Tanks	VII.I.A-425	3.3-1, 144	A
Piping	Pressure boundary	Stainless steel	Soil (ext)	Cracking	Buried and Underground Piping and Tanks	VII.I.A-425	3.3-1, 144	A

Add the following row to SLRA Table 3.3.2-12:

Table 3.3.2-12: Control Building Ventilation – Summary of Aging Management Evaluation								
Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-2191 Item	Table 1 Item	Notes
Piping	Pressure boundary	Stainless steel	Soil (ext)	Cracking	Buried and Underground Piping and Tanks	VII.I.A-425	3.3-1, 144	A

Add the following rows to SLRA Table 3.3.2-15:

Table 3.3.2-15: Fire Protection – Summary of Aging Management Evaluation								
Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-2191 Item	Table 1 Item	Notes
Fire hydrant	Pressure boundary	Gray cast iron	Soil (ext)	Cracking	Buried and Underground Piping and Tanks	VII.I.A-425	3.3-1, 144	A
Piping	Pressure boundary	Carbon steel	Soil (ext)	Cracking	Buried and Underground Piping and Tanks	VII.I.A-425	3.3-1, 144	A
Piping	Pressure boundary	Gray cast iron	Soil (ext)	Cracking	Buried and Underground Piping and Tanks	VII.I.A-425	3.3-1, 144	A
Valve body	Pressure boundary	Gray cast iron	Soil (ext)	Cracking	Buried and Underground Piping and Tanks	VII.I.A-425	3.3-1, 144	A

Add the following row to SLRA Table 3.4.2-2:

Table 3.4.2-2: Feedwater and Blowdown – Summary of Aging Management Evaluation								
Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-2191 Item	Table 1 Item	Notes
Piping	Pressure boundary	Stainless steel	Soil (ext)	Cracking	Buried and Underground Piping and Tanks	VIII.H.S-420	3.4-1, 072	A

Associated Enclosures:

None

NRC RAI Letter Nos. ML18243A006 and ML18243A007 dated September 17, 2018

RAI B.2.3.21-3

Background:

The "detection of aging effects" program element of GALL-SLR AMP XI.M33, "Selective Leaching," states the following:

a. One-time inspections are only conducted for components exposed to closed-cycle cooling water (CCCW) or treated water when no plant-specific operating experience (OE) of selective leaching exists in these environments.

b. Opportunistic and periodic inspections are conducted for components exposed to raw water, waste water, or soil, and for components in CCCW or treated water where plant-specific OE includes selective leaching in these environments.

SLRA Section B.2.3.21 states "[t]o date, PTN site-specific OE has not revealed selective leaching in components exposed to treated water. Those components are only subject to a one-time inspection unless that inspection identifies selective leaching."

During its audit, the staff noted that during the license renewal "C" auxiliary feedwater (AFW) lubricating oil cooler inspection, selective leaching was found on the gray cast iron bonnet end bells and divider plates. In addition, the staff noted that the AFW lubricating oil cooler uses demineralized water.

SLRA Table 3.0-1, "Service Environments for Mechanical Aging Management Reviews," states that "[t]reated water is demineralized water and is the base water for all clean systems."

Issue:

During its audit, the staff noted that selective leaching was identified on components exposed to a treated water environment. Based on this observation, it is unclear to the staff why one-time inspections are appropriate for components susceptible to selective leaching exposed to a treated water environment.

Request:

State the basis for why one-time inspections are appropriate for components susceptible to selective leaching exposed to a treated water environment.

FPL Revised Response:

This revised RAI response supersedes in its entirety the RAI response provided in Attachment 16 of Reference 2 discussed during the November 13, 2018 NRC public meeting with FPL (Reference 3). Copper alloy >8% aluminum and copper alloy >15% zinc components exposed to a treated water environment will be subject to periodic and opportunistic inspections rather than one-time inspections.

As documented in the response to RAI B.2.3.21-1 (Attachment 10 to Reference 1), selective leaching was discovered in gray cast iron components exposed to treated water. Therefore, all susceptible materials in a treated water environment are subject to periodic and opportunistic inspections consistent with the GALL-SLR Selective Leaching AMP XI.M33. SLRA Section 17.2.2.21, item 25 of Table 17-3, and B.2.3.21 are revised to clarify that susceptible materials in all applicable environments at PTN will be subject to periodic and opportunistic inspections and that there are no copper alloy >8% aluminum or copper alloy >15% zinc components exposed to soil at PTN.

References:

1. FPL Letter L-2018-152 dated August 31, 2018, Turkey Point Units 3 and 4 Subsequent License Renewal Application, Safety Review Requests for Additional Information (RAI) Set 1 Responses, ADAMS Accession No. ML18248A257.
2. 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.
3. NRC Public Meeting updated agenda dated November 1, 2018, Telecon Between NRC and FPL to Discuss Items Associated with the Safety Review of the Turkey Point Subsequent License Renewal Application, ADAMS Accession No. ML18315A003.

Associated SLRA Revisions:

SLRA Section 17.2.2.21, Table 17-3, and Section B.2.3.21 are amended as indicated by the following text deletion (strikethrough) and text addition (red underlined font) revisions. These revisions supersede the revisions provided in L-2018-166 Attachment 16.

Revise current SLRA Section 17.2.2.21 paragraphs 2 through 4, updated via L-2018-152 Attachment 10 (page 2 of 6) as follows:

~~This AMP includes a one-time inspection for components exposed to a treated water environment when site-specific OE has not revealed selective leaching in these environments. To date, no site-specific OE at PTN has revealed selective leaching therefore, a one-time inspection is required.~~ The AMP ~~also~~ includes periodic inspections for components that are exposed to raw water, **treated water,** waste water, lubricating oil, or soil environments**.** ~~and~~ **The AMP also includes** opportunistic inspections whenever components are opened, or whenever buried or submerged surfaces are exposed**.**~~, and these periodic~~ **Periodic** inspections are conducted at an interval of no greater than every 10 years during the SPEO.

The scope of this AMP includes components made of gray cast iron, cast iron, ductile iron, and copper alloys (except for inhibited brass) that contain greater than 15 percent zinc or greater than 8 percent aluminum exposed to a raw water, treated water, waste water, lubricating oil, or soil environment. ~~Depending on environment, the~~ **The** AMP includes ~~one-time, or~~ opportunistic and periodic visual inspections of selected components that are susceptible to selective leaching, coupled with mechanical examination techniques (e.g., chipping, scraping). Destructive examinations of components to determine the presence of and depth of dealloying through-wall thickness are also conducted. These techniques can determine whether loss of material due to selective leaching is occurring and whether selective leaching will affect the ability of the components to perform their intended function for the SPEO. Inspections are conducted in accordance with site-specific procedures, including inspection parameters such as lighting, distance, offset, and surface conditions. When the acceptance criteria are not met such that it is determined that the affected component should be replaced prior to the end of the SPEO, additional inspections are performed.

~~Each of the one-time and~~**The** periodic inspections for these populations at each unit comprises a 3 percent sample or a maximum of 10 components. Gray cast iron, cast iron, and ductile iron components will be visually and mechanically inspected, and the rest will be visually inspected. In addition, for populations having 35 or more components, two destructive examinations will be performed for each material and environment population in each 10-year inspection interval at each unit. For each population with less than 35 susceptible components, one destructive examination will be performed.

Revise the current commitment for the Selective Leaching AMP in Table 17-3, item 25, as follows:

No.	Aging Management Program or Activity (Section)	NUREG-2191 Section	Commitment	Implementation Schedule
25	Selective Leaching (17.2.2.21)	XI.M33	Implement the new PTN Selective Leaching AMP.	Implement AMP and start inspections no earlier than 10 years prior to the SPEO. Complete ~~the one-time inspection and~~ the first periodic inspection no later than 6 months or the last RFO prior to SPEO. Corresponding dates are as follows: PTN3: 7/19/2022 - 1/19/2032 PTN4: 4/10/2023 - 10/10/2032

Revise current SLRA Section B.2.3.21 Paragraphs 2 through 4, updated via L-2018-152 Attachment 10 (pages 2 and 3 of 6) as follows:

~~Depending on environment, the~~ **The** PTN Selective Leaching AMP includes ~~either one-time inspections or~~ opportunistic and periodic visual inspections of selected components that are susceptible to selective leaching, coupled with mechanical examination techniques (e.g., chipping, scraping). Destructive examinations of components to determine the presence of and depth of dealloying through-wall thickness are also conducted. These techniques can determine whether loss of material due to selective leaching is occurring and whether selective leaching will affect the ability of the components to perform their intended function for the SPEO.

~~To date, PTN site-specific OE has not revealed selective leaching in components exposed to treated water. Those components are only subject to a one-time inspection unless that inspection identifies selective leaching. For components in other environments,~~ ~~p~~**P**eriodic inspections will be performed every 10 years and opportunistic inspections will be performed when possible. The populations requiring examination and their type of required inspections for PTN 3 and 4 are:

- Copper alloy > 8 percent aluminum exposed to raw water (Periodic and Opportunistic)
- Copper alloy > 8 percent aluminum exposed to treated water (~~One-Time~~ **Periodic and Opportunistic**)
- ~~Copper alloy > 8 percent aluminum exposed to soil (Periodic and Opportunistic)~~
- Copper alloy > 15 percent zinc and raw water (Periodic and Opportunistic)
- Copper alloy > 15 percent zinc and treated water (~~One-Time~~ **Periodic and Opportunistic**)
- ~~Copper alloy > 15 percent zinc exposed to soil (Periodic and Opportunistic)~~
- Gray cast iron exposed to raw water (Periodic and Opportunistic)
- Gray cast iron and cast iron exposed to treated water (Periodic and Opportunistic)
- Gray cast iron and waste water (Periodic and Opportunistic)
- Gray cast iron and lubricating oil (Periodic and Opportunistic)
- Gray cast iron exposed to soil (Periodic and Opportunistic)
- Ductile iron exposed to raw water (Periodic and Opportunistic)

~~Each of the one-time and~~**The** periodic inspections for these populations at each unit comprises a 3 percent sample or a maximum of 10 components. Gray cast iron and ductile iron components will be visually and mechanically inspected; the rest will be visually inspected. In addition, for gray cast iron exposed to raw water and ductile iron

exposed to raw water (i.e., the only populations having 35 or more components), two destructive examinations will be performed for each material and environment population in each 10-year inspection interval at each unit. For each population with less than 35 susceptible components, one destructive examination will be performed.

Associated Enclosures:

None