PMTurkeyCOLPEm Resource

From: Comar, Manny
Sent: Friday, November 05, 2010 3:55 PM
To: TurkeyCOL Resource
Subject: FW: FPL Letter L-2010-195 Response to RAI Letter No. 004 (eRAI 4809) SRP 02.04.06 - Probable Maximum Tsunami Flooding
Attachments: L-2010-195 Signed 09-02-2010 RAI 004 Response Letter.pdf

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From: Comar, Manny
Sent: Wednesday, September 08, 2010 1:04 PM
To: Ahn, Hosung
Subject: FW: FPL Letter L-2010-195 Response to RAI Letter No. 004 (eRAI 4809) SRP 02.04.06 - Probable Maximum Tsunami Flooding

fyi

From: Madden, George [mailto:George.Madden@fpl.com]
Sent: Thursday, September 02, 2010 10:51 AM
To: Brown, Alison; Matthews, David; Reyes, Luis; Madden, George; Maher, William; Comar, Manny; Orthen, Richard; Bortone, Pilar; Stewart, Scott
Subject: FPL Letter L-2010-195 Response to RAI Letter No. 004 (eRAI 4809) SRP 02.04.06 - Probable Maximum Tsunami Flooding

Florida Power & Light Company
Proposed Turkey Point Units 6 and 7
Docket Nos. 52-040 and 52-041
Response to Request for Additional Information Letter No. 004 (eRAI 4809)
Standard Review Plan Section 02.04.06 - Probable Maximum Tsunami Flooding

References:

1. NRC Letter to FPL dated August 3, 2010, Request for Additional Information Letter No. 004 Related to SRP Section 02.04.06 - Probable Maximum Tsunami Floodings for the Turkey Point Nuclear Plant Units 6 and 7 Combined License Application (ML102150446)

Florida Power & Light Company (FPL) provides, as attachments to this letter, its responses to the Nuclear Regulatory Commission's (NRC) requests for additional information Question No. 02.04.06-1 and Question No. 02.04.06-3 provided in the referenced letter. The attachments identify changes that will be made in a future revision of the Turkey Point Units 6 and 7 Combined License application (if applicable).

The response to Question No. 02.04.06-2 in the referenced letter is scheduled to be provided by September 22, 2010. FPL will keep the NRC Project Manager informed of the proposed schedule.

v/r
George Madden
NNP Licensing
FPL/ Insight Global
(O) (561) 694-4311
(C) (772) 370-3375
Email: George.Madden@FPL.com

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Sent Date: 11/5/2010 3:54:34 PM
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From: Comar, Manny

Created By: Manny.Comar@nrc.gov

Recipients:
"TurkeyCOL Resource" <TurkeyCOL.Resource@nrc.gov>
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L-2010-195
10 CFR 52.3

September 2, 2010

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

Re: Florida Power & Light Company
Proposed Turkey Point Units 6 and 7
Docket Nos. 52-040 and 52-041
Response to Request for Additional Information Letter No. 004 (eRAI 4809)
Standard Review Plan Section 02.04.06 - Probable Maximum Tsunami Flooding

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If you have any questions, or need additional information, please contact me at 561-691-7490.

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

Executed on September 2, 2010

Sincerely,

William Maher
Senior Licensing Director – New Nuclear Projects

Attachments:

1. FPL Response to Question No. 02.04.06-1 (eRAI 4809)
2. FPL Response to Question No. 02.04.06-3 (eRAI 4809)

cc:
PTN 6 & 7 Project Manager, AP1000 Projects Branch 1, USNRC DNRL/NRO
Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, Turkey Point Plant 3 & 4

NRC RAI Letter No. PTN-RAI-LTR-004

SRP Section: FSAR 02.04.06 - Probable Maximum Tsunami Flooding

Question from Hydrologic Engineering Branch

Question Number: 02.04.06-1 (eRAI 4809)

Section C.I.2.4.6.3 of Regulatory Guide 1.206 (RG 1.206) provides specific guidance with respect to the source characteristics needed to determine the PMT. These characteristics include detailed geologic descriptions of the controlling tsunami generators, including location, source dimensions, and maximum displacement.

In the FSAR, discuss submarine landslides in the Florida Straits/Bahamas/Cuba region and indicate how these sources will be included in determination of the PMT. If these sources are not considered for determination of the PMT, provide the justification for excluding them.

FPL RESPONSE

Information related to submarine landslides in the Florida Straits, Bahamas and Cuba regions have been provided in response to Nuclear Regulatory Commission (NRC) Hydrology Information Need Question HA-29 (FPL Letter to NRC L-2010-087, Attachment 21, dated April 30, 2010). The description of regional geology and evidence of submarine landslides in the regions will be included in FSAR Subsections 2.5.1.1.1.2 and 2.5.1.1.5 in a future COLA revision.

A summary of tsunami potential due to submarine landslides in the Florida Straits, Bahamas and Cuba regions will be included in FSAR Subsection 2.4.6.1.1, as described below, in a future COLA revision. Based on the geological evaluation of submarine landslides in the regions, it is concluded that submarine landslides in the Florida Straits, Bahamas or Cuba regions would not produce a PMT at the site.

References

None

This response is PLANT SPECIFIC.

ASSOCIATED COLA REVISIONS

In response to RAI 02.04.06-1, the last paragraph of FSAR Subsection 2.4.6.1.1 will be updated in a future revision to read as follows:

> **The Ocean Drilling Program (ODP) provides stratigraphic information on the Bahamas Platform and the Straits of Florida from borehole and seismic reflection survey results. The ODP data suggest evidence of significant submarine debris flows and turbidite deposits during a four million year interval in the middle Miocene (Reference 217). However,**

no stratigraphic evidence could be established to relate these Miocene gravity flows to any tsunami deposit or tsunami-like event along the southern Florida coasts. After the Miocene, no debris flow or turbidite deposit could be identified in this region possibly due to the erosional effects of the Gulf loop currents that was first established in the Pliocene. It is hypothesized that the debris flow and turbidite deposit resulted from materials that had accumulated atop the carbonate banks at a marine high stand, which became unstable as sea level fell (Reference 217). Such debris flows are not expected to occur as a result of eustatic sea level rise. Therefore, submarine landslides in the Straits of Florida and Bahamas regions are precluded as a PMT source candidate for the Units 6 & 7 site. Details of stratigraphic information in the Bahamas and the Straits of Florida are provided in Subsection 2.5.1.1.1.2. Potential geological hazards near the site region are described in Subsection 2.5.1.1.5.

Information on submarine landslides along the northern coast of Cuba is very scarce. Iturralde-Vinent (Reference 218) summarizes the current understanding of tsunami hazards in Cuba, details of which are provided in Subsection 2.5.1.1.5. Iturralde-Vinent identifies potential tsunami hazards for the Cuban north coast region based on large carbonate boulders found on marine terraces; however, no submarine landslide zones were identified in this region. Consequently, a submarine landslide along the north coast of Cuba was not included as a candidate PMT source for the Units 6 & 7 site.

Units 6 & 7, therefore, would not be impacted by significant submarine landslide-generated tsunamis from the U.S. Atlantic margin**, the Straits of Florida, Bahamas or Cuba regions.**

In response to RAI 02.04.06-1, the following references will be added to FSAR Subsection 2.4.6.8 in a future revision:

217. ODP Shipboard Scientific Party, Chapter 5. Site 626: Straits of Florida, in Austin, J.A. Jr., and Schlager, W. P., Proceedings Ocean Drilling Program, Initial Report 101, p. 49-109, 1986.

218. Iturralde-Vinent, M.A. (Ed.), Geología de Cuba para Todos, Edicíon Científica, Museo Nacional de Historia Natural-CITMA, preprint, 114 pages, 2009.

ASSOCIATED ENCLOSURES:

None

NRC RAI Letter No. PTN-RAI-LTR-004

SRP Section: FSAR 02.04.06 - Probable Maximum Tsunami Flooding

Questions from Hydrologic Engineering Branch (RHEB)

Question Number: 02.04.06-3 (eRAI 4809)

Section C.I.2.4.6.3 of Regulatory Guide 1.206 (RG 1.206) provides specific guidance with respect to the historical tsunami record, including paleo-tsunami evidence, source characteristics needed to determine the PMT, and orientation of the site relative to the generating mechanism, shape of the coastline, offshore land areas, and hydrography.

Describe in the FSAR:

(1) any evidence of tsunami deposits at the site, distinguishing characteristics of tsunami versus storm deposits, and interpretation of the boring logs; (2) any updated information on submarine landslides offshore of Puerto Rico and indicate how these sources are included in the PMT determination; (3) clarification that seafloor displacement from earthquake sources is not necessary to generate significant tsunamis, with regard to mid-plate earthquakes; and (4) the meaning of the phrase "wide continental shelf" offshore of the site in relation to the attenuating effect of tsunami waves.

FPL RESPONSE

(1) Evidence of tsunami deposits at the site, distinguishing characteristics of tsunami versus storm deposits, and interpretation of the boring logs are provided in the response to Nuclear Regulatory Commission (NRC) Hydrology Information Need Question HA-32 (FPL Letter to NRC L-2010-087, Attachment 24, dated April 30, 2010). Details of the discussion on tsunami deposits, tsunami versus storm surge deposits, and the interpretation of boring logs will be included in FSAR Subsections 2.5.1.1.5, and 2.5.1.2.2 in a future COLA revision.

The last paragraph of FSAR Subsection 2.4.6.2 will be updated in a future revision to provide references to FSAR Subsection 2.5.1.1.5 for a discussion on paleotsunami deposits, as shown below.

(2) Updated information on submarine landslides offshore of Puerto Rico is provided in the response to NRC Hydrology Information Need Question HA-30 (FPL Letter to NRC L-2010-087, Attachment 22, dated April 30, 2010). Details of the discussion will be included in FSAR Subsection 2.5.1.1.5 in a future COLA revision.

A new paragraph will be added at the end of FSAR Subsection 2.4.6.1.6 to provide a brief summary on Puerto Rico landslides and a reference to FSAR Subsection 2.5.1.1.5, as shown below.

(3) A discussion on tsunami potential from mid-plate earthquakes in the Atlantic margin is provided in the response to NRC Hydrology Information Need Question HA-31 (FPL Letter to NRC L-2010-087, Attachment 23, dated April 30, 2010) along with proposed texts for a COLA revision. The proposed revision to FSAR Subsection 2.4.6.1.6, which

is included in COLA Revision 1, will be updated in a future COLA revision to provide additional clarification, as shown below.

(4) The continental shelf near the Turkey Point site is defined in the response to NRC Hydrology Information Need Question HA-28 (FPL Letter to NRC L-2010-087, Attachment 19, dated April 30, 2010). A detailed description of Atlantic continental shelf and slope will be included in FSAR Subsection 2.5.1.1.1.1 in a future COLA revision.

FSAR Subsection 2.4.6.1.1 will be updated in a future COLA revision to provide clarification in relation to tsunami attenuation effects, as shown below.

References

None

This response is PLANT SPECIFIC.

ASSOCIATED COLA REVISIONS

In response to Part (1) of RAI 02.04.06-3, the last sentence of FSAR Subsection 2.4.6.2 will be updated in a future revision as follows:

> ~~An extensive literature search did not reveal any evidence of seismic paleotsunami deposit in the region.~~ **No seismically-induced paleotsunami deposits have been positively identified in available scientific literature within the 200-mile radius of the Turkey Point site, as described in Subsection 2.5.1.1.5. Distinguishing characteristics of tsunami versus storm deposits are also described in Subsection 2.5.1.1.5. Turkey Point site boring log data interpretation and relevance to paleotsunami deposits is described in Subsection 2.5.1.2.2.**

In response to Part (2) of RAI 02.04.06-3, the following paragraph will be inserted at the end of FSAR Subsection 2.4.6.1.6 in a future revision:

> **Although the north Caribbean subduction zone is noted for several seismically-generated tsunamis in recent times, as described in Subsection 2.4.6.1.5, potential submarine landslides of the carbonate platform edge north of Puerto Rico are capable of producing large tsunamis locally (see Subsection 2.4.6.2 and 2.5.1.1.5 for detailed discussions). However, because the Units 6 & 7 site is sheltered by the Bahamas Islands, such landslide-generated tsunamis are not expected to affect the site. Therefore, landslides in the carbonate platform north of Puerto Rico are not considered as a PMT source for the Units 6 & 7 site.**

In response to Part (3) of RAI 02.04.06-3, the third paragraph of FSAR Subsection 2.4.6.1.6, as proposed in the response to NRC Information Need Question HA-31 (FPL Letter to NRC L-2010-087, Attachment 23, dated April 30, 2010), will be modified in a future revision, as follows:

> A significant tsunami generated directly by an earthquake only occurs if the earthquake is large (magnitude, with few exceptions, greater than about 6.5) and if the fault slip associated with the earthquake has a

> significant vertical ~~component of offset~~ **seafloor displacement** (thrust or normal **faults**)~~that extends to the seafloor~~. There is no record of surface fault ~~offset~~ **rupture and significant seismic wave displacement at the seafloor** associated with any historical earthquake in the central and eastern United States including the 1886 Charleston, South Carolina event of about magnitude 7, the largest historical earthquake in the U.S. Atlantic coastal region. Consequently ~~Therefore~~, the conditions for tsunamigenesis by ~~submarine fault~~ seafloor displacement associated with an earthquake do not appear to exist along the U. S. Atlantic margin**.**~~, and~~ Units 6 & 7, therefore, would not be impacted by significant **tsunamis as a result of** ~~submarine fault offset-generated tsunamis~~ **vertical seafloor displacement** associated with the U.S. Atlantic margin earthquakes.

In response to Part (4) of RAI 02.04.06-3, the first and third paragraphs of FSAR Subsection 2.4.6.1.1 will be updated in a future revision as follows:

First paragraph:

> Submarine landslide zones along the U.S. Atlantic margin are concentrated along the New England and Long Island, New York sections of the margin, outward of major ancient rivers in the mid-Atlantic region, and in the salt dome province offshore of North **and South** ~~Carolina~~ **Carolinas**, as shown in Figure 2.4.6-201 (Reference 202). Although submarine landslides along the U.S. Atlantic margin, from Georges Bank offshore of the New England coast to Blake Spur south of the Carolina Trough, have the potential to cause devastating tsunamis locally, the presence of a wide continental shelf is expected to reduce their impact at the shoreline near the landslides (Reference 202).

Third paragraph:

> Units 6 & 7 are located approximately 400 miles (640 kilometers) southwest of Blake Spur and are separated by a wide ~~and shallow~~ continental **slope and** shelf (Figure 2.4.6-201). **Details of the Atlantic continental slope and shelf near the site are described in Subsection 2.5.1.1.1.1.** Additionally, the landslide zones are oriented in a manner that Units 6 & 7 would be away from the main axis of submarine landslide-generated tsunamis. Consequently, the impact of any submarine landslide-generated tsunami ~~in~~ **on** the continental **slope and** shelf north of Blake Spur would be considerably reduced before reaching Units 6 & 7.

ASSOCIATED ENCLOSURES

None