FPL

L-2015-197
10 CFR 52.3

July 15, 2015

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 NRC Request for Additional Information Letter No. 085 (eRAI 7950)
SRP Section 02.05.01 – Basic Geologic and Seismic Information

Reference:

NRC Letter to FPL dated June 16, 2015, Request for Additional Information Letter No. 085 Related to SRP Section 02.05.01 – Basic Geologic and Seismic Information for the Turkey Point Nuclear Plant Units 6 and 7 Combined License Application

Florida Power & Light Company (FPL) provides, as attachments to this letter, its responses to the Nuclear Regulatory Commission's (NRC) requests for additional information (RAIs) 02.05.01-38 and 02.05.01-39 provided in the Reference. 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).

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 July 15, 2015.

Sincerely,

William Maher
Senior Licensing Director – New Nuclear Projects

WDM/RFB

Attachment 1: FPL Response to NRC RAI No. 02.05.01-38 (eRAI 7950)
Attachment 2: FPL Response to NRC RAI No. 02.05.01-39 (eRAI 7950)

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

D097
NRO

NRC RAI Letter No. PTN-RAI-LTR-081

SRP Section: 02.05.01 - Basic Geologic and Seismic Information

Questions from Geosciences and Geotechnical Engineering Branch 2 (RGS2)

NRC RAI Number: 02.05.01-38 (eRAI 7950)

In eRAI 7804, Question 2.5.1-36, staff asked you to provide a discussion of a fault identified by seismic reflection data and located in Biscayne Bay (Cunningham et al 2012) that was not previously included in the FSAR. In your response, you cite a new publication (Cunningham, 2015). Staff examined that report, which identifies an additional, potentially geologically young, tectonic feature, located east of Miami, on the Miami Terrace, about 30 miles from TPNPP, which is not described in the TPNPP FSAR. Figure 14 in Cunningham 2015 clearly shows a tectonic anticline with uplifted truncated seismic reflections assigned to the top of the lower Arcadia Formation. Horizontal buried wave cut terraces on the flank of the anticline indicate uplift and erosion of the lower Arcadia Formation followed by deposition of late Pliocene or early Pleistocene-age sediments. Cunningham suggests that this compression, uplift and reverse faulting is consistent with compressional stresses in the Cuban fold and thrust belt and cites Masaferro and others, 1999. The author also suggests that this compression event is consistent with the timing of tectonic movement of the Santaren anticline.

a) In support of 10 CFR 100.23, please provide a discussion of this tectonic feature with respect to TPNPP and integrate into the regional tectonic setting for the TPNPP COLA.

b) Discuss how this feature might affect the PSHA at TPNPP in light of sensitivity analyses completed for the Santaren Anticline (~170 miles from TP) and the sensitivity analyses completed for the Walker's Cay fault (~200 mile from TP).

FPL RESPONSE:

Cunningham et al. (2012) and Cunningham (2015) (References 1 and 2) report a group of reverse faults and an anticline interpreted from seismic-reflection data acquired from near the offshore Miami Terrace, north-northeast of the Turkey Point Units 6 & 7 site (Figures 1 and 2). The anticline is imaged on seismic line 2TIE (Figure 2), and the reverse faults were imaged in several closely spaced and short (<0.5-mile-long) seismic lines located near seismic line 2TIE (e.g., Figure 1). The anticline is located approximately 3.7 miles (6 kilometers) west of the reverse faults. The anticline is 27 miles (43 kilometers) north-northeast of the Turkey Point Units 6 & 7 site, while the reverse faults are 29 miles (47 kilometers) northeast of the site. To support preparation of this RAI response, the lead author, Kevin Cunningham, was contacted and additional information was obtained about the locations of these structures. In particular, Cunningham provided details that allowed for the creation of the inset maps to Figures 1 and 2, but did not provide any additional information about the most recent activity on these structures beyond what is reported in the literature. The remainder of this response is divided into two parts, a) and b), to address each part of this RAI.

a) In support of 10 CFR 100.23, please provide a discussion of this tectonic feature with respect to TPNPP and integrate into the regional tectonic setting for the TPNPP COLA.

Based on recently acquired offshore seismic reflection profiles, Cunningham et al. (2012) (Reference 1) and Cunningham (2015) (Reference 2) identify a group of 5 reverse faults (only two of which are shown as purple and cyan planes on their figures for clarity) (Figure 1) and an anticline (Figure 2) beneath the offshore Miami Terrace, approximately 30 miles (45 kilometers) northeast of the Turkey Point Units 6 & 7 site. These structures deform strata of the Upper Floridan Aquifer (UFA), which contains the upper portion of the middle Eocene Avon Park Formation, the Ocala and Suwannee Limestones (where present) and the Oligocene or early Miocene lower Arcadia Formation (Reference 2).

The two primary reverse faults, shown as purple and cyan on Figure 1, offset seismic reflections in middle Eocene-age strata of the lower portion of the UFA system in an east-side-up sense (Reference 2). Yellow arrows point to seismic-reflections indicating structural offset between fault blocks (Reference 2). Cunningham (Reference 2) omits the three other faults for clarity on Figure 1. Because the reverse faults were only imaged at one location, no information about the strike or extent of these faults is currently available. Cunningham et al. (2012) (Reference 1) indicate that the timing of reverse fault movement is not well constrained, but reports that the most-recent movement probably occurred sometime during the late Eocene to early Pliocene Epochs, whereas Cunningham (2015) (Reference 2) indicates that the reverse-fault movement occurred sometime within the Oligocene to early Pleistocene (Reference 2).

The anticline, located west of the reverse faults along seismic line 2TIE, also deforms the middle Eocene Avon Park Formation through Oligocene or early Miocene lower Arcadia Formation (Figure 2).The fold introduces approximately 500 feet (152 meters) of relief on the top of the Avon Park Formation over a distance of approximately 1.5 miles (2.4 kilometers). This fold is only imaged in one location, so no information about its strike or spatial extent is known (Reference 2). Seismic reflections that “probably represent late Pliocene- or early Pleistocene-age sediments” unconformably overlie uplifted truncated seismic reflections assigned to the top of the lower Arcadia Formation (Figure 2) (Reference 2, p. 18). The late Pliocene- or early Pleistocene-age sediments also downlap onto and overstep horizontal wave-cut terraces. Cunningham (2015) (Reference 2) states that the horizontal buried terraces indicate that contractional uplift ceased following erosion of the Oligocene or early Miocene lower Arcadia Formation and prior to deposition of the late Pliocene- or early Pleistocene-age sediments.

Cunningham (2015) (Reference 2) suggests that the reverse faults on the offshore Miami Terrace and the anticline observed on the 2TIE seismic profile formed coevally. Cunningham concludes that the relations observed in the seismic-reflection profiles point to contractional uplift and reverse faulting sometime during the Oligocene to early Pleistocene (Reference 2). The timing of this uplift and reverse faulting in southeastern Florida postdates intense northerly directed thrust movement in nearby Cuba during the early to middle Eocene (Pardo, 2009) (FSAR Reference 2.5.1-439), but may coincide with later possible contractional deformation episodes recorded in the Bahamian foreland of the Cuban fold and thrust belt. For example, reverse-fault movement

sometime between the Oligocene to early Pleistocene is compatible with the timing of the majority of fold uplift of the Santaren anticline (Southern Santaren Channel, Great Bahama Bank) reported by Masaferro et al. (FSAR References 2.5.1-426 and 2.5.1-479). East of the Florida Platform, Mulder et al. (2012) (Reference 3) report observations that are consistent with Cenozoic, but pre-Quaternary, westward tectonic tilting on the Little Bahama Bank, which would also be temporally compatible with these contractional structures. Cunningham also suggests that it is possible that the timing of the movement along the reverse faults beneath the Miami Terrace coincides with middle Miocene to early Pliocene movement along the unnamed strike-slip fault mapped beneath Biscayne Bay (Reference 2). The apparent timing of these contractional structures is similar to the youngest of the Tertiary Straits of Florida normal faulting, and these features are older than the latest possible faulting recorded at Walkers Cay (FSAR References 2.5.1-221, 2.5.1-474, 2.5.1-476, 2.5.1-482, 2.5.1-484, and 2.5.1-794).

FSAR Subsection 2.5.1.1.1.1.3.2.1 will be revised to include a discussion of the reverse faults and the anticline from References 1 and 2. Figures 1 and 2 provided as part of this RAI response will be added to the COLA to include this recent work. This RAI response provides added information, and does not require the revision of any previous RAI responses.

b) Discuss how this feature might affect the PSHA at TPNPP in light of sensitivity analyses completed for the Santaren Anticline (~170 miles from TP) and the sensitivity analyses completed for the Walkers Cay fault (~200 miles from TP).

Appendix A to Regulatory Guide 1.208 defines a capable tectonic source as a structure that can generate both vibratory ground motion and tectonic surface deformation in the present seismotectonic regime. It should have at least: (1) the presence of near-surface deformation of a recurring nature within the last 500,000 years or at least once in the last 50,000 years; (2) an association with one or more moderate to large earthquakes or sustained earthquake activity that are usually accompanied by significant surface deformation; or (3) a structural association with capable tectonic sources having characteristics of either (1) or (2) such that movement on one could be reasonably expected to be accompanied by movement on the other.

In Reference 1, Cunningham et al. (2012) indicate that the timing of reverse fault movement is not well constrained, but probably occurred during the late Eocene to early Pliocene Epochs (i.e., >3.6 Ma). Cunningham (2015) (Reference 2) reports that anticlinal uplift and reverse faulting occurred sometime within the Oligocene to early Pleistocene (i.e., >1.8 Ma). Because the uppermost deformed (faulted or folded) unit observed in seismic profiles beneath the Miami Terrace is the Oligocene to Miocene Arcadia Formation, and undeformed late Pliocene or early Pleistocene sediments (>1.8 Ma) overlie the reverse faults and anticline identified in the seismic lines, the structures are not considered to be capable tectonic features. Within approximately 25 kilometers of Cunningham's (2015) (Reference 2) reverse faults and fold there is only one earthquake in the project Phase 1 earthquake catalog, including dependent events. This Emb 2.70 earthquake occurred on December 22, 1945 and is located approximately 10 km north-northeast of the fold and 10 km north-northwest of the reverse faults. Thus,

there does not appear to be an association of seismicity with these structures. Moreover, there are no nearby potential Quaternary tectonic structures or capable faults (see FSAR Figure 2.5.1-205). Therefore, the reverse faults and fold reported by Cunningham et al. (2012) and Cunningham (2015) (References 1 and 2) are not capable tectonic sources and would not affect, and should not be included in, the PSHA for the Turkey Point Units 6 & 7 site.

Available information regarding the Walkers Cay fault and Santaren anticline allow for the possibility of Quaternary activity. For example, while post-middle Miocene deformation on faults imaged as the Walkers Cay fault is minimal, one strand extends to the seafloor, and thus, offsets undated, but potentially Quaternary, strata. Hazard sensitivity analyses performed for the Walkers Cay fault source (FSAR Subsection 2.5.2.4.4.3.4.1) and the Santaren anticline fault source (response to RAI 02.05.01-34) indicate that these two potential sources are insignificant contributors to seismic hazard at the site.

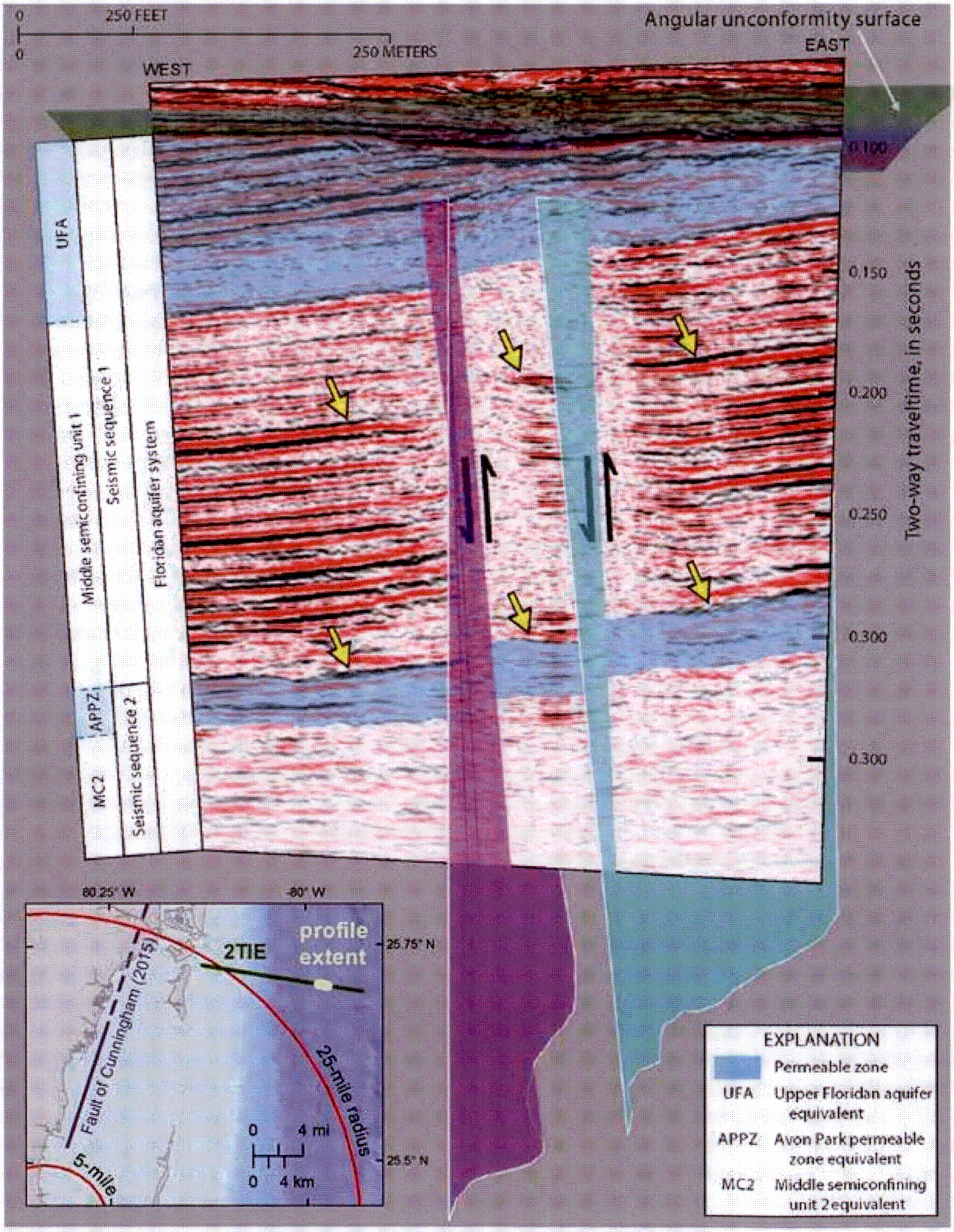


Figure 1: Seismic Reflection Profile of Reverse Faults from Cunningham (2015)

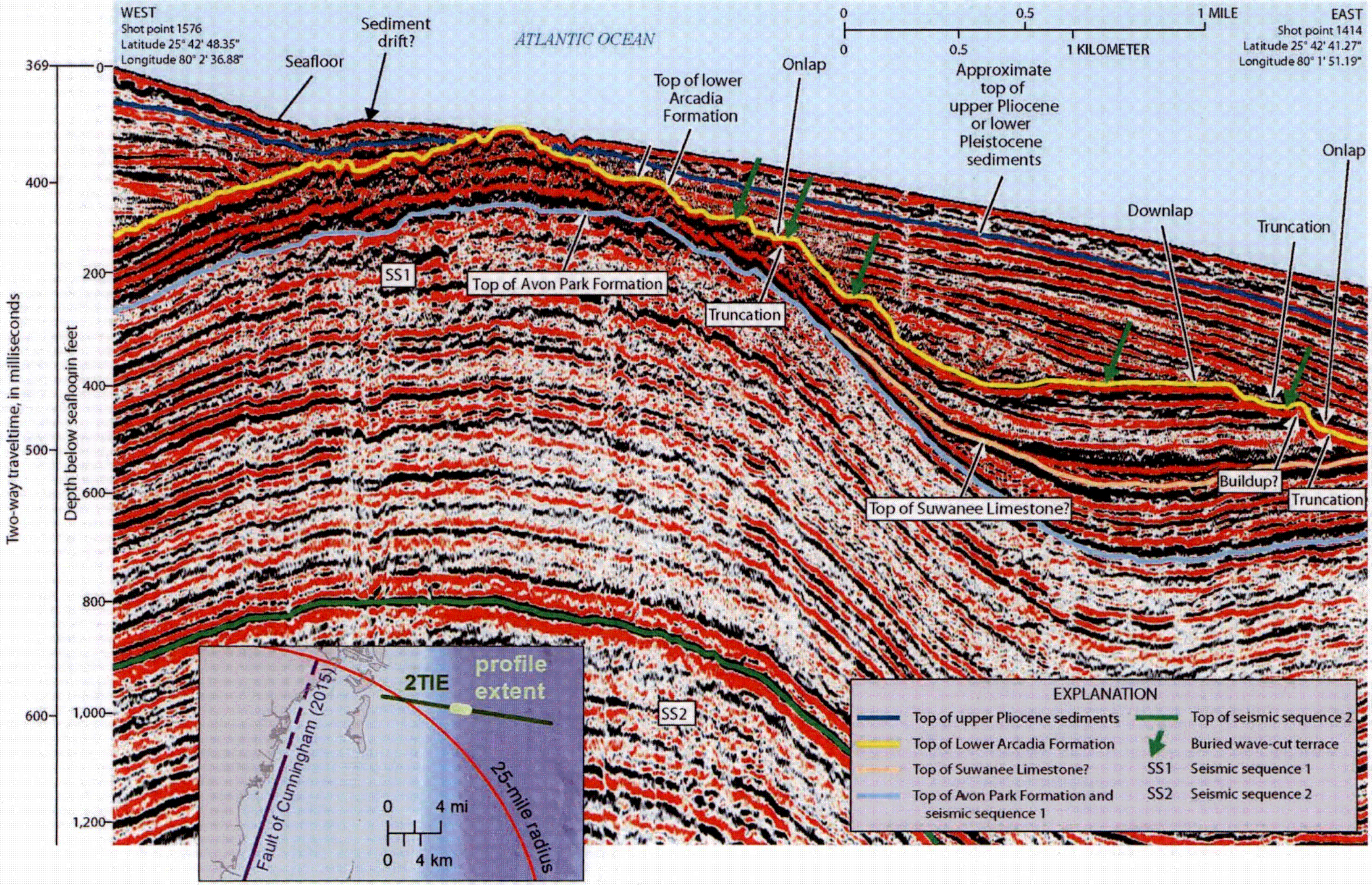


Figure 2: Seismic Reflection Profile of Anticline from Cunningham (2015)

This response is PLANT SPECIFIC.

References:

1. Cunningham, K. J., Walker, C, and Westcott, R. L., 2012, Near-Surface Marine Seismic-Reflection Data Define Potential Hydrogeologic Confinement Bypass in the Carbonate Floridian Aquifer System, Southeastern Florida: SEG Las Vegas 2012 Annual Meeting, 6 p.

2. Cunningham, K. J., 2015, Seismic-Sequence Stratigraphy and Geologic Structure of the Floridan Aquifer System Near "Boulder Zone" Deep Wells in Miami-Dade County, Florida: U.S. Geological Survey, Scientific Investigations Report 2015–5013, 28 p.

3. Mulder, T., Ducassou, E., Gillet, H., Hanquiez, V., Tournadour, E., Combes, J., Eberli, G. P., Kindler, P., Gonthier, E., Conesa, G., Robin, C., Sianipar, R., Reijmer, J. J. G., Francois, A., 2012, Canyon morphology on a modern carbonate slope of the Bahamas: Evidence of regional tectonic tilting: Geology, Vol. 40, No. 9, pp. 771-774.

ASSOCIATED COLA REVISIONS:

In addition to the COLA Revisions provided in the response to RAI 02.05.01-36, the following text will be inserted in FSAR Subsection 2.5.1.1.1.3.2.1 before the subheading "Seismicity of the Florida Peninsula and Platform" in a future COLA revision as follows:

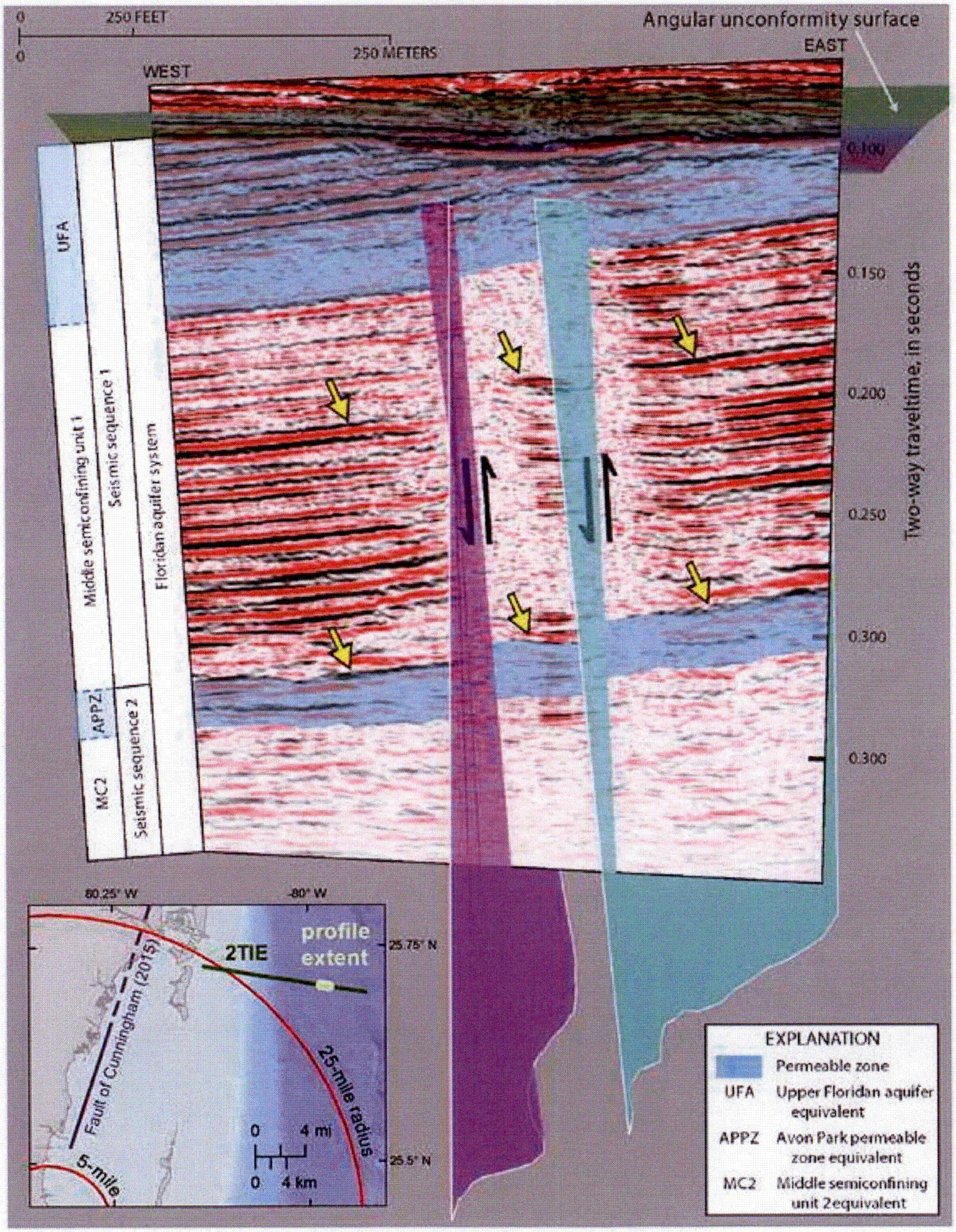
Reverse Faults and Anticline on Miami Terrace from Cunningham

In addition to the strike-slip faulting in Biscayne Bay, reverse faults and an anticline on the offshore Miami Terrace were imaged in seismic-reflection profiles approximately 30 miles (45 kilometers) northeast of Turkey Points Units 6 & 7 (References 989 and 999) (Figures 2.5.1-394 and 2.5.1-395). Both of these features, the anticline and the reverse faults, were each only imaged in one location, so no information about the extent or strike of these structures is currently available. However, based on the seismic-reflection data, the reverse faults offset strata of the Upper Floridan aquifer in a down-to-the-west sense (Figure 2.5.1-394). Yellow arrows point to seismic-reflections indicating structural offset between fault blocks (Reference 999) (Figure 2.5.1-394). The anticline, located 3.7 miles (6 kilometers) west of the group of reverse faults, comprises folded strata of the Eocene Avon Park to lower Miocene Arcadia Formations (Figure 2.5.1-395). Subsequent to this folding, erosion resulted in a set of horizontal wave-cut terraces incising the anticline, and finally, undeformed late Pliocene- to early Pleistocene-age strata unconformably onlap and downlap these terraces (Reference 999). Cunningham interprets the compression causing these faults and the fold to have occurred after the erosion of the Oligocene or early Miocene lower Arcadia Formation and before deposition of the overlying undeformed late Pliocene or early Pleistocene strata, and thus 'sometime during the Oligocene to early Pleistocene' (Reference 999, p. 18). The timing of this contraction is similar to the uplift of the Santaren anticline and the tectonic strike-slip fault from Cunningham (Reference 999) in Biscayne Bay. Given their age and

absence of any nearby Quaternary tectonic structures or capable faults, the reverse faults and fold described by Cunningham et al. (2012) and Cunningham (2015) (References 989 and 999) do not represent capable tectonic sources.

A new FSAR Figure 2.5.1-394 will be added in a future COLA revision:

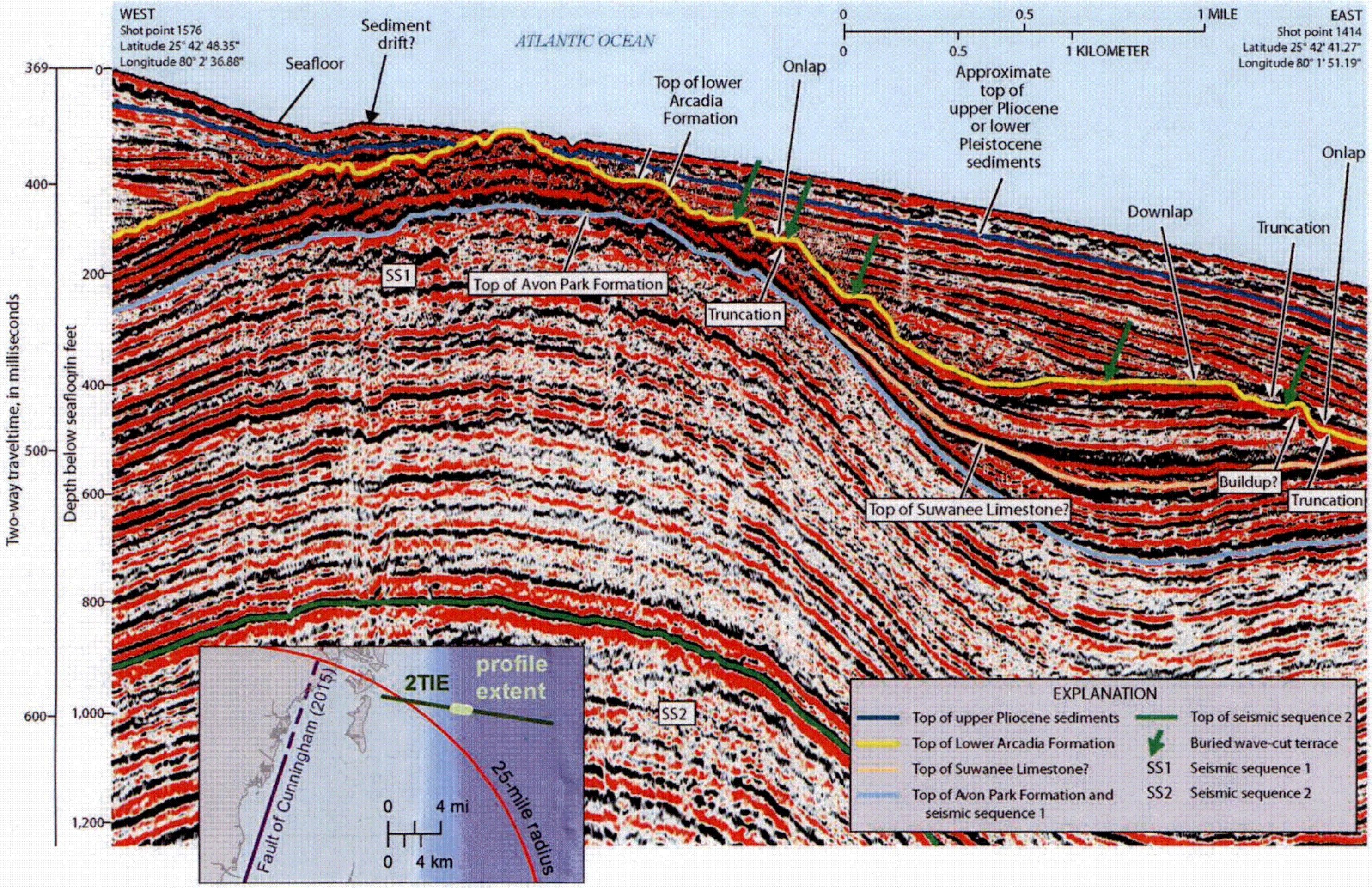
Figure 2.5.1-394 Seismic Reflection Profile of Reverse Faults from Cunningham (2015)



Source: Reference 999

A new FSAR Figure 2.5.1-395 will be added in a future COLA revision:

Figure 2.5.1-395 Seismic Reflection Profile of Anticline from Cunningham (2015)



Source: Reference 999

ASSOCIATED ENCLOSURES:

None

NRC RAI Letter No. PTN-RAI-LTR-081

SRP Section: 02.05.01 - Basic Geologic and Seismic Information

Questions from Geosciences and Geotechnical Engineering Branch 2 (RGS2)

NRC RAI Number: 02.05.01-39 (eRAI 7950)

In eRAI 7804, Question 2.5.1-37, staff requested a map showing all limestone dissolution features found in the TPNPP site vicinity. The 2 figures you provided in the RAI response are very low resolution, and the features are not on one map to show the position of these features relative to TP site. Please either provide a revised map, or alternately provide a table of coordinates for all these features.

FPL RESPONSE:

In response to the Request for Additional Information (RAI) 02.05.01-37, FPL provided FSAR Figures 2.5.1-390 and 2.5.1-391 to show karst features near the Turkey Point Units 6 & 7 Site. This response provides a table of coordinates for all these features (Table 1). The coordinates are provided in NAD83 Geographic Coordinate System (latitude and longitude) with degrees, minutes, seconds format.

Table 1 (Sheet 1 of 5)
Coordinates for Karst Features Presented in FSAR Figures 2.5.1-390 and 2.5.1-391

Name	Legend	Latitude	Longitude
FGS-SIR-86-004	Surface Sinkhole/Subsidence Feature	25° 59' 23.97" N	80° 10' 59.85" W
FGS-SIR-86-003	Surface Sinkhole/Subsidence Feature	26° 05' 39.87" N	80° 07' 28.38" W
FGS-SIR-86-001	Surface Sinkhole/Subsidence Feature	26° 10' 26.63" N	80° 07' 56.95" W
FGS-SIR-86-002	Surface Sinkhole/Subsidence Feature	26° 10' 26.91" N	80° 08' 18.39" W
FGS-SIR-87-001	Surface Sinkhole/Subsidence Feature	25° 57' 45.20" N	80° 09' 59.07" W
Unnamed	Submarine Sinkhole	24° 15' 29.98" N	81° 55' 05.99" W
NR-1	Submarine Sinkhole	24° 13' 53.98" N	82° 18' 11.99" W
Miami	Submarine Sinkhole	25° 51' 29.98" N	80° 01' 53.99" W
Marathon South	Submarine Sinkhole	24° 15' 11.98" N	80° 54' 17.99" W
Marathon North	Submarine Sinkhole	24° 15' 23.98" N	80° 54' 05.99" W
Key Biscayne	Submarine Sinkhole	25° 42' 11.98" N	79° 58' 35.99" W
Jordan, west lobe	Submarine Sinkhole	24° 16' 23.98" N	81° 02' 11.99" W
Jordan, east lobe	Submarine Sinkhole	24° 16' 23.98" N	81° 01' 53.99" W
Jordan East	Submarine Sinkhole	24° 16' 05.98" N	80° 58' 53.99" W
Cay Sal Bank	Submarine Sinkhole	23° 54' 59.98" N	80° 19' 59.99" W
Calypso Port 2	Submarine Sinkhole	26° 12' 05.38" N	79° 59' 10.79" W

Table 1 (Sheet 2 of 5)
Coordinates for Karst Features Presented in FSAR Figures 2.5.1-390 and 2.5.1-391

Name	Legend	Latitude	Longitude
Calypso Port 1	Submarine Sinkhole	26° 07' 29.38" N	79° 56' 43.19" W
Devils Punch Bowl	Spring	25° 44' 48.54" N	80° 12' 22.74" W
Tequesta	Spring	25° 37' 03.62" N	80° 18' 05.19" W
Montgomery Botanical Center	Spring	25° 39' 45.40" N	80° 16' 42.05" W
Coconut Grove	Spring	25° 43' 31.02" N	80° 14' 14.81" W
Wanless-Tedesco	Spring	25° 35' 37.98" N	80° 18' 16.49" W
SW Biscayne Bay (Gonzalez, 2004)	Spring	25° 25' 32.98" N	80° 19' 11.49" W
SITE 39	Spring	25° 36' 46.68" N	80° 18' 07.69" W
SITE 38	Spring	25° 36' 46.98" N	80° 18' 07.69" W
Ricisak Spring	Spring	25° 36' 23.18" N	80° 18' 25.79" W
BBS42	Spring	25° 36' 55.28" N	80° 18' 19.19" W
BBS41	Spring	25° 36' 55.88" N	80° 18' 20.39" W
BBS40	Spring	25° 36' 55.88" N	80° 18' 19.49" W
BBS37	Spring	25° 36' 55.48" N	80° 18' 17.89" W
BBS36	Spring	25° 36' 55.48" N	80° 18' 17.39" W
BBS35	Spring	25° 36' 57.38" N	80° 18' 20.99" W
BBS34	Spring	25° 36' 00.08" N	80° 18' 08.59" W
BBS33B	Spring	25° 36' 57.58" N	80° 18' 10.59" W
BBS33A	Spring	25° 36' 57.68" N	80° 18' 10.39" W
BBS32	Spring	25° 36' 59.88" N	80° 18' 09.69" W
BBS31	Spring	25° 36' 57.78" N	80° 18' 16.99" W
BBS30	Spring	25° 36' 57.78" N	80° 18' 17.29" W
BBS29	Spring	25° 36' 57.38" N	80° 18' 17.29" W
BBS28	Spring	25° 36' 56.88" N	80° 18' 18.19" W
BBS27	Spring	25° 36' 57.08" N	80° 18' 17.89" W
BBS26	Spring	25° 36' 21.98" N	80° 18' 28.19" W
BBS22	Spring	25° 36' 20.48" N	80° 18' 27.39" W
N1	Seismic Sag or Collapse Feature	25° 33' 48.94" N	80° 16' 45.20" W
N7	Seismic Sag or Collapse Feature	25° 32' 17.59" N	80° 11' 42.04" W
N5	Seismic Sag or Collapse Feature	25° 28' 38.47" N	80° 13' 49.46" W

Table 1 (Sheet 3 of 5)
Coordinates for Karst Features Presented in FSAR Figures 2.5.1-390 and 2.5.1-391

Name	Legend	Latitude	Longitude
N2	Seismic Sag or Collapse Feature	25° 28' 14.92" N	80° 15' 45.52" W
EW4	Seismic Sag or Collapse Feature	25° 31' 41.16" N	80° 12' 56.56" W
EKE2	Seismic Sag or Collapse Feature	25° 29' 02.30" N	80° 06' 46.83" W
EKE1	Seismic Sag or Collapse Feature	25° 29' 21.38" N	80° 08' 54.91" W
BBN1	Seismic Sag or Collapse Feature	25° 31' 47.66" N	80° 09' 08.80" W
Government Cut	Seismic Sag or Collapse Feature	25° 46' 49.36" N	80° 10' 28.61" W
Jewfish Creek	Seismic Sag or Collapse Feature	25° 11' 02.20" N	80° 23' 10.01" W
Key Largo	Seismic Sag or Collapse Feature	25° 08' 37.39" N	80° 17' 49.13" W
NNRCOM3D	Seismic Sag or Collapse Feature	26° 07' 11.62" N	80° 19' 58.29" W
NNRC-A	Seismic Sag or Collapse Feature	26° 05' 37.77" N	80° 13' 31.83" W
L-35A	Seismic Sag or Collapse Feature	26° 10' 01.06" N	80° 19' 13.24" W
I595	Seismic Sag or Collapse Feature	26° 05' 17.82" N	80° 12' 33.24" W
C-9-E	Seismic Sag or Collapse Feature	25° 57' 09.78" N	80° 11' 33.54" W
C-9-D	Seismic Sag or Collapse Feature	25° 57' 24.78" N	80° 21' 02.36" W
C-9-C	Seismic Sag or Collapse Feature	25° 57' 24.69" N	80° 21' 52.84" W
C-9-B	Seismic Sag or Collapse Feature	25° 57' 24.61" N	80° 23' 24.22" W
C-9-A	Seismic Sag or Collapse Feature	25° 57' 24.40" N	80° 23' 39.13" W
C-11-D	Seismic Sag or Collapse Feature	26° 04' 04.38" N	80° 10' 58.11" W
C-11-C	Seismic Sag or Collapse Feature	26° 04' 04.11" N	80° 11' 25.52" W

**Table 1 (Sheet 4 of 5)
Coordinates for Karst Features Presented in
FSAR Figures 2.5.1-390 and 2.5.1-391**

Name	Legend	Latitude	Longitude
C-11-B	Seismic Sag or Collapse Feature	26° 03' 54.62" N	80° 14' 42.71" W
C-11-A	Seismic Sag or Collapse Feature	26° 03' 42.24" N	80° 24' 48.46" W
C-1-A	Seismic Sag or Collapse Feature	25° 33' 06.55" N	80° 21' 04.01" W
C-1-B	Seismic Sag or Collapse Feature	25° 32' 55.19" N	80° 20' 51.34" W
C-1-C	Seismic Sag or Collapse Feature	25° 32' 44.45" N	80° 20' 34.72" W
Hillsboro Sag 7	Seismic Sag or Collapse Feature	26° 19' 40.74" N	80° 06' 02.95" W
Hillsboro Sag 6	Seismic Sag or Collapse Feature	26° 19' 40.35" N	80° 07' 02.48" W
Hillsboro Sag 5	Seismic Sag or Collapse Feature	26° 19' 39.96" N	80° 08' 02.01" W
Hillsboro Sag 4	Seismic Sag or Collapse Feature	26° 19' 40.49" N	80° 12' 13.84" W
Hillsboro Sag 3	Seismic Sag or Collapse Feature	26° 20' 20.06" N	80° 14' 25.93" W
Hillsboro Sag 2	Seismic Sag or Collapse Feature	26° 20' 30.75" N	80° 15' 04.86" W
Hillsboro Sag 1	Seismic Sag or Collapse Feature	26° 20' 46.70" N	80° 15' 57.05" W
NNRW26APR	Seismic Sag or Collapse Feature	26° 07' 57.06" N	80° 23' 03.49" W
Weeping Rock Cave	Cave	25° 37' 24.05" N	80° 18' 30.11" W
Strawberry Fields Cave	Cave	25° 34' 15.89" N	80° 23' 12.11" W
Stink Vine Cave	Cave	25° 41' 00.55" N	80° 16' 36.51" W
Smathers Cave	Cave	25° 40' 02.10" N	80° 16' 54.09" W
Root Cave	Cave	25° 40' 54.39" N	80° 16' 32.83" W
Rim Cave	Cave	25° 39' 51.27" N	80° 16' 43.09" W
Razor Rock Cave	Cave	25° 37' 09.37" N	80° 18' 19.67" W
Pathos Cave	Cave	25° 39' 53.67" N	80° 16' 42.86" W
Palma Vista Cave	Cave	25° 24' 14.32" N	80° 39' 09.41" W

**Table 1 (Sheet 5 of 5)
Coordinates for Karst Features Presented in
FSAR Figures 2.5.1-390 and 2.5.1-391**

Name	Legend	Latitude	Longitude
Owaissa-Bauer cave	Cave	25° 31' 19.39" N	80° 28' 07.32" W
Old Cutler Road Cave	Cave	25° 39' 56.07" N	80° 16' 46.28" W
Matheson	Cave	25° 40' 54.28" N	80° 16' 30.46" W
Hurricane Cave	Cave	25° 37' 17.81" N	80° 18' 32.07" W
Frango Fringe Cave	Cave	25° 36' 20.92" N	80° 19' 07.70" W
Floating Rock Cave	Cave	25° 37' 23.99" N	80° 18' 31.28" W
Fat Sleeper Cave	Cave	25° 37' 26.12" N	80° 18' 23.57" W
Devastation Cave	Cave	25° 37' 15.73" N	80° 18' 30.21" W
Cutler Hammock Cave	Cave	25° 36' 30.04" N	80° 19' 06.21" W
Crystal Pool Cave	Cave	25° 40' 02.82" N	80° 16' 55.14" W
Whispering Pines Cave	Cave	25° 35' 29.34" N	80° 20' 00.18" W
Large Sinkhole	Cave	25° 37' 19.42" N	80° 18' 16.87" W
Joint Cave	Cave	25° 37' 16.40" N	80° 18' 16.15" W
Florea Unnamed 2	Cave	25° 37' 26.56" N	80° 18' 22.38" W
Florea Unnamed 1	Cave	25° 37' 25.53" N	80° 18' 25.33" W
FIU Cave	Cave	25° 37' 24.75" N	80° 18' 27.36" W
Creepy Crawly Cave	Cave	25° 36' 24.03" N	80° 19' 10.36" W
Coon Cave	Cave	25° 36' 20.25" N	80° 19' 10.48" W

This response is PLANT SPECIFIC.

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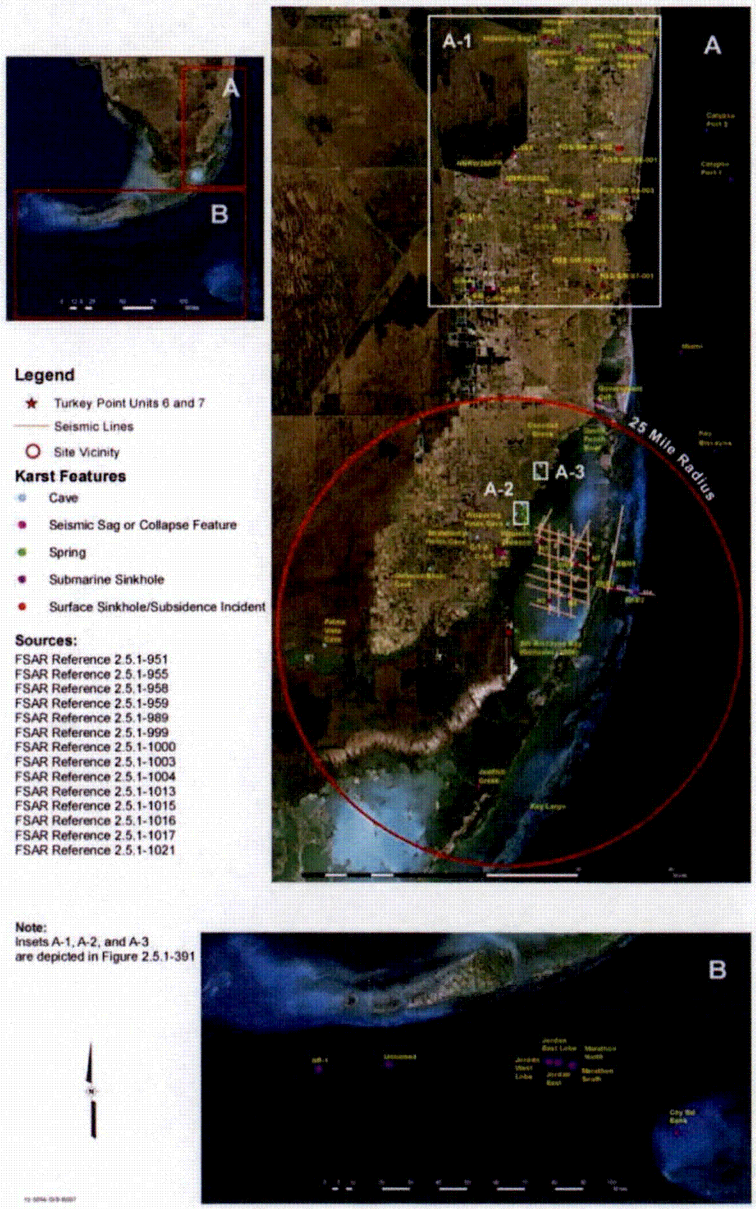
ASSOCIATED COLA REVISIONS:

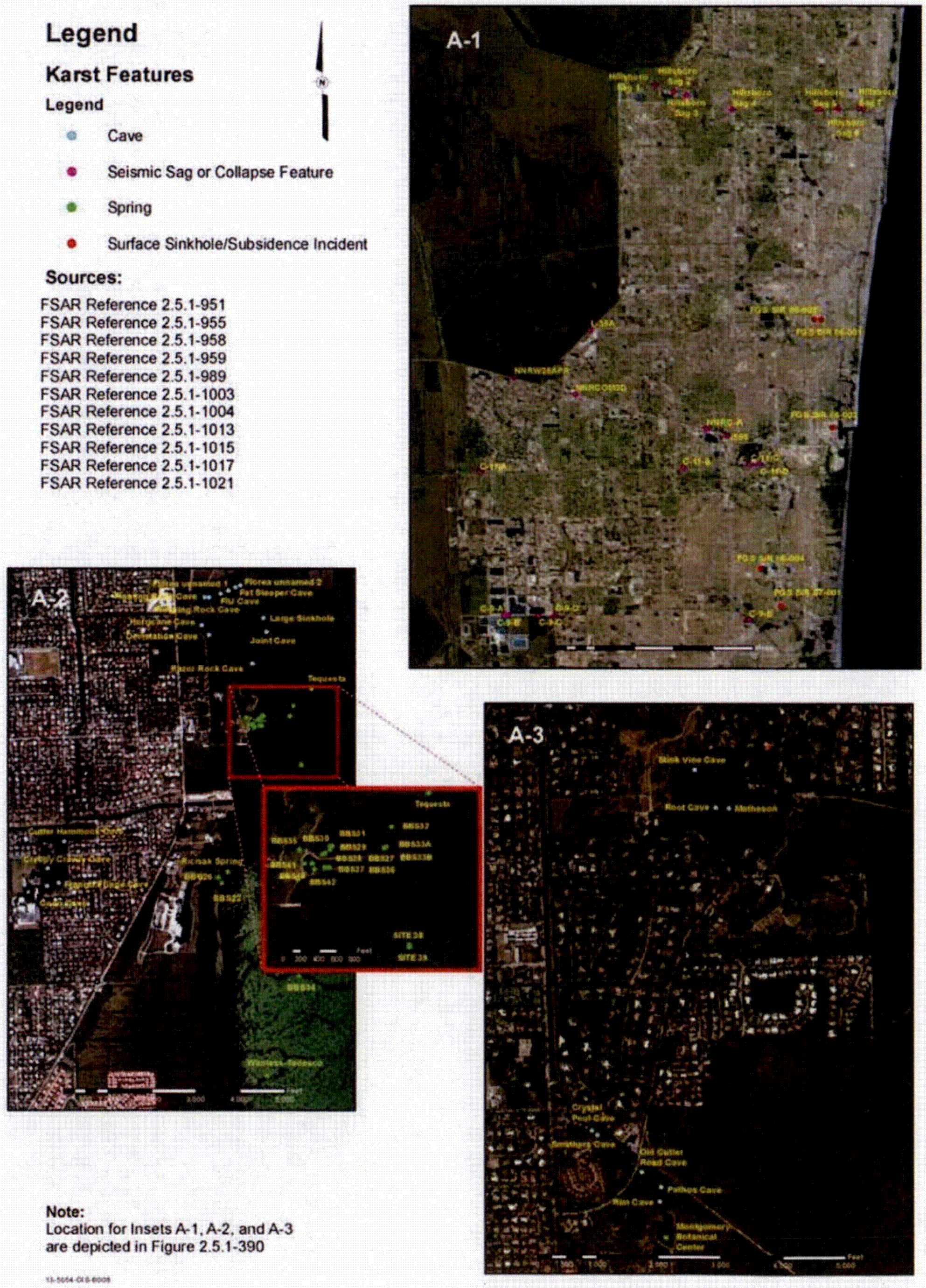
A note will be added to the following figures in a future revision of the COLA:

Figure 2.5.1-390 Surface and Subsurface Karst Features in Southeastern Florida



Note: Coordinates for karst features are provided in Table 2.5.1-210 based on information and descriptions obtained from detailed literature review.

Figure 2.5.1-391 Karst Features Near the Turkey Point Units 6 & 7 Site



Note: Coordinates for karst features are provided in Table 2.5.1-210 based on information and descriptions obtained from detailed literature review.

The following table will be added in a future revision of the COLA:

Table 2.5.1-210 (Sheet 1 of 5)
Coordinates for Karst Features Presented in Figures 2.5.1-390 and 2.5.1-391

Name	Legend	Latitude[a]	Longitude[a]
FGS-SIR-86-004	Surface Sinkhole/Subsidence Feature	25° 59' 23.97" N	80° 10' 59.85" W
FGS-SIR-86-003	Surface Sinkhole/Subsidence Feature	26° 05' 39.87" N	80° 07' 28.38" W
FGS-SIR-86-001	Surface Sinkhole/Subsidence Feature	26° 10' 26.63" N	80° 07' 56.95" W
FGS-SIR-86-002	Surface Sinkhole/Subsidence Feature	26° 10' 26.91" N	80° 08' 18.39" W
FGS-SIR-87-001	Surface Sinkhole/Subsidence Feature	25° 57' 45.20" N	80° 09' 59.07" W
Unnamed	Submarine Sinkhole	24° 15' 29.98" N	81° 55' 05.99" W
NR-1	Submarine Sinkhole	24° 13' 53.98" N	82° 18' 11.99" W
Miami	Submarine Sinkhole	25° 51' 29.98" N	80° 01' 53.99" W
Marathon South	Submarine Sinkhole	24° 15' 11.98" N	80° 54' 17.99" W
Marathon North	Submarine Sinkhole	24° 15' 23.98" N	80° 54' 05.99" W
Key Biscayne	Submarine Sinkhole	25° 42' 11.98" N	79° 58' 35.99" W
Jordan, west lobe	Submarine Sinkhole	24° 16' 23.98" N	81° 02' 11.99" W
Jordan, east lobe	Submarine Sinkhole	24° 16' 23.98" N	81° 01' 53.99" W
Jordan East	Submarine Sinkhole	24° 16' 05.98" N	80° 58' 53.99" W
Cay Sal Bank	Submarine Sinkhole	23° 54' 59.98" N	80° 19' 59.99" W
Calypso Port 2	Submarine Sinkhole	26° 12' 05.38" N	79° 59' 10.79" W
Calypso Port 1	Submarine Sinkhole	26° 07' 29.38" N	79° 56' 43.19" W
Devils Punch Bowl	Spring	25° 44' 48.54" N	80° 12' 22.74" W
Tequesta	Spring	25° 37' 03.62" N	80° 18' 05.19" W
Montgomery Botanical Center	Spring	25° 39' 45.40" N	80° 16' 42.05" W
Coconut Grove	Spring	25° 43' 31.02" N	80° 14' 14.81" W

Table 2.5.1-210 (Sheet 2 of 5)
Coordinates for Karst Features Presented in Figures 2.5.1-390 and 2.5.1-391

Name	Legend	Latitude[(a)]	Longitude[(a)]
Wanless-Tedesco	Spring	25° 35' 37.98" N	80° 18' 16.49" W
SW Biscayne Bay (Gonzalez, 2004)	Spring	25° 25' 32.98" N	80° 19' 11.49" W
SITE 39	Spring	25° 36' 46.68" N	80° 18' 07.69" W
SITE 38	Spring	25° 36' 46.98" N	80° 18' 07.69" W
Ricisak Spring	Spring	25° 36' 23.18" N	80° 18' 25.79" W
BBS42	Spring	25° 36' 55.28" N	80° 18' 19.19" W
BBS41	Spring	25° 36' 55.88" N	80° 18' 20.39" W
BBS40	Spring	25° 36' 55.88" N	80° 18' 19.49" W
BBS37	Spring	25° 36' 55.48" N	80° 18' 17.89" W
BBS36	Spring	25° 36' 55.48" N	80° 18' 17.39" W
BBS35	Spring	25° 36' 57.38" N	80° 18' 20.99" W
BBS34	Spring	25° 36' 00.08" N	80° 18' 08.59" W
BBS33B	Spring	25° 36' 57.58" N	80° 18' 10.59" W
BBS33A	Spring	25° 36' 57.68" N	80° 18' 10.39" W
BBS32	Spring	25° 36' 59.88" N	80° 18' 09.69" W
BBS31	Spring	25° 36' 57.78" N	80° 18' 16.99" W
BBS30	Spring	25° 36' 57.78" N	80° 18' 17.29" W
BBS29	Spring	25° 36' 57.38" N	80° 18' 17.29" W
BBS28	Spring	25° 36' 56.88" N	80° 18' 18.19" W
BBS27	Spring	25° 36' 57.08" N	80° 18' 17.89" W
BBS26	Spring	25° 36' 21.98" N	80° 18' 28.19" W
BBS22	Spring	25° 36' 20.48" N	80° 18' 27.39" W
N1	Seismic Sag or Collapse Feature	25° 33' 48.94" N	80° 16' 45.20" W
N7	Seismic Sag or Collapse Feature	25° 32' 17.59" N	80° 11' 42.04" W
N5	Seismic Sag or Collapse Feature	25° 28' 38.47" N	80° 13' 49.46" W
N2	Seismic Sag or Collapse Feature	25° 28' 14.92" N	80° 15' 45.52" W
EW4	Seismic Sag or Collapse Feature	25° 31' 41.16" N	80° 12' 56.56" W
EKE2	Seismic Sag or Collapse Feature	25° 29' 02.30" N	80° 06' 46.83" W

Table 2.5.1-210 (Sheet 3 of 5)
Coordinates for Karst Features Presented in Figures 2.5.1-390 and 2.5.1-391

Name	Legend	Latitude[(a)]	Longitude[(a)]
EKE1	Seismic Sag or Collapse Feature	25° 29' 21.38" N	80° 08' 54.91" W
BBN1	Seismic Sag or Collapse Feature	25° 31' 47.66" N	80° 09' 08.80" W
Government Cut	Seismic Sag or Collapse Feature	25° 46' 49.36" N	80° 10' 28.61" W
Jewfish Creek	Seismic Sag or Collapse Feature	25° 11' 02.20" N	80° 23' 10.01" W
Key Largo	Seismic Sag or Collapse Feature	25° 08' 37.39" N	80° 17' 49.13" W
NNRCOM3D	Seismic Sag or Collapse Feature	26° 07' 11.62" N	80° 19' 58.29" W
NNRC-A	Seismic Sag or Collapse Feature	26° 05' 37.77" N	80° 13' 31.83" W
L-35A	Seismic Sag or Collapse Feature	26° 10' 01.06" N	80° 19' 13.24" W
I595	Seismic Sag or Collapse Feature	26° 05' 17.82" N	80° 12' 33.24" W
C-9-E	Seismic Sag or Collapse Feature	25° 57' 09.78" N	80° 11' 33.54" W
C-9-D	Seismic Sag or Collapse Feature	25° 57' 24.78" N	80° 21' 02.36" W
C-9-C	Seismic Sag or Collapse Feature	25° 57' 24.69" N	80° 21' 52.84" W
C-9-B	Seismic Sag or Collapse Feature	25° 57' 24.61" N	80° 23' 24.22" W
C-9-A	Seismic Sag or Collapse Feature	25° 57' 24.40" N	80° 23' 39.13" W
C-11-D	Seismic Sag or Collapse Feature	26° 04' 04.38" N	80° 10' 58.11" W
C-11-C	Seismic Sag or Collapse Feature	26° 04' 04.11" N	80° 11' 25.52" W
C-11-B	Seismic Sag or Collapse Feature	26° 03' 54.62" N	80° 14' 42.71" W
C-11-A	Seismic Sag or Collapse Feature	26° 03' 42.24" N	80° 24' 48.46" W
C-1-A	Seismic Sag or Collapse Feature	25° 33' 06.55" N	80° 21' 04.01" W

**Table 2.5.1-210 (Sheet 4 of 5)
Coordinates for Karst Features Presented in
Figures 2.5.1-390 and 2.5.1-391**

Name	Legend	Latitude[a]	Longitude[a]
C-1-B	Seismic Sag or Collapse Feature	25° 32' 55.19" N	80° 20' 51.34" W
C-1-C	Seismic Sag or Collapse Feature	25° 32' 44.45" N	80° 20' 34.72" W
Hillsboro Sag 7	Seismic Sag or Collapse Feature	26° 19' 40.74" N	80° 06' 02.95" W
Hillsboro Sag 6	Seismic Sag or Collapse Feature	26° 19' 40.35" N	80° 07' 02.48" W
Hillsboro Sag 5	Seismic Sag or Collapse Feature	26° 19' 39.96" N	80° 08' 02.01" W
Hillsboro Sag 4	Seismic Sag or Collapse Feature	26° 19' 40.49" N	80° 12' 13.84" W
Hillsboro Sag 3	Seismic Sag or Collapse Feature	26° 20' 20.06" N	80° 14' 25.93" W
Hillsboro Sag 2	Seismic Sag or Collapse Feature	26° 20' 30.75" N	80° 15' 04.86" W
Hillsboro Sag 1	Seismic Sag or Collapse Feature	26° 20' 46.70" N	80° 15' 57.05" W
NNRW26APR	Seismic Sag or Collapse Feature	26° 07' 57.06" N	80° 23' 03.49" W
Weeping Rock Cave	Cave	25° 37' 24.05" N	80° 18' 30.11" W
Strawberry Fields Cave	Cave	25° 34' 15.89" N	80° 23' 12.11" W
Stink Vine Cave	Cave	25° 41' 00.55" N	80° 16' 36.51" W
Smathers Cave	Cave	25° 40' 02.10" N	80° 16' 54.09" W
Root Cave	Cave	25° 40' 54.39" N	80° 16' 32.83" W
Rim Cave	Cave	25° 39' 51.27" N	80° 16' 43.09" W
Razor Rock Cave	Cave	25° 37' 09.37" N	80° 18' 19.67" W
Pathos Cave	Cave	25° 39' 53.67" N	80° 16' 42.86" W
Palma Vista Cave	Cave	25° 24' 14.32" N	80° 39' 09.41" W
Owaissa-Bauer cave	Cave	25° 31' 19.39" N	80° 28' 07.32" W
Old Cutler Road Cave	Cave	25° 39' 56.07" N	80° 16' 46.28" W
Matheson	Cave	25° 40' 54.28" N	80° 16' 30.46" W

**Table 2.5.1-210 (Sheet 5 of 5)
Coordinates for Karst Features Presented in
Figures 2.5.1-390 and 2.5.1-391**

Name	Legend	Latitude[a]	Longitude[a]
Hurricane Cave	Cave	25° 37' 17.81" N	80° 18' 32.07" W
Frango Fringe Cave	Cave	25° 36' 20.92" N	80° 19' 07.70" W
Floating Rock Cave	Cave	25° 37' 23.99" N	80° 18' 31.28" W
Fat Sleeper Cave	Cave	25° 37' 26.12" N	80° 18' 23.57" W
Devastation Cave	Cave	25° 37' 15.73" N	80° 18' 30.21" W
Cutler Hammock Cave	Cave	25° 36' 30.04" N	80° 19' 06.21" W
Crystal Pool Cave	Cave	25° 40' 02.82" N	80° 16' 55.14" W
Whispering Pines Cave	Cave	25° 35' 29.34" N	80° 20' 00.18" W
Large Sinkhole	Cave	25° 37' 19.42" N	80° 18' 16.87" W
Joint Cave	Cave	25° 37' 16.40" N	80° 18' 16.15" W
Florea Unnamed 2	Cave	25° 37' 26.56" N	80° 18' 22.38" W
Florea Unnamed 1	Cave	25° 37' 25.53" N	80° 18' 25.33" W
FIU Cave	Cave	25° 37' 24.75" N	80° 18' 27.36" W
Creepy Crawly Cave	Cave	25° 36' 24.03" N	80° 19' 10.36" W
Coon Cave	Cave	25° 36' 20.25" N	80° 19' 10.48" W

[a] **Coordinates are provided in NAD83 Geographic Coordinate System (latitude and longitude) with degrees, minutes, seconds format.**

Data from References 951, 955, 958, 959, 989, 999, 1000, 1003, 1004, 1013, 1015, 1016, 1017, and 1021.

ASSOCIATED ENCLOSURES:

None