L-2011-510
10 CFR 52.3

November 28, 2011

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 and Response Schedule to NRC Request for Additional Information
Letter No. 043 (eRAI 5875) SRP Section - 02.05.03 Surface Faulting

Reference:

1. NRC Letter to FPL dated October 27, 2011, Request for Additional Information Letter No.043 Related to SRP Section 02.05.03 – Surface Faulting 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) Request for Additional Information (RAI) 02.05.03 -1 provided in Reference 1. The attachment identifies changes that will be made in a future revision of the Turkey Point Units 6 and 7 Combined License Application (if applicable).

Additionally, the Nuclear Regulatory Commission (NRC) requested Florida Power & Light Company (FPL) to respond to the Request for Additional Information (RAI) within 30 days of the date of the referenced letter. If FPL was unable to provide a response within 30 days, NRC requested FPL to provide a schedule to provide the responses. This letter also provides the FPL schedule to respond to the NRC Requests for Additional Information (RAI) 02.05.03-2, 02.05.03-3, and 02.05.03-4 provided in the referenced letter.

The responses to RAI 02.05.03-2, RAI 02.05.03-3, and RAI 02.05.03-4 are scheduled to be provided by January 19, 2012.

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

D097
NRO

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

Executed on November 28, 2011

Sincerely,

William Maher
Senior Licensing Director – New Nuclear Projects

WDM/RFB

Attachment : FPL Response to NRC RAI No. 02.05.03 - 1 (eRAI 5875)

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-040

SRP Section: 02.05.03 – Surface Faulting

QUESTIONS from Geosciences and Geotechnical Engineering Branch 2 (RGS2)

NRC RAI Number: 02.05.03-1 (eRAI 5875)

FSAR Section 2.5.3.8.2.1 "Potential Sources of Non-Tectonic, Geologic Deformation" passage, concludes that shallow depressions preserved at the surface, recognized in the site vicinity, are formed by gradual top-down, subaerial dissolution and that they are unlikely to have underlying cavity voids with potential for rapid collapse. The staff notes the presence of similar-sized and -shaped features on the sea floor of Biscayne Bay within 3 km to the east of Units 6 and 7 in publically available satellite images such as presented by Google Earth software. In order for the staff to completely understand the geologic setting of the TPNPP site and in support of 10 CFR 100.23 please address the following:

a) Discuss how you evaluated the apparent semi-circular alignments of individual off-shore depressions. Discuss if the features may be consistent with incipient collapse into a larger underlying void, such as the cenotes of the Yucatan or the filled sink in nearby Key Largo Marine Sanctuary reported by Shinn et al., 1996, Ref 228.

b) Discuss a possible timeframe when such features could have formed and whether they could have formed at similar elevations below Units 6 and 7.

FPL RESPONSE:

a) The seafloor of Biscayne Bay east of the Turkey Point Units 6 & 7 site includes many dark vegetated patches that appear to be similar to the dark vegetated patches mapped subaerially at the site (Figure 2.5.3-202 and Figure 1). Initial analysis conducted for the FSAR, mapping of the subaerial and submarine features, did not identify a significant pattern in the distribution of the vegetated patches. The re-analysis, in response to this RAI, noted occasional areas of a shoreline-perpendicular linear pattern or alignments of the vegetated patches (Figure 2). This pattern is commonly noted throughout southern Florida, in particular the Everglades, and corresponds with tidal and/or surface water flow directions (FSAR Subsections 2.5.1.1.1.1.1.1 and 2.5.3.2).

Further analysis of the submarine vegetated patches was conducted. Four circular areas with radii of 0.3 mi were evaluated for density of surficial depressions or vegetated patches. Two onshore circles were drawn, one centered on the site (circle 2) and one just west of the site (circle 1). Similarly, two offshore circles were drawn, both east of the site (Figure 1). Subaerial depressions were interpreted from 1940 aerial photography (1:40,000 scale), and submarine vegetated patches were interpreted from 1986 aerial photography (1:40,000 scale) (Figure 2.5.3-202 and Figure 1). Detailed mapping was performed to a scale of about 1:2,000 to define the locations and extents of patches within, and immediately surrounding each circular area. Data from the two subaerial circular areas (circles 1 and 2 in Figure 1) and the two submarine circular areas (circles 3 and 4 in Figure 1) are shown in Table 1.

The average areas of the individual vegetated patches in the subaerial circles 1 and 2 are 780 m^2 and 540 m^2 and the average areas for the submarine circles are 320 m^2 and 180 m^2 (Table 1). While the submarine patches have a lower average area, the values for both locations (subaerial and submarine) are of the same order of magnitude. The size distribution of the patches in both the subaerial and submarine environments is variable, with high standard deviations for the average patch area, and a size range that varies from 20-30 m^2 to >100 m^2. Very similar vegetated patch densities are calculated for subaerial and submarine areas (Table 1). The statistics for the subaerial circles are somewhat skewed by the presence of a few very large patches (especially in circle 1), reflected by the fact that the standard deviations in these circles are actually larger than the mean. These outliers may in fact consist of several smaller patches, which have been obscured by vegetation. Otherwise, the patches in all four circles display very similar characteristics, with similar minimum patch sizes and population densities. The similarity of the vegetated patch size and distribution in all four circles suggests that they could have been formed by the same process, namely surficial erosion and/or solution (see FSAR p. 2.5.3-3 and RAI 02.05.02-1 response (FPL Letter L-2011-234, dated June 24, 2011)).

The imagery available through Google Earth was reviewed specifically to look for possible semi-circular alignments in the surficial depressions or vegetated patches and depressions located in Biscayne Bay. One possible semi-circular arrangement of vegetation patches can be observed just east of the site (Figures 2 and 3). This concave-north arc of vegetation seems to have a radius of roughly 300 meters. Hence, if it were a complete circle, rather than a half-circle or arc, it would be similar in diameter to the Key Largo sinkhole of Shinn et al (FSAR Reference 228). For reference, a Google Earth image of the Shinn et al, (FSAR Reference 228) sinkhole is shown on Figure 4.

It is difficult to find other similarities between the Key Largo sinkhole in Figure 4 and this semi-circular arrangement of vegetated patches in Figure 3. The different morphology (a circle versus a semi-circle) and differing vegetation patterns of the two features is apparent in Figures 3 and 4. The Key Largo sinkhole, and other sinkholes reported on the Miami and Pourtales terraces are typically associated with a topographic relief on the order of 5 to 200 meters (FSAR Reference 228 and Land and Paul, 2000). While very detailed bathymetry is not yet available for this area, inspection of available lower resolution bathymetric data and published literature does not indicate a similar topographic feature at this location (NOAA, 1998). Earlier air photos of the possible semi-circular feature show a less well-defined concave-north arc of vegetation (Figure 5). In addition, the model for formation of the large sinkholes found east of the Florida Keys indicates that these features form in a linear belt near the southeast edge of the Pourtales and Miami terraces that represents a paleo-mixing zone for fresh and saline water (Land and Paull, 2000). Hence, similar sinkhole features would not be expected near the Turkey Point Units 6 & 7 site and west of this linear belt. For similar reasons, the semi-circular arrangement of vegetated patches east of the Turkey Point Units 6 & 7 site does not share significant similarities with cenotes of the Yucatan peninsula. The Belize Blue Hole, for example, is 125 m deep, and such dramatic topography is not seen at the Turkey Point Units 6 & 7 site (Gischler et al., 2008).

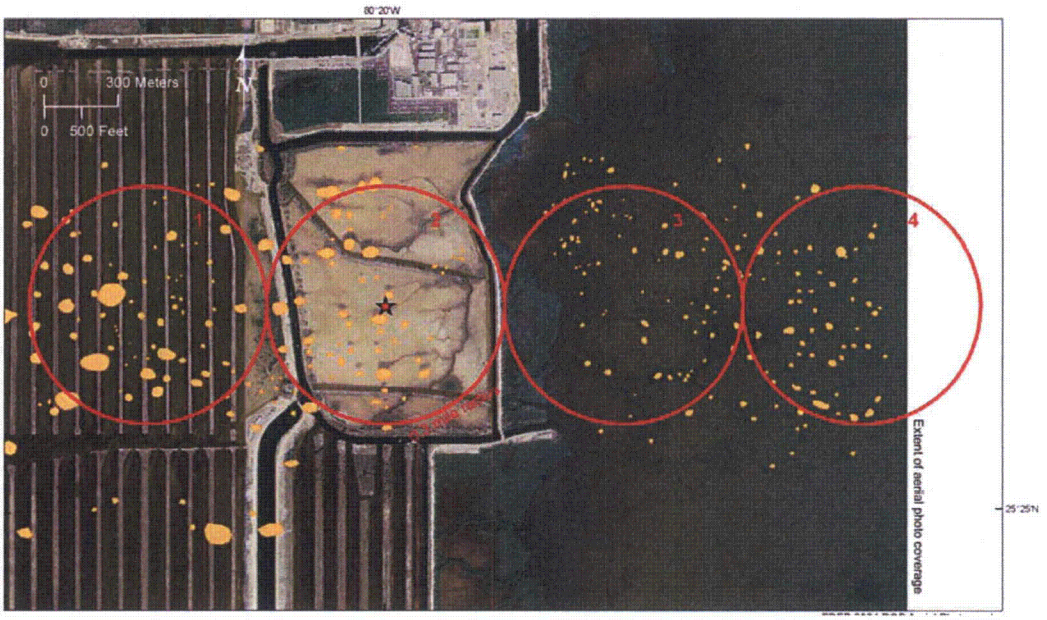
In summary, no large features identified by alignments of vegetated patches can be confidently identified and correlated with sinkholes such as the cenotes of the Yucatan or the Key Largo sinkhole reported by Shinn et al (FSAR Reference 228).

Table 1: Tabulated Data on Area and Distribution of Vegetated Patches

Circle Area	Surface Type	No. of patches	Density of patches (per mi^2)	Mean patch area (m^2)	St. dev. of patch area (m^2)	Min area (m^2)	Max area (m^2)
1	Subaerial	67	237	780	1420	20	7910
2	Subaerial	55	195	540	640	40	2440
3	Primarily submarine	67	237	180	150	20	700
4[1]	Submarine	51[1]	180	320	290	30	1420

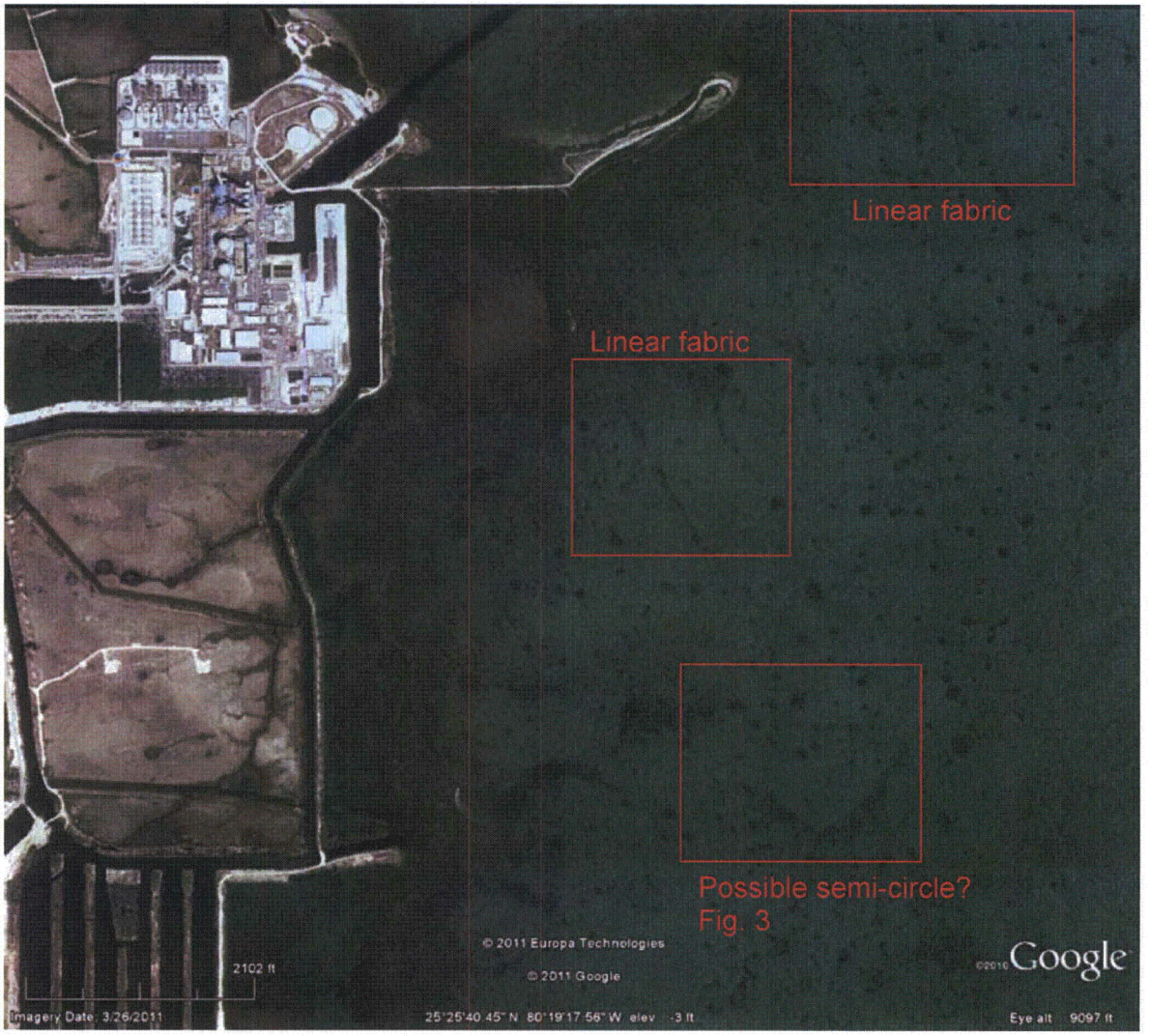
[1] Mapping does not cover the area of the circle; therefore, count is absolute minimum.

Figure 1: Areas evaluated for size and density of vegetated patches



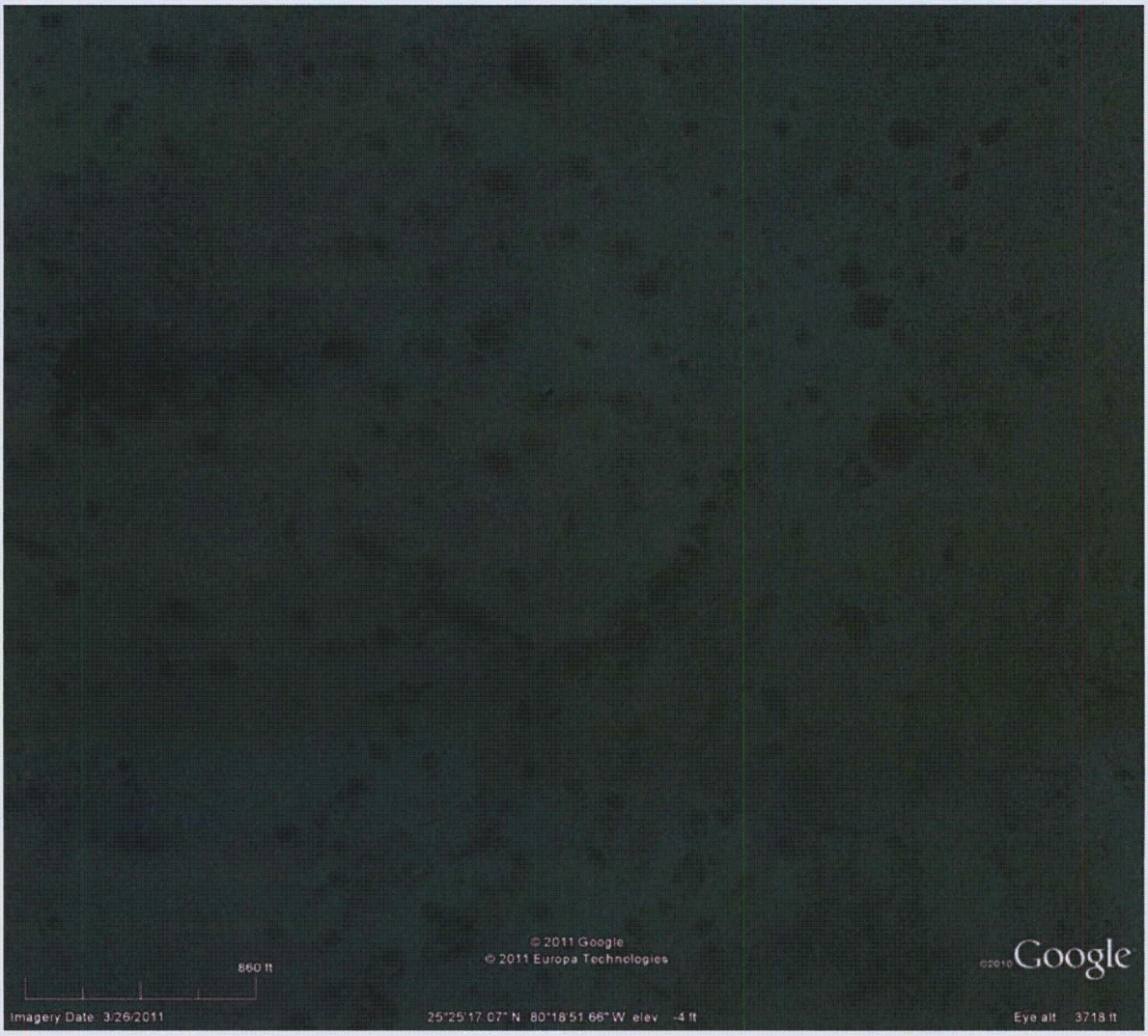
Source: FSAR References 233 and 207

Figure 2: Google Earth image from Biscayne Bay adjacent to the Turkey Point Units 6 & 7 site



Source: Google Earth, 2011a

Figure 3. Close-up view of potential semi-circle arrangement of vegetated patches

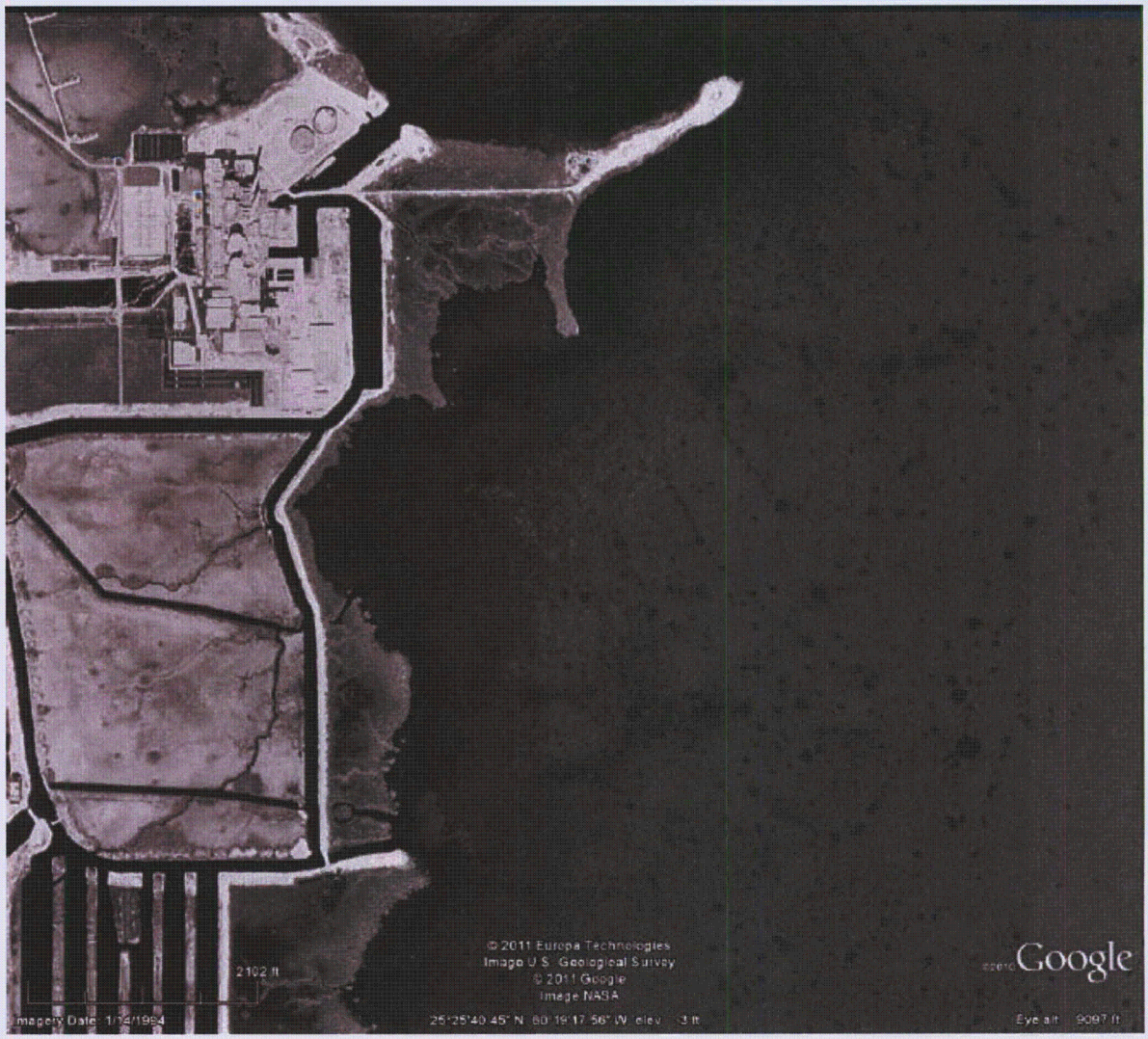


Source: Google Earth, 2011b

Figure 4: Image of Google Earth image of the sinkhole reported by Shinn et al, (FSAR Reference 228)

Source: Google Earth, 2011c

Figure 5. Aerial photo (1994) of Biscayne Bay adjacent to the Turkey Point Units 6 & 7 site



Source: Google Earth, 2011d

b) See FSAR RAI 02.05.01-2 part b (FPL Letter L-2011-234, dated June 24, 2011) for the discussion of when such features could have formed and whether they could have formed at similar elevations below Units 6 and 7.

This response is PLANT SPECIFIC.

References:

Gischler, E., Shinn, E.A., Oschmann, W., Feibig, J., and Buster, N.A., A 1500–year Holocene Caribbean climate archive from the Blue Hole, Lighthouse Reef, Belize, Journal of Coastal Research, v. 24, no. 6, p. 1495-1505, 2008.

Google Earth, 2011a, 25° 25' 40.45" N and 80° 19' 17.56" W. Imagery date: March 26, 2011, accessed on November 8, 2011.

Google Earth, 2011b, 25° 25' 17.07" N and 80° 18' 51.66" W. Imagery date: March 26, 2011, accessed on November 8, 2011.

Google Earth, 2011c, 25° 08' 37.11" N and 80° 17' 49.54" W. Imagery date: December 23, 2010, accessed on November 7, 2011.

Google Earth, 2011d, 25° 25' 40.45" N and 80° 19' 17.58" W. Imagery date: January 14, 1994, accessed on November 7, 2011.

Land, L. A. and Paull, C. K., 2000; Submarine karst belt rimming the continental slope in the Straits of Florida: Geo-Marine Letters, v. 20, p. 123-132.

NOAA, 1998; Biscayne Bay, FL (S200) Bathymetric Digital Elevation Model (30 meter resolution) derived from source hydrographic survey soundings collected by NOAA. Available at www.estuarinebathymetry.noaa.gov, accessed November 7, 2011.

ASSOCIATED COLA REVISIONS:

None

ASSOCIATED ENCLOSURES:

None