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2.6 GEOLOGY

The geological conditions at the Units 6 & 7 plant area are summarized in this section. The information is subdivided into three categories: physiography, stratigraphy, and structural geology.

The geological information in this section is based on the information contained in FSAR Subsection 2.5.1.

2.6.1 GEOLOGICAL CONDITIONS

The Turkey Point plant property is located within the Atlantic Coastal Plains physiographic province (Figure 2.6-1). Elevation of the ground surface in the 200-mile radius site region varies from 3 feet below MSL to 345 feet above MSL (FDEP 2008).

2.6.1.1 Physiography

The Turkey Point plant property is located within Miami-Dade County, Florida, approximately 25 miles south of Miami, 8 miles east of Florida City, and 9 miles southeast of Homestead, Florida. The plant property is located within the Southern Slope sub-province of the Southern Zone physiographic subregion of the Florida Platform within the Atlantic Coastal Plain physiographic province (Figure 2.6-1) (Randazzo and Jones 1997 and White 1970).

Surficial deposits at Units 6 & 7 consist of organic muck and the Miami Limestone (Figure 2.6-2). The organic muck is the dominant sediment type, whereas the Miami Limestone is located surficially in the northwestern portion of the plant area.

The plant area is at or near sea level with an existing elevation of –2.4 to 0.8 feet (NAVD 88) and is generally flat. The plant area is flat and uniform throughout with the exception of the vegetated depressions. The vegetative depressions are surficial dissolution features within the Miami Limestone and are described in FSAR Subsections 2.5.1, 2.5.3, and 2.5.4.4.

2.6.1.2 Stratigraphy

Strata sampled during the Units 6 & 7 subsurface investigation are shown in Figure 2.6-3 as they occur from the ground surface to a depth beneath the plant area. Most of the 88 borings drilled penetrate the Miami Limestone, Key Largo Limestone, and Fort Thompson Formation to a depth up to 125 feet. Thirty-four deeper borings penetrated into the underlying Tamiami Formation at approximately 115 feet and continued to a depth of approximately 150 feet. Two deep borings, B-601 and B-701, penetrated into the Peace River Formation of the Hawthorn Group at depths ranging from 216 to 224 feet, respectively. Boring B-701 advanced into the Arcadia Formation of the Hawthorn Group at a depth of 455 feet before terminating at a final depth of 615.5 feet.

2.6.1.3 Structural Geology

The Turkey Point plant property lies on the stable Florida carbonate platform, and no faults or folds are mapped within 25 miles. The plant property is on a tectonically stable region characterized by extremely low rates of seismicity. New data including geologic mapping and bedding attitudes inferred from lithologic contacts in boreholes indicate flat, planar bedding in Pleistocene and older units and an absence of geologic structures within the plant property. No topographic features within the vicinity of the plant area indicate the presence of surface faulting.

Based on an analysis of aerial imagery, Grossman's Hammock is the only lineament within the 25-mile radius site vicinity. Grossman's Hammock is a north-south-trending vegetated rock reef 8 miles long. Based on ground penetrating radar analysis, there is no faulting associated with this feature (Kruse et al. 2000). Crone and Wheeler (2000) and Wheeler (2006) classify Grossman's Hammock as a non-tectonic feature.

No geomorphic features or lineaments associated with faulting within the plant property were identified during analysis of aerial imagery. The lineament analysis did identify linear and ellipsoidal/circular features associated with changes in vegetation within the 5- and 0.6-mile radii of the plant area. These features are loci of more highly concentrated vegetation. These features are likely the result of the surficial dissolution of the limestone bedrock and are described in detail in FSAR Subsection 2.5.3.8.2. There is no geomorphic expression of these features or other evidence that would indicate tectonic faulting associated with these vegetation lineaments. Data obtained during site characterization indicated the absence of collapse sinkholes in the plant area.

Results of the subsurface exploration program at the plant area reveal continuous, horizontal stratigraphy, which precludes the presence of faults, folds, or structures related to tectonic deformation.

Section 2.6 References

Crone and Wheeler 2000. Crone, A.J., Wheeler, R.L., *Data for Quaternary Faults, Liquefaction Features, and Possible Tectonic Features in the Central and Eastern United States, East of the Rocky Mountain Front*, Open File Report 00-260, U.S. Geological Survey, 2000.

FDEP 2004. Florida Department of Environmental Protection (FDEP), *RGB Aerial Photography*, 2004.

FDEP 2008. FDEP, *Florida Geological Survey-Frequently Asked Questions, Miscellaneous Questions Answered #6*. Available at http://www.dep.state.fl.us/geology/feedback/faq.htm#m6, accessed December 5, 2008.

Green et al. 1995. Green, R.C., Campbell, K.M., and Scott, T.M., *Surficial and Bedrock Geology of the Eastern Portion of the U.S.G.S. 1:100,000 Scale Homestead Quadrangle*, Open-File Map Series 83/01-07, Florida Geological Survey, 1995.

Green et al. 1996. Green, R.C., Campbell, K.M., and Scott, T.M., *Surficial and Bedrock Geology of the Western Portion of the U.S.G.S. 1:100,000 Scale Homestead Quadrangle*, Open-File Map Series 83/08-12, 1996.

Kruse et al. 2000. Kruse, S.E., Schneider, J.C., Campagna, D.J., Inman, J.A., and Hickey, T.D., "Ground Penetrating Radar Imaging of Cap Rock, Caliche and Carbonate Strata," *Journal of Applied Geophysics*, v. 43, pg. 239–249, 2000.

NOAA 2008. National Oceanic and Atmospheric Administration (NOAA), *National Geophysical Data Center (NGDC) Coastal Relief Model*, Available at http://www.ngdc.noaa.gov/mgg/coastal/startcrm.htm, accessed March 19, 2008.

Randazzo and Jones 1997. Randazzo, A.F., Jones, D.S., *The Geology Of Florida*, University Of Florida Press, Gainesville, Florida, 1997.

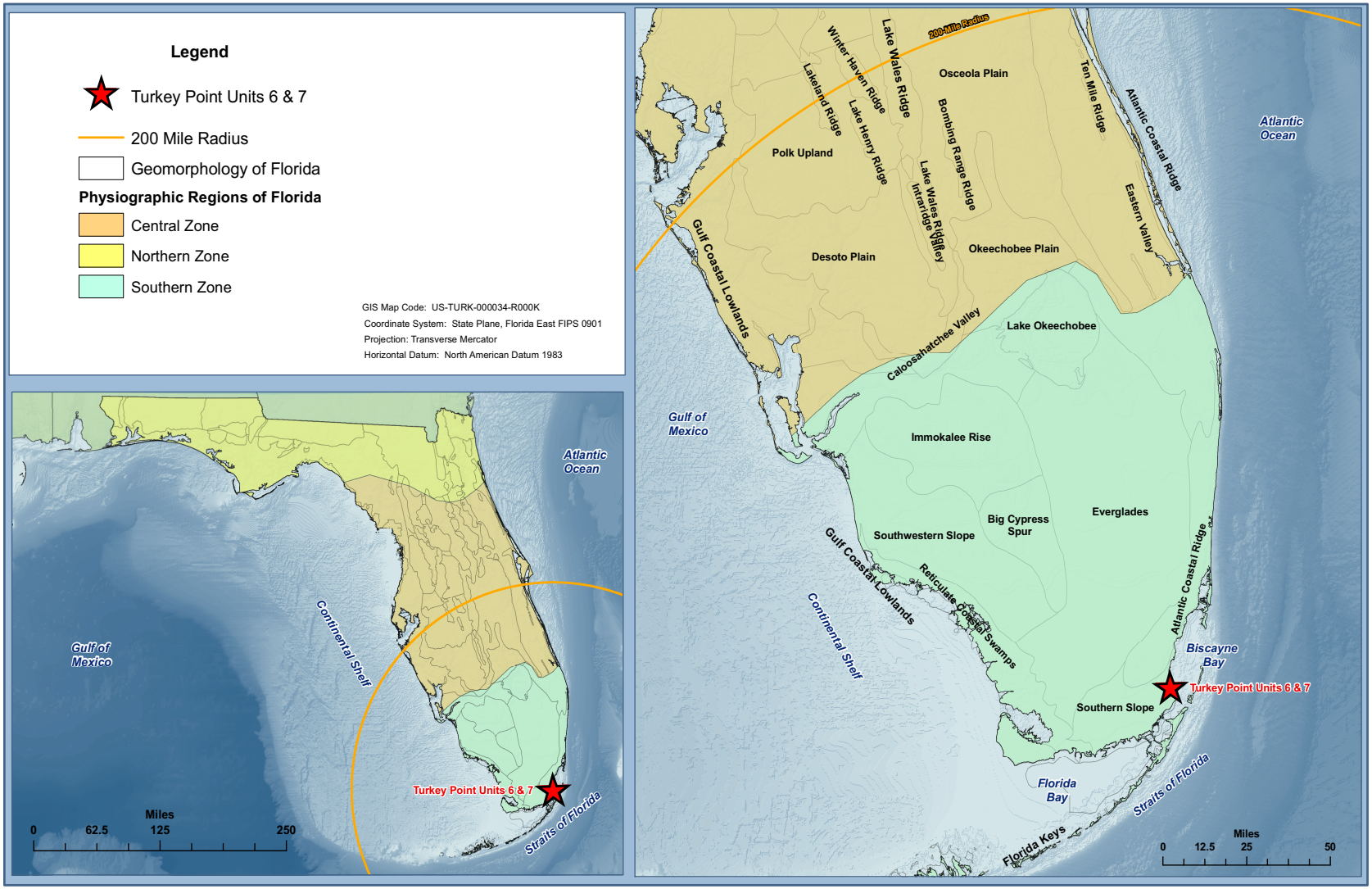
Scott et al. 2001. Scott, T.M., Campbell, K.M., Rupert, F.R., Arthur, J.D., Green, R.C., Means, G.H., Missimer, T.M., Lloyd, J.M., Yon, W.J., and Duncan, J.G., *Geologic Map of the State of Florida*, Map Series 146, FDEP, Florida Geologic Survey (FGS), 2001 (Revised - April 15, 2006 by David Anderson).

USGS 2004. U.S. Geological Survey (USGS), *Historical Aerial Photography for the Greater Everglades of South Florida: The 1940, 1:40,000 Photoset*, Open-File Report 02-327, 2004.

Wheeler 2006. Wheeler, R.L., "Quaternary Tectonic Faulting in the Eastern United States," *Engineering Geology*, v. 82, p. 165-186, 2006.

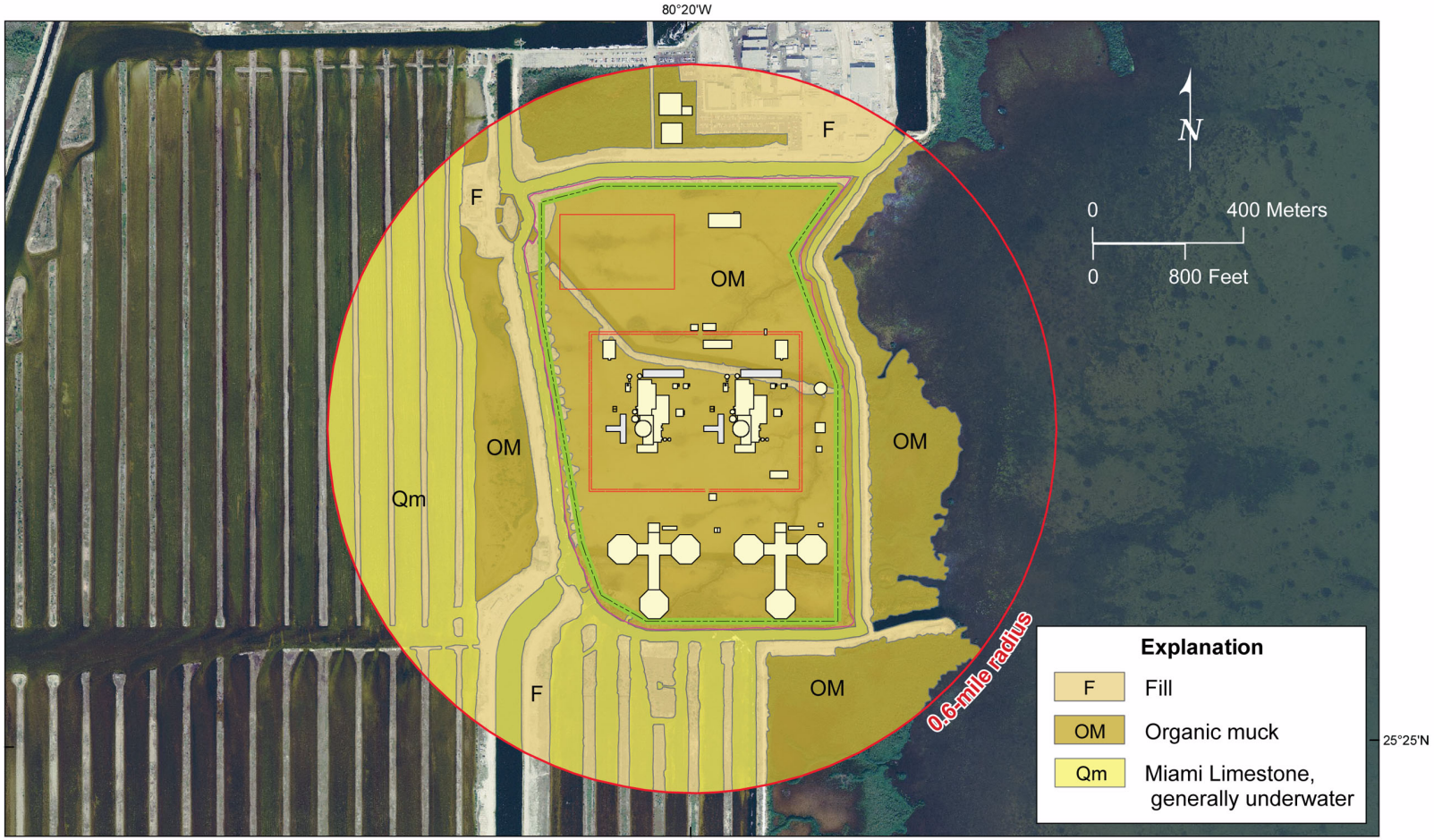
White 1970. White, W.A., *The Geomorphology of the Florida Peninsula,* Geological Bulletin 51, Bureau of Geology, State of Florida Department of Natural Resources, 1970.

Figure 2.6-1 Map of Physiographic Provinces



Modified from Randazzo and Jones 1997, White 1970
Note: Florida is within the Atlantic Coastal Plain physiographic province.

Figure 2.6-2 Units 6 & 7 Geologic Map (0.6-Mile Radius)



Base sources: NOAA 2008 and FDEP 2004
Source of geologic information: Scott et al. 2001

Figure 2.6-3 Turkey Point Site Stratigraphy

ERATHEM	SYSTEM	SERIES	HYDRO-GEOLOGIC UNIT		STRATIGRAPHIC UNIT		LITHOLOGY	APPROXIMATE TOP ELEVATION (ft NAVD 88)	APPROXIMATE THICKNESS (ft)
CENEZOIC	QUATERNARY	HOLOCENE			organic muck		organic soil and silt	0	3
		PLEISTOCENE	Surficial aquifer system	Biscayne aquifer	Miami Limestone		sandy, oolitic limestone	-3	25
					Key Largo Limestone		well indurated, vuggy, coralline limestone	-28	22
					Fort Thompson Formation		poor/well indurated fossiliferous limestone	-50	65
	TERTIARY	PLIOCENE		Semi-confining unit	Tamiami Formation		sand and silt with calcarenitic limestone	-115	105
		MIOCENE	Intermediate confining unit		Hawthorn Group	Peace River Formation	silty calcareous sand and silt	*formation contact based on natural gamma signature* -220	235
						Arcadia Formation	calcareous wackestone with indurated limestones, sandstone, and sand	-455	>160
								drilling ended at -616.5 ft	

Note: These units were sampled during the Units 6 & 7 subsurface investigation.