SECTION 2.0: SITE CHARACTERISTICS
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2.0-202	Comparison of Predicted Units 6 & 7 Control Room X/Q Values with DCD Acceptance Criteria

CHAPTER 2 SITE CHARACTERISTICS

The introductory information at the beginning of Chapter 2 of the referenced DCD is incorporated by reference with the following departures and/or supplements.

Insert the following subsection at the end of the introductory text of DCD Chapter 2, before DCD Section 2.1.

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2.0 SITE CHARACTERISTICS

Chapter 2 describes the characteristics and site-related design parameters of Turkey Point Units 6 & 7. The site location, characteristics, and parameters, as described in the following sections, are provided in sufficient detail to support a safety assessment of the proposed site:

Section 2.1 — Geography and Demography

Section 2.2 — Nearby Industrial, Transportation, and Military Facilities

Section 2.3 — Meteorology

Section 2.4 — Hydrologic Engineering

Section 2.5 — Geology, Seismology, and Geotechnical Engineering

In this chapter, the following terms are used to describe the Turkey Point plant site and surrounding area:

Turkey Point Plant Site — The Units 6 & 7 plant area is part of the larger Turkey Point plant property in unincorporated Miami-Dade County, Florida. The approximately 11,000-acre Turkey Point plant property comprises two oil/gas-fired (Units 1 & 2), one gas-fired combined-cycle (Unit 5), and (with the addition of Units 6 & 7) four nuclear powered (Units 3, 4, 6 & 7) steam electric generating units. Figure 2.1-201 shows the Turkey Point site and the surrounding area within 50 miles. Figure 2.1-202 shows the general location of the Turkey Point property and localities surrounding the site within 10 miles.

Vicinity — The area from the center point of the power block footprint to a 5-mile radius. The vicinity includes a much larger tract of land than the Turkey Point plant property. The vicinity is located in Miami-Dade County. For descriptions within

Section 2.5 only, vicinity is defined in accordance with RG 1.208 as a 40-kilometer (25-mile) radius.

Region — The area from the center point of the power block footprint to a 50-mile radius. The Turkey Point plant property is located in a rural, sparsely populated area. For descriptions within Section 2.5 only, region is defined in accordance with RG 1.208 as a 320-kilometer (200-mile) radius.

Table 2.0-201 provides a comparison of site-related design parameters for which the AP1000 plant is designed and site characteristics specific to Units 6 & 7 in support of this safety assessment. The first two columns of Table 2.0-201 are a compilation of the site parameters from DCD Table 2-1 and DCD Tier 1 Table 5.0-1. The third column of Table 2.0-201 is the corresponding site characteristic. The fourth column denotes the section or table in the Units 6 & 7 FSAR where this data is presented. The last column indicates whether or not the site characteristic is bounded by the corresponding DCD site parameter. “Yes” indicates the site characteristic falls within the parameter, while “No” indicates it does not. Where a “No” is indicated, a justification is provided in the FSAR reference. Control room atmospheric dispersion values, expressed as X/Q for all applicable accident analyses, are presented in Table 2.0-202. All of the control room values fall within the DCD acceptance criteria.

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Table 2.0-201 (Sheet 1 of 7)
Comparison of DCD Site Parameters and Turkey Point Units 6 & 7 Site Characteristics

	AP 1000 DCD Site Parameters[a]	Units 6 & 7 Site Characteristics	Units 6 & 7 Site Characteristic Reference	Bounding Yes/No
Air Temperature				
Maximum Safety[b]	115°F dry bulb/86.1°F coincident wet bulb[c]	103°F dry bulb/75.2°F coincident wet bulb (100-year return period)	Subsection 2.3.1.5	Yes
PTN DEP 2.0-3	86.1°F wet bulb (noncoincident)	87.4°F wet bulb (non-coincident) (100-year return estimate of 2-hour duration)	Subsection 2.3.1.5	No[d]
Minimum Safety[b]	–40°F	17.9°F (100-year return period)	Subsection 2.3.1.5	Yes
Maximum Normal[e]	101°F dry bulb /80.1°F coincident wet bulb	91.3°F dry bulb/79.3°F coincident wet bulb (0.4 percent annual exceedance)	Subsection 2.3.1.5	Yes
PTN DEP 2.0-2	80.1°F wet bulb (noncoincident)[f]	81.5°F wet bulb (non-coincident) (0.4 percent annual exceedance)	Subsection 2.3.1.5	No[d]
Minimum Normal[e]	–10°F	46.9°F (99.6 percent annual exceedance)	Subsection 2.3.1.5	Yes
Wind Speed				
PTN DEP 2.0-1 Operating Basis	145 mph (3-second gust); importance factor 1.15 (safety), 1.0 (nonsafety); exposure C; topographic factor 1.0	150 mph (3-second gust, 50-year return) 161 mph (3-second gust, 100-year return); importance factor 1.15 (safety), 1.0 (nonsafety); exposure C; topographic factor 1.0	Subsection 2.3.1.3.1	No[d]
Tornado	300 mph	200 mph	Subsection 2.3.1.3.2	Yes
	Maximum pressure differential of 2.0 lb/in^2	0.9 lb/in^2	Subsection 2.3.1.3.2	Yes

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Table 2.0-201 (Sheet 2 of 7)
Comparison of DCD Site Parameters and Turkey Point Units 6 & 7 Site Characteristics

	AP 1000 DCD Site Parameters[a]	Units 6 & 7 Site Characteristics	Units 6 & 7 Site Characteristic Reference	Bounding Yes/No
Seismic				
SSE	SSE free field peak ground acceleration of 0.30 g with modified Regulatory Guide 1.60 response spectra[g][h] (See Figures 5.0-1 and 5.0-2). Seismic input is defined at finished grade except for sites where the nuclear island is founded on hard rock. If the site-specific spectra exceed the response spectra in Figures 5.0-1 and 5.0-2 at any frequency, or if soil conditions are outside the range evaluated for AP1000 design certification, a site-specific evaluation can be performed. This evaluation will consist of a site-specific dynamic analysis and generation of in-structure response spectra at key locations to be compared with the floor response spectra of the certified design at 5-percent damping. The site is acceptable if the floor response spectra from the site-specific evaluation do not exceed the AP1000 spectra for each of the locations or the exceedances are justified. The hard rock high frequency (HRHF) ground motion response spectra (GMRS) are shown in Figure 5.0-3 and Figure 5.0-4 defined at the foundation level for 5% damping. The HRHF GMRS provide an alternative set of spectra for evaluation of site specific GMRS. A site is acceptable if its site specific GMRS fall within the AP1000 HRHF GMRS.	Peak ground acceleration:[g] 0.06g horizontal 0.06g vertical GMRS peak ground acceleration defined at 100 Hz. Ground Motion Response Spectra: The horizontal and vertical GMRS are bounded by the certified seismic design response spectra (CSDRS)	Subsection 2.5.2.6 Figure 2.5.2-260 Figure 2.5.2-261 Figure 3.7-202	Yes
Fault Displacement Potential	Negligible	The potential for tectonic deformation is negligible.	Subsection 2.5.3.8	Yes

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Table 2.0-201 (Sheet 3 of 7)
Comparison of DCD Site Parameters and Turkey Point Units 6 & 7 Site Characteristics

	AP 1000 DCD Site Parameters[a]	Units 6 & 7 Site Characteristics	Units 6 & 7 Site Characteristic Reference	Bounding Yes/No
Soil				
Average Allowable Static Bearing Capacity	The allowable bearing capacity, including a factor of safety appropriate for the design load combination, shall be greater than or equal to the average bearing demand of 8,900 lb/ft^2 over the footprint of the nuclear island at its excavation depth.	Static bearing capacity: 43,000 lb/ft^2.	Subsection 2.5.4.10	Yes
Maximum Allowable Dynamic Bearing Capacity for Normal Plus Safe Shutdown Earthquake (SSE)	The allowable bearing capacity, including a factor of safety appropriate for the design load combination, shall be greater than or equal to the maximum bearing demand of 35,000 lb/ft^2 at the edge of the nuclear island at its excavation depth, or site-specific analyses demonstrate factor of safety appropriate for normal plus safe shutdown earthquake loads.	Dynamic bearing capacity: 43,000 lb/ft^2.	Subsection 2.5.4.10	Yes
Shear Wave Velocity	Greater than or equal to 1,000 ft/sec based on minimum low-strain soil properties over the footprint of the nuclear island at its excavation depth.	Materials below nuclear island subgrades have V_S greater than 1000 ft/sec.	Subsection 2.5.4.2 Table 2.5.4-215	Yes
Lateral Variability	Soils supporting the nuclear island should not have extreme variations in subgrade stiffness. This may be demonstrated by one of the following:	The natural soil conditions along with the placement of lean concrete fill over the Key Largo Limestone provide uniform soil conditions under all Category 1 structures as defined by RG 1.132.	Subsection 2.5.4.10	Yes

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Table 2.0-201 (Sheet 4 of 7)
Comparison of DCD Site Parameters and Turkey Point Units 6 & 7 Site Characteristics

	AP 1000 DCD Site Parameters[a]	Units 6 & 7 Site Characteristics	Units 6 & 7 Site Characteristic Reference	Bounding Yes/No
Soil (cont.)				
Lateral Variability (cont.)	1. Soils supporting the nuclear island are uniform in accordance with Regulatory Guide 1.132 if the geologic and stratigraphic features at depths less than 120 feet below grade can be correlated from one boring or sounding location to the next with relatively smooth variations in thicknesses or properties of the geologic units, or 2. Site-specific assessment of subsurface conditions demonstrates that the bearing pressures below the footprint of the nuclear island do not exceed 120% of those from the generic analyses of the nuclear island at a uniform site, or 3. Site-specific analysis of the nuclear island basemat demonstrates that the site specific demand is within the capacity of the basemat. As an example of sites that are considered uniform, the variation of shear wave velocity in the material below the foundation to a depth of 120 feet below finished grade within the nuclear island footprint and 40 feet beyond the boundaries of the nuclear island footprint meets the criteria in the case outlined below: Case 1: For a layer with a low strain shear wave velocity greater than or equal to 2500 feet per second, the layer should have approximately uniform thickness, should have a dip not greater than 20 degrees, and should have less than 20 percent variation in the shear wave velocity from the average velocity in any layer.			

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Table 2.0-201 (Sheet 5 of 7)
Comparison of DCD Site Parameters and Turkey Point Units 6 & 7 Site Characteristics

	AP 1000 DCD Site Parameters[a]	Units 6 & 7 Site Characteristics	Units 6 & 7 Site Characteristic Reference	Bounding Yes/No
Soil (cont.)				
Liquefaction Potential	Negligible	The calculated factor of safety values against liquefaction indicate adequate resistance to liquefaction. The thickness and stiffness of the overlying rock, lean concrete fill, and compacted limerock would preclude the effects of liquefaction from reaching near the ground surface.	Subsection 2.5.4.8	Yes
Minimum Soil Angle of Internal Friction	Greater than or equal to 35 degrees below footprint of nuclear island at its excavation depth	Nuclear island excavations are backfilled with lean concrete up to the foundation level of the structures. Nonsafety-related power block structures are founded on structural fill above the Miami Limestone.	Subsection 2.5.4.5	Not Applicable
Missiles				
Tornado	4000-lb automobile at 105 mph horizontal, 74 mph vertical	4000-lb automobile at 105 mph horizontal, 74 mph vertical	APP-GW-GLR-020, "Wind and Tornado Site Interface Criteria," Westinghouse Electric Company, LLC.[i]	Yes
	275-lb, 8-in. shell at 105 mph horizontal, 74 mph vertical	275-lb, 8-in. shell at 105 mph horizontal, 74 mph vertical		Yes
	1-in.-diameter steel ball at 105 mph in the most damaging direction	1-in.-diameter steel ball at 105 mph in the most damaging direction	Subsection 3.5.1.5	Yes
Flood Level	Less than plant elevation 100'	DCD plant elevation of 100 ft. = 26 ft. North American Vertical Datum 1988 (NAVD 88) (design grade floor elevation) The maximum total (surge and wave action) water elevation from a probable maximum hurricane is 24.8 ft. NAVD 88.	Subsection 2.4.1.1 Subsection 2.4.5.3.3	Yes

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Table 2.0-201 (Sheet 6 of 7)
Comparison of DCD Site Parameters and Turkey Point Units 6 & 7 Site Characteristics

	AP 1000 DCD Site Parameters[a]	Units 6 & 7 Site Characteristics	Units 6 & 7 Site Characteristic Reference	Bounding Yes/No
Groundwater Level	Less than plant elevation 98'	DCD groundwater elevation of 98 ft. = 24 ft. NAVD 88. Post-construction groundwater conditions indicate an average elevation of approximately –0.4 feet NAVD 88 in the power block area.	Subsection 2.4.12.5	Yes
Plant Grade Elevation	Less than plant elevation 100' except for portion at a higher elevation adjacent to the annex building	The design grade floor elevation is 26 feet NAVD 88, which corresponds to AP1000 elevation of 100 feet. The actual plant grade is lower and varies to accommodate site grading, drainage, and local site flooding. The finished grade elevation is 25.5 feet NAVD 88.	Subsection 2.4.1.1	Yes
Precipitation				
Rain	20.7 in./hr [1-hr 1-mi^2 PMP]	19.4 in./hr	Subsection 2.4.2.3.1 Table 2.4.2-207	Yes
Snow/Ice	75 pounds per square foot on ground with exposure factor of 1.0 and important factor of 1.2 (safety) and 1.0 (non-safety)	Based on historical data, the recurrent ground snow load for all monitoring stations is 0.026 lb/ft^2; therefore, estimations of the weight of snowpack are not necessary for the Turkey Point plant site.	Subsection 2.3.1.3.4	Yes
Atmospheric Dispersion Values X/Q[j]				
Site Boundary (0-2 hours)	≤5.1x10^{-4} sec/m^3	4.19E-04 sec/m^3 (EAB)	Subsection 2.3.4.2	Yes
Site Boundary (annual average)	≤2.0x10^{-5} sec/m^3	1.7E-05 sec/m^3 (EAB)	Subsection 2.3.5.2	Yes
Low Population Zone Boundary				
0–8 hours	≤2.2x10^{-4} sec/m^3	1.87E-05 sec/m^3	Subsection 2.3.4.2	Yes
8–24 hours	≤1.6x10^{-4} sec/m^3	1.25E-05 sec/m^3	Subsection 2.3.4.2	Yes

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Table 2.0-201 (Sheet 7 of 7)
Comparison of DCD Site Parameters and Turkey Point Units 6 & 7 Site Characteristics

	AP 1000 DCD Site Parameters[a]	Units 6 & 7 Site Characteristics	Units 6 & 7 Site Characteristic Reference	Bounding Yes/No
24–96 hours	≤1.0x10^{-4} sec/m^3	5.25E-06 sec/m^3	Subsection 2.3.4.2	Yes
96–720 hours	≤8.0x10^{-5} sec/m^3	1.51E-06 sec/m^3	Subsection 2.3.4.2	Yes
Population Distribution				
Exclusion area (site)[j]	0.5 mi	The minimum distance from the source boundary to the exclusion area boundary is 1427 ft. (0.27 mi)	Subsection 2.1.2	No[d]

PTN DEP 2.0-4

(a) DCD Site Parameters are a compilation of DCD Tier 1 Table 5.0-1 and DCD Tier 2 Table 2-1.
(b) Maximum and minimum safety values are based on historical data and exclude peaks of less than 2 hours duration.
(c) The containment pressure response analysis is based on a conservative set of dry-bulb and wet-bulb temperatures. These results envelop any conditions where the dry-bulb temperature is 115°F or less and wet-bulb temperature of less than or equal to 86.1°F.
(d) These Site Characteristics and comparison evaluation are discussed in COLA Part 7, Departures and Exemption Requests.
(e) The maximum normal value is the 1 percent seasonal exceedance temperature. The minimum normal value is the 99 percent seasonal exceedance temperature. The minimum temperature is for the months of December, January, and February in the northern hemisphere. The maximum temperature is for the months of June through September in the northern hemisphere. The 1 percent seasonal exceedance is approximately equivalent to the annual 0.4 percent exceedance. The 99 percent seasonal exceedance is approximately equivalent to the annual 99.6 percent exceedance.
(f) The noncoincident wet-bulb temperature is applicable to the cooling tower only.
(g) With ground response spectra as given in DCD Figures 3.7.1-1 and 3.7.1-2. Seismic input is defined at finished grade except for sites where the nuclear island is founded on hard rock.
(h) Sites that fall within the hard rock high frequency GMRS given in DCD Figures 3I.1-1 and 3I.1- 2 are acceptable.
(i) Per APP-GW-GLR-020, the kinetic energies of the missiles discussed in DCD Section 3.5 are greater than the kinetic energies of the missiles discussed in Regulatory Guide 1.76 and result in a more conservative design.
(j) For AP1000, the term “site boundary” and “exclusion area boundary” are used interchangeably. Thus, the X/Q specified for the site boundary applies whenever a discussion refers to the exclusion area boundary. At Turkey Point the “site boundary” and “exclusion area boundary” are not interchangeable. See Figures 2.1-202 and 2.1-204.

PTN SUP 2.0-1

Table 2.0-202
Comparison of Predicted Units 6 & 7 Control Room X/Q Values with DCD Acceptance Criteria

X/Q (sec/m^3) at HVAC Intake for the Identified Release Points[a]														
Release Time	Plant Vent or PCS Air Diffuser[b]	Plant Vent	PCS Air Diffuser	Ground Level Contain-ment Release Points[c][d]	Ground Level Contain-ment Release Points	PORV and Safety Valve Releases[e]	PORV and Safety Valve Releases	Condenser Air Removal Stack[f]	Condenser Air Removal Stack	Steam Line Break Releases	Steam Vent	Fuel Handling Area[g]	Fuel Handling Area Blowout Panel	Fuel Handling Area Truck Bay Door
	DCD	Units 6 & 7	Units 6 & 7	DCD	Units 6 & 7	DCD	Units 6 & 7	DCD	Units 6 & 7	DCD	Units 6 & 7	DCD	Units 6 & 7	Units 6 & 7
0–2 hours	3.0E-03	1.7E-03	1.3E-03	6.0E-03	1.6E-03	2.0E-02	1.2E-02	6.0E-03	1.6E-03	2.4E-02	1.3E-02	6.0E-03	1.4E-03	1.2E-03
2–8 hours	2.5E-03	1.1E-05	7.5E-03	3.6E-03	9.6E-04	1.8E-02	7.3E-03	4.0E-03	1.2E-03	2.0E-02	7.4E-03	4.0E-03	9.7E-04	8.9E-04
8–24 hours	1.0E-03	5.1E-04	3.4E-04	1.4E-03	4.8E-04	7.0E-03	3.1E-03	2.0E-03	5.2E-04	7.5E-03	3.3E-03	2.0E-03	4.3E-04	3.9E-04
1–4 days	8.0E-04	3.2E-04	2.1E-04	1.8E-03	3.3E-04	5.0E-03	2.3E-03	1.5E-03	4.0E-04	5.5E-03	2.5E-03	1.5E-03	3.1E-04	2.9E-04
4–30 days	6.0E-04	2.0E-04	1.2E-04	1.5E-03	2.0E-04	4.5E-03	1.4E-03	1.0E-03	3.0E-04	5.0E-03	1.4E-03	1.0E-03	2.0E-04	1.9E-04
X/Q (sec/m^3) at Annex Building Door for the Identified Release Points[h]														
Release Time	Plant Vent or PCS Air Diffuser[b]	Plant Vent	PCS Air Diffuser	Ground Level Contain-ment Release Points[c]	Ground Level Contain-ment Release Points	PORV and Safety Valve Releases[e]	PORV and Safety Valve Releases	Condenser Air Removal Stack[f]	Condenser Air Removal Stack	Steam Line Break Releases	Steam Vent	Fuel Handling Area[g]	Fuel Handling Area Blowout Panel	Fuel Handling Area Truck Bay Door
	DCD	Units 6 & 7	Units 6 & 7	DCD	Units 6 & 7	DCD	Units 6 & 7	DCD	Units 6 & 7	DCD	Units 6 & 7	DCD	Units 6 & 7	Units 6 & 7
0–2 hours	1.0E-03	3.7E-04	3.6E-04	1.0E-03	3.4E-04	4.0E-03	8.3E-04	2.0E-02	3.0E-03	4.0E-03	8.1E-04	6.0E-03	3.5E-04	3.5E-04
2–8 hours	7.5E-04	2.3E-04	2.1E-04	7.5E-04	2.0E-04	3.2E-03	4.7E-04	1.8E-02	1.7E-03	3.2E-03	4.6E-04	4.0E-03	2.2E-04	2.3E-04
8–24 hours	3.5E-04	1.1E-04	9.9E-05	3.5E-04	9.7E-05	1.2E-03	2.2E-04	7.0E-03	8.1E-04	1.2E-03	2.1E-04	2.0E-03	1.0E-04	1.0E-04
1–4 days	2.8E-04	6.9E-05	6.0E-05	2.8E-04	6.1E-05	1.0E-03	1.3E-04	5.0E-03	5.3E-04	1.0E-03	1.2E-04	1.5E-03	6.8E-05	7.1E-05
4–30 days	2.5E-04	4.4E-05	3.9E-05	2.5E-04	3.8E-05	8.0E-04	8.2E-05	4.5E-03	2.7E-04	8.0E-04	7.9E-05	1.0E-03	4.1E-05	4.4E-05

(a) These dispersion factors are to be used 1) for the time period preceding the isolation of the main control room and actuation of the emergency habitability system, 2) for the time after 72 hours when the compressed air supply in the emergency habitability system would be exhausted and outside air would be drawn into the main control room, and 3) for the determination of control room doses when the non-safety ventilation system is assumed to remain operable such that the emergency habitability system is not actuated.

(b) These dispersion factors are used for analysis of the doses due to a postulated small line break outside of containment. The plant vent and PCS air diffuser are potential release paths for other postulated events (loss-of-coolant accident, rod ejection accident, and fuel handling accident inside the containment); however, the values are bounded by the dispersion factors for ground level releases.

(c) The listed values represent modeling the containment shell as a diffuse area source, and are used for evaluating the doses in the main control room for a loss-of-coolant accident, for the containment leakage of activity following a rod ejection accident, and for a fuel handling accident occurring inside the containment.

(d) The LOCA dose analysis models the ground level containment release point HVAC intake atmospheric dispersion factors. Other analyses model more conservative values.
(e) The listed values bound the dispersion factors for releases from the steam line safety and power-operated relief valves. These dispersion factors would be used for evaluating the doses in the main control room for a steam generator tube rupture, a main steam line break, a locked reactor coolant pump rotor, and for the secondary side release from a rod ejection accident.
(f) This release point is included for information only as a potential activity release point. None of the design basis accident radiological consequences analyses model release from this point.
(g) The listed values bound the dispersion factors for releases from the fuel storage and handling area. The listed values also bound the dispersion factors for releases from the fuel storage area in the event that spent fuel boiling occurs and the fuel building relief panel opens on high temperature. These dispersion factors are used for the fuel handling accident occurring outside containment and for evaluating the impact of releases associated with spent fuel pool boiling.
(h) These dispersion factors are to be used when the emergency habitability system is in operation and the only path for outside air to enter the main control room is that due to ingress/egress.