SUBSECTION 2.4.3:
PROBABLE MAXIMUM FLOOD ON STREAMS AND RIVERS

PTN COL 2.4-2

2.4.3 PROBABLE MAXIMUM FLOOD ON STREAMS AND RIVERS

Units 6 & 7 are located adjacent to the Biscayne Bay shoreline. There are no major natural streams or rivers nearby. The topography of the area is extremely flat with natural elevations ranging from 2 to 5 feet NAVD 88 (Reference 201). Although there are no major natural streams or rivers nearby, there are several man-made canals located west of Units 6 & 7 extending from Florida City and Homestead to Biscayne Bay as described in Subsection 2.4.1.

A storm event with the magnitude of the probable maximum precipitation (PMP) would likely be associated with a tropical storm event and accompanied by a strong low-pressure system and a storm surge in the Biscayne Bay. The NOAA Hydrometeorological Report No. 51, Subsection 3.2.5 indicates that PMP estimates in Florida were developed by adjusting rainfall events associated with tropical storms for a looping track, a known occurrence with tropical storms along the Atlantic Ocean and Gulf of Mexico coasts where rainfall is concentrated over a specific area (Reference 202). Near the shoreline, where Units 6 & 7 are located, the seawater level in Biscayne Bay would control the floodwater level in these canals. The Federal Emergency Management Agency Flood Insurance Study, Dade County, Florida and Incorporated Areas (Reference 203), provides still water elevations in Biscayne Bay at the Turkey Point plants and near the mouths for these canals for various return period frequencies. These still water levels range between elevation 8.5 feet NGVD 29 (6.9 feet NAVD 88) (Reference 204) for the 10-year return period still water elevation (Reference 203, Table 2, Transect 31) to 12.4 feet NGVD 29 (10.8 feet NAVD 88) (Reference 204) for the 500-year return period still water elevation (Reference 203, Table 2, Transect 30). All historical flooding events listed in the Dade County Flood Insurance Study are a result of tropical storms, which indicates that flooding in the county is primarily a result of tropical storm events (Reference 203).

The still water elevation as a result of the probable maximum hurricane is at elevation 21.1 feet NAVD 88 with a wave run-up water level at elevation 24.8 feet NAVD 88 as presented in Subsection 2.4.5. As described in Subsection 2.4.2, the design grade elevation for Units 6 & 7 safety-related buildings is elevation 26.0 feet NAVD 88, which is above the Biscayne Bay flood elevations listed above.

Additionally, the flood elevations listed above are higher than the ground elevations surrounding Units 6 & 7 as well as the canal locations. Therefore,

floodwater levels from Biscayne Bay will extend landward a significant distance even during a 10-year flooding event on the bay. Water levels in Biscayne Bay will control the water levels in the canals. Because the topography near the site and the canals is flat for many miles in all directions, it provides a large amount of storage volume for canal flooding with very little increase in water level.

For instance, the floodplain width for the Florida City Canal, located north of the site, is more than 45,000 feet wide upstream of the site as measured from the Florida City Canal to the Little Card Sound shoreline south of the site (Reference 201). As indicated above, the elevations in the vicinity of the site range from 2 to 5 feet NAVD 88. Using this information, every 1000 foot reach of the Florida City Canal floodplain contains approximately 1030 acre-ft of storage for every foot of vertical rise above elevation 5 feet NAVD 88. FSAR Subsection 2.4.2 indicates that the 6 hour, 10 square mile PMP depth is 32.0 inches. With the flat topography and wide floodplains described above, there would be no concentration of the flood discharge as the runoff and canal overflows would spread out laterally in the floodplain areas near the site. Consequently, the flood level from 32 inches of precipitation would not reach levels above those estimated for the probable maximum hurricane level indicated in Subsection 2.4.5, or that would impact the site, which have the safety-related buildings design grade elevation at 26.0 feet NAVD 88.

In accordance with American National Standards/American Nuclear Society 2.8-1992 (Reference 205), nuclear power reactor sites located on shorelines only need to consider flooding as a result of the probable maximum hurricane. There is no additional need to consider the impacts of flooding as a result of the PMP on adjacent streams or rivers as a result of the controlling nature of coastal water levels along a shoreline. Based on the estimation that storm surge elevations in Biscayne Bay control flood levels in the canals and that there are no other nearby major streams or rivers, a PMP runoff analysis on streams and rivers for Units 6 & 7 was not performed. Subsection 2.4.2 includes a description on the local PMP runoff analysis performed for the power block area to assess the impacts of the PMP on the Units 6 & 7 drainage system.

2.4.3.1 References

201. U.S. Geological Survey, *Arsenicker Keys and Card Sound Quadrangles*, Florida-Dade County, 7.5 Minute Series Topographic Maps, 1997 and 1994.

202. National Oceanic and Atmospheric Administration, NWS, *Probable Maximum Precipitation Estimates*, United States East of the 105th Meridian, Hydrometeorological Report No. 51, June 1978.

203. Federal Emergency Management Agency, *Flood Insurance Study*, Dade County, Florida and Incorporated Areas, Revised March 1994.

204. U.S. National Geodetic Survey, *National Vertical Datum Conversion Utility*. Available at http://www.ngs.noaa.gov/TOOLS/Vertcon/vertcon.html, accessed August 2008.

205. American National Standards Institute/American Nuclear Society, *American National Standard for Determining Design Basis Flooding at Power Reactor Sites*, ANSI/ANS-2.8-1992, 1992 (withdrawn 2002).