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2.4.5 Probable Maximum Surge and Seiche Flooding

Storm surge is not considered a credible flood-causing mechanism at the Clinch River Nuclear (CRN) Site. The CRN Site is located on the north bank of the Clinch River arm of Watts Bar Reservoir between Clinch River Mile (CRM) 19 to CRM 14.5 (Reference 2.4.5-1) approximately 1580 river miles inland (Clinch River Miles 14.5, Tennessee River Miles 567.8, Ohio River Miles 48, and Mississippi River Miles 953) from the Gulf of Mexico at grade elevation 821 feet (ft). The TVA reservoir control guide provides a nominal maximum Watts Bar Reservoir pool elevation during normal non-flood conditions of approximately 741 ft National Geodetic Vertical Datum of 1929 (NGVD29). The actual reservoir pool elevation typically varies plus or minus 1 foot around the nominal value. The plant grade at elevation 821 ft North American Vertical Datum of 1988 (NAVD88) is approximately 80 ft above the normal maximum pool levels during normal non-flood conditions.

While a seismic seiche has been recorded in the Tennessee Valley area it was of very small magnitude. The 9.2 magnitude, March 1964 Alaska Earthquake event, resulted in seiche being observed on about 25 percent of the 130 gages available in Tennessee at the time with a largest recorded seiche amplitude of 0.1 ft on Tennessee lakes, reservoirs, and/or ponds, and 0.6 ft in Kentucky (Reference 2.4.5-2). Reference 2.4.5-3 indicates that the CRN site is within the Eastern Tennessee Seismic Zone. However, there has been no recorded seiche of any significant magnitude reported as a result of earthquake events in the Tennessee Valley area. Examination of the slopes in the vicinity of the plant does not indicate instabilities or the potential for landslide. There also have been no recorded landslide generated seiche incidences in the TVA reservoir system.

Wind-generated seiches pose no flood threats to the CRN Site. This is because the river width at the site has a limited fetch length of 4.25 mi with a river sinuosity, lack of vertical barriers at the edge of water, gently sloped bottom and heavily vegetated, gently sloped floodplain that naturally damp standing waves. Combined with an elevation difference of approximately 80 ft between the summer operation guide nominal high water surface elevation of 741 ft NGVD29 (Watts Bar Reservoir summer guide maximum plus 1 ft) and a proposed plant grade of 821 ft NAVD88, seiche from any source would not produce maximum water levels at the site.

Because the site is not located on an open or large body of water, surge or seiche flooding will not produce the maximum water levels at the site with 79 ft of margin between normal non-flood conditions and plant grade.

2.4.5.1 References

- 2.4.5-1. TVA, *Final Environmental Impact Statement, Watts Bar Reservoir Land Management Plan, Loudon, Meigs, Rhea, and Roane Counties, Tennessee*, February 2009.
- 2.4.5-2. McGarr, Arthur and Robert C. Vorlis, *The Alaska Earthquake, March 27, 1964: Effects on the Hydrologic Regimen, Seismic Seiches From the March 1964 Alaska Earthquake*, Geological Survey Professional Paper 544-E, 1968.
- 2.4.5-3. Petersen, M.D., M.P. Moschetti, P.M. Powers, C.S. Mueller, K.M. Haller, A.D. Frankel, Yuehua Zeng, Sanaz Rezaeian, S.C. Harmsen, O.S. Boyd, Ned Field, Rui Chen, K.S. Rukstales, Nico Luco, R.L. Wheeler, R.A. Williams, and A.H. Olsen, 2014, *Documentation for the 2014 Update of the United States National Seismic Hazard Maps: U.S. Geological Survey Open-File Report 2014-1091*, p. 243, <http://pubs.usgs.gov/of/2014/1091/pdf/ofr2014-1091.pdf>.