

36 inches

DCD FSAR Tier 1, Table 2.1-1, and DCD FSAR Tier 2, Table 2.0-1, define an additional site parameter for winter precipitation as the depth of the 48-hour probable maximum winter precipitation (PMWP) (i.e., less than or equal to 914.4 millimeters (mm) 936 inches). Depending on the location of the site, the 48-hour PMWP may not necessarily be in the form of frozen precipitation.

2.3.1.2.2 Extreme Wind Speed (Other Than Tornado and Hurricane)

The applicant used the American Society of Civil Engineers/Structural Engineering Institute (ASCE/SEI) Standard 7-05, "Minimum Design Loads for Buildings and Other Structures," to determine that the site parameter for extreme wind speed (other than tornado and hurricane), as presented in DCD FSAR Tier 1, Table 2.1-1, and DCD FSAR Tier 2, Table 2.0-1, is 64.8 meters per second (m/s) (145 miles per hour (mph)) for Exposure Category C (as described in DCD FSAR Chapter 3.3.1.1, "Design Wind Velocity and Recurrence Interval," and Chapter 3.8.4.3, "Loads and Load Combinations"). The staff confirmed this value using ASCE/SEI Standard 7-05. ASCE/SEI Standard 7-05 describes the basic wind speed as the "three second wind gust speed at 33 ft (10 meters (m)) above the ground in Exposure Category C." Exposure Category C relies on the surface roughness categories as defined in Chapter 6, "Wind Loads," of ASCE/SEI Standard 7-05. Exposure Category C is acceptable at many sites because of scattered obstructions of various sizes in the immediate site area. Exposure Category B specifies that there must be urban and suburban areas, wooded areas, or other terrain with numerous closely spaced obstructions that are the size of single-family dwellings or larger and that prevail in the upwind direction for a distance of at least 2,600 feet (792 meters) or 20 times the height of the building, whichever is greater. Exposure Category D specifies that there must be flat, unobstructed areas and water surfaces that prevail in the upwind direction for a distance greater than 5,000 feet (1,525 meters) or 20 times the building height, whichever is greater. ASCE/SEI Standard 7-05 states that Exposure Category C shall apply for all cases in which Exposure Category B or D do not apply. DCD FSAR Section 3.3.1.1, "Design Wind Velocity and Recurrence Interval," further states that the 64.8 m/s (145 mph) value is based on the 50-year, 3-second gust wind speed and corresponds to the wind speed measured at 10 meters (33 feet) aboveground.

Footnote 2 to DCD FSAR Tier 1, Table 2.1-1, and DCD FSAR Tier 2, Table 2.0-1, states that the importance factor site parameter value of 1.15 is to be used for the design of seismic Category I and II structures only. Section 3.3.1 of the APR1400 DCD states that the operating basis wind speed site parameter value of 145 miles per hour (mph) (3-second gust) is based on an annual probability of occurrence of 0.02 (i.e., 50-year return period). Higher winds with an annual probability of occurrence of 0.01 (i.e., 100-year return period) were used in the design of seismic Category I and II structures by applying an importance factor of 1.15.

2.3.1.2.3 Tornado

The site parameters for tornadoes, as presented in DCD FSAR Tier 1, Table 2.1-1, and DCD FSAR Tier 2, Table 2.0-1, are as follows:

- The maximum horizontal wind speed is 102.8 m/s (230 mph).
- The rotational speed is 82.2 m/s (184 mph).
- The translational speed is 20.6 m/s (46 mph).

states that there should be no potential for surface tectonic and nontectonic deformation at the site.

ITAAC: There are no ITAAC for this area of review.

TS: There are no TS for this area of review.

COL Information or Action Items: See SER Section 2.5.5 below.

Technical Reports: There are no technical reports associated with this area of review.

Topical Reports: There are no topical reports associated with this area of review.

APR1400 Interface Issues Identified in the DCD: There are no APR1400 interface issues associated with this area of review.

Stability of Subsurface Materials and Foundations, DCD Section 2.5.4

DCD Tier 1: The Tier 1 information associated with this section is found in DCD, Tier 1, Revision 0, Section 2.1, "Site Parameters." DCD Section 2.1, Table 2.1-1, provides the design-basis parameters of subsurface stability for maximum static and dynamic bearing demand, minimum shear wave velocity, maximum dip angle for soil uniformity, liquefaction potential, maximum differential settlement inside and between buildings, minimum soil angle of internal friction, and backfill material properties for the APR1400 plant.

Table 2.1-1 provides site acceptability requirements for COL applicants referencing an APR1400. A COL applicant's site will be acceptable if the site characteristics are bounded by the postulated site parameters identified in the aforementioned table.

DCD Tier 2: The applicant has provided a DCD Tier 2, Revision 0, description of the process for determining the site-specific design-basis subsurface material stability information required of a COL applicant in Section 2.5.4, summarized here, in part, as follows.

The APR1400 requirements for stability of subsurface materials and foundations are included in APR1400 DCD Section 2.5.4. This section describes the site-specific geotechnical and geophysical information that COL applicants must provide through investigations that they must conduct to determine the properties of all soils and rock, which may affect the nuclear power plant facilities under both static and dynamic conditions.

The DCD applicant stated that the COL applicant would need to verify whether the site rock and soil material properties are consistent with those assumed in DCD Tier 2, Revision 0, Section 3.7.1, "Seismic Design Parameters." DCD Section 3.8.5, "Foundations," discusses the analyses related to the foundation and factors of safety (FOS) for stability for the APR1400 standard plant design.

DCD Tier 2, Table 2.0-1, which also provides the APR1400 site design parameters, specifies that the maximum static bearing demand for the APR1400 design is 718.2 kPa (15,000 kilopounds per square foot (ksf)) and that the maximum dynamic bearing demand is 2,872.8 kPa (60 ksf). The DCD applicant specified that the allowable static and dynamic bearing capacities, including FOS of 3 and 2, respectively, shall be greater than, or equal to, the maximum static and dynamic bearing demands specified in the table. DCD Tier 2, Table 2.0-1,

15 ksf

76.2 mm (3.0 in.) between NI Common Basemat and EDG Building & DFOT Building 12.7 mm (0.5 in.) between other adjacent buildings

allowable

allowable

also specifies the minimum shear wave velocity as 304.8 m/s (1,000 feet per second (ft/s)). DCD Tier 2, Table 2.0-1, postulates a maximum dip angle for soil uniformity of 20 degrees with respect to the horizontal and no liquefaction potential for seismic Category I structures. In addition, DCD Tier 2, Table 2.0-1, specifies a maximum differential settlement inside buildings of 12.7 mm (0.5 inch) per 15.24 meters (50 feet) in any direction and a maximum differential settlement between buildings of 12.7 mm (0.5 inch). DCD Tier 2, Table 2.0-1, specifies several parameters for backfill material that include a material density of 2,195 kilograms per cubic meter (kg/m³) (137 pound-force per cubic foot (pcf)), a dynamic Poisson's ratio of 0.33, strain-compatible minimum shear wave velocity of 347.7 m/s (510 feet per second (fps)), and a range for minimum dynamic shear moduli.

155.4 m/s

ITAAC: There are no ITAAC for this area of review.

TS: There are no TS for this area of review.

COL Information or Action Items: See Section 2.5.5 below.

Technical Reports: There are no technical reports associated with this area of review.

Topical Reports: There are no topical reports associated with this area of review.

APR1400 Interface Issues identified in the DCD: There are no APR1400 interface issues associated with this area of review.

Stability of Slopes, DCD Section 2.5.5

DCD Tier 1: The Tier 1 information associated with this section is found in DCD Tier 1, Revision 0, Section 2.1, "Site Parameters." DCD Section 2.1, Table 2.1-1, provides the design-basis parameters for stability of slopes for slope failure potential and the minimum FOS for slopes for static and dynamic conditions for the APR1400 plant. A COL applicant's site for construction of an APR1400 will be acceptable if the site characteristics are bounded by the postulated site parameters identified in Table 2.1-1.

DCD Tier 2: The applicant has provided a DCD Tier 2, Revision 0, description for the type of site-specific geologic and geotechnical information and investigations that the COL applicant must provide to determine the stability of all slopes, both natural and manmade, whose failure under any of the conditions to which they could be exposed during the life of the plant could adversely affect the safety of the plant.

DCD Tier 2, Table 2.0-1, which also provides the APR1400 site design parameters, specifies no slope failure potential, a minimum FOS for slopes for static conditions of 1.5, and a minimum FOS for slopes for dynamic conditions of 1.2.

ITAAC: There are no ITAAC for this area of review.

TS: There are no TS for this area of review.

COL Information or Action Items: See Section 2.5.5 below.

Technical Reports: There are no technical reports associated with this area of review.