2.6 Geology

This section presents a brief description of the geologic conditions that are present at and in the vicinity of the VEGP site. The ESP Site Safety Analysis Report (SSAR) presents a detailed site geologic evaluation in SSAR Section 2.5.

2.6.1 Geologic Setting

The VEGP site lies within the Coastal Plain physiographic province (Figure 2.6-1). The surrounding topography consists of gently rolling hills with a principally dendritic drainage pattern. The surface topography ranges in elevation from less than 90 ft msl to nearly 300 ft msl in the site area. The ground surface in the developed portions of the site is at an elevation of approximately 220 ft msl. Incision of the adjacent Savannah River has formed steep bluffs and topographic relief of nearly 150 ft from the river surface to the VEGP site. The river level adjacent to the site is at an elevation of approximately 80 ft msl. The floodplain is a broad alluvial surface that is 6 to 10 ft above the river. All major streams are tributary to the Savannah River.

The Coastal Plain province consists of a seaward-dipping wedge of unconsolidated and semi-consolidated sediments that extend eastward from their contact with the Piedmont province at the Fall Line west of the VEGP site to the edge of the continental shelf. Sediment thickness increases from zero at the contact with the Piedmont province to over 4,000 ft at the coastline.

The bedrock surface in the VEGP site vicinity has been leveled by erosion and dips to the southeast at approximately 50 ft/mi **(Fallaw and Price 1995)**. Bedrock within the site vicinity consists of sedimentary Triassic basin rock and Paleozoic crystalline rock.

The Paleozoic and Triassic bedrock complex is overlain by poorly consolidated to unconsolidated Coastal Plain sediments that dip and thicken to the southeast. These sediments range in age from Upper Cretaceous to Quaternary. To support characterization of the site, a deep boring drilled as part of the ESP subsurface investigation program indicates these sediments to be approximately 1,050 ft thick beneath the VEGP site. The Cretaceous and Tertiary sediments have been subdivided into multiple formations based on both lithology and carbonate fossils where present. The youngest sediments of Quaternary age consist of alluvial deposits within stream and river valleys. Figure 2.6-2 is a generalized stratigraphic column showing the formations present beneath the VEGP site and vicinity.

Beneath the VEGP site, the Blue Bluff member of the Lisbon Formation will form the bearing layer on which structural fill will be placed to form the foundation for the proposed plant structures. The Blue Bluff member is composed of sand, silt, and clay with interbedded layers of fossiliferous limestone and is exposed in the bluffs along the southwest bank of the Savannah River. It forms a confining layer between the underlying Tertiary aquifer system and the

overlying Water Table aquifer. Borings drilled as part of the ESP subsurface investigation program encountered the top of the Blue Bluff member beneath the VEGP site at a depth of about 80 ft (140 ft msl). It was determined to have a thickness of about 60 ft.

The Barnwell Group overlying the Blue Bluff member includes, from oldest to youngest, the Clinchfield Formation, the Dry Branch Formation, and the Tobacco Road Sand. Most of these units are exposed along the bluffs of the Savannah River or within stream valleys, or lie on topographically higher areas surrounding the site area (Figure 2.6-3). The Clinchfield Formation consists predominantly of calcareous sands and biomoldic limestones. Some silty and clayey sands are also present, with varying amounts of carbonate material and silicified zones. Evidence of solution cavities in the Clinchfield indicate that the process of carbonate removal is occurring, which could be a primary contributing factor to the development of surface depressions noted in the site area. The top of the Clinchfield Formation beneath the VEGP site was encountered at depths on the order of 50 ft, but the depth to and thickness of the unit is variable.

The Dry Branch Formation consists primarily of silty, clayey quartz sands. Varying amounts of carbonate material are sometimes present, often in the form of bioherms. Portions of the Dry Branch Formation become significantly more clayey, with finely laminated beds of variable thickness. The top of the Dry Branch Formation at the VEGP site ranges from the ground surface to depths on the order of 30 ft.

The Tobacco Road Sand consists of moderately to poorly sorted sands and clayey sands with varying amounts of kaolin. The unit is exposed in stream valleys and road cuts surrounding the site area. The thickness of the Tobacco Road Sand varies due to incision by the overlying Hawthorne Formation but can reach thicknesses in excess of 50 ft. Where present at the VEGP site, the top of the Tobacco Road Sand generally occurs at the ground surface.

The Hawthorne Formation overlies the Barnwell Group in the vicinity of the VEGP site and consists of poorly sorted sands and clayey sands. The sands range from fine to cobble size and are well rounded. Clay is present in the form of laminae to cobble-size clasts. This unit was not identified in any of the borings drilled as part of the ESP subsurface investigation program. It was likely removed during excavation for the existing units and, therefore, is no longer present in the developed portions of the VEGP site. However, it is present in higher elevations of the site and surrounding area. The age of the Hawthorne Formation is problematic due to the lack of fossils. However, Falls and Prowell 2001 indicate a Miocene age for this formation.

Alluvium exists within the surrounding stream and river valleys and forms terraces that can be locally delineated and mapped. A modern alluvial floodplain and several alluvial terraces are present on the east side of the Savannah River. The relative position of the higher terraces above the Holocene floodplain indicates a Pleistocene age **(Prowell 1996)**.

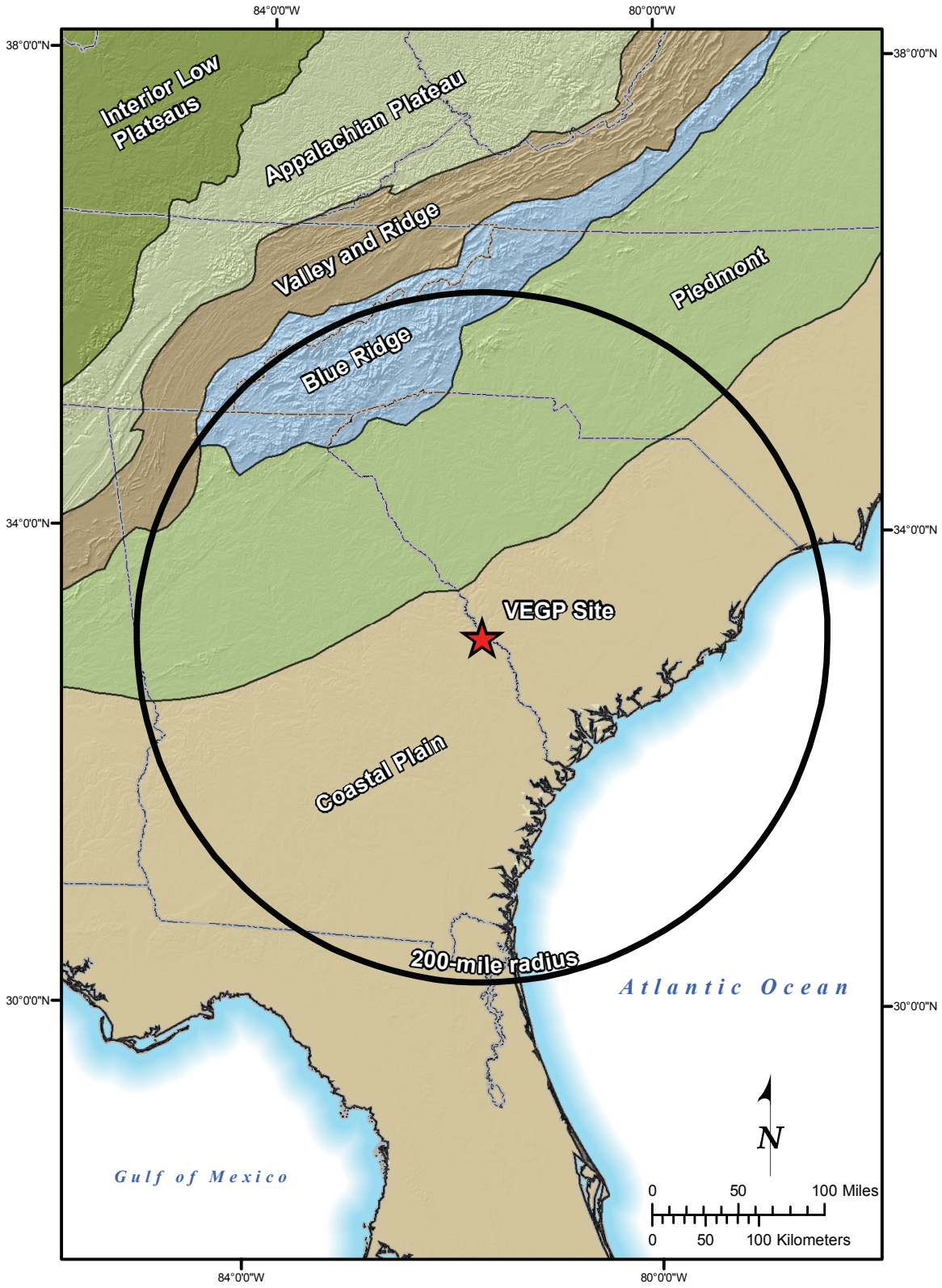

Figure 2.6-1 Physiographic Map

AGE				UNIT	DESCRIPTION
Cenozoic	Quaternary	Pleistocene / Recent		Alluvium and terrace deposits	Gravel, sand, silt and clay deposited along river and stream valleys
	Tertiary	Miocene		• Hawthorn Formation	Cobbles, gravel, sand and clayey sand
		Eocene	Upper	Barnwell Group • Tobacco Road Sand • Dry Branch Formation • Clinchfield Formation o Utley Limestone Member	Sand, clayey sand, silty sand, calcareous sand, clay and limestone
			Middle	Claiborne Group • Lisbon Formation o Blue Bluff Member / McBean Member • Still Branch Sand • Congaree Formation	Sand, silt, clay, limestone and sandstone
			Lower		
		Paleocene	Upper	• Snapp Formation • Black Mingo Formation	Clay, silty clay, silty sand and sand
			Lower		
Mesozoic	Cretaceous	Upper		• Steel Creek Formation • Gaillard Formation • Black Creek Formation • Pio Nono Formation / Unnamed Sand • Cape Fear Formation	Sand, silty sand, silty to clayey sand, silty clay and clay
	Triassic			Triassic (Dunbarton) basin	Sandstone, siltstone, and claystone, with beds of conglomerate and fanglomerate
Precambrian & Paleozoic				Crystalline basement	Gneiss, phyllite and greenstone

Refs: Huddlestun and Summerour 1996
Falls and Prowell 2001

Figure 2.6-2 Generalized Stratigraphic Column

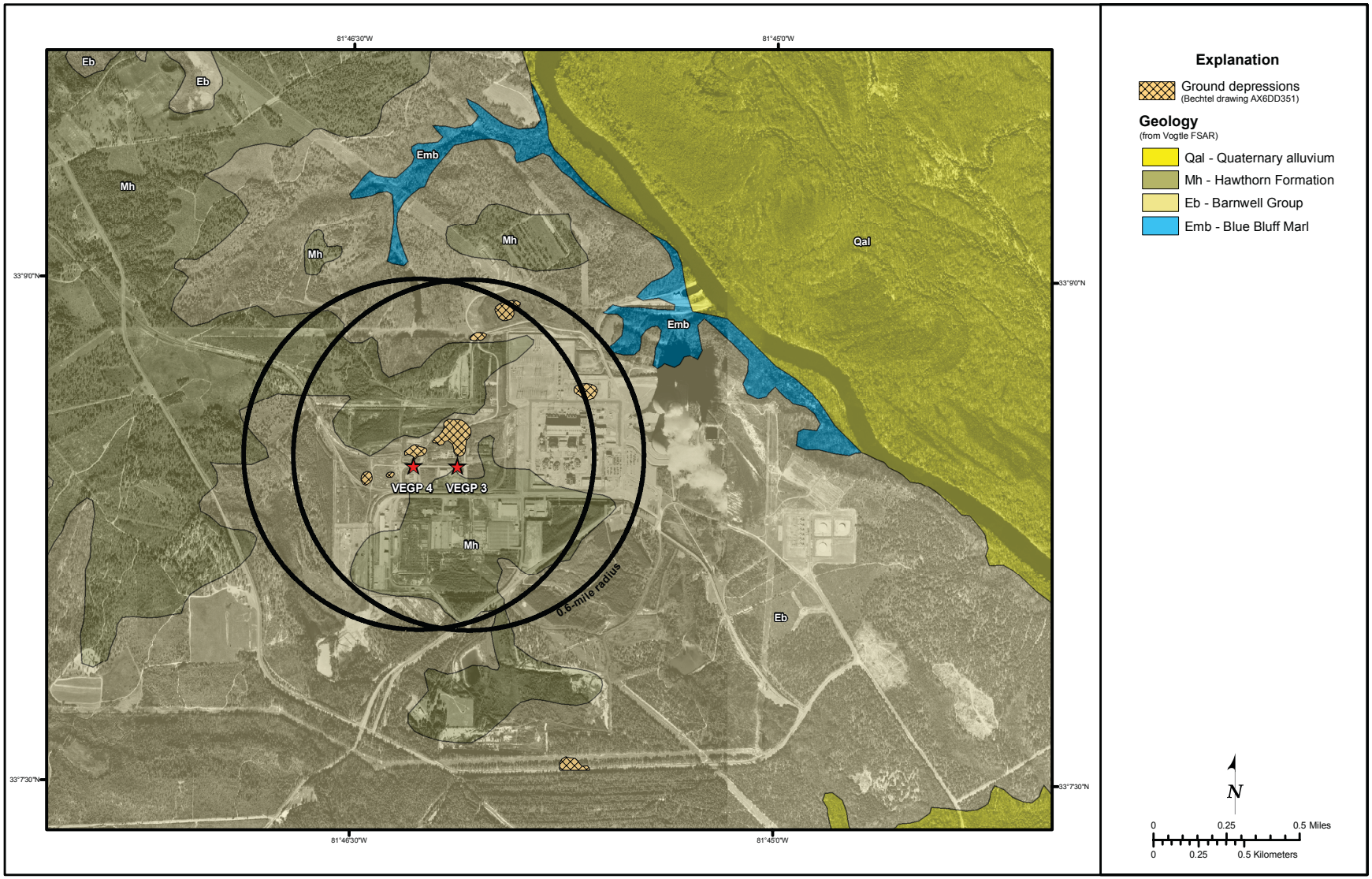

Figure 2.6-3 Site Geologic Map (0.6-mile radius)

Section 2.6 References

(Fallaw and Price 1995) Fallaw, W.C., and V. Price, Stratigraphy of the Savannah River Site and Vicinity, Southeastern Geology, v. 35, no. 1, pp. 21-58, 1995.

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(Huddlestun and Summerour 1996) Huddlestun, P.F., and J.H. Summerour, The Lithostratigraphic Framework of the Uppermost Cretaceous and Lower Tertiary of Eastern Burke County, Georgia, Georgia Department of Natural Resources, Environmental Protection Division, Georgia Geologic Survey, Bulletin 127, 1996.

(Prowell 1996) Prowell, D.C., Geologic Map of the Savannah River Site, Aiken, Allendale, and Barnwell Counties, South Carolina, U.S. Geological Survey, Miscellaneous Field Studies, Map MF-2300, 1996.

2.7 Meteorology, Air Quality, and Noise

This section describes the regional and local climatological and meteorological characteristics applicable to the VEGP site. This section also provides site-specific meteorological information for use in evaluating construction and operational impacts. This section concludes with a brief discussion of existing noise generating sources at the VEGP site and predicted noise levels relative to measured background conditions.

2.7.1 Regional Climatology

2.7.1.1 Data Sources

SNC used several sources of data to characterize regional climatological conditions pertinent to the VEGP site. This includes data acquired by the National Weather Service (NWS) at its Augusta, Georgia (Bush Field), first-order station and from nine other nearby locations in its network of cooperative observer stations, as compiled and summarized by the National Climatic Data Center (NCDC).

These climatological observing stations are located in Burke, Richmond, Jenkins, Screven and Jefferson Counties, Georgia, and in Aiken, Barnwell, Orangeburg, and Bamberg Counties, South Carolina. Table 2.7-1 identifies the specific stations and lists their approximate distance and direction from the existing reactors at the VEGP site. Figure 2.7-1 identifies these station locations relative to the VEGP site.

The objective of selecting nearby, off-site climatological monitoring stations is to demonstrate that the mean and extreme values measured at those locations are reasonably representative of conditions that might be expected to be observed at the VEGP site. The 50-mi radius circle shown in Figure 2.7-1 provides a relative indication of the distance between the climate observing stations and the VEGP site.

However, a 50-km (about 31-mi) grid spacing is considered to be a reasonable fine mesh grid in current regional climate modeling, and this distance was used as a nominal radius for the station selection process. The identification of stations to be included was based on the following considerations:

- Proximity to the site (i.e., within the nominal 50-km radius indicated above, to the extent practicable).
- Coverage in all directions surrounding the site (to the extent possible).

- Where more than one station exists for a given direction relative to the site, a station was chosen if it contributed one or more extreme conditions (e.g., rainfall, snowfall, maximum and/or minimum temperatures) for that general direction.

Nevertheless, if an overall extreme precipitation or temperature condition was identified for a station located within a reasonable distance beyond the nominal 50-km radius and that event was considered to be reasonably representative for the site area, such stations were also included, regardless of directional coverage.

Normals (i.e., 30-year averages), means, and extremes of temperature, rainfall, and snowfall are based on the following data sources:

- The *2004 Local Climatological Data Annual Summary with Comparative Data for Augusta, Georgia* **(NCDC 2005a)**
- *Climatography of the United States, No. 20, 1971–2000, Monthly Station Climate Summaries* **(NCDC 2005b)**
- *Climatography of the United States, No. 81, 1971–2000, U.S. Monthly Climate Normals* **(NCDC 2002a)**
- Southeast Regional Climate Center (SERCC)*, Historical Climate Summaries and Normals for the Southeast* **(SERCC 2006)**
- *Cooperative Summary of the Day, TD3200, Period of Record Through 2001, for the Eastern United States, Puerto Rico, and the Virgin Islands* **(NCDC 2002c)**

First-order NWS stations also record measurements, typically on an hourly basis, of other weather elements, including winds, several indicators of atmospheric moisture content (i.e., relative humidity, dew point, and wet-bulb temperatures), and barometric pressure, as well as other observations when those conditions occur (e.g., fog, thunderstorms). Table 2.7-2, excerpted from the 2004 local climatological data (LCD) summary for the Augusta NWS Station, presents the long-term characteristics of these parameters.

Additional data sources were also used to develop the description of the climatological characteristics of the VEGP site area and region:

- *Engineering Weather Data, 2000 Interactive Edition*, Version 1.0 **(AFCCC-NCDC 1999)**
- *Minimum Design Loads for Buildings and Other Structures* **(ASCE 2002)**
- *Storm Events for Georgia and South Carolina*, Tornado Event Summaries, accessed July 2005 and January 2006 **(NCDC 2006a)**
- *Historical Hurricane Tracks Storm Query*, 1851 through 2004 **(NOAA-CSC 2005)**

- *The Climate Atlas of the United States* **(NCDC 2002b)**
- *Storm Events for Georgia and South Carolina,* Hail Event and Snow and Ice Event Summaries for Burke, Jenkins, Richmond, and Screven Counties in Georgia, and Aiken, Allendale, and Barnwell Counties in South Carolina **(NCDC 2006b)**
- *Storm Data (and Unusual Weather Phenomena with Late Reports and Corrections),* January 1959 (Volume 1, Number 1) to January 2004 (Volume 42, Number 1) **(NCDC 2004)**
- *Air Stagnation Climatology for the United States (1948-1998)* **(Wang and Angell 1999)**
- *Mixing Heights, Wind Speeds, and Potential for Urban Air Pollution Throughout the Contiguous United States* **(Holzworth 1972)**

2.7.1.2 General Climate Description

The VEGP site is located in the region known as the Upper Coastal Plain, lying between the Appalachian Mountains and the Atlantic Ocean, just south of the Fall Line that separates the Piedmont from the Coastal Plain (see Figure 2.6-1). Elevation is generally 150 to 250 ft above sea level in this region, which is cut by the valley of the Savannah River. The river valley ranges from 2 to 5 mi wide near the VEGP site.

The general climate in this region is characterized by mild, short winters; long periods of mild sunny weather in the autumn; somewhat more windy but mild weather in spring; and long, hot summers.

The regional climate is predominantly influenced by the Azores high-pressure system. Due to the clockwise circulation around the western extent of the Azores High, maritime tropical air mass characteristics prevail much of the year, especially during the summer with the establishment of the Bermuda High and the Gulf High. Together, these systems govern Georgia's summertime temperature and precipitation patterns. This macro-circulation feature also affects the frequency of high air pollution potential in the site region. These characteristics and their relationship to the Bermuda High, especially in the late summer and autumn, are addressed in Section 2.7.2.3.

This macro-scale circulation feature continues during the transitional seasons and winter months; however, it is regularly disrupted by the passage of synoptic- and meso-scale weather systems. During winter, cold air masses may briefly intrude into the region with the cyclonic (i.e., counter-clockwise) northerly flow that follows the passage of low-pressure systems. These systems frequently originate in the continental interior around Colorado, pick up moisture-laden air due to southwesterly through southeasterly airflow in advance of the system, and result in a

variety of precipitation events that include rain, snow, sleet, and freezing rain, or mixtures, depending on the temperature characteristics of the weather system itself and the temperature of the underlying air (see Section 2.7.3.4). Similar cold air intrusion and precipitation patterns may also be associated with secondary low-pressure systems that form in the eastern Gulf of Mexico or along the Atlantic Coast and move northeastward along the coast (also referred to as "nor'easters").

Larger and relatively more persistent outbreaks of very cold, dry air associated with massive high-pressure systems that move southeastward out of Canada also periodically affect the VEGP site region. These weather conditions are moderated by the Appalachian Mountains to the northwest, which shelter the region in winter from these cold air masses that sweep down through the continental interior. In general, the cold air that does reach the VEGP site area is warmed by its descent to the relatively lower elevations of the region, as well as by modification due to heating as it passes over the land.

Monthly precipitation exhibits a cyclical pattern, with one maximum during the winter into early spring and a second maximum during late spring into summer (see Section 2.7.1.3.3). The winter and early spring maximum is associated with low-pressure systems moving eastward and northward through the Gulf States and up the Atlantic Coast, drawing in warm, moist air from the Gulf of Mexico and the Atlantic Ocean. These air masses receive little modification as they move into the region. The late spring and summer maximum is due to thunderstorm activity. Heavy precipitation associated with late summer and early autumn tropical cyclones, as discussed in Section 2.7.3.5, is not uncommon. The VEGP site is located far enough inland that the strong winds associated with tropical cyclones are much reduced by the time that such systems affect the site area.

2.7.1.3 Normal, Mean, and Extreme Climatological Conditions

This section discusses normals and period-of-record means and extremes for several standard weather elements (i.e., temperature, atmospheric water vapor, precipitation, wind conditions) representative of this climate setting.

As indicated previously, Table 2.7-2 presents the more extensive set of meteorological measurements and observations made at the Augusta NWS Station, located 20 mi northwest of the VEGP site. For comparison, Table 2.7-3 summarizes the annual normal daily maximum, minimum, and mean temperatures, as well as the normal annual rainfall and snowfall totals for Augusta, Georgia, and the nine other nearby cooperative observing stations.

With the exception of temperature measurements from Springfield, South Carolina, long-term periods of record for temperature and precipitation for the other climatological observing

stations, as well as summaries of the latest 30-year station normals from 1971 through 2000, are readily available from the NCDC and the SERCC.

More detailed discussions of these and other climatological characteristics, including measured extremes, are addressed in Section 2.7.4.1.

2.7.1.3.1 Temperature

Daily mean temperatures are based on the average of the daily mean maximum and minimum temperature values. Annual daily normal temperatures are similar over the VEGP site area ranging from 63.1°F at Waynesboro 2NE to 65.0°F at the Midville Experiment Station. Likewise, the diurnal (day-to-night) temperature ranges, as indicated by the differences between the daily mean maximum and minimum temperatures, are fairly comparable, ranging from 21.9°F at Bamberg to 26.3°F at Aiken 4NE. **(NCDC 2002a)**

On a monthly basis, the LCD summary for Augusta, Georgia, indicates that the daily normal temperature is highest during July (80.8°F) and reaches a minimum in January (44.8°F) **(NCDC 2005a)**.

The highest temperature observed in the VEGP site area (112°F) was recorded on July 24, 1952, at the Louisville 1E Station, located about 37 mi to the west-southwest. The lowest temperature observed in the VEGP site area (-4°F) was recorded on January 21, 1985, at the Aiken 4NE Station, located 25 mi to the north-northeast. **(NCDC 2005b)**

2.7.1.3.2 Atmospheric Water Vapor

Based on a 49-year period of record, the LCD summary for the Augusta, Georgia NWS Station (see Table 2.7-2) indicates that the mean annual wet-bulb temperature is 56.7°F, with a seasonal maximum during the summer months (June through August) and a seasonal minimum during the winter months (December through February). The highest monthly mean wet-bulb temperature is 72.7°F in July (only slightly less during August); the lowest monthly mean value (40.3°F) occurs during January. **(NCDC 2005a)**

The LCD summary shows a mean annual dew point temperature of 51.9°F, also reaching its seasonal maximum and minimum during the summer and winter, respectively. The highest monthly mean dew point temperature is 69.7°F in July; again, only slightly less during August. The lowest monthly mean dew point temperature (34.4°F) occurs during January. **(NCDC 2005a)**

The 30-year normal daily relative humidity averages 72 percent on an annual basis, typically reaching its diurnal maximum in the early morning (around 0700 hours) and its diurnal minimum

during the early afternoon (around 1300 hours). There is less variability in this day-to-night pattern with the passage of weather systems, persistent cloud cover, and precipitation. Nevertheless, this diurnal pattern is evident throughout the year. The LCD summary shows that average early morning relative humidity levels exceed 90 percent during August, September, and October. **(NCDC 2005a)**

2.7.1.3.3 Precipitation

With the exception of the Aiken 4NE Station, normal annual rainfall totals are similar for the nine other nearby observing stations listed in Table 2.7-3, differing by only about 4.7 in. (or about 10 percent) and ranging from 43.85 to 48.57 in. The current 30-year average for Aiken 4NE is somewhat higher, at 52.43 in. **(NCDC 2002a)**

The LCD summary of normal rainfall totals for Augusta, Georgia, indicates two "seasonal" maximums — the highest (13.22 in.) during the winter into early spring (January through March) and the second (12.74 in.) during late spring into summer (June through August). Together, these periods account for almost 60 percent of the annual total for the Augusta Station, although rainfall is greater than 2.6 in. during every month of the year. The overall maximum monthly total rainfall occurs during March (4.61 in.). **(NCDC 2005a)**

The overall highest 24-hour rainfall total in the VEGP site area — 9.68 in. on April 16, 1969 — was recorded at the Aiken 4NE Station in South Carolina **(NCDC 2005b)**. While Section 2.7.3.5 indicates that most of the individual station 24-hour rainfall records were established as a result of precipitation associated with tropical cyclones that passed within a 100-nautical-mile radius of the VEGP site, this particular event was not. Similarly, the overall highest monthly rainfall total recorded in the site area — 17.32 in. during June 1973 at Springfield, South Carolina **(SERCC 2006; NCDC 2002c)**, 37 mi northeast of the VEGP site — represents the accumulation of 21 days of measurable precipitation during that month **(NCDC 2002c)**.

Snowfall is an infrequent occurrence, as discussed in Section 2.7.3.4, with normal annual totals of only 0.1 to 1.4 in. **(NCDC 2005b; SERCC 2006)**. With one exception, all of the 24-hour and monthly record snowfall totals were established during the storm of early February 1973, the highest 24-hour and monthly totals (19.0 and 22.0 in., respectively) being recorded at the Bamberg Station in South Carolina, about 44 mi east-northeast of the VEGP site. Similar amounts, ranging from 14.0 to 17.0 in., were recorded at most of the other stations. **(NCDC 2002c, 2005b; SERCC 2006)**

See Section 2.7.4.1.3 for more details regarding these events and a discussion of other station precipitation records.

2.7.1.3.4 Wind Conditions

Based on a 29-year period of record, the LCD summary for the Augusta NWS Station (see Table 2.7-2) indicates that the annual prevailing wind direction (i.e., the direction from which the wind blows most often) is from 240 degrees (i.e., west-southwest). Monthly average prevailing wind directions from November through March have more of a westerly to west-northwesterly component due to increased cold frontal passages. Prevailing wind directions during the other months are more variable, generally having a southerly to southeasterly component reflecting the establishment and influence of the Bermuda High (see Section 2.7.1.2). **(NCDC 2005a)**

Based on a similar period of record, the LCD summary shows an annual mean wind speed of 6.1 mph. On a seasonal basis, the highest average wind speeds occur during the spring (about 7.1 mph), are slightly less during the winter (about 6.7 mph), and are lowest during the autumn and summer (averaging between 5.3 and 5.4 mph, respectively). On average, the LCD indicates that the highest monthly wind speed (7.4 mph) occurs during March. **(NCDC 2005a)**

Characteristics of extreme wind conditions for design basis purposes are discussed in Section 2.7.3.2. Wind data summaries, based on measurements from the existing VEGP meteorological monitoring program, for the purpose of climatological characterization and as they relate to the dispersion of radioactive effluents released into the atmosphere, are discussed in Sections 2.7.4.2 and 2.7.4.3.

2.7.2 Regional Air Quality

2.7.2.1 Background Air Quality

The VEGP site is located within the Augusta (Georgia) – Aiken (South Carolina) Interstate Air Quality Control Region (40 CFR 81.114). The counties within this region are designated as being in attainment or unclassified for all criteria air pollutants (40 CFR 81.311; 40 CFR 81.341). Attainment areas are areas where the ambient air quality levels are better than the EPA-promulgated National Ambient Air Quality Standards (NAAQS). Criteria pollutants are those for which NAAQS have been established: sulfur dioxide, particulate matter (i.e., PM_{10} and $PM_{2.5}$ — particles with nominal aerodynamic diameters less than or equal to 10.0 and 2.5 microns, respectively), carbon monoxide, nitrogen dioxide, ozone, and lead (40 CFR Part 50).

Four pristine areas in the States of Georgia and South Carolina are designated as “Mandatory Class I Federal Areas Where Visibility is an Important Value.” They include the Cohutta Wilderness Area, the Okefenokee Wilderness Area, and the Wolf Island Wilderness Area in Georgia (40 CFR 81.408), and the Cape Romain Wilderness Area in South Carolina (40 CFR 81.426). The two closest of these Class I areas are both about 130 mi away from the VEGP

site — the Wolf Island Wilderness Area to the south-southeast and the Cape Romain Wilderness Area to the east-southeast.

2.7.2.2 Projected Air Quality

The new nuclear steam supply system and other related radiological systems are not sources of criteria pollutant or other air toxics emissions. Non-radiological emission-generating sources and activities are identified and discussed further in Section 3.6.3.1.

Characteristics of these emission sources and the potential effects on air quality and visibility associated with their operation or activity are addressed in Section 5.8.1.2. Current State and Federal air quality-related regulations and permits, expected to be applicable to VEGP Units 3 and 4, are also identified in that section.

2.7.2.3 Restrictive Dispersion Conditions

Atmospheric dispersion can be described as the horizontal and vertical transport and diffusion of pollutants released into the atmosphere. Horizontal and along-wind dispersion is controlled primarily by wind direction variation and wind speed. Section 2.7.4.2 addresses wind characteristics for the VEGP site vicinity based on measurements from the existing meteorological monitoring program at the VEGP site. The persistence of those wind conditions is discussed in Section 2.7.4.3.

In general, lower wind speeds represent less-turbulent air flow, which is restrictive to horizontal and vertical dispersion. And, although wind direction tends to be more variable under lower wind speed conditions (which increases horizontal transport), air parcels containing pollutants often re-circulate within a limited area, thereby increasing cumulative exposure.

Major air pollution episodes are usually related to the presence of stagnating high-pressure weather systems (or anti-cyclones) that influence a region with light and variable wind conditions for 4 days or more. An updated air stagnation climatology report has been published with data for the continental US based on over 50 years of observations from 1948 through 1998. Although inter-annual frequency varies, the data in Figures 1 and 2 of that report indicate that, on average, the VEGP site area can expect about 20 days per year with stagnation conditions, or about 4 cases per year, with the mean duration of each case lasting about 5 days. **(Wang and Angell 1999)**

Air stagnation conditions primarily occur during an “extended” summer season that runs from May through October. This is a result of the weaker pressure and temperature gradients, and therefore weaker wind circulations, during this period (as opposed to the winter season). Based on the *Air Stagnation Climatology for the United States (1948-1998),* Figures 17 to 67, the

highest incidence is recorded in the latter half of that period between August and October, typically reaching its peak in September. As the LCD summary for Augusta, Georgia, in Table 2.7-2 indicates, this 3-month period coincides with the lowest monthly mean wind speeds during the year. Within this "extended" summer season, air stagnation is at a relative minimum during July due to the influence of the Bermuda High pressure system. **(Wang and Angell 1999)**

The mixing height (or depth) is defined as the height above the surface through which relatively vigorous vertical mixing takes place. Lower mixing heights (and wind speeds), therefore, are a relative indicator of more restrictive dispersion conditions. Holzworth (1972) reports mean seasonal and annual morning and afternoon mixing heights and wind speeds for the contiguous US based on observations over the 5-year period from 1960 to 1964. Out of the network of 62 NWS stations in the 48 contiguous US at which daily surface and upper air sounding measurements were routinely made, one station was located in Athens, Georgia, about 105 mi northwest of the VEGP site. The information in that report indicates that the results from that station should be reasonably representative of conditions at the VEGP site.

Table 2.7-4 summarizes the mean seasonal and annual morning and afternoon mixing heights and wind speeds for Athens, Georgia **(Holzworth 1972)**. From a climatological standpoint, considering all weather conditions, the lowest morning mixing heights occur in the autumn and are highest during the winter although, on average, morning mixing heights are only slightly lower in the spring and summer months than during the winter. Conversely, afternoon mixing heights reach a seasonal minimum in the winter and a maximum during the summer, as might be expected due to more intense summertime heating.

The wind speeds listed in Table 2.7-4 for Athens, Georgia, are consistent with the LCD summary for Augusta, Georgia, in Table 2.7-2 in that the lowest mean wind speeds are shown to occur during summer and autumn. This period of minimum wind speeds likewise coincides with the "extended" summer season described by Wang and Angell (1999) that is characterized by relatively higher air stagnation conditions.

2.7.3 Severe Weather

2.7.3.1 Thunderstorms and Lightning

Thunderstorms can occur in the VEGP site area at any time during the year. Based on a 54-year period of record, Augusta, Georgia, averages about 52 thunderstorm-days (i.e., days on which thunder is heard at an observing station) per year. On average, July has the highest monthly frequency of occurrence — about 12 days. Annually, nearly 60 percent of thunderstorm-days are recorded between late spring and mid-summer (i.e., from June through

August). From October through January, a thunderstorm might be expected to occur about 1 day per month. **(NCDC 2005a)**

The mean frequency of lightning strokes to earth can be estimated using a method attributed to the Electric Power Research Institute, as reported by the US Department of Agriculture Rural Utilities Service in the publication entitled *Summary of Items of Engineering Interest* **(DOA-RUS 1998)**. This methodology assumes a relationship between the average number of thunderstorm-days per year (T) and the number of lightning strokes to earth per square mile per year (N), where:

$$N = 0.31T$$

Based on the average number of thunderstorm-days per year at Augusta, Georgia (i.e., 52; see Table 2.7-2), the frequency of lightning strokes to earth per square mile is about 16 per year for the VEGP site area. This frequency is essentially equivalent to the mean of the 5-year (1996 to 2000) flash density for the area that includes the VEGP site, as reported by the NWS — 4 to 8 flashes per square kilometer per year **(NWS 2002)** — and, therefore, a reasonable indicator.

The potential reactor area for VEGP Units 3 and 4 is represented in Figure 3.1-3 as an area bounded by a 775-ft-radius circle (or approximately 0.068 mi^2). Given the estimated annual average frequency of lightning strokes to earth in the VEGP site area, the frequency of lightning strokes in the reactor area can be calculated as follows:

(16 lightning strokes/mi^2/year) x (0.068 mi^2) = 1.09 lightning strokes/year

or about once each year in the reactor area.

2.7.3.2 Extreme Winds

Estimating the wind loading on plant structures for design and operating bases considers the "basic" wind speed, which is the "3-second gust speed at 33 ft (10 m) above the ground in Exposure Category C," as defined in Sections 6.2 and 6.3 of the ASCE-SEI design standard, *Minimum Design Loads for Buildings and Other Structures* **(ASCE 2002)**.

The basic wind speed for the VEGP site is about 97 mph, as estimated by linear interpolation from the plot of basic wind speeds in Figure 6-1 of ASCE (2002) for that portion of the US that includes the VEGP site. This interpolated value is about 7.5 percent higher than the basic wind speed reported in the Engineering Weather Data summary for the Augusta (Bush Field) NWS Station (90 mph) **(AFCCC-NCDC 1999)**, which is located about 20 mi northwest of the VEGP site. The former value is, therefore, considered to be a reasonably conservative indicator of the basic wind speed.

From a probabilistic standpoint, these values are associated with a mean recurrence interval of 50 years. Section C6.0 of the ASCE-SEI design standard provides conversion factors for estimating 3-second-gust wind speeds for other recurrence intervals **(ASCE 2002)**. Based on this guidance, the 100-year return period value is determined by multiplying the 50-year return period value by a scaling factor of 1.07, which yields a 100-year return period 3-second-gust wind speed for the VEGP site of about 104 mph.

2.7.3.3 Tornadoes

The design-basis tornado (DBT) characteristics applicable to structures, systems, and components important to safety at the proposed VEGP site include the following parameters as identified in Draft Regulatory Guide DG-1143, *Design-Basis Tornado and Tornado Missiles for Nuclear Power Plants, Proposed Revision 1 of NRC Regulatory Guide 1.76 (dated April 1974)*, January 2006 (DG-1143) and the predecessor US Atomic Energy Commission (USAEC) guidance document WASH-1300, *Technical Basis for Interim Regional Tornado Criteria* **(USAEC 1974)**, on which the original version of Regulatory Guide 1.76 is based:

- Tornado strike probability
- Maximum wind speed
- Translational speed
- Maximum rotational wind speed
- Radius of maximum rotational speed
- Pressure drop
- Rate of pressure drop

The tornado strike probability is determined by evaluating certain characteristics of tornadoes that have been observed within a 2-degree latitude and longitude square centered on the VEGP site. These characteristics include the Fujita-scale wind speed classification (or “F-scale”) and the Pearson-scale path length and path width classification (or “P-scale”). As tornado intensity increases, so does the magnitude or the dimensions of these parameters along with the assigned numerical classification, which ranges from 0 to 5.

The 2-degree square area was assumed to be centered on the VEGP Unit 1 reactor, adjacent to the new unit footprint, and located at the following coordinates:

Latitude = 33^{o} 08’ 30” N; Longitude = 81^{o} 45’ 44” W

A searchable database of tornado occurrences by location, date and time; starting and ending coordinates; F-scale classification; P-scale dimensions; and damage statistics has been compiled by the NCDC beginning with January 1950 **(NCDC 2006a)**. The 2-degree square area for this evaluation includes all or portions of 30 counties in Georgia and all or portions of 18 counties in South Carolina.

Through the nearly 55-year period ending April 30, 2005, the records in the database indicate that a total of 348 tornadoes or portions of a tornado path passed within the 2-degree square area centered on the VEGP site. Tornado F-scale classifications (with corresponding wind speed range) and respective frequencies of occurrence are as follows:

- F5 (wind speed > 117 m/sec) = 0
- F4 (wind speed 93 to 116 m/sec) = 1
- F3 (wind speed 70 to 92 m/sec) = 18
- F2 (wind speed 50 to 69 m/sec) = 62
- F1 (wind speed 33 to 49 m/sec) = 151
- F0 (wind speed 18 to 32 m/sec) = 116

Following the WASH-1300 methodology, the probability that a tornado will strike a particular location during any one year is given as:

$$P_S = n\,(a / A)$$

where:

P_S = mean tornado strike probability per year

n = average number of tornadoes per year in the area being considered

a = average individual tornado area

A = total area being considered (i.e., the 2-degree square area)

Based on an average occurrence of 6.29 tornadoes per year (i.e., 348 tornadoes over a 55.33-year period of record), an average individual tornado area of 0.197 sq mi (i.e., an average tornado path length of 3.3 mi and an average tornado path width of 105.3 yds), and a total area of 16,010 sq mi for the 2-degree square under consideration, the tornado strike probability (P_S) for the VEGP site area is estimated to be about 774×10^{-7} (about 0.0000774 per year), or a recurrence interval of once every 12,920 years.

WASH-1300 indicates that determination of the DBT characteristics is based on the premise that the probability of occurrence of a tornado that exceeds the DBT should be on the order of 10^{-7} per year per nuclear power plant. DG-1143 retains that threshold criterion.

The estimated recurrence interval for the VEGP site area exceeds this threshold; therefore, it is necessary to determine the DBT parameters listed at the beginning of this section. These parameters are able to be calculated from the area-specific database used to determine P_S. However, DG-1143 also provides DBT characteristics for three tornado intensity regions, each with a 10^{-7} probability of occurrence, that are acceptable to the agency.

As indicated in DG-1143, Figure 1, the VEGP site is adjacent to Tornado Intensity Regions I and II. The more conservative DBT parameters for Region I will be used for the design of structures, systems, and components that are important to safety that must take DBT characteristics into account. DG-1143, Table 1, provides the following DBT parameter values for Tornado Intensity Region I:

- Maximum wind speed = 300 mph
- Translational speed = 60 mph
- Maximum rotational wind speed = 240 mph
- Radius of maximum rotational speed = 150 ft
- Pressure drop = 2.0 psi
- Rate of pressure drop = 1.2 psi/sec

2.7.3.4 Hail, Snowstorms, and Ice Storms

Frozen precipitation typically occurs in the form of hail, snow, sleet, and freezing rain. The frequency of occurrence of these types of weather events in the VEGP site area is based on the latest version of *The Climate Atlas of the United States* **(NCDC 2002b)**, which has been developed from observations made over the 30-year period of record from 1961 to 1990.

Though hail can occur at any time of the year and is associated with well-developed thunderstorms, it has been observed primarily during the spring and early summer months and least often during the late summer and autumn months. The Climate Atlas indicates that Burke County, Georgia, and adjacent Barnwell County, South Carolina, can expect, on average, hail with diameters 0.75 in. or greater about 1 day per year. The occurrence of hailstorms with hail greater than or equal to 1.0 in. in diameter averages less than 1 day per year in Burke County.

However, the annual mean number of days with hail 0.75 in. or greater is slightly higher in nearby Richmond and Columbia Counties, Georgia (just to the northwest of the VEGP site), and in Aiken and Edgefield Counties, South Carolina (just to the north and north-northwest of the VEGP site), ranging from 1 to 2 days per year with hail 0.75 in. diameter or greater, and up to 1 day per year with hail 1.0 in. diameter or greater.

NCDC cautions that hailstorm events are point observations and somewhat dependent on population density. While no hailstorms of note have been recorded in some years, multiple events have been observed in other years, including 16 events on 9 separate dates in 1998 and 8 events on 8 separate dates during 1999 in Aiken County, and 8 events on 6 separate dates during 1998 in Richmond County **(NCDC 2006b)**. Therefore, the slightly higher annual mean number of hail days may be a more representative indicator of frequency for the relatively less-populated VEGP site area.

Despite these long-term statistics, golfball-size hail (about 1.75 in. in diameter) is not a rare occurrence **(NCDC 2004, 2006b)**. However, in terms of extreme hailstorm events, the NCDC publication *Storm Data* indicates that baseball size hail (about 2.75 in. in diameter) was observed at one location in the general VEGP site area **(NCDC 2004)** on May 21, 1964, at Hampton, South Carolina, about 43 mi southeast of the VEGP site.

Snow is infrequent in the Upper Coastal Plain of Georgia and South Carolina, where the VEGP site is located, but can occur when a source of moist air from the Atlantic Ocean or the Gulf of Mexico interacts with a very cold air mass that penetrates across the otherwise protective Appalachian mountain range in northern Georgia and northwestern South Carolina. The Climate Atlas **(NCDC 2002b)** indicates that the occurrence of snowfalls 1 in. or greater in the VEGP site area averages less than 1 day per year.

Heavy snow is a rarity. The greatest snowfall on record in the VEGP site area occurred between February 9 and 11, 1973, depending on the cooperative observing station records. Snowfall totals for the overall event typically ranged between 14 and 22 in., the highest single-day total recorded at the Bamberg Station (19.0 in.) which contributed to the highest cumulative monthly total for that station and for the site area. Single-day and cumulative monthly record snowfall totals were also set at nearly all of the other nearby cooperative observing stations as a result of this event. Additional details are given in Section 2.7.4.1.3 and Table 2.7-5.

Depending on the temperature characteristics of the air mass, snow events are often accompanied by or alternate between sleet and freezing rain as the weather system traverses the VEGP region. The Climate Atlas **(NCDC 2002b)** indicates that, on average, freezing precipitation occurs only about 1 or 2 days per year at the VEGP site.

However, the site area appears to be in a transition zone for frequency of occurrence, with the eastern two-thirds of Aiken and Barnwell Counties and all of Allendale County (immediately to the northeast, east, and southeast in South Carolina), and the northeastern quadrant of Screven County, Georgia (just to the southeast of the VEGP site in northeastern Burke County), showing an average frequency of 3 to 5 days of freezing precipitation per year **(NCDC 2002b)**. So, it is not unreasonable to expect a slightly higher annual frequency of occurrence of freezing precipitation events at the VEGP site.

Storm event records from the winters of 2000 through 2005 for the seven-county area surrounding the VEGP site note that ice accumulations of up to 1 in. have occurred, although it is typically less than this thickness **(NCDC 2006b)**.

2.7.3.5 Tropical Cyclones

Tropical cyclones include not only hurricanes and tropical storms, but systems classified as tropical depressions, sub-tropical depressions, and extra-tropical storms, among others. This characterization considers all "tropical cyclones" (rather than systems classified only as hurricanes and tropical storms) because storm classifications are generally downgraded once landfall occurs and the system weakens, although they may still result in significant rainfall events as they travel through the site region.

NOAA's Coastal Services Center (NOAA-CSC) provides a comprehensive historical database, extending from 1851 through 2004, of tropical cyclone tracks based on information compiled by the National Hurricane Center. This database indicates that a total of 102 tropical cyclone centers or storm tracks have passed within a 100-nautical-mile radius of the VEGP site during this historical period **(NOAA-CSC 2005)**. Storm classifications and respective frequencies of occurrence over this 154-year period of record are as follows:

- Hurricanes – Category 3 (5), Category 2 (4), Category 1 (16)
- Tropical storms — 46
- Tropical depressions — 23
- Sub-tropical storms — 1
- Sub-tropical depressions — 2
- Extra-tropical storms — 5

Tropical cyclones within this 100-nautical-mile radius have occurred as early as May and as late as November, with the highest frequency (36 out of 102 events) recorded during September, including all classifications except sub-tropical depressions. August and October account for 21

and 20 events, respectively, indicating that 75 percent of the tropical cyclones that affect the VEGP site area occur from mid-summer to early autumn. Three of the five Category 3 hurricanes have occurred during September, and the other two occurred in August.

Tropical cyclones are responsible for at least 12 separate rainfall records at 8 NWS cooperative observer network stations in the VEGP site area – eight 24-hour (daily) rainfall totals and 3 monthly rainfall totals (see Section 2.7.4.1.3 and Table 2.7-5). In October 1990, rainfall associated with Tropical Depression Marco (along with a slow-moving cold frontal system) resulted in historical daily maximum totals of 8.60 in. at the Louisville 1E Station, 8.19 in. at the Midville Experiment Station, and 5.50 in. at the Newington 2NE Station, all located in Georgia. Two daily records were established due to Hurricane Gracie in September 1959, at the Blackville 3W (7.53 in.) and Springfield (7.10 in.) stations in South Carolina. In August 1964, a 24-hour rainfall total of 8.02 in. was recorded at the Millen 4N Station (in Georgia) due to Tropical Storm Cleo, and in September 2000, Tropical Depression Helene produced 8.02 in. of rain in a 24-hour period at the Bamberg, South Carolina, observing station. A daily maximum total of 7.30 in. was measured at the Augusta Weather Service Office (WSO) (also in Georgia) in September 1998 during the passage of Tropical Storm Earl. **(NCDC 2004, 2006b; SERCC 2006)**

Monthly station records were established due to contributions from the following tropical cyclones: Tropical Depression Marco in October 1990 (14.82 in. at Augusta WSO and 14.67 in. at Blackville 3W), and Tropical Storm Cleo in August 1964 (13.45 in. at Millen 4N); and to some extent, Tropical Depression Jerry in August 1995 (15.26 in. at Bamberg). **(NCDC 2002c, 2004, 2006b)**

2.7.4 Local Meteorology

Data acquired by the NWS at its Augusta, Georgia (Bush Field), first-order station and from nine other nearby locations in its network of cooperative observer stations, as compiled and summarized by the NCDC, are used to characterize normals, means, and extremes of temperature, rainfall, and snowfall in the vicinity of the VEGP site. Section 2.7.1.1 identifies the sources of these climatological summaries and data resources. The approximate distances and directions of these climatological observing stations relative to the VEGP site are listed in Table 2.7-1; their locations are shown in Figure 2.7-1.

As indicated in Section 2.7.1.1, first-order NWS stations also record measurements, typically on an hourly basis, of other weather elements, including winds, relative humidity, dew point and wet-bulb temperatures, barometric pressure, and other observations (e.g., fog, thunderstorms).

Besides using data from these nearby climatological observing stations, measurements from the tower-mounted meteorological monitoring system that supports operation of the two existing VEGP units are also used to characterize local meteorological conditions. The onsite primary meteorological tower is about 1 mi south-southwest of the VEGP Unit 1 and Unit 2 Containment Buildings (see Figure 3.1-3) and about 0.9 mi south of the proposed VEGP Units 3 and 4. Consequently, based on this proximity, the meteorological parameters related to dispersion (i.e., wind speed, wind direction, and atmospheric stability) collected at the primary tower are also representative of dispersion conditions for the VEGP site.

2.7.4.1 Normal, Mean, and Extreme Values

Section 2.7.1.3 summarizes normals, and period-of-record means and extremes for several standard weather elements (i.e., temperature, atmospheric water vapor, precipitation, and wind conditions).

To substantiate that mean and extreme values at these stations, based on their long-term records of observations, are representative of conditions that might be expected at the VEGP site, this section provides additional details regarding the individual station records from which the values presented in Section 2.7.1.3 were obtained.

Historical extremes of temperature, rainfall, and snowfall are listed in Table 2.7-5 for the ten NWS and cooperative observing stations in the VEGP site area.

2.7.4.1.1 Temperature

Characteristics of the normal daily maximum and minimum temperatures, the daily mean temperatures, and the diurnal temperature ranges for the ten nearby climatological observing stations are discussed in Section 2.7.1.3.1 and in Table 2.7-3. The overall maximum and minimum temperature extremes observed in the VEGP site area are summarized in Section 2.7.1.3.1 as well.

Extreme maximum temperatures recorded in the vicinity of the VEGP site have ranged from 105°F to 112°F, with the highest reading observed at the Louisville 1E Station on July 24, 1952. The station record high temperature for the Midville Experiment Station (i.e., 105°F) has been reached on four separate occasions. As Table 2.7-5 shows, individual station extreme maximum temperature records were set at multiple locations on the same or adjacent dates (i.e., Waynesboro 2NE, Louisville 1E, and Millen 4N; Augusta, Midville Experiment Station, and Aiken 4NE; and Waynesboro 2NE, Midville Experiment Station, and Newington 2NE). **(NCDC 2005b; SERCC 2006)**

Extreme minimum temperatures in the vicinity of the VEGP site have ranged from 2°F to -4°F, with the lowest reading on record observed at the Aiken 4NE Station on January 21, 1985, the same date on which the record low temperature was set at the nine other nearby stations **(NCDC 2005b; SERCC 2006)**.

The extreme maximum and minimum temperature data indicate that synoptic-scale conditions responsible for periods of record-setting excessive heat as well as significant cold air outbreaks tend to affect the overall VEGP site area. The similarity of the respective extremes suggests that these statistics are reasonably representative of the temperature extremes that might be expected to be observed at the VEGP site.

Long-term, engineering-related climatological data summaries prepared by the AFCCC and the NCDC for the nearby Augusta NWS Station **(AFCCC-NCDC 1999)** are used to characterize typical design basis dry-bulb (DB) temperatures. These characteristics include:

- Maximum ambient threshold DB temperatures at annual exceedance probabilities of 2.0 and 0.4 percent, along with mean coincident wet-bulb (MCWB) temperatures at those values.
- Minimum ambient threshold DB temperatures at annual exceedance probabilities of 1.0 and 0.4 percent.

Based on the 24-year period of record from 1973 to 1996 for Augusta, Georgia, the maximum DB temperature with a 2.0 percent annual exceedance probability is 92°F, with a MCWB temperature of 75°F. The maximum DB temperature with a 0.4 percent annual exceedance probability is 97°F, with a corresponding MCWB temperature value of 76°F. **(AFCCC-NCDC 1999)**

For the same period of record, the minimum DB temperatures with 1.0 and 0.4 percent annual exceedance probabilities are 25°F and 21°F, respectively.

2.7.4.1.2 Atmospheric Moisture Content

Annual, seasonal, and monthly characteristics of the wet-bulb and dew point temperatures, along with relative humidity (including diurnal variations), based on measurements at the Augusta NWS Station, are discussed in Section 2.7.1.3.2.

Long-term, engineering-related climatological data summaries for the nearby Augusta NWS Station also indicate that a typical design basis ambient wet-bulb temperature with a 0.4 percent annual exceedance probability is 79°F **(AFCCC-NCDC 1999)**.

2.7.4.1.3 Precipitation

Characteristics of the normal annual rainfall and snowfall totals for the ten nearby climatological observing stations are discussed in Section 2.7.1.3.3 and are presented in Table 2.7-3. The overall maximum daily and monthly totals observed in the VEGP site area for these forms of precipitation are summarized in Section 2.7.1.3.3 as well.

Because precipitation is a point measurement, mean and extreme statistics, such as individual storm event, or daily or cumulative monthly totals typically vary from station to station. Assessing the variability of precipitation extremes over the VEGP site area, in an effort to evaluate whether the available long-term data are representative of conditions at the site, is largely dependent on station coverage.

Historical precipitation extremes (rainfall and snowfall) are presented in Table 2.7-5 for the ten nearby climatological observing stations listed in Table 2.7-1. Based on the similarity of the maximum recorded 24-hour and monthly totals among these stations and the areal distribution of these stations around the VEGP site, the data suggest that these statistics are reasonably representative of precipitation extremes that might be expected to be observed at the site.

As indicated in Section 2.7.3.5, most of the individual station 24-hour rainfall records (and to a lesser extent the monthly record totals) were established as a result of precipitation associated with tropical cyclones that passed within a 100-nautical-mile radius of the VEGP site.

However, the overall highest 24-hour rainfall total in the vicinity of the VEGP site — 9.68 in. on April 16, 1969, at the Aiken 4NE Station in South Carolina **(NCDC 2005b)** — was not associated with a low-pressure system or other well-defined synoptic-scale feature. Rather, this appears to have been an embedded, localized event in an otherwise widespread area of disturbed weather that brought precipitation to the entire East Coast **(ESSA 1969)**.

Similarly, the overall highest monthly rainfall total recorded in the vicinity of the VEGP site — 17.32 in. during June 1973 at the cooperative observing station in Springfield, South Carolina **(SERCC 2006; NCDC 2002c)** — represents the accumulation of 21 days of measurable precipitation during that month **(NCDC 2002c)** due to both synoptic-scale weather features (e.g., stationary frontal boundaries and stalled low-pressure areas off the Carolina coast) and more regional- to local-scale events (e.g., thunderstorms).

For the most part, when daily or monthly rainfall records were established at a given station, regardless of their cause(s), significant amounts of precipitation were usually measured at the other stations in the VEGP site area **(NCDC 2002c)**.

Although the disruptive effects of any winter storm accompanied by frozen precipitation can be significant in the Upper Coastal Plain of Georgia and South Carolina, storms that produce large measurable amounts of snow occur infrequently. With one exception, all of the 24-hour and monthly record snowfall totals listed in Table 2.7-5 were established during the storm of early February 1973, the highest 24-hour and monthly totals (19.0 and 22.0 in., respectively) being recorded at the Bamberg Station in South Carolina. Similar amounts, ranging from 14.0 to 17.0 in., were recorded at most of the other stations. **(NCDC 2005b; SERCC 2006)**

The stations with lower maximum 24-hour snowfall totals — 8.0 in. at the Augusta WSO on February 9 and 5.0 in. at Newington 2NE on February 10 (both in Georgia) **(NCDC 2005b; SERCC 2006)**, and 8.0 in. at Springfield, South Carolina, on February 11 **(SERCC 2006; NCDC 2002c)** — recorded a comparable amount of snowfall on the preceding or following day, making the 2-day totals for these stations similar to the single-day records at the other stations (except at the Newington 2NE Station, the lowest of all the station records).

The record monthly snowfall total at the Millen 4N Station (15.0 in. in February 1968) represents the cumulative amount from two smaller snow events that occurred around February 8 and from February 22 to 24. A review of the daily records for the other stations indicates that except for the Augusta (Georgia) and Blackville 3W (South Carolina) stations, the data are missing for these time periods. **(NCDC 2002c)**

2.7.4.1.4 Fog

The closest station to the VEGP site at which observations of fog are made and routinely recorded is the Augusta NWS Station about 20 mi to the northwest. The 2004 LCD summary for this station (Table 2.7-2) indicates an average of 35.1 days per year of heavy fog conditions, based on a 54-year period of record. The NWS defines heavy fog as fog that reduces visibility to 1/4 mi or less.

The frequency of fog conditions at the VEGP site would be expected to be similar to that of Augusta because of their proximity to one another and because of the similarity of topographic features at both locations (i.e., gently rolling terrain, adjacent to the Savannah River, and location within that broad river valley).

2.7.4.2 Average Wind Direction and Wind Speed Conditions

The distribution of wind direction and wind speed is an important consideration when characterizing the dispersion climatology of a site. Long-term average wind motions at the macro- and synoptic scales (i.e., on the order of several thousand down to several hundred kilometers) are influenced by the general circulation patterns of the atmosphere at the macro-

scale and by large-scale topographic features (e.g., mountain ranges, land-water interfaces such as coastal areas). These characteristics are addressed in Section 2.7.1.2.

Site-specific or micro-scale (i.e., on the order of 2 km or less) wind conditions, while reflecting these larger-scale circulation effects, are influenced primarily by local and, to a lesser extent (generally), by meso- or regional-scale (i.e., up to about 200 km) topographic features. Wind measurements at these smaller scales are available from the existing meteorological monitoring program at the VEGP site and from data recorded at the nearby Augusta NWS Station.

Section 6.4 provides a summary description of the onsite meteorological monitoring program at the VEGP site. In its current configuration, wind direction and wind speed measurements are made at two levels on an instrumented 60-m tower (i.e., the lower level at 10 m and the upper level at 60 m).

Figures 2.7-2 through 2.7-6 present annual and seasonal wind rose plots (i.e., graphical distributions of the direction from which the wind is blowing and wind speeds for each of sixteen, 22.5-degree compass sectors centered on north, north-northeast, northeast, etc.) for the 10-m level based on measurements at the VEGP site over the composite 5-year period from 1998 through 2002.

For the VEGP site, the wind direction distribution at the 10-m level generally follows a southwest-northeast orientation on an annual basis (see Figure 2.7-2). The prevailing wind (i.e., defined as the direction from which the wind blows most often) is from the southwest, with nearly 25 percent of the winds blowing from the southwest through west sectors. Conversely, winds from the northeast through east sectors occur about 20 percent of the time. On a seasonal basis, winds from the southwest quadrant predominate during the spring and summer months (see Figures 2.7-4 and 2.7-5). This is also the case during the winter, although westerly winds prevail and the relative frequency of west-northwest winds during this season is greater (see Figure 2.7-3) due to increased cold frontal passages. Winds from the northeast quadrant predominate during the autumn months (see Figure 2.7-6). Plots of individual monthly wind roses at the 10-m measurement level are presented in Figure 2.7-7 (Sheets 1 to 12).

Wind rose plots based on measurements at the 60-m level are shown in Figures 2.7-8 through 2.7-13. By comparison, wind direction distributions for the 60-m level are fairly similar to the 10-m level wind roses on a composite annual (see Figure 2.7-8) and seasonal basis (see Figures 2.7-9 through 2.7-12). Plots of individual monthly wind roses at the 60-m measurement level are presented in Figure 2.7-13 (Sheets 1 to 12).

Wind information summarized in the LCD for the Augusta NWS Station (see Table 2.7-2) indicates a prevailing west-southwesterly wind direction **(NCDC 2005a)** that appears to be

similar to the 10-m level wind flow at the VEGP site, at least on an annual basis (see Figure 2.7-2).

Table 2.7-6 summarizes seasonal and annual mean wind speeds based on measurements from the upper and lower levels of the existing VEGP site meteorological tower (1998–2002) and from wind instrumentation at the Augusta NWS Station (1971–2000 station normals) **(NCDC 2005a)**. The elevation of the wind instruments at the Augusta NWS Station is nominally 20 ft (about 6.1 m) **(NCDC 2005a)**, comparable to the lower (10-m) level measurements at the VEGP site.

On an annual basis, mean wind speeds at the 10- and 60-m levels are 2.5 m/sec and 4.6 m/sec, respectively, at the VEGP site. The annual mean wind speed at Augusta (i.e., 2.7 m/sec) is similar to the 10-m level at the VEGP site, differing by only 0.2 m/sec; seasonal average wind speeds at Augusta are likewise slightly higher. Seasonal mean wind speeds for both measurement levels at the VEGP site follow the same pattern discussed in Section 2.7.2.3 for Augusta and Athens, Georgia, and their relationship to the seasonal variation of relatively higher air stagnation and restrictive dispersion conditions in the site region.

Based on the joint frequency distributions of wind speed and wind direction by atmospheric stability class (see Section 2.7.4.4.), the annual frequencies of calm wind conditions are 0.35 and 0.05 percent of the time for the 10- and 60-m tower levels, respectively, at the VEGP site.

2.7.4.3 Wind Direction Persistence

Wind direction persistence is a relative indicator of the duration of atmospheric transport from a specific sector-width to a corresponding downwind sector-width that is 180 degrees opposite. Atmospheric dilution is directly proportional to the wind speed (other factors remaining constant). When combined with wind speed, a wind direction persistence/wind speed distribution further indicates the downwind sectors with relatively more or less dilution potential (i.e., higher or lower wind speeds, respectively) associated with a given transport wind direction.

Tables 2.7-7 and 2.7-8 present wind direction persistence/wind speed distributions based on measurements at the VEGP site for the 5-year period of record from 1998 through 2002. The distributions account for durations ranging from 1 to 48 hours for wind directions from 22.5-degree and 67.5-degree upwind sectors centered on each of the 16 standard compass radials (i.e., north, north-northeast, northeast, etc.). Further, the distributions are provided for wind measurements made at the lower (10-m) and the upper (60-m) tower levels, respectively.

2.7.4.4 Atmospheric Stability

Atmospheric stability is a relative indicator for the potential diffusion of pollutants released into the ambient air. Atmospheric stability, as discussed in this ER, is determined by the delta-temperature ($\Delta\mathbf{T}$) method as defined in Table 1 of Proposed Revision 1 to Regulatory Guide 1.23, *Meteorological Programs in Support of Nuclear Power Plants*, September 1980 (RG 1.23).

The approach classifies stability based on the temperature change with height (i.e., the difference in °C per 100 m). Stability classifications are assigned according to the following criteria:

- Extremely Unstable (Class A) — $\Delta\mathbf{T}/\Delta\mathbf{Z} \leq -1.9$°C
- Moderately Unstable (Class B) — -1.9°C $< \Delta\mathbf{T}/\Delta\mathbf{Z} \leq -1.7$°C
- Slightly Unstable (Class C) — -1.7°C $< \Delta\mathbf{T}/\Delta\mathbf{Z} \leq -1.5$°C
- Neutral Stability (Class D) — -1.5°C $< \Delta\mathbf{T}/\Delta\mathbf{Z} \leq -0.5$°C
- Slightly Stable (Class E) — -0.5°C $< \Delta\mathbf{T}/\Delta\mathbf{Z} \leq +1.5$°C
- Moderately Stable (Class F) — $+1.5$°C $< \Delta\mathbf{T}/\Delta\mathbf{Z} \leq +4.0$°C
- Extremely Stable (Class G) — $+4.0$°C $< \Delta\mathbf{T}/\Delta\mathbf{Z}$

The diffusion capacity is greatest for extremely unstable conditions and decreases progressively through the remaining unstable, neutral stability, and stable classifications.

During the 1998 through 2002 time period at the VEGP site, $\Delta\mathbf{T}$ was determined from the difference between temperature measurements made at the 10- and 60-m tower levels. Seasonal and annual frequencies of atmospheric stability class and associated 10-m level mean wind speeds for this period of record are presented in Table 2.7-9.

The data indicate a predominance of slightly stable (Class E) and neutral stability (Class D) conditions, ranging from about 50 to 60 percent of the time on a seasonal and annual basis. Extremely unstable conditions (Class A) are more frequent during the spring and summer months due to greater solar insolation. Extremely stable conditions (Class G) are most frequent during the fall and winter months, owing in part to increased radiational cooling at night.

Joint frequency distributions (JFDs) of wind speed and wind direction by atmospheric stability class and for all stability classes combined for the 10-m and 60-m wind measurement levels at the VEGP site are presented in Table 2.7-10 and Table 2.7-11, respectively, for the 5-year period of record from 1998 through 2002. The 10-m level JFDs are used to evaluate short-term

dispersion estimates for accidental atmospheric releases (see Section 2.7.5) and long-term diffusion estimates of routine releases (see Section 2.7.6).

2.7.4.5 Topographic Description and Potential Modifications

The VEGP site (approximately 3,169 acres) is located in Burke County, Georgia, along (west of) the Savannah River. Topographic features within a 5-mi radius of the VEGP site are shown in Figure 2.7-14. Terrain elevation profiles along each of the 16 standard 22.5-degree compass radials out to a distance of 50 mi from the VEGP site are illustrated in Figure 2.7-15 (Sheets 1 through 4).

These profiles indicate that the terrain in the VEGP site area is flat to gently rolling. The only other nearby topographic feature of note is the Savannah River, located adjacent to the VEGP site; the broad river valley represents a depression running northwest to southeast.

The site for proposed VEGP Units 3 and 4 is immediately west of existing VEGP Units 1 and 2 (see Figure 3.1-3). During construction of the new units, a portion of the currently undeveloped area of the VEGP site would be cleared of existing vegetation and subsequently graded to accommodate VEGP Units 3 and 4 and their ancillary structures.

Consequently, terrain modifications would be expected to be minimal, limited to the proposed site for VEGP Units 3 and 4 and the immediately surrounding area, and not represent a significant alteration to the flat to gently rolling topographic character of the area and region around the site.

2.7.5 Short-Term Diffusion Estimates

2.7.5.1 Basis

To evaluate potential health effects for Westinghouse AP1000 design-basis accidents, Section 7.1 of NUREG-1555, *Environmental Standard Review Plan, Standard Review Plans for Environmental Reviews for Nuclear Power Plants*, October 1999 (NUREG-1555), specifically requires the applicant to account for the 50-percentile χ/Q values at appropriate distances from the release points of effluents to the atmosphere. These 50-percentile χ/Q values are determined using onsite meteorological data, and they represent more realistic dispersion conditions for the VEGP site vicinity and area than those assumed in the safety evaluation of SSAR Section 2.3.4. The NRC-sponsored PAVAN model (NUREG/CR-2858, *PAVAN: An Atmospheric Dispersion Program for Evaluating Design Basis Accidental Releases of Radioactive Materials from Nuclear Power Stations*, PNL-4413, November 1982 [NUREG/CR-2858]) has been used to generate these overall site 50-percentile χ/Q values.

Recent, readily-available site data (1998–2002) have been used for a quantitative evaluation of the hypothetical accident at the proposed VEGP site. The use of a recent 5-year data set for dispersion analyses involving accidental releases in this ESP application satisfies the requirement of Regulatory Guide 4.7, *General Site Suitability Criteria for Nuclear Power Stations*, Revision 2, April 1998 (RG 4.7). These 5-year composite joint frequency distributions of wind direction, wind speed, and atmospheric stability recorded at the VEGP site are presented in Table 2.7-10.

The PAVAN program implements the guidance provided in Regulatory Guide 1.145, *Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants*, Revision 1, November 1982 (Re-issued February 1983) (RG 1.145). Mainly, the code computes χ/Q values at the Exclusion Area Boundary (EAB) and Low Population Zone (LPZ) for each combination of wind speed and atmospheric stability class for each of 16 downwind direction sectors (i.e., north, north-northeast, northeast, etc.). The χ/Q values calculated for each direction sector are then ranked in descending order, and an associated cumulative frequency distribution is derived based on the frequency distribution of wind speeds and stabilities for the complementary upwind direction sector. The χ/Q values are also ranked independently of wind direction into a cumulative frequency distribution for the entire site.

Compared to an elevated release, a ground-level release usually results in higher ground-level concentrations at downwind receptors due to less dilution from shorter traveling distances. Since the ground-level release scenario provides a bounding case, elevated releases are not considered in this ESP application.

As shown in Figure 3.1-3, the EAB for VEGP Units 3 and 4 is entirely contained within the site property line. This is the same as the exclusion area for the existing VEGP units. For the purposes of determining χ/Qs and subsequent radiation dose analyses, an effective EAB, hereafter referred to as the Dose Calculation EAB, was developed for the proposed units. The AP1000 units will be located within the power block area, shown in Figure 3.1-3, which is the perimeter of a 775-ft-radius circle with the centroid at a point between the two AP1000 units. The Dose Calculation EAB is a circle that extends 1/2 mi beyond the power block area (i.e., a circle with a 3,415-ft radius with its centroid at the centroid of the power block circle). The Dose Calculation EAB is completely within the actual plant EAB and, thus, the χ/Qs and the subsequent radiation doses are conservatively higher.

The PAVAN model has been configured to calculate offsite χ/Q values assuming both wake-credit allowed and wake-credit not allowed. No residential areas are located within the Dose Calculation EAB. The AP1000 design **(Westinghouse 2005)** indicates that the highest structure (i.e., the Reactor Building) will be about 234 ft above grade level. Therefore, the closest point on the Dose Calculation EAB is more than 10 building heights (or, 2,340 ft) away

from the boundary of the plant envelope developed for the VEGP site. As a result, the entire Dose Calculation EAB is located beyond the wake influence zone induced by the Reactor Building. The LPZ is a 2-mi-radius (3,218 m) circle centered at the midpoint of the existing VEGP reactors. Because it is located beyond the Dose Calculation EAB, the "wake-credit not allowed" scenario of the PAVAN results has been used for the χ/Q analyses at both the Dose Calculation EAB and the LPZ.

To be conservative, the 1/2 mi (or approximately 800 m) distance between the VEGP Units 3 and 4 power block area circle and the Dose Calculation EAB has been entered as input for each downwind sector to calculate the χ/Q values at the Dose Calculation EAB. Similarly, the shortest distance from the power block area circle to the LPZ has been input for all direction sectors to calculate the χ/Q values at the LPZ. The shortest distance from the center-point of the existing units is to the western perimeter of the power block area, which is about 914 m. Therefore, the minimum distance from the power block area circle to the LPZ is about 2,304 m (or about 1.4 mi).

2.7.5.2 PAVAN Modeling Results

Based on the upper envelope of the ordered 5-percent overall site limit χ/Q values as calculated by the PAVAN model (see Tables 2.7-12 and 2.7-13), the 50-percentile overall site (i.e., non-direction specific) χ/Qs at the Dose Calculation EAB and the LPZ are estimated to be 7.38×10^{-5} sec/m^3 and 1.83×10^{-5} sec/m^3, respectively. These model-predicted χ/Q values represent a 0- to 2-hour time interval with no credit for building wake effects as indicated in the preceding section.

To estimate χ/Qs for longer time intervals, the program calculates an annual average χ/Q value using the procedure described in Regulatory Guide 1.111, *Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors*, Revision 1, July 1977 (RG 1.111). The values for intermediate time periods (i.e., 8 hours, 16 hours, 72 hours, and 624 hours) were determined by logarithmic interpolation between the 50-percentile, 0- to 2-hour χ/Qs at the Dose Calculation EAB and the LPZ and the corresponding annual average χ/Qs. These results, along with the 50-percentile, 0- to 2-hour and the annual average χ/Q values, are summarized below.

Summary of Interpolated χ/Q Values for Intermediate Time Periods

Source Location	Receptor Distance	50-Percentile 0-2 hr	0-8 hours (8 hours)	8-24 hour (16 hours)	1-4 days (72 hours)	4-30 days (624 hours)	Annual Average
PBAC[a]	Dose Calculation	**7.38E-05**	**6.59E-05**	**6.23E-05**	**5.52E-05**	**4.63E-05**	**3.74E-05**

	EAB						
PBAC[a]	LPZ	**1.83E-05**	**1.40E-05**	**1.22E-05**	**9.15E-06**	**6.04E-06**	**3.63E-06**

Note:
a - PBAC = Power Block Area Circle

2.7.6 Long-Term (Routine) Diffusion Estimates

2.7.6.1 Basis

The NRC-sponsored computer program XOQDOQ (NUREG/CR-2919, *XOQDOQ: Computer Program for the Meteorological Evaluation of Routine Effluent Releases at Nuclear Power Stations*, PNL-4380, September 1982 [NUREG/CR-2919]), was used to estimate χ/Q values due to routine releases of gaseous effluents to the atmosphere. The XOQDOQ model implements the assumptions outlined in RG 1.111. The XOQDOQ model assumes a straight-line trajectory between the release point and all receptors.

The primary function of the XOQDOQ computer code is to calculate annual χ/Q values and annual average relative deposition (D/Q) values at receptors of interest (e.g., the Dose Calculation EAB and the LPZ boundaries, the nearest milk cow, residence, garden, meat animal). The program assumes that the material released to the atmosphere follows a Gaussian distribution around the plume centerline. In estimating concentrations for longer time periods, the Gaussian distribution is assumed to be evenly distributed within a given directional sector.

The following input data and assumptions were used in the XOQDOQ modeling analysis:

- Meteorological data: 5-year (January 1, 1998 to December 31, 2000) composite onsite JFD of wind speed, wind direction, and atmospheric stability.
- Type of release: Ground-level.
- Wind sensor height: 10 m.
- Vertical temperature difference: 10m – 60 m.
- Number of wind speed categories: 11.
- Release height: 10 m (default height).
- Minimum building cross-sectional area: 2,926 sq m.
- Containment structure equivalent height: 65.6 m.

- Distances from the release point to the nearest site boundary, meat animal, residence, and vegetable garden (see Table 2.7-14).

The AP1000 reactor design has been used to calculate the minimum building cross-sectional area as called for in NUREG/CR-2919. The containment building minimum cross-sectional area contains two parts; the reactor enclosure building plus a Passive Cooling Containment System (PCS) water tank on the top of that structure. The height of the entire contiguous building is assumed to be 234.4 ft (71.4 m), while the bottom (W_B) and the top (W_T) widths of the building are 146.3 ft (44.6 m) and 89 ft (27.1 m), respectively. The height of the PCS is 39.1 ft (11.9 m).

The total calculated cross-sectional area of the structure (A_T) is 31,498 ft^2 (2,926 m^2). Using this total area, and dividing by the actual width of the bottom of the reactor enclosure building (i.e., 146.3 ft), the equivalent structural height is calculated ($H_e = A_T / W_B$) to be 215.2 ft (65.6 m), which assumes that the structure width is uniform in the vertical direction. Since all receptors are located beyond the wake influence zone (see Section 2.7.5.1), the building height has no effect on the modeling results.

When compared to elevated releases, ground-level releases usually produce higher pollutant concentrations for receptors located at ground level. Thus, only ground-level releases are conservatively assumed in the χ/Q analysis.

Distances from the midpoint between the VEGP Unit 1 and Unit 2 reactors to various receptors of interest (i.e., nearest residence, meat animal, site boundary, and vegetable garden) for each directional sector are provided in AREOR (2004). The distance to the nearest residence (0.67 mi) was conservatively used in all the directional sectors for all types of sensitive receptors (meat animal, vegetable garden, and residence). The results are presented in Table 2.7-14.

2.7.6.2 XOQDOQ Modeling Results

The overall maximum annual average χ/Q value (with no decay) is 5.5×10^{-6} sec/m^3 and occurs at the Dose Calculation EAB at a distance of 800 m (about 0.5 mi) to the northeast of the VEGP site. The maximum annual average χ/Q values (along with the direction and distance of the receptor locations relative to the VEGP site) for the other sensitive receptor types are:

- 3.4×10^{-6} sec/m^3 for the nearest residence occurring in the northeast sector at a distance of 1,071 m (0.67 mi).
- Because the same shortest distance (1,071 m) was used to estimate χ/Q values for the nearest vegetable garden and meat animal, the same χ/Q value (3.4×10^{-6} sec/m^3) was obtained at these receptors.

Table 2.7-15 summarizes the maximum χ/Q and D/Q values predicted by the XOQDOQ model for the sensitive receptors of interest due to routine releases. Table 2.7-16 summarizes the maximum annual average χ/Q and D/Q values at the 22 standard radial distances between 0.25 and 50 mi and for the model's 10 distance-segment boundaries between 0.5 and 50 mi downwind.

Detailed annual average χ/Q and D/Q estimates generated by the XOQDOQ model for the receptors of interest, and at distances between 0.25 and 50 mi, as well as for the standard distance-segment boundaries, are also presented. Table 2.7-17 presents χ/Q estimates at the specific points of interest. Tables 2.7-18 and 2.7-19 list χ/Q estimates with no radioactive decay and no plume depletion at downwind distances between 0.25 and 50 mi, and for the standard distance-segment boundaries, respectively. Tables 2.7-20 and 2.7-21 contain χ/Q estimates that include radioactive decay with a half-life of 2.26 days for short-lived noble gases and no plume depletion. Tables 2.7-22 and 2.7-23 contain χ/Q estimates that include radioactive decay with a half-life of 8 days for all iodines released to the atmosphere as well as plume depletion. Finally, Tables 2.7-24 and 2.7-25 contain estimates of long-term average D/Q values at downwind distances between 0.25 and 50 mi, as well as for the standard distance-segment boundaries, respectively.

2.7.7 Noise

Noise at VEGP comes from normal plant operations. Sources of noise at the VEGP site include the cooling towers, transformers and other electrical equipment, circulating water pumps, and public address system. These noise sources are sufficiently distant from the VEGP site boundary that the noise generated diminishes to near ambient levels before reaching receptors outside the VEGP site boundary. As shown in Table 2.7-26, background plus VEGP-generated noise levels predicted at seven locations along the VEGP site boundary range from 25 to 40 dBa, approximately within the range of the average measured background noise levels of 22 to 39 dBa **(GPC 1985)**.

Table 2.7-1 NWS and Cooperative Observing Stations Near the VEGP Site

Station [a]	State	County	Approximate Distance (miles)	Direction Relative to Site	Elevation (feet)
Waynesboro 2NE	GA	Burke	16	WSW	270
Augusta WSO (Bush Field)	GA	Richmond	20	NW	132
Millen 4N	GA	Jenkins	22	SSW	195
Midville Experiment Station	GA	Burke	32	SW	280
Louisville 1E	GA	Jefferson	37	WSW	322
Newington 2NE	GA	Screven	41	SSE	209
Aiken 4NE	SC	Aiken	25	NNE	502
Blackville 3W	SC	Barnwell	29	ENE	324
Springfield	SC	Orangeburg	37	NE	300
Bamberg	SC	Bamberg	44	ENE	165

Notes:

a - Numeric and letter designators following a station name (e.g., Waynesboro 2NE) indicate the station's approximate distance in miles (e.g., 2) and direction (e.g.., northeast) relative to the place name (e.g., Waynesboro).

Table 2.7-2 Local Climatological Data Summary for Augusta, Georgia

NORMALS, MEANS, AND EXTREMES

AUGUSTA, GA (AGS)

LATITUDE: 33° 22′ 11″ N LONGITUDE: 81° 57′ 53″ W ELEVATION (FT): GRND: 160 BARO: 163 TIME ZONE: EASTERN (UTC + 5) WBAN: 03820

	ELEMENT	POR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F	NORMAL DAILY MAXIMUM	30	56.5	61.3	69.2	76.7	83.9	89.6	92.0	90.2	85.3	76.5	67.8	59.1	75.7
	MEAN DAILY MAXIMUM	48	56.4	60.6	68.3	76.8	84.0	89.4	91.9	90.6	85.6	76.9	68.3	59.1	75.7
	HIGHEST DAILY MAXIMUM	54	82	86	89	96	99	105	107	108	101	97	90	82	108
	YEAR OF OCCURRENCE		2002	1962	1995	1986	2000	1952	1980	1983	1999	1954	1961	1998	AUG 1983
	MEAN OF EXTREME MAXS.	56	74.4	76.0	80.7	88.8	93.4	98.1	99.0	97.9	94.5	88.3	81.5	76.1	87.4
	NORMAL DAILY MINIMUM	30	33.1	35.5	42.5	48.1	57.2	65.4	69.6	68.4	62.4	49.6	40.9	34.7	50.6
	MEAN DAILY MINIMUM	48	32.7	34.7	40.4	48.9	58.0	66.0	70.1	69.1	63.3	50.7	41.5	34.3	50.8
	LOWEST DAILY MINIMUM	54	-1	0	0	26	35	47	55	52	36	22	15	5	-1
	YEAR OF OCCURRENCE		1985	1998	1998	1982	1971	1984	1951	2004	1967	1952	1970	1981	JAN 1985
	MEAN OF EXTREME MINS.	56	16.6	19.0	25.0	33.4	43.5	54.7	62.5	60.4	49.7	34.4	24.9	18.5	36.9
	NORMAL DRY BULB	30	44.8	48.4	55.9	62.4	70.5	77.5	80.8	79.3	73.8	63.1	54.4	46.9	63.1
	MEAN DRY BULB	56	45.2	48.4	55.3	63.0	71.2	77.9	81.0	80.1	74.6	64.1	54.5	46.9	63.5
	MEAN WET BULB	49	40.3	42.8	48.4	55.5	63.4	69.8	72.7	72.3	67.4	57.4	48.5	41.7	56.7
	MEAN DEW POINT	49	34.4	36.0	41.5	49.4	58.9	66.0	69.7	69.4	64.3	53.4	43.2	36.1	51.9
	NORMAL NO. DAYS WITH:														
	MAXIMUM ≥ 90°	30	0.0	0.0	0.0	0.6	5.9	16.0	23.5	19.4	9.4	0.6	0.0	0.0	75.4
	MAXIMUM ≤ 32°	30	0.4	0.2	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.7
	MINIMUM ≤ 32°	30	15.0	11.5	4.6	0.9	0.0	0.0	0.0	0.0	0.0	0.6	6.5	13.1	52.2
	MINIMUM ≤ 0°	30	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H/C	NORMAL HEATING DEG. DAYS	30	617	469	301	129	21	1	0	0	5	118	317	547	2525
	NORMAL COOLING DEG. DAYS	30	1	2	15	52	191	385	506	459	285	74	15	1	1986
RH	NORMAL (PERCENT)	30	70	67	66	66	70	72	74	77	77	75	74	72	72
	HOUR 01 LST	30	80	77	77	80	86	87	88	91	90	89	86	82	84
	HOUR 07 LST	30	84	84	85	86	87	87	89	92	92	91	89	85	88
	HOUR 13 LST	30	55	50	48	45	48	52	54	56	55	50	51	54	52
	HOUR 19 LST	30	68	61	57	55	60	63	67	72	77	78	74	71	67
S	PERCENT POSSIBLE SUNSHINE														
W/O	MEAN NO. DAYS WITH:														
	HEAVY FOG(VISBY≤1/4 MI)	54	3.5	2.7	2.1	2.5	2.5	1.4	1.6	3.1	3.8	3.9	4.0	4.0	35.1
	THUNDERSTORMS	54	0.9	1.8	2.7	3.6	6.0	9.4	11.9	9.3	3.4	1.3	0.8	0.7	51.8
CLOUDINESS	MEAN:														
	SUNRISE-SUNSET (OKTAS)	1			7.2		3.2	4.0	5.6	4.8		5.6		4.0	
	MIDNIGHT-MIDNIGHT (OKTAS)	1			6.4		4.0	4.0	4.8	4.0					
	MEAN NO. DAYS WITH:														
	CLEAR	1	2.0	2.0	9.0		14.0	7.0	2.0	6.0	3.0	7.0	5.0	10.0	
	PARTLY CLOUDY	1		2.0	1.0		2.0	8.0	2.0	2.0	2.0	4.0	1.0	1.0	
	CLOUDY	1	2.5	3.0	12.0		3.0	4.0		6.0	7.0	3.0	1.0	7.0	
PR	MEAN STATION PRESSURE(IN)	31	29.97	29.93	29.89	29.86	29.83	29.84	29.87	29.88	29.89	29.93	29.96	29.98	29.90
	MEAN SEA-LEVEL PRES. (IN)	47	30.14	30.09	30.04	30.02	30.00	29.99	30.03	30.01	30.04	30.08	30.11	30.15	30.06
WINDS	MEAN SPEED (MPH)	28	6.7	7.1	7.4	6.9	6.1	5.7	5.6	5.0	5.3	5.2	5.5	6.2	6.1
	PREVAIL.DIR(TENS OF DEGS)	29	27	29	29	18	14	14	24	14	04	04	29	29	24
	MAXIMUM 2-MINUTE:														
	SPEED (MPH)	10	40	37	40	37	49	45	36	38	36	38	38	35	49
	DIR. (TENS OF DEGS)		26	30	29	28	23	34	21	01	02	34	18	28	23
	YEAR OF OCCURRENCE		1997	2003	1999	2001	2004	1998	1995	2002	1997	1995	2001	2000	MAY 2004
	MAXIMUM 5-SECOND:														
	SPEED (MPH)	10	54	45	51	55	74	53	47	49	45	52	49	43	74
	DIR. (TENS OF DEGS)		25	31	29	34	23	33	21	01	01	33	03	28	23
	YEAR OF OCCURRENCE		1997	2003	1999	1997	2004	1998	1998	2002	1997	1995	1995	2000	MAY 2004
PRECIPITATION	NORMAL (IN)	30	4.50	4.11	4.61	2.94	3.07	4.19	4.07	4.48	3.59	3.20	2.68	3.14	44.58
	MAXIMUM MONTHLY (IN)	54	8.91	7.67	11.92	8.43	9.61	10.57	11.43	11.34	9.51	14.82	7.76	8.65	14.82
	YEAR OF OCCURRENCE		1987	1961	1980	1961	1979	2004	1967	1986	1975	1990	1985	1981	OCT 1990
	MINIMUM MONTHLY (IN)	54	0.75	0.69	0.88	0.60	0.36	0.68	1.02	0.65	0.31	T	0.09	0.32	T
	YEAR OF OCCURRENCE		1981	1968	1968	1970	2000	1984	1987	1980	1984	1953	1960	1955	OCT 1953
	MAXIMUM IN 24 HOURS (IN)	54	3.61	3.69	5.31	3.96	4.44	5.08	3.71	5.98	7.30	8.57	3.82	3.12	8.57
	YEAR OF OCCURRENCE		1960	1985	1967	1955	1981	1981	1979	1964	1998	1990	1985	1970	OCT 1990
	NORMAL NO. DAYS WITH:														
	PRECIPITATION ≥ 0.01	30	11.0	8.7	9.8	7.4	9.0	10.1	11.2	10.9	7.8	6.2	7.2	9.5	108.8
	PRECIPITATION ≥ 1.00	30	1.2	1.2	1.3	0.8	0.8	1.4	1.1	1.4	0.9	1.0	0.8	0.7	12.6
SNOWFALL	NORMAL (IN)	30	0.3	1.0	0.*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.4
	MAXIMUM MONTHLY (IN)	50	2.6	14.0	1.1	T	0.0	T	0.0	0.0	0.0	0.0	T	1.0	14.0
	YEAR OF OCCURRENCE		1992	1973	1980	1992		1994					1968	1993	FEB 1973
	MAXIMUM IN 24 HOURS (IN)	50	2.6	13.7	1.1	T	0.0	T	0.0	0.0	0.0	0.0	T	1.0	13.7
	YEAR OF OCCURRENCE		1992	1973	1980	1992		1994					1968	1993	FEB 1973
	MAXIMUM SNOW DEPTH (IN)	48	2	13	1	0	0	0	0	0	0	0	0	1	13
	YEAR OF OCCURRENCE		1988	1973	1980									1958	FEB 1973
	NORMAL NO. DAYS WITH:														
	SNOWFALL ≥ 1.0	30	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3

Source: NCDC 2005a

Table 2.7-3 Climatological Normals (Means) at Selected NWS and Cooperative Observing Stations in the VEGP Site Area

Station	Normal Annual Temperatures (^{O}F) [a]			Normal Annual Precipitation	
	Daily Maximum	Daily Minimum	Daily Mean	Rainfall [a] (inches)	Snowfall (inches)
Waynesboro 2NE	75.2	51.0	63.1	47.20	1.0 [b]
Augusta	75.7	50.6	63.2	44.58	1.4 [b]
Millen 4N	76.1	50.6	63.4	43.85	0.5 [c]
Midville Exp Station	76.9	52.9	65.0	44.90	0.1 [b]
Louisville 1E	75.6	51.7	63.7	45.92	0.9 [b]
Newington 2NE	76.2	52.5	64.4	47.81	0.8 [b]
Aiken 4NE	77.2	50.9	64.1	52.43	1.4 [b]
Blackville 3W	77.6	51.6	64.6	47.23	0.7 [b]
Springfield	NA [e]	NA [e]	NA [e]	46.28	0.7 [d]
Bamberg	75.0	53.1	64.1	48.57	1.3 [b]

Sources: a - NCDC 2002a
b - NCDC 2005b
c - SERCC 2006, based on available Period of Record (1930–1998)
d - SERCC 2006, based on available Period of Record (1948–2005)
e - NA = Measurements not made at this station

Table 2.7-4 Mean Seasonal and Annual Morning and Afternoon Mixing Heights and Wind Speeds for Athens, Georgia

Parameter	Winter	Spring	Summer	Autumn	Annual
Mixing Height – AM (m)	407	383	390	314	374
Wind Speed – AM (m/sec)	6.0	5.3	3.8	4.4	4.9
Mixing Height – PM (m)	1,042	1,754	1,918	1,455	1,542
Wind Speed – PM (m/sec)	7.0	7.2	4.9	5.7	6.2

Note: Mean wind speed values represent the arithmetic average of speeds observed at the surface and aloft within the mixed layer.

Source: Holzworth 1972

Table 2.7-5 Climatological Extremes at Selected NWS and Cooperative Observing Stations in the VEGP Site Area

Parameter	Waynesboro 2NE	Augusta WSO	Millen 4N	Midville Exp Station	Louisville 1E	Newington 2NE	Aiken 4NE	Blackville 3W	Springfield	Bamberg
Maximum Temperature	108 ^{O}F [a, b] (7/25/52); (7/14/80)	108 ^{O}F [a] (8/21/83)	109 ^{O}F [b] (7/24/52)	105 ^{O}F [a, b] (7/13/80); (8/21/83) (7/19/86); (7/21/86)	112 ^{O}F [a] (7/24/52)	110 ^{O}F [a] (7/13/80)	109 ^{O}F [a] (8/22/83)	108 ^{O}F [a] (8/1/99)	NA [d]	109 ^{O}F [a] (7/24/52)
Minimum Temperature	-1 ^{O}F [a, b] (1/20/85); (1/21/85)	-1 ^{O}F [a] (1/21/85)	0 ^{O}F [b] (1/21/85)	-1 ^{O}F [a] (1/21/85)	-2 ^{O}F [a] (1/21/85)	-1 ^{O}F [a] (1/21/85)	-4 ^{O}F [a] (1/21/85)	-1 ^{O}F [a] (1/21/85)	NA [d]	2 ^{O}F [a] (1/21/85)
Maximum 24-hr Rainfall	7.40 in. [a] (10/3/94)	7.30 in. [a] (9/3/98)	8.02 in. [b] (8/29/64)	8.19 in. [a] (10/12/90)	8.60 in. [a] (10/12/90)	5.50 in. [a] (10/10/90)	9.68 in. [a] (4/16/69)	7.53 in. [a] (9/30/59)	7.10 in. [b, c] (9/30/59)	8.02 in. [a, c] (9/23/00)
Maximum Monthly Rainfall	16.99 in. [a, b] (10/94)	14.82 in. [a, b] (10/90)	13.45 in. [b] (8/64)	15.97 in. [b, c] (8/70)	14.76 in. [b, c] (8/91)	15.29 in. [a, b] (7/89)	14.45 in. [a, b] (3/80)	14.67 in. [a, b] (10/90)	17.32 in. [b, c] (6/73)	15.26 in. [a, b] (8/95)
Maximum 24-hr Snowfall	16.0 in. [a, b] (2/10/73)	8.0 in. [a, b] (2/9/73)	14.0 in. [b] (2/10/73)	14.0 in. [b, c] (2/10/73)	14.8 in. [a, b] (2/10/73)	5.0 in. [a, b] (2/10/73)	15.0 in. [a, b] (2/10/73)	17.0 in. [b, c] (2/10/73)	8.0 in. [b, c] (2/11/73)	19.0 in. [a, b] (2/10/73)
Maximum Monthly Snowfall	16.0 in. [a, b] (2/73)	14.0 in. [a, b] (2/73)	15.0 in. [b] (2/68)	14.0 in. [b, c] (2/73)	14.8 in. [a, b] (2/73)	8.0 in. [a, b] (2/73)	15.0 in. [a, b] (2/73)	17.0 in. [b, c] (2/73)	15.0 in. [b, c] (2/73)	22.0 in. [a, b] (2/73)

Sources: a - NCDC 2005b
b - SERCC 2006
c - NCDC 2002c
d - NA = Measurements not made at this station

Table 2.7-6 Seasonal and Annual Mean Wind Speeds for the VEGP Site (1998–2002) and the Augusta, Georgia NWS Station (1971–2000, Normals)

Primary Tower Elevation	Location	Winter	Spring	Summer	Autumn	Annual
Upper Level (60 m) (m/sec)	Plant Vogtle	5.0	5.0	4.1	4.4	4.6
Lower Level (10 m) (m/sec)	Plant Vogtle	2.6	2.8	2.4	2.3	2.5
Single Level (6.1 m) (m/sec)	Augusta WSO [a]	3.0	3.0	2.4	2.4	2.7

Notes: Winter = December, January, February
Spring = March, April, May
Summer = June, July, August
Autumn = September, October, November

Source: a - NCDC 2005a

Table 2.7-7 Wind Direction Persistence/Wind Speed Distributions for the VEGP Site – 10-m Level

1998 TO 2002 WIND PERSISTENCE
VEGP METEOROLOGICAL TOWER – 10-M LEVEL
22.5° SECTOR WIDTH
START AND END OF PERIOD 98010101 - 02123124
PERSISTENCIES FROM 98010101 TO 02123124 (SECTOR WIDTH = 22.5 DEGREES)

Speed Greater than or Equal to 5.0 mph

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	1180	1133	1919	2028	1392	822	948	863	906	1298	1541	1478	1804	1444	856	894
2	439	376	919	983	538	231	353	294	305	493	621	526	830	639	266	310
4	99	75	343	326	139	27	88	58	56	102	164	105	246	197	51	52
8	6	4	97	65	13	4	5	2	3	4	14	4	28	30	3	0
12	0	0	36	10	0	0	0	0	0	0	0	0	2	9	0	0
18	0	0	9	0	0	0	0	0	0	0	0	0	0	3	0	0
24	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PERSISTENCIES FROM 98010101 TO 02123124 (SECTOR WIDTH = 22.5 DEGREES)

Speed Greater than or Equal to 10.0 mph

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	136	126	323	415	149	58	116	85	74	167	246	250	362	361	150	59
2	42	51	129	197	39	16	37	27	24	57	106	91	156	167	46	22
4	7	9	40	63	5	3	8	5	3	9	25	21	47	45	11	6
8	0	0	11	7	0	0	0	0	0	0	0	1	4	5	0	0
12	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 2.7-7 (cont.) Wind Direction Persistence/Wind Speed Distributions for the VEGP Site – 10-m Level

PERSISTENCIES FROM 98010101 TO 02123124 (SECTOR WIDTH = 22.5 DEGREES)

Speed Greater than or Equal to 15.0 mph

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	3	9	13	25	8	1	6	3	4	14	21	17	40	43	19	2
2	0	3	2	10	0	0	0	0	0	4	6	5	13	14	5	1
4	0	0	0	5	0	0	0	0	0	0	3	0	0	2	0	0
8	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PERSISTENCIES FROM 98010101 TO 02123124 (SECTOR WIDTH = 22.5 DEGREES)

Speed Greater than or Equal to 20.0 mph

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	1	0	0	4	0	0	0	0	0	2	0	1	3	5	0	0
2	0	0	0	3	0	0	0	0	0	0	0	0	0	1	0	0
4	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 2.7-7 (cont.) Wind Direction Persistence/Wind Speed Distributions for the VEGP Site – 10-m Level

PERSISTENCIES FROM 98010101 TO 02123124 (SECTOR WIDTH = 22.5 DEGREES)

Speed Greater than or Equal to 25.0 mph

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 2.7-7 (cont.) Wind Direction Persistence/Wind Speed Distributions for the VEGP Site – 10-m Level

1998 TO 2002 WIND PERSISTENCE
VEGP METEOROLOGICAL TOWER - 10-M LEVEL
67.5° SECTOR WIDTH

START AND END OF PERIOD 98010101 - 02123124

PERSISTENCIES FROM 98010101 TO 02123124 (SECTOR WIDTH = 67.5 DEGREES)

Speed Greater than or Equal to 5.0 mph

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	3207	4232	5080	5339	4242	3162	2633	2717	3067	3745	4317	4823	4726	4104	3194	2930
2	1885	2649	3569	3875	2751	1762	1438	1539	1694	2224	2686	3187	3226	2738	1881	1630
4	901	1461	2358	2587	1495	830	666	740	733	1031	1363	1765	1941	1635	908	738
8	310	653	1331	1443	570	271	219	248	208	250	455	623	824	749	297	216
12	129	358	828	880	237	96	78	116	68	73	168	209	361	376	119	80
18	54	187	466	471	87	23	19	29	4	15	57	64	134	148	41	20
24	32	107	283	287	32	0	3	6	0	3	20	15	52	67	17	2
30	17	69	164	178	2	0	0	0	0	0	6	2	22	33	2	0
36	11	48	96	117	0	0	0	0	0	0	0	0	4	20	0	0
48	0	27	33	38	0	0	0	0	0	0	0	0	0	8	0	0

PERSISTENCIES FROM 98010101 TO 02123124 (SECTOR WIDTH = 67.5 DEGREES)

Speed Greater than or Equal to 10.0 mph

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	321	585	864	887	622	323	259	275	326	487	663	858	973	873	570	345
2	160	271	484	515	328	114	115	127	143	243	354	489	592	549	332	143
4	74	115	212	243	128	26	42	49	40	71	135	218	299	313	168	59
8	33	44	69	74	24	0	12	15	0	2	15	36	81	115	55	16
12	19	21	26	20	4	0	2	3	0	0	0	2	30	43	18	4
18	5	6	3	1	0	0	0	0	0	0	0	0	6	13	4	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 2.7-7 (cont.) Wind Direction Persistence/Wind Speed Distributions for the VEGP Site – 10-m Level

PERSISTENCIES FROM 98010101 TO 02123124 (SECTOR WIDTH = 67.5 DEGREES)

Speed Greater than or Equal to 15.0 mph

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	14	25	47	46	34	15	10	13	21	39	52	78	100	102	64	24
2	5	6	20	17	10	0	0	0	4	14	23	29	49	56	29	7
4	0	0	7	7	5	0	0	0	0	5	5	6	16	21	9	0
8	0	0	1	1	1	0	0	0	0	0	0	0	3	3	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PERSISTENCIES FROM 98010101 TO 02123124 (SECTOR WIDTH = 67.5 DEGREES)

Speed Greater than or Equal to 20.0 mph

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	1	1	4	4	4	0	0	0	2	2	3	4	9	8	5	1
2	0	0	3	3	3	0	0	0	0	0	0	0	3	3	1	0
4	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 2.7-7 (cont.) Wind Direction Persistence/Wind Speed Distributions for the VEGP Site – 10-m Level

PERSISTENCIES FROM 98010101 TO 02123124 (SECTOR WIDTH = 67.5 DEGREES)

Speed Greater than or Equal to 25.0 mph

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 2.7-8 Wind Direction Persistence/Wind Speed Distributions for the VEGP Site – 60-m Level

1998 TO 2002 WIND PERSISTENCE
VEGP METEOROLOGICAL TOWER - 60-M LEVEL
22.5° SECTOR WIDTH
START AND END OF PERIOD 98010101 - 02123124
PERSISTENCIES FROM 98010101 TO 02123124 (SECTOR WIDTH = 22.5 DEGREES)

Speed Greater than or Equal to 5.0 mph

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	1610	1940	3083	2713	2037	1558	1645	2015	2294	2694	3397	3268	3052	2001	1615	1488
2	641	889	1687	1343	946	666	734	986	1057	1266	1739	1594	1576	910	663	575
4	168	245	736	446	273	167	218	319	290	346	569	492	586	293	146	131
8	20	33	192	70	43	19	20	56	35	27	73	51	122	67	6	3
12	4	7	67	7	15	1	4	15	0	0	5	13	17	16	0	0
18	0	0	20	0	5	0	0	0	0	0	0	0	0	0	0	0
24	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PERSISTENCIES FROM 98010101 TO 02123124 (SECTOR WIDTH = 22.5 DEGREES)

Speed Greater than or Equal to 10.0 mph

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	616	954	1922	1457	984	747	802	713	1006	1597	2138	2098	2036	1247	775	615
2	240	435	1107	710	442	303	339	305	433	750	1106	1066	1106	619	322	231
4	68	116	515	219	114	77	100	82	118	207	366	359	444	233	73	59
8	14	16	161	33	23	10	13	6	12	13	43	44	101	60	4	2
12	4	6	63	5	12	0	1	0	0	0	3	13	13	15	0	0
18	0	0	20	0	2	0	0	0	0	0	0	0	0	0	0	0
24	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 2.7-8 (cont.) Wind Direction Persistence/Wind Speed Distributions for the VEGP Site – 60-m Level

PERSISTENCIES FROM 98010101 TO 02123124 (SECTOR WIDTH = 22.5 DEGREES)

Speed Greater than or Equal to 15.0 mph

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	131	211	522	254	106	66	112	75	171	364	628	721	732	436	147	123
2	53	87	264	94	31	11	33	15	52	123	277	314	362	211	49	39
4	23	27	117	29	6	0	10	2	8	26	81	94	140	89	15	9
8	12	10	44	8	0	0	3	0	0	0	3	9	34	21	2	1
12	4	6	24	4	0	0	0	0	0	0	0	3	1	2	0	0
18	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PERSISTENCIES FROM 98010101 TO 02123124 (SECTOR WIDTH = 22.5 DEGREES)

Speed Greater than or Equal to 20.0 mph

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	24	21	44	25	12	8	16	4	19	48	97	135	183	118	36	12
2	13	6	20	10	4	0	5	0	3	14	21	48	87	54	16	4
4	7	1	7	5	0	0	3	0	0	2	0	12	30	19	7	2
8	3	0	0	1	0	0	0	0	0	0	0	0	6	1	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 2.7-8 (cont.) Wind Direction Persistence/Wind Speed Distributions for the VEGP Site – 60-m Level

PERSISTENCIES FROM 98010101 TO 02123124 (SECTOR WIDTH = 22.5 DEGREES)

Speed Greater than or Equal to 25.0 mph

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	2	0	5	5	1	0	0	0	2	6	15	26	37	21	5	3
2	0	0	1	3	0	0	0	0	0	2	2	12	16	7	1	2
4	0	0	0	1	0	0	0	0	0	0	0	6	6	2	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 2.7-8 (cont.) Wind Direction Persistence/Wind Speed Distributions for the VEGP Site – 60-m Level

1998 TO 2002 WIND PERSISTENCE
VEGP METEOROLOGICAL TOWER - 60-M LEVEL
67.5° SECTOR WIDTH
START AND END OF PERIOD 98010101 - 02123124
PERSISTENCIES FROM 98010101 TO 02123124 (SECTOR WIDTH = 67.5 DEGREES)

Speed Greater than or Equal to 5.0 mph

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	5038	6633	7736	7833	6308	5240	5218	5954	7003	8385	9359	9717	8321	6668	5104	4713
2	3401	4871	6139	6199	4565	3663	3670	4240	5098	6291	7318	7740	6402	4858	3475	3173
4	1887	3216	4448	4396	2827	2165	2126	2561	3130	4099	5024	5525	4399	3100	1942	1745
8	842	1778	2685	2516	1215	905	847	1122	1331	1939	2694	3133	2539	1549	726	666
12	459	1095	1746	1561	527	398	376	556	576	953	1523	1874	1606	876	295	286
18	225	581	1046	836	152	127	134	198	184	370	671	934	842	425	112	121
24	123	355	665	449	61	52	44	77	69	151	331	511	460	223	51	71
30	82	241	417	251	19	28	14	46	24	57	146	308	217	110	17	49
36	52	162	253	145	11	16	4	28	5	13	58	186	84	54	3	38
48	18	66	95	49	0	0	0	1	0	0	4	80	9	11	0	26

PERSISTENCIES FROM 98010101 TO 02123124 (SECTOR WIDTH = 67.5 DEGREES)

Speed Greater than or Equal to 10.0 mph

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	2185	3492	4333	4363	3188	2533	2262	2521	3316	4741	5833	6272	5381	4058	2637	2006
2	1281	2389	3217	3156	2011	1548	1344	1406	2029	3291	4248	4711	4052	2884	1663	1170
4	627	1465	2159	1982	998	757	620	620	959	1932	2698	3182	2793	1848	876	557
8	245	751	1218	993	313	228	183	188	223	775	1306	1701	1607	984	325	207
12	139	460	754	570	119	74	69	76	50	330	700	985	1007	555	125	109
18	84	230	449	296	26	8	14	21	0	118	275	496	503	264	24	52
24	45	131	285	165	5	0	1	4	0	48	104	273	252	130	2	32
30	26	76	176	97	0	0	0	0	0	19	30	170	108	56	0	20
36	12	45	108	62	0	0	0	0	0	1	6	106	35	29	0	14
48	0	13	44	19	0	0	0	0	0	0	0	41	0	10	0	2

Table 2.7-8 (cont.) Wind Direction Persistence/Wind Speed Distributions for the VEGP Site – 60-m Level

PERSISTENCIES FROM 98010101 TO 02123124 (SECTOR WIDTH = 67.5 DEGREES)

Speed Greater than or Equal to 15.0 mph

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	465	864	987	882	426	284	253	358	610	1163	1713	2081	1889	1315	706	401
2	223	470	549	462	163	104	90	126	243	606	1005	1322	1217	814	369	189
4	100	233	276	207	46	32	29	32	63	239	482	731	711	456	173	92
8	51	106	121	79	11	5	8	8	1	41	111	257	304	206	59	48
12	37	59	75	47	7	0	0	0	0	8	31	97	145	95	8	33
18	19	24	44	29	1	0	0	0	0	0	5	12	37	40	0	21
24	10	11	26	19	0	0	0	0	0	0	0	0	18	25	0	10
30	4	5	14	13	0	0	0	0	0	0	0	0	11	18	0	4
36	0	0	6	7	0	0	0	0	0	0	0	0	5	12	0	0
48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PERSISTENCIES FROM 98010101 TO 02123124 (SECTOR WIDTH = 67.5 DEGREES)

Speed Greater than or Equal to 20.0 mph

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	57	89	90	81	45	36	28	39	71	164	280	415	436	337	166	72
2	26	43	44	38	15	10	5	9	21	55	122	210	240	194	88	38
4	14	16	17	15	5	3	3	3	3	12	38	82	107	92	41	23
8	5	3	1	1	1	0	0	0	0	1	2	16	18	19	7	10
12	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	2
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 2.7-8 (cont.) Wind Direction Persistence/Wind Speed Distributions for the VEGP Site – 60-m Level

PERSISTENCIES FROM 98010101 TO 02123124 (SECTOR WIDTH = 67.5 DEGREES)

Speed Greater than or Equal to 25.0 mph

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	5	7	10	11	6	1	0	2	8	23	47	78	84	63	29	10
2	2	1	5	5	3	0	0	0	2	6	21	36	40	30	12	3
4	0	0	1	1	1	0	0	0	0	1	9	16	17	12	3	0
8	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 2.7-9 Seasonal and Annual Vertical Stability Class and Mean 10-m Level Wind Speed Distributions for the VEGP Site (1998–2002)

Period	Vertical Stability Categories [a]						
	A	B	C	D	E	F	G
Winter							
Frequency (%)	2.23	2.94	6.40	31.25	28.96	14.06	14.14
Wind Speed (m/sec)	3.4	3.9	3.6	3.1	2.6	1.7	1.4
Spring							
Frequency (%)	11.49	5.29	7.04	25.18	27.10	13.94	9.95
Wind Speed (m/sec)	3.6	3.7	3.6	3.3	2.5	1.8	1.4
Summer							
Frequency (%)	8.27	6.12	7.60	24.73	33.00	14.22	6.04
Wind Speed (m/sec)	3.4	3.1	2.9	2.7	2.1	1.5	1.4
Autumn							
Frequency (%)	3.76	3.79	8.36	28.90	26.92	13.65	14.62
Wind Speed (m/sec)	3.2	3.3	3.2	2.8	2.2	1.7	1.2
Annual							
Frequency (%)	6.48	4.54	7.34	27.50	28.99	13.97	11.17
Wind Speed (m/sec)	3.5	3.5	3.3	3.0	2.4	1.7	1.3

Note: a - Vertical stability based on temperature difference (ΔT) between 10-m and 60-m measurement levels.

Table 2.7-10 Joint Frequency Distribution of Wind Speed and Wind Direction (10-m Level) by Atmospheric Stability Class for the VEGP Site (1998–2002)

Hours at Each Wind Speed and Direction

Period of Record: 01/01/98 1:00 - 12/31/02 23:00 Total Period

Elevation: **Speed:** SP10M **Direction:** DI10M **Lapse:** DT60M

Stability Class: A Delta Temperature Extremely Unstable

	Wind Speed (m/s)												
Wind Direction (from)	**0.23 - 0.50**	**0.51 - 0.75**	**0.76 - 1.0**	**1.1 - 1.5**	**1.6 - 2.0**	**2.1 - 3.0**	**3.1 - 5.0**	**5.1 - 7.0**	**7.1 - 10.0**	**10.1 - 13.0**	**13.1 - 18.0**	**> 18.0**	**Total**
N	0	0	0	3	7	38	63	4	0	0	0	0	115
NNE	0	0	2	3	17	48	33	13	0	0	0	0	116
NE	0	0	0	7	6	36	79	17	0	0	0	0	145
ENE	0	0	1	3	13	75	127	30	0	0	0	0	249
E	0	0	0	5	15	77	133	10	0	0	0	0	240
ESE	0	0	1	4	17	66	55	0	0	0	0	0	143
SE	0	1	1	4	11	41	49	5	0	0	0	0	112
SSE	0	0	1	9	2	32	36	2	1	0	0	0	83
S	0	1	0	10	22	42	51	5	0	0	0	0	131
SSW	0	0	2	6	19	59	97	12	0	0	0	0	195
SW	0	0	2	8	18	71	117	20	3	0	0	0	239
WSW	0	0	2	6	23	74	167	26	3	0	0	0	301
W	0	2	0	4	17	79	156	26	2	0	0	0	286
WNW	0	0	0	5	9	39	88	16	3	0	0	0	160
NW	0	0	0	6	9	28	57	14	3	0	0	0	117
NNW	1	0	1	2	6	23	59	1	0	0	0	0	93
Totals	1	4	13	85	211	828	1367	201	15	0	0	0	2725

Number of Calm Hours for this Table	0
Number of Variable Direction Hours for this Table	11
Number of Invalid Hours	1633
Number of Valid Hours for this Table	2725
Total Hours for the Period	43823

Note: Stability class based on temperature difference (ΔT or lapse) between 10-m and 60-m measurement levels.

Table 2.7-10 (cont.) Joint Frequency Distribution of Wind Speed and Wind Direction (10-m Level) by Atmospheric Stability Class for the VEGP Site (1998–2002)

Hours at Each Wind Speed and Direction

Period of Record: 01/01/98 1:00 - 12/31/02 23:00 Total Period

Elevation: **Speed:** SP10M **Direction:** DI10M **Lapse:** DT60M

Stability Class: B Delta Temperature Moderately Unstable

	Wind Speed (m/s)												
Wind Direction (from)	**0.23 - 0.50**	**0.51 - 0.75**	**0.76 - 1.0**	**1.1 - 1.5**	**1.6 - 2.0**	**2.1 - 3.0**	**3.1 - 5.0**	**5.1 - 7.0**	**7.1 - 10.0**	**10.1 - 13.0**	**13.1 - 18.0**	**> 18.0**	**Total**
N	0	0	1	3	9	39	64	5	0	1	0	0	122
NNE	0	0	0	5	13	38	36	8	2	0	0	0	102
NE	0	1	0	4	7	40	48	7	0	0	0	0	107
ENE	1	0	0	1	11	54	69	23	0	0	0	0	159
E	0	0	0	5	4	44	65	8	0	0	0	0	126
ESE	0	0	1	6	6	31	22	3	0	0	0	0	69
SE	0	0	4	7	8	23	22	1	0	0	0	0	65
SSE	0	0	0	7	14	21	18	1	0	0	0	0	61
S	0	1	0	2	12	30	27	4	0	0	0	0	76
SSW	0	0	0	3	17	53	51	5	2	0	0	0	131
SW	0	0	1	9	18	51	75	19	2	0	0	0	175
WSW	0	0	0	4	7	58	64	18	1	0	0	0	152
W	0	0	0	2	8	60	96	22	3	0	0	0	191
WNW	0	0	0	2	7	37	75	28	4	1	0	0	154
NW	0	0	0	3	5	33	42	12	2	0	0	0	97
NNW	0	0	0	1	11	37	70	4	0	0	0	0	123
Totals	1	2	7	64	157	649	844	168	16	2	0	0	1910

Number of Calm Hours for this Table	1
Number of Variable Direction Hours for this Table	44
Number of Invalid Hours	1633
Number of Valid Hours for this Table	1910
Total Hours for the Period	43823

Note: Stability class based on temperature difference (ΔT or lapse) between 10-m and 60-m measurement levels.

Table 2.7-10 (cont.) Joint Frequency Distribution of Wind Speed and Wind Direction (10-m Level) by Atmospheric Stability Class for the VEGP Site (1998–2002)

Hours at Each Wind Speed and Direction

Period of Record: 01/01/98 1:00 - 12/31/02 23:00 Total Period

Elevation: **Speed:** SP10M **Direction:** DI10M **Lapse:** DT60M

Stability Class: C Delta Temperature Slightly Unstable

	Wind Speed (m/s)												
Wind Direction (from)	**0.23 - 0.50**	**0.51 - 0.75**	**0.76 - 1.0**	**1.1 - 1.5**	**1.6 - 2.0**	**2.1 - 3.0**	**3.1 - 5.0**	**5.1 - 7.0**	**7.1 - 10.0**	**10.1 - 13.0**	**13.1 - 18.0**	**> 18.0**	**Total**
N	0	1	1	8	24	81	84	5	1	0	0	0	205
NNE	0	0	4	6	17	72	72	3	0	0	0	0	174
NE	0	0	0	5	15	60	72	13	0	0	0	0	165
ENE	0	0	3	6	19	74	115	17	0	0	0	0	234
E	0	0	1	9	21	58	105	1	1	0	0	0	196
ESE	0	0	2	9	15	52	44	1	0	0	0	0	123
SE	0	1	2	11	19	43	35	5	1	0	0	0	117
SSE	0	0	2	10	9	28	45	10	1	0	0	0	105
S	0	0	3	8	29	70	47	4	0	0	0	0	161
SSW	0	1	0	7	26	70	84	8	1	0	0	0	197
SW	0	0	0	11	22	74	127	21	3	0	0	0	258
WSW	0	1	0	11	24	94	101	23	1	0	0	0	255
W	0	0	3	10	27	110	138	41	5	0	0	0	334
WNW	0	0	0	8	22	53	71	43	7	0	0	0	204
NW	0	2	1	3	24	68	66	14	4	0	0	0	182
NNW	2	1	2	4	20	81	67	1	0	0	0	0	178
Totals	2	7	24	126	333	1088	1273	210	25	0	0	0	3088

Number of Calm Hours for this Table	1
Number of Variable Direction Hours for this Table	114
Number of Invalid Hours	1633
Number of Valid Hours for this Table	3088
Total Hours for the Period	43823

Note: Stability class based on temperature difference (ΔT or lapse) between 10-m and 60-m measurement levels.

Table 2.7-10 (cont.) Joint Frequency Distribution of Wind Speed and Wind Direction (10-m Level) by Atmospheric Stability Class for the VEGP Site (1998–2002)

Hours at Each Wind Speed and Direction

Period of Record: 01/01/98 1:00 - 12/31/02 23:00Total Period

Elevation: **Speed:** SP10M **Direction:** DI10M **Lapse:** DT60M

Stability Class: D Delta Temperature Neutral

	Wind Speed (m/s)												
Wind Direction (from)	**0.23 - 0.50**	**0.51 - 0.75**	**0.76 - 1.0**	**1.1 - 1.5**	**1.6 - 2.0**	**2.1 - 3.0**	**3.1 - 5.0**	**5.1 - 7.0**	**7.1 - 10.0**	**10.1 - 13.0**	**13.1 - 18.0**	**> 18.0**	**Total**
N	0	7	13	78	137	345	215	29	0	0	0	0	824
NNE	2	6	8	72	106	278	209	32	2	0	0	0	715
NE	3	4	15	57	99	342	507	75	1	0	0	0	1103
ENE	1	2	12	61	95	303	454	87	4	1	0	0	1020
E	1	10	18	67	114	268	215	21	3	0	0	0	717
ESE	3	5	14	49	71	165	124	9	0	0	0	0	440
SE	1	16	9	48	80	138	149	39	2	0	0	0	482
SSE	4	9	17	65	96	186	152	18	0	0	0	0	547
S	2	9	14	78	114	240	125	10	0	0	0	0	592
SSW	1	9	21	47	96	229	219	38	3	0	0	0	663
SW	3	3	14	83	117	269	238	40	7	0	0	0	774
WSW	1	8	18	68	141	294	246	53	2	1	0	0	832
W	1	4	11	72	123	269	334	81	16	0	0	0	911
WNW	6	3	19	59	109	222	287	83	14	0	0	0	802
NW	2	4	11	69	97	212	123	31	4	0	0	0	553
NNW	0	3	12	60	98	244	154	17	0	0	0	0	588
Totals	31	102	226	1033	1693	4004	3751	663	58	2	0	0	11563

Number of Calm Hours for this Table	4
Number of Variable Direction Hours for this Table	543
Number of Invalid Hours	1633
Number of Valid Hours for this Table	11563
Total Hours for the Period	43823

Note: Stability class based on temperature difference (ΔT or lapse) between 10-m and 60-m measurement levels.

Table 2.7-10 (cont.) Joint Frequency Distribution of Wind Speed and Wind Direction (10-m Level) by Atmospheric Stability Class for the VEGP Site (1998–2002)

Hours at Each Wind Speed and Direction

Period of Record: 01/01/98 1:00 - 12/31/02 23:00 Total Period

Elevation: **Speed:** SP10M **Direction:** DI10M **Lapse:** DT60M

Stability Class: E Delta Temperature Slightly Stable

	Wind Speed (m/s)												
Wind Direction (from)	**0.23 - 0.50**	**0.51 - 0.75**	**0.76 - 1.0**	**1.1 - 1.5**	**1.6 - 2.0**	**2.1 - 3.0**	**3.1 - 5.0**	**5.1 - 7.0**	**7.1 - 10.0**	**10.1 - 13.0**	**13.1 - 18.0**	**> 18.0**	**Total**
N	9	16	26	87	94	154	108	12	1	0	0	0	507
NNE	9	11	37	89	93	224	112	13	1	0	0	0	589
NE	9	20	26	88	124	338	272	23	3	0	0	0	903
ENE	12	14	33	94	149	327	206	29	6	1	0	0	871
E	7	23	38	95	164	330	114	19	2	0	0	0	792
ESE	12	8	50	123	184	246	86	14	0	0	0	0	723
SE	13	21	45	110	184	293	160	9	0	0	0	0	835
SSE	13	25	47	167	250	322	101	8	0	0	0	0	933
S	10	21	60	239	233	271	76	9	1	0	0	0	920
SSW	3	21	43	151	200	272	135	17	1	0	0	0	843
SW	8	18	53	167	245	335	170	13	1	0	0	0	1010
WSW	9	18	40	191	223	266	82	10	1	0	0	0	840
W	5	13	59	127	156	281	169	15	0	0	0	0	825
WNW	9	11	22	113	122	216	185	29	1	0	0	0	708
NW	8	14	27	102	107	147	84	9	1	0	0	0	499
NNW	7	8	21	57	85	128	75	6	2	0	0	0	389
Totals	143	262	627	2000	2613	4150	2135	235	21	1	0	0	12187

Number of Calm Hours for this Table	35
Number of Variable Direction Hours for this Table	396
Number of Invalid Hours	1633
Number of Valid Hours for this Table	12187
Total Hours for the Period	43823

Note: Stability class based on temperature difference (ΔT or lapse) between 10-m and 60-m measurement levels.

Table 2.7-10 (cont.) Joint Frequency Distribution of Wind Speed and Wind Direction (10-m Level) by Atmospheric Stability Class for the VEGP Site (1998–2002)

Hours at Each Wind Speed and Direction

Period of Record: 01/01/98 1:00 - 12/31/02 23:00 Total Period

Elevation: **Speed:** SP10M **Direction:** DI10M **Lapse:** DT60M

Stability Class: F Delta Temperature Moderately Stable

	Wind Speed (m/s)												
Wind Direction (from)	**0.23 - 0.50**	**0.51 - 0.75**	**0.76 - 1.0**	**1.1 - 1.5**	**1.6 - 2.0**	**2.1 - 3.0**	**3.1 - 5.0**	**5.1 - 7.0**	**7.1 - 10.0**	**10.1 - 13.0**	**13.1 - 18.0**	**> 18.0**	**Total**
N	11	20	20	56	61	65	15	0	0	0	0	0	248
NNE	16	21	30	62	44	61	25	0	0	0	0	0	259
NE	22	15	24	70	71	97	19	0	0	0	0	0	318
ENE	17	29	27	77	86	162	24	1	0	0	0	0	423
E	16	28	45	103	128	117	5	0	0	0	0	0	442
ESE	16	25	37	94	112	69	2	0	0	0	0	0	355
SE	21	17	35	85	112	52	6	0	0	0	0	0	328
SSE	15	28	30	88	106	65	7	0	0	0	0	0	339
S	12	22	47	143	111	55	0	1	0	0	0	0	391
SSW	20	14	36	138	135	88	10	0	0	0	0	0	441
SW	19	24	36	148	224	99	7	0	0	0	0	0	557
WSW	12	19	47	183	228	110	1	0	0	0	0	0	600
W	10	18	50	169	129	64	9	1	0	0	0	0	450
WNW	10	24	30	103	110	45	11	3	0	0	0	0	336
NW	6	16	21	66	57	34	3	0	0	0	0	0	203
NNW	12	14	18	44	49	38	7	0	0	0	0	0	182
Totals	235	334	533	1629	1763	1221	151	6	0	0	0	0	5872

Number of Calm Hours for this Table	39
Number of Variable Direction Hours for this Table	230
Number of Invalid Hours	1633
Number of Valid Hours for this Table	5872
Total Hours for the Period	43823

Note: Stability class based on temperature difference (ΔT or lapse) between 10-m and 60-m measurement levels.

Table 2.7-10 (cont.) Joint Frequency Distribution of Wind Speed and Wind Direction (10-m Level) by Atmospheric Stability Class for the VEGP Site (1998–2002)

Hours at Each Wind Speed and Direction

Period of Record: 01/01/98 1:00 - 12/31/02 23:00 Total Period

Elevation: **Speed:** SP10M **Direction:** DI10M **Lapse:** DT60M

Stability Class: G Delta Temperature Extremely Stable

	Wind Speed (m/s)												
Wind Direction (from)	**0.23 - 0.50**	**0.51 - 0.75**	**0.76 - 1.0**	**1.1 - 1.5**	**1.6 - 2.0**	**2.1 - 3.0**	**3.1 - 5.0**	**5.1 - 7.0**	**7.1 - 10.0**	**10.1 - 13.0**	**13.1 - 18.0**	**> 18.0**	**Total**
N	26	31	49	75	46	18	5	0	0	0	0	0	250
NNE	25	26	34	33	13	16	1	0	1	0	0	0	149
NE	45	30	35	58	24	16	0	0	0	0	0	0	208
ENE	29	26	42	73	61	36	2	0	0	0	0	0	269
E	28	33	55	101	78	30	3	0	0	0	0	0	328
ESE	28	33	56	110	40	17	1	0	0	0	0	0	285
SE	21	31	39	48	48	20	3	0	0	0	0	0	210
SSE	20	34	43	46	36	14	2	0	0	0	0	0	195
S	15	20	41	58	47	22	1	0	1	0	0	0	205
SSW	24	22	56	104	111	49	5	0	0	0	0	0	371
SW	32	34	56	150	203	68	2	0	0	0	0	0	545
WSW	19	38	61	207	170	50	2	0	0	0	0	0	547
W	25	36	78	178	133	42	0	0	0	0	0	0	492
WNW	26	34	43	83	56	14	2	1	0	0	0	0	259
NW	35	32	32	41	21	6	0	0	0	0	0	0	167
NNW	22	25	45	81	28	16	1	0	0	0	0	0	218
Totals	420	485	765	1446	1115	434	30	1	2	0	0	0	4698

Number of Calm Hours for this Table	67
Number of Variable Direction Hours for this Table	432
Number of Invalid Hours	1633
Number of Valid Hours for this Table	4698
Total Hours for the Period	43823

Note: Stability class based on temperature difference (ΔT or lapse) between 10-m and 60-m measurement levels.

Table 2.7-10 (cont.) Joint Frequency Distribution of Wind Speed and Wind Direction (10-m Level) by Atmospheric Stability Class for the VEGP Site (1998–2002)

Hours at Each Wind Speed and Direction

Period of Record: 01/01/98 1:00 - 12/31/02 23:00 Total Period

Elevation: **Speed:** SP10M **Direction:** DI10M **Lapse:** DT60M

Summary of All Stability Classes: Delta Temperature

	Wind Speed (m/s)												
Wind Direction (from)	**0.23 - 0.50**	**0.51 - 0.75**	**0.76 - 1.0**	**1.1 - 1.5**	**1.6 - 2.0**	**2.1 - 3.0**	**3.1 - 5.0**	**5.1 - 7.0**	**7.1 - 10.0**	**10.1 - 13.0**	**13.1 - 18.0**	**> 18.0**	**Total**
N	46	75	110	310	378	740	554	55	2	1	0	0	2271
NNE	52	64	115	270	303	737	488	69	6	0	0	0	2104
NE	79	70	100	289	346	929	997	135	4	0	0	0	2949
ENE	60	71	118	315	434	1031	997	187	10	2	0	0	3225
E	52	94	157	385	524	924	640	59	6	0	0	0	2841
ESE	59	71	161	395	445	646	334	27	0	0	0	0	2138
SE	56	87	135	313	462	610	424	59	3	0	0	0	2149
SSE	52	96	140	392	513	668	361	39	2	0	0	0	2263
S	39	74	165	538	568	730	327	33	2	0	0	0	2476
SSW	48	67	158	456	604	820	601	80	7	0	0	0	2841
SW	62	79	162	576	847	967	736	113	16	0	0	0	3558
WSW	41	84	168	670	816	946	663	130	8	1	0	0	3527
W	41	73	201	562	593	905	902	186	26	0	0	0	3489
WNW	51	72	114	373	435	626	719	203	29	1	0	0	2623
NW	51	68	92	290	320	528	375	80	14	0	0	0	1818
NNW	44	51	99	249	297	567	433	29	2	0	0	0	1771
Totals	833	1196	2195	6383	7885	12374	9551	1484	137	5	0	0	42043

Number of Calm Hours for this Table	147
Number of Variable Direction Hours for this Table	1770
Number of Invalid Hours	1633
Number of Valid Hours for this Table	42043
Total Hours for the Period	43823

Note: Stability class based on temperature difference (ΔT or lapse) between 10-m and 60-m measurement levels.

Table 2.7-11 Joint Frequency Distribution of Wind Speed and Wind Direction (60-m Level) by Atmospheric Stability Class for the VEGP Site (1998–2002)

Hours at Each Wind Speed and Direction

Period of Record: 01/01/98 1:00 - 12/31/02 23:00 Total Period

Elevation: **Speed:** SP60M **Direction:** DI60M **Lapse:** DT60M

Stability Class: A Delta Temperature Extremely Unstable

	Wind Speed (m/s)												
Wind Direction (from)	**0.23 - 0.50**	**0.51 - 0.75**	**0.76 - 1.0**	**1.1 - 1.5**	**1.6 - 2.0**	**2.1 - 3.0**	**3.1 - 5.0**	**5.1 - 7.0**	**7.1 - 10.0**	**10.1 - 13.0**	**13.1 - 18.0**	**> 18.0**	**Total**
N	0	0	0	4	5	22	36	33	6	0	0	0	106
NNE	0	0	0	1	6	24	34	21	9	1	0	0	96
NE	0	0	0	0	4	23	84	88	28	0	0	0	227
ENE	0	0	1	3	7	35	141	71	15	1	0	0	274
E	0	0	0	1	2	31	86	26	2	0	0	0	148
ESE	1	0	0	4	3	19	52	21	1	0	0	0	101
SE	0	0	0	2	2	10	31	7	0	0	0	0	52
SSE	0	0	1	2	4	27	49	14	1	0	0	0	98
S	0	0	2	4	6	15	51	32	8	0	0	0	118
SSW	0	0	0	2	11	27	80	51	23	3	0	0	197
SW	0	0	0	3	14	33	98	110	60	13	0	0	331
WSW	0	1	1	2	9	26	96	104	76	15	5	0	335
W	0	1	0	2	9	34	57	48	46	5	0	0	202
WNW	0	0	1	2	1	12	37	37	12	7	0	0	109
NW	0	0	0	2	10	19	46	30	4	1	2	0	114
NNW	0	0	1	0	5	22	47	33	2	0	0	0	110
Totals	1	2	7	34	98	379	1025	726	293	46	7	0	2618

Number of Calm Hours for this Table	0
Number of Variable Direction Hours for this Table	6
Number of Invalid Hours	3217
Number of Valid Hours for this Table	2618
Total Hours for the Period	43823

Note: Stability class based on temperature difference (ΔT or lapse) between 10-m and 60-m measurement levels.

Table 2.7-11 (cont.) Joint Frequency Distribution of Wind Speed and Wind Direction (60-m Level) by Atmospheric Stability Class for the VEGP Site (1998–2002)

Hours at Each Wind Speed and Direction

Period of Record = 01/01/98 1:00 - 12/31/02 23:00 Total Period

Elevation: **Speed: SP60M** **Direction:** DI60M **Lapse:** DT60M

Stability Class B Delta Temperature Moderately Unstable

	Wind Speed (m/s)												
Wind Direction (from)	**0.23 - 0.50**	**0.51 - 0.75**	**0.76 - 1.0**	**1.1 - 1.5**	**1.6 - 2.0**	**2.1 - 3.0**	**3.1 - 5.0**	**5.1 - 7.0**	**7.1 - 10.0**	**10.1 - 13.0**	**13.1 - 18.0**	**> 18.0**	**Total**
N	0	0	1	4	4	17	48	20	8	0	0	0	102
NNE	0	0	0	1	5	15	33	22	5	0	0	0	81
NE	0	1	0	4	1	20	60	46	12	0	0	0	144
ENE	0	0	0	2	3	23	67	35	4	0	0	0	134
E	0	0	0	2	3	18	43	21	1	0	0	0	88
ESE	0	0	0	1	2	18	27	10	0	0	0	0	58
SE	0	0	1	0	3	12	20	10	0	0	0	0	46
SSE	0	0	0	3	1	15	19	5	0	0	0	0	43
S	0	0	0	1	4	15	29	11	8	0	0	0	68
SSW	0	0	1	1	1	17	48	22	18	1	1	0	110
SW	0	0	0	0	8	28	80	46	35	4	1	0	202
WSW	0	0	0	1	6	26	73	49	35	7	1	0	198
W	0	0	0	1	6	17	67	48	29	12	0	0	180
WNW	0	0	0	0	3	14	46	26	17	7	2	0	115
NW	0	0	0	2	4	17	52	27	8	1	0	0	111
NNW	0	0	0	0	5	18	53	28	2	0	0	0	106
Totals	0	1	3	23	59	290	765	426	182	32	5	0	1786

Number of Calm Hours for this Table	0
Number of Variable Direction Hours for this Table	26
Number of Invalid Hours	3217
Number of Valid Hours for this Table	1786
Total Hours for the Period	43823

Note: Stability class based on temperature difference (ΔT or lapse) between 10-m and 60-m measurement levels.

Table 2.7-11 (cont.) Joint Frequency Distribution of Wind Speed and Wind Direction (60-m Level) by Atmospheric Stability Class for the VEGP Site (1998–2002)

Hours at Each Wind Speed and Direction

Period of Record: 01/01/98 1:00 - 12/31/02 23:00 Total Period

Elevation: **Speed:** SP60M **Direction:** DI60M **Lapse:** DT60M

Stability Class: C Delta Temperature Slightly Unstable

	Wind Speed (m/s)												
Wind Direction (from)	**0.23 - 0.50**	**0.51 - 0.75**	**0.76 - 1.0**	**1.1 - 1.5**	**1.6 - 2.0**	**2.1 - 3.0**	**3.1 - 5.0**	**5.1 - 7.0**	**7.1 - 10.0**	**10.1 - 13.0**	**13.1 - 18.0**	**> 18.0**	**Total**
N	0	0	0	2	12	54	80	27	4	0	0	0	179
NNE	1	1	1	3	10	34	62	24	8	0	0	0	144
NE	0	2	0	6	7	36	99	48	6	0	0	0	204
ENE	0	0	2	5	8	45	97	49	8	0	0	0	214
E	0	0	0	6	11	44	100	16	2	1	0	0	180
ESE	0	0	1	6	5	18	34	11	0	1	0	0	76
SE	0	0	1	1	7	19	41	14	2	0	0	0	85
SSE	0	0	0	6	5	26	51	13	6	1	0	0	108
S	0	0	0	4	13	38	63	21	10	0	0	0	149
SSW	0	0	0	4	9	37	85	38	13	3	0	0	189
SW	0	0	2	3	4	49	102	73	34	7	0	0	274
WSW	0	1	0	5	9	52	122	60	41	6	1	0	297
W	0	1	1	1	12	47	111	54	44	11	1	0	283
WNW	0	0	0	4	5	34	69	43	26	12	2	0	195
NW	0	0	1	5	12	40	92	30	5	2	0	0	187
NNW	0	1	3	5	4	46	89	22	5	0	0	0	175
Totals	1	6	12	66	133	619	1297	543	214	44	4	0	2939

Number of Calm Hours for this Table	0
Number of Variable Direction Hours for this Table	60
Number of Invalid Hours	3217
Number of Valid Hours for this Table	2939
Total Hours for the Period	43823

Note: Stability class based on temperature difference (ΔT or lapse) between 10-m and 60-m measurement levels.

Table 2.7-11 (cont.) Joint Frequency Distribution of Wind Speed and Wind Direction (60-m Level) by Atmospheric Stability Class for the VEGP Site (1998–2002)

Hours at Each Wind Speed and Direction

Period of Record: 01/01/98 1:00 - 12/31/02 23:00 Total Period

Elevation: **Speed:** SP60M **Direction:** DI60M **Lapse:** DT60M

Stability Class: D Delta Temperature Neutral

	Wind Speed (m/s)												
Wind Direction (from)	**0.23 - 0.50**	**0.51 - 0.75**	**0.76 - 1.0**	**1.1 - 1.5**	**1.6 - 2.0**	**2.1 - 3.0**	**3.1 - 5.0**	**5.1 - 7.0**	**7.1 - 10.0**	**10.1 - 13.0**	**13.1 - 18.0**	**> 18.0**	**Total**
N	2	2	1	24	47	152	291	114	39	2	0	0	674
NNE	0	4	9	24	49	129	319	182	62	2	0	0	780
NE	0	3	5	25	42	147	425	382	125	1	0	0	1155
ENE	1	1	8	27	59	158	352	199	47	3	2	0	857
E	1	4	6	24	40	115	237	91	27	1	0	0	546
ESE	2	0	6	21	32	76	134	50	12	2	0	0	335
SE	2	2	9	20	38	72	170	100	41	1	0	0	455
SSE	1	5	7	23	43	114	210	109	22	0	0	0	534
S	1	4	4	29	59	148	233	100	22	3	0	0	603
SSW	2	3	7	19	36	102	231	138	57	12	1	0	608
SW	1	3	6	22	48	135	307	186	111	13	1	0	833
WSW	2	3	6	23	37	149	299	253	155	22	2	0	951
W	0	4	9	24	45	143	286	212	166	46	8	0	943
WNW	0	5	6	26	33	93	189	139	93	21	0	0	605
NW	0	2	11	18	34	122	206	109	31	5	0	0	538
NNW	2	2	5	22	42	158	258	109	45	1	0	0	644
Totals	17	47	105	371	684	2013	4147	2473	1055	135	14	0	11061

Number of Calm Hours for this Table	0
Number of Variable Direction Hours for this Table	257
Number of Invalid Hours	3217
Number of Valid Hours for this Table	11061
Total Hours for the Period	43823

Note: Stability class based on temperature difference (ΔT or lapse) between 10-m and 60-m measurement levels.

Table 2.7-11 (cont.) Joint Frequency Distribution of Wind Speed and Wind Direction (60-m Level) by Atmospheric Stability Class for the VEGP Site (1998–2002)

Hours at Each Wind Speed and Direction

Period of Record = 01/01/98 1:00 - 12/31/02 23:00 Total Period

Elevation: **Speed:** SP60M **Direction:** DI60M **Lapse:** DT60M

Stability Class E Delta Temperature Slightly Stable

	Wind Speed (m/s)												
Wind Direction (from)	**0.23 - 0.50**	**0.51 - 0.75**	**0.76 - 1.0**	**1.1 - 1.5**	**1.6 - 2.0**	**2.1 - 3.0**	**3.1 - 5.0**	**5.1 - 7.0**	**7.1 - 10.0**	**10.1 - 13.0**	**13.1 - 18.0**	**> 18.0**	**Total**
N	3	2	7	18	17	91	205	107	21	8	0	0	479
NNE	0	0	3	20	25	93	248	212	58	0	0	0	659
NE	2	1	4	12	32	87	331	373	122	4	0	0	968
ENE	1	1	4	19	31	89	347	277	50	4	3	0	826
E	1	2	4	15	21	82	312	204	27	3	0	0	671
ESE	1	2	6	16	24	71	289	221	24	1	0	0	655
SE	0	1	6	9	16	81	345	215	18	0	0	0	691
SSE	0	4	6	31	48	196	513	163	11	1	0	0	973
S	0	3	5	25	41	179	421	222	29	2	1	0	928
SSW	1	3	6	13	21	90	371	336	57	3	0	0	901
SW	1	4	3	18	27	71	419	368	98	7	0	0	1016
WSW	2	2	2	11	25	64	310	288	106	9	0	0	819
W	3	3	5	13	26	48	253	364	146	10	1	0	872
WNW	2	1	6	11	15	61	170	204	112	9	0	0	591
NW	1	3	3	16	14	60	169	147	41	2	0	0	456
NNW	1	0	8	15	25	61	131	91	17	3	1	0	353
Totals	19	32	78	262	408	1424	4834	3792	937	66	6	0	11858

Number of Calm Hours for this Table	8
Number of Variable Direction Hours for this Table	83
Number of Invalid Hours	3217
Number of Valid Hours for this Table	11858
Total Hours for the Period	43823

Note: Stability class based on temperature difference (ΔT or lapse) between 10-m and 60-m measurement levels.

Table 2.7-11 (cont.) Joint Frequency Distribution of Wind Speed and Wind Direction (60-m Level) by Atmospheric Stability Class for the VEGP Site (1998–2002)

Hours at Each Wind Speed and Direction

Period of Record = 01/01/98 1:00 - 12/31/02 23:00 Total Period

Elevation: **Speed:** SP60M **Direction:** DI60M **Lapse:** DT60M

Stability Class F Delta Temperature Moderately Stable

	Wind Speed (m/s)												
Wind Direction (from)	**0.23 - 0.50**	**0.51 - 0.75**	**0.76 - 1.0**	**1.1 - 1.5**	**1.6 - 2.0**	**2.1 - 3.0**	**3.1 - 5.0**	**5.1 - 7.0**	**7.1 - 10.0**	**10.1 - 13.0**	**13.1 - 18.0**	**> 18.0**	**Total**
N	1	3	1	8	9	39	78	43	8	0	0	0	190
NNE	0	0	1	3	13	39	117	68	15	0	0	0	256
NE	1	2	0	8	9	39	100	156	33	0	0	0	348
ENE	2	1	1	8	16	27	150	174	26	0	0	0	405
E	1	1	2	8	7	30	163	142	2	0	0	0	356
ESE	3	2	1	13	14	44	157	89	3	0	0	0	326
SE	1	1	3	6	15	41	157	85	6	0	0	0	315
SSE	1	2	4	18	27	94	142	94	5	0	0	0	387
S	1	1	11	25	30	80	156	149	8	0	0	0	461
SSW	1	5	3	4	8	47	187	212	28	0	0	0	495
SW	3	1	5	10	15	40	156	280	44	0	0	0	554
WSW	0	0	3	8	11	26	150	242	37	1	0	0	478
W	2	1	4	6	14	29	133	216	49	0	0	0	454
WNW	1	0	2	7	13	31	89	142	31	0	0	0	316
NW	0	0	3	5	8	30	87	80	5	0	0	0	218
NNW	2	2	2	4	9	27	75	51	7	0	0	0	179
Totals	20	22	46	141	218	663	2097	2223	307	1	0	0	5738

Number of Calm Hours for this Table	4
Number of Variable Direction Hours for this Table	14
Number of Invalid Hours	3217
Number of Valid Hours for this Table	5738
Total Hours for the Period	43823

Note: Stability class based on temperature difference (ΔT or lapse) between 10-m and 60-m measurement levels.

Table 2.7-11 (cont.) Joint Frequency Distribution of Wind Speed and Wind Direction (60-m Level) by Atmospheric Stability Class for the VEGP Site (1998–2002)

Hours at Each Wind Speed and Direction

Period of Record = 01/01/98 1:00 - 12/31/02 23:00 Total Period

Elevation: **Speed:** SP60M **Direction:** DI60M **Lapse:** DT60M

Stability Class G Delta Temperature Extremely Stable

	Wind Speed (m/s)												
Wind Direction (from)	**0.23 - 0.50**	**0.51 - 0.75**	**0.76 - 1.0**	**1.1 - 1.5**	**1.6 - 2.0**	**2.1 - 3.0**	**3.1 - 5.0**	**5.1 - 7.0**	**7.1 - 10.0**	**10.1 - 13.0**	**13.1 - 18.0**	**> 18.0**	**Total**
N	2	2	4	10	16	32	69	17	0	0	1	0	153
NNE	2	2	2	12	15	56	86	17	1	0	0	0	193
NE	1	1	7	15	22	37	90	55	7	0	0	0	235
ENE	0	3	8	13	12	40	118	88	20	0	0	0	302
E	0	4	3	9	13	24	123	97	10	0	0	0	283
ESE	2	2	5	7	8	28	111	72	1	0	0	0	236
SE	1	1	4	9	20	38	90	43	2	0	0	0	208
SSE	1	2	7	17	29	76	82	39	4	0	0	0	257
S	1	1	7	18	33	70	113	94	27	0	0	0	364
SSW	1	3	5	13	12	34	135	172	45	0	0	0	420
SW	1	0	2	9	13	43	147	171	58	0	0	0	444
WSW	4	1	2	7	15	41	103	216	37	0	0	0	426
W	4	5	3	12	15	47	126	159	33	0	0	0	404
WNW	1	3	3	8	10	41	102	90	11	0	0	0	269
NW	1	1	6	11	12	47	98	50	4	0	0	0	230
NNW	0	0	3	8	16	44	57	31	2	0	0	0	161
Totals	22	31	71	178	261	698	1650	1411	262	0	1	0	4585

Number of Calm Hours for this Table	9
Number of Variable Direction Hours for this Table	42
Number of Invalid Hours	3217
Number of Valid Hours for this Table	4585
Total Hours for the Period	43823

Note: Stability class based on temperature difference (ΔT or lapse) between 10-m and 60-m measurement levels.

Table 2.7-11 (cont.) Joint Frequency Distribution of Wind Speed and Wind Direction (60-m Level) by Atmospheric Stability Class for the VEGP Site (1998–2002)

Hours at Each Wind Speed and Direction

Period of Record = 01/01/98 1:00 - 12/31/02 23:00 Total Period

Elevation: **Speed:** SP60M **Direction:** DI60M **Lapse:** DT60M

Summary of All Stability Classes Delta Temperature

	Wind Speed (m/s)												
Wind Direction (from)	**0.23 - 0.50**	**0.51 - 0.75**	**0.76 - 1.0**	**1.1 - 1.5**	**1.6 - 2.0**	**2.1 - 3.0**	**3.1 - 5.0**	**5.1 - 7.0**	**7.1 - 10.0**	**10.1 - 13.0**	**13.1 - 18.0**	**> 18.0**	**Total**
N	8	9	14	70	110	407	807	361	86	10	1	0	1883
NNE	3	7	16	64	123	390	899	546	158	3	0	0	2209
NE	4	10	16	70	117	389	1189	1148	333	5	0	0	3281
ENE	4	6	24	77	136	417	1272	893	170	8	5	0	3012
E	3	11	15	65	97	344	1064	597	71	5	0	0	2272
ESE	9	6	19	68	88	274	804	474	41	4	0	0	1787
SE	4	5	24	47	101	273	854	474	69	1	0	0	1852
SSE	3	13	25	100	157	548	1066	437	49	2	0	0	2400
S	3	9	29	106	186	545	1066	629	112	5	1	0	2691
SSW	5	14	22	56	98	354	1137	969	241	22	2	0	2920
SW	6	8	18	65	129	399	1309	1234	440	44	2	0	3654
WSW	8	8	14	57	112	384	1153	1212	487	60	9	0	3504
W	9	15	22	59	127	365	1033	1101	513	84	10	0	3338
WNW	4	9	18	58	80	286	702	681	302	56	4	0	2200
NW	2	6	24	59	94	335	750	473	98	11	2	0	1854
NNW	5	5	22	54	106	376	710	365	80	4	1	0	1728
Totals	80	141	322	1075	1861	6086	15815	11594	3250	324	37	0	40585

Number of Calm Hours for this Table	21
Number of Variable Direction Hours for this Table	488
Number of Invalid Hours	3217
Number of Valid Hours for this Table	40585
Total Hours for the Period	43823

Note: Stability class based on temperature difference (ΔT or lapse) between 10-m and 60-m measurement levels.

Table 2.7-12 PAVAN Output – Upper Envelope of the 5 Percent Overall Site Limit χ/Q_s at the Dose Calculation EAB (Building Wake Credit Not Included)

X/Q PERCENTILES
(BASED ON THE UPPER ENVELOPE OF THE
ORDERED X/Q-FREQUENCY VALUES, AND AS
PLOTTED ON A LOG-NORMAL GRAPH.)
PERCENT OF TIME CHI/Q IS EQUALED OR EXCEEDED

CHI/Q SEC/CUBIC METER	WITH RESPECT TO THE TOTAL TIME	WHEN THE WIND BLOWS INTO THIS SECTOR ONLY
7.398E-04	1.000	1.000
4.508E-04	3.000	3.000
3.486E-04	5.000	5.000
2.346E-04	10.000	10.000
1.814E-04	15.000	15.000
1.442E-04	20.000	20.000
1.229E-04	25.000	25.000
1.078E-04	30.000	30.000
9.747E-05	35.000	35.000
8.860E-05	40.000	40.000
8.079E-05	45.000	45.000
7.378E-05	50.000	50.000
6.738E-05	55.000	55.000
6.069E-05	60.000	60.000
5.399E-05	65.000	65.000
4.773E-05	70.000	70.000
4.178E-05	75.000	75.000
3.602E-05	80.000	80.000

Table 2.7-13 PAVAN Output – Upper Envelope of the 5 Percent Overall Site Limit χ/Q_s at the LPZ (Building Wake Credit Not Included)

X/Q PERCENTILES
(BASED ON THE UPPER ENVELOPE OF THE
ORDERED X/Q-FREQUENCY VALUES, AND AS
PLOTTED ON A LOG-NORMAL GRAPH.)
PERCENT OF TIME CHI/Q IS EQUALED OR EXCEEDED

CHI/Q SEC/CUBIC METER	WITH RESPECT TO THE TOTAL TIME	WHEN THE WIND BLOWS INTO THIS SECTOR ONLY
2.826E-04	1.000	1.000
1.677E-04	3.000	3.000
1.267E-04	5.000	5.000
8.316E-05	10.000	10.000
6.254E-05	15.000	15.000
4.946E-05	20.000	20.000
4.013E-05	25.000	25.000
3.348E-05	30.000	30.000
2.850E-05	35.000	35.000
2.446E-05	40.000	40.000
2.110E-05	45.000	45.000
1.825E-05	50.000	50.000
1.586E-05	55.000	55.000
1.378E-05	60.000	60.000
1.192E-05	65.000	65.000
1.023E-05	70.000	70.000
8.544E-06	75.000	75.000
6.960E-06	80.000	80.000

Table 2.7-14 Shortest Distances Between the VEGP Units 3 and 4 Power Block Area and Receptors of Interest by Downwind Direction Sector [a]

Direction	Meat Animal	Residence	Vegetable Garden	EAB[b]
N	1,071	1,071	1,071	800
NNE	1,071	1,071	1,071	800
NE	1,071	1,071	1,071	800
ENE	1,071	1,071	1,071	800
E	1,071	1,071	1,071	800
ESE	1,071	1,071	1,071	800
SE	1,071	1,071	1,071	800
SSE	1,071	1,071	1,071	800
S	1,071	1,071	1,071	800
SSW	1,071	1,071	1,071	800
SW	1,071	1,071	1,071	800
WSW	1,071	1,071	1,071	800
W	1,071	1,071	1,071	800
WNW	1,071	1,071	1,071	800
NW	1,071	1,071	1,071	800
NNW	1,071	1,071	1,071	800

Notes:

a – Distances shown are in meters.

b – EAB = Exclusion Area Boundary.

c – There are no milk-giving animals (i.e., cows, goats) within a 5-mile radius of the VEGP Units 3 and 4 Site.

Table 2.7-15 XOQDOQ-Predicted Maximum χ/Q and D/Q Values at Receptors of Interest

Type of Location	Direction from Site	Distance meters / (miles)	χ/Q (sec/m^3) (No Decay) (Undepleted)	χ/Q (sec/m^3) (2.26 Day Decay) (Undepleted)	χ/Q (sec/m3) (8 Day Decay) (Depleted)	D/Q (1/m2)
Residence	NE	1,071 (0.67)	3.4E-06	3.4E-06	3.0E-06	1.0E-08[a]
Dose Calculation EAB	NE	800 (0.5)	5.5E-06	5.5E-06	5.0E-06	1.7E-08[b]
Meat Animal	NE	1,071 (0.67)	3.4E-06	3.4E-06	3.0E-06	1.0E-08[a]
Vegetable Garden	NE	1,071 (0.67)	3.4E-06	3.4E-06	3.0E-06	1.0E-08[a]

Notes:

a - NE, ENE, and E

b - NE and ENE

Table 2.7-16 XOQDOQ-Predicted Maximum Annual Average χ/Q and D/Q Values at the Standard Radial Distances and Distance-Segment Boundaries

No Decay Uudepleted	DISTANCE IN MILES FROM THE SITE										
NE	0.25	0.50	0.75	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50
X/Q (s/m^3)	1.832E-5	5.438E-6	2.773E-6	1.778E-6	9.945E-7	6.633E-7	4.952E-7	3.914E-7	3.208E-7	2.702E-7	2.322E-7
	DISTANCE IN MILES FROM THE SITE										
NE	5.00	7.50	10.00	15.00	20.00	25.00	30.00	35.00	40.00	45.00	50.00
X/Q (s/m^3)	2.029E-7	1.209E-7	8.394E-8	5.038E-8	3.517E-8	2.666E-8	2.127E-8	1.759E-8	1.492E-8	1.291E-8	1.135E-8
	SEGMENT BOUNDARIES IN MILES FROM THE SITE										
NE	0.5 - 1	1 - 2	2 - 3	3 - 4	4 - 5	5 - 10	10 - 20	20 - 30	30 - 40	40 - 50	
X/Q (s/m^3)	2.923E-6	1.021E-6	4.985E-7	3.217E-7	2.326E-7	1.227E-7	5.108E-8	2.677E-8	1.763E-8	1.293E-8	
2.26 Day Decay, Undepleted	DISTANCE IN MILES FROM THE SITE										
NE	0.25	0.50	0.75	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50
X/Q (s/m^3)	1.828E-5	5.416E-6	2.757E-6	1.764E-6	9.828E-7	6.529E-7	4.855E-7	3.821E-7	3.120E-7	2.616E-7	2.240E-7
	DISTANCE IN MILES FROM THE SITE										
NE	5.00	7.50	10.00	15.00	20.00	25.00	30.00	35.00	40.00	45.00	50.00
X/Q (s/m^3)	1.949E-7	1.139E-7	7.753E-8	4.482E-8	3.019E-8	2.211E-8	1.708E-8	1.368E-8	1.128E-8*	9.497E-9*	8.125E-9*
	SEGMENT BOUNDARIES IN MILES FROM THE SITE										
NE	0.5 - 1	1 - 2	2 - 3	3 - 4	4 - 5	5 - 10	10 - 20	20 - 30	30 - 40	40 - 50	
X/Q (s/m^3)	2.907E-6	1.010E-6	4.888E-7	3.128E-7	2.244E-7	1.157E-7	4.559E-8	2.225E-8	1.373E-8	9.517E-9*	

Note: * ENE

Table 2.7-16 (cont.) XOQDOQ-Predicted Maximum Annual Average χ/Q and D/Q Values at the Standard Radial Distances and Distance-Segment Boundaries

8.0 Day Decay, Depleted	DISTANCE IN MILES FROM THE SITE										
NE	0.25	0.50	0.75	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50
X/Q (s/m^3)	1.732E-5	4.961E-6	2.467E-6	1.553E-6	8.418E-7	5.468E-7	3.989E-7	3.087E-7	2.483E-7	2.055E-7	1.737E-7
	DISTANCE IN MILES FROM THE SITE										
NE	5.00	7.50	10.00	15.00	20.00	25.00	30.00	35.00	40.00	45.00	50.00
X/Q (s/m^3)	1.495E-7	8.375E-8	5.508E-8	3.024E-8	1.960E-8	1.391E-8	1.046E-8	8.186E-9	6.598E-9	5.439E-9	4.564E-9
	SEGMENT BOUNDARIES IN MILES FROM THE SITE										
NE	0.5 - 1	1 - 2	2 - 3	3 - 4	4 - 5	5 - 10	10 - 20	20 - 30	30 - 40	40 - 50	
X/Q (s/m^3)	2.615E-6	8.687E-7	4.023E-7	2.493E-7	1.742E-7	8.562E-8	3.103E-8	1.405E-8	8.231E-9	5.458E-9	
Relative Deposition /Area	DISTANCE IN MILES FROM THE SITE										
NE	0.25	0.50	0.75	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50
D/Q ($1/m^2$)	4.897E-8	1.656E-8	8.503E-9	5.221E-9	2.603E-9	1.579E-9	1.067E-9	7.735E-10	5.882E-10	4.634E-10	3.751E-10
	DISTANCE IN MILES FROM THE SITE										
NE	5.00	7.50	10.00	15.00	20.00	25.00	30.00	35.00	40.00	45.00	50.00
D/Q ($1/m^2$)	3.103E-10	1.521E-10	9.541E-11	4.823E-11	2.919E-11	1.957E-11	1.402E-11	1.053E-11	8.187E-12	6.540E-12	5.338E-12
	SEGMENT BOUNDARIES IN MILES FROM THE SITE										
NE	0.5 - 1	1 - 2	2 - 3	3 - 4	4 - 5	5 - 10	10 - 20	20 - 30	30 – 40	40 - 50	
D/Q($1/m^2$)	8.835E-9	2.730E-9	1.086E-9	5.936E-10	3.773E-10	1.620E-10	5.025E-11	1.992E-11	1.064E-11	6.583E-12	

Note: * ENE

Table 2.7-17 Long-Term Average χ/Q Values (sec/m^3) for Routine Releases at Specific Receptors of Interest (1998–2002 Meteorological Data)

GROUND LEVEL RELEASE - NO PURGE RELEASES

Type of Location	Direction From Site	Distance (Miles)	Distance (Meters)	X/Q(Sec/m^3) NO DECAY UNDEPLETED	X/Q(Sec/m^3) 2.26 DAY DECAY UNDEPLETED	X/Q(Sec/m^3) 8.00 Day DECAY DEPLETED	D/Q (1/m^2)
RE MA VG	S	.67	1071.	2.1E-06	2.0E-06	1.8E-06	6.6E-09
RE MA VG	SSW	.67	1071.	1.9E-06	1.9E-06	1.7E-06	6.2E-09
RE MA VG	SW	.67	1071.	2.5E-06	2.5E-06	2.2E-06	8.6E-09
RE MA VG	WSW	.67	1071.	2.5E-06	2.5E-06	2.3E-06	9.4E-09
RE MA VG	W	.67	1071.	2.6E-06	2.6E-06	2.4E-06	8.3E-09
RE MA VG	WNW	.67	1071.	2.4E-06	2.3E-06	2.1E-06	6.3E-09
RE MA VG	NW	.67	1071.	2.2E-06	2.2E-06	1.9E-06	6.3E-09
RE MA VG	NNW	.67	1071.	2.3E-06	2.3E-06	2.1E-06	6.6E-09
RE MA VG	N	.67	1071.	2.4E-06	2.3E-06	2.1E-06	7.2E-09
RE MA VG	NNE	.67	1071.	2.6E-06	2.6E-06	2.4E-06	8.3E-09
RE MA VG	NE	.67	1071.	3.4E-06	3.4E-06	3.0E-06	1.0E-08
RE MA VG	ENE	.67	1071.	3.3E-06	3.3E-06	2.9E-06	1.0E-08
RE MA VG	E	.67	1071.	3.0E-06	3.0E-06	2.7E-06	1.0E-08
RE MA VG	ESE	.67	1071.	2.3E-06	2.2E-06	2.0E-06	7.7E-09
RE MA VG	SE	.67	1071.	1.8E-06	1.8E-06	1.6E-06	5.3E-09
RE MA VG	SSE	.67	1071.	1.7E-06	1.7E-06	1.5E-06	5.2E-09
Unit3-4	WSW	.15	244.	3.3E-05	3.3E-05	3.2E-05	9.3E-08
Unit3-4	W	.15	244.	3.5E-05	3.5E-05	3.4E-05	8.2E-08
Unit3-4	WNW	.15	244.	3.1E-05	3.1E-05	3.0E-05	6.2E-08
SITE BOUNDARY	S	.50	800.	3.3E-06	3.3E-06	3.0E-06	1.1E-08
SITE BOUNDARY	SSW	.50	800.	3.0E-06	3.0E-06	2.8E-06	9.9E-09
SITE BOUNDARY	SW	.50	800.	4.0E-06	4.0E-06	3.7E-06	1.4E-08
SITE BOUNDARY	WSW	.50	800.	4.1E-06	4.0E-06	3.7E-06	1.5E-08
SITE BOUNDARY	W	.50	800.	4.3E-06	4.3E-06	3.9E-06	1.3E-08
SITE BOUNDARY	WNW	.50	800.	3.8E-06	3.8E-06	3.5E-06	1.0E-08
SITE BOUNDARY	NW	.50	800.	3.5E-06	3.5E-06	3.2E-06	1.0E-08
SITE BOUNDARY	NNW	.50	800.	3.7E-06	3.6E-06	3.3E-06	1.1E-08
SITE BOUNDARY	N	.50	800.	3.8E-06	3.7E-06	3.4E-06	1.2E-08
SITE BOUNDARY	NNE	.50	800.	4.3E-06	4.3E-06	3.9E-06	1.3E-08
SITE BOUNDARY	NE	.50	800.	5.5E-06	5.5E-06	5.0E-06	1.7E-08
SITE BOUNDARY	ENE	.50	800.	5.3E-06	5.3E-06	4.9E-06	1.7E-08
SITE BOUNDARY	E	.50	800.	4.9E-06	4.9E-06	4.5E-06	1.6E-08
SITE BOUNDARY	ESE	.50	800.	3.7E-06	3.7E-06	3.3E-06	1.2E-08
SITE BOUNDARY	SE	.50	800.	2.9E-06	2.9E-06	2.7E-06	8.6E-09
SITE BOUNDARY	SSE	.50	800.	2.7E-06	2.7E-06	2.5E-06	8.3E-09

RE = Residence
MA = Meat Animal
VG = Vegetable Garden

Table 2.7-18 Long-Term Average χ/Q Values (sec/m^3) for Routine Releases at Distances Between 0.25 and 50 mi, No Decay, Undepleted

NO DECAY, UNDEPLETED

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) DISTANCE IN MILES FROM THE SITE											
SECTOR	.250	.500	.750	1.000	1.500	2.000	2.500	3.000	3.500	4.000	4.500
S	1.097E-05	3.306E-06	1.697E-06	1.088E-06	6.032E-07	3.998E-07	2.971E-07	2.339E-07	1.912E-07	1.606E-07	1.377E-07
SSW	9.903E-06	2.986E-06	1.546E-06	9.958E-07	5.570E-07	3.707E-07	2.750E-07	2.160E-07	1.762E-07	1.478E-07	1.265E-07
SW	1.326E-05	3.993E-06	2.063E-06	1.328E-06	7.408E-07	4.926E-07	3.660E-07	2.881E-07	2.353E-07	1.976E-07	1.694E-07
WSW	1.342E-05	4.026E-06	2.076E-06	1.336E-06	7.479E-07	4.982E-07	3.702E-07	2.912E-07	2.378E-07	1.996E-07	1.711E-07
W	1.421E-05	4.237E-06	2.168E-06	1.392E-06	7.796E-07	5.201E-07	3.877E-07	3.059E-07	2.504E-07	2.106E-07	1.808E-07
WNW	1.282E-05	3.803E-06	1.947E-06	1.251E-06	7.014E-07	4.684E-07	3.498E-07	2.764E-07	2.266E-07	1.908E-07	1.639E-07
NW	1.157E-05	3.450E-06	1.790E-06	1.156E-06	6.516E-07	4.357E-07	3.241E-07	2.552E-07	2.086E-07	1.751E-07	1.502E-07
NNW	1.210E-05	3.626E-06	1.899E-06	1.231E-06	6.940E-07	4.637E-07	3.443E-07	2.706E-07	2.208E-07	1.852E-07	1.586E-07
N	1.239E-05	3.719E-06	1.951E-06	1.266E-06	7.147E-07	4.779E-07	3.543E-07	2.781E-07	2.266E-07	1.898E-07	1.624E-07
NNE	1.424E-05	4.240E-06	2.171E-06	1.395E-06	7.821E-07	5.221E-07	3.892E-07	3.071E-07	2.515E-07	2.115E-07	1.816E-07
NE	1.832E-05	5.438E-06	2.773E-06	1.778E-06	9.945E-07	6.633E-07	4.952E-07	3.914E-07	3.208E-07	2.702E-07	2.322E-07
ENE	1.781E-05	5.295E-06	2.696E-06	1.728E-06	9.670E-07	6.451E-07	4.816E-07	3.805E-07	3.119E-07	2.626E-07	2.257E-07
E	1.645E-05	4.895E-06	2.488E-06	1.591E-06	8.856E-07	5.890E-07	4.395E-07	3.473E-07	2.847E-07	2.397E-07	2.060E-07
ESE	1.211E-05	3.630E-06	1.865E-06	1.198E-06	6.685E-07	4.449E-07	3.310E-07	2.607E-07	2.132E-07	1.791E-07	1.537E-07
SE	9.657E-06	2.893E-06	1.486E-06	9.531E-07	5.289E-07	3.509E-07	2.611E-07	2.058E-07	1.684E-07	1.415E-07	1.215E-07
SSE	9.037E-06	2.711E-06	1.382E-06	8.836E-07	4.892E-07	3.242E-07	2.413E-07	1.903E-07	1.558E-07	1.310E-07	1.125E-07

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) DISTANCE IN MILES FROM THE SITE											
SECTOR	5.000	7.500	10.000	15.000	20.000	25.000	30.000	35.000	40.000	45.000	50.000
S	1.201E-07	7.112E-08	4.917E-08	2.936E-08	2.045E-08	1.546E-08	1.232E-08	1.018E-08	8.626E-09	7.459E-09	6.552E-09
SSW	1.102E-07	6.491E-08	4.471E-08	2.655E-08	1.841E-08	1.388E-08	1.103E-08	9.093E-09	7.694E-09	6.642E-09	5.826E-09
SW	1.477E-07	8.727E-08	6.025E-08	3.589E-08	2.493E-08	1.883E-08	1.498E-08	1.236E-08	1.046E-08	9.039E-09	7.932E-09
WSW	1.492E-07	8.812E-08	6.081E-08	3.621E-08	2.515E-08	1.899E-08	1.511E-08	1.246E-08	1.055E-08	9.113E-09	7.996E-09
W	1.579E-07	9.376E-08	6.494E-08	3.885E-08	2.707E-08	2.048E-08	1.632E-08	1.348E-08	1.143E-08	9.884E-09	8.682E-09
WNW	1.432E-07	8.529E-08	5.918E-08	3.548E-08	2.475E-08	1.875E-08	1.495E-08	1.236E-08	1.048E-08	9.067E-09	7.967E-09
NW	1.309E-07	7.737E-08	5.339E-08	3.178E-08	2.206E-08	1.664E-08	1.323E-08	1.091E-08	9.232E-09	7.971E-09	6.992E-09
NNW	1.381E-07	8.131E-08	5.597E-08	3.318E-08	2.297E-08	1.730E-08	1.373E-08	1.130E-08	9.553E-09	8.239E-09	7.221E-09
N	1.413E-07	8.295E-08	5.697E-08	3.369E-08	2.328E-08	1.751E-08	1.388E-08	1.142E-08	9.644E-09	8.313E-09	7.281E-09
NNE	1.585E-07	9.419E-08	6.524E-08	3.904E-08	2.720E-08	2.058E-08	1.640E-08	1.355E-08	1.149E-08	9.932E-09	8.724E-09
NE	2.029E-07	1.209E-07	8.394E-08	5.038E-08	3.517E-08	2.666E-08	2.127E-08	1.759E-08	1.492E-08	1.291E-08	1.135E-08
ENE	1.971E-07	1.174E-07	8.150E-08	4.889E-08	3.413E-08	2.586E-08	2.064E-08	1.706E-08	1.447E-08	1.253E-08	1.101E-08
E	1.800E-07	1.073E-07	7.453E-08	4.477E-08	3.129E-08	2.373E-08	1.895E-08	1.568E-08	1.331E-08	1.152E-08	1.013E-08
ESE	1.341E-07	7.943E-08	5.492E-08	3.279E-08	2.282E-08	1.725E-08	1.374E-08	1.134E-08	9.613E-09	8.310E-09	7.297E-09
SE	1.060E-07	6.292E-08	4.357E-08	2.607E-08	1.818E-08	1.376E-08	1.097E-08	9.066E-09	7.689E-09	6.652E-09	5.845E-09
SSE	9.818E-08	5.836E-08	4.046E-08	2.425E-08	1.693E-08	1.283E-08	1.024E-08	8.467E-09	7.186E-09	6.220E-09	5.468E-09

Table 2.7-19 Long-Term Average χ/Q Values (sec/m^3) for Routine Releases at the Standard Distance Segments Between 0.5 and 50 mi, No Decay, Undepleted

	SEGMENT BOUNDARIES IN MILES FROM THE SITE									
DIRECTION FROM SITE	.5-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
S	1.784E-06	6.205E-07	2.992E-07	1.917E-07	1.380E-07	7.225E-08	2.980E-08	1.554E-08	1.020E-08	7.469E-09
SSW	1.621E-06	5.717E-07	2.769E-07	1.767E-07	1.268E-07	6.600E-08	2.697E-08	1.395E-08	9.115E-09	6.651E-09
SW	2.165E-06	7.609E-07	3.686E-07	2.360E-07	1.697E-07	8.868E-08	3.643E-08	1.892E-08	1.238E-08	9.051E-09
WSW	2.181E-06	7.677E-07	3.727E-07	2.385E-07	1.714E-07	8.955E-08	3.676E-08	1.908E-08	1.249E-08	9.125E-09
W	2.283E-06	8.003E-07	3.903E-07	2.511E-07	1.812E-07	9.519E-08	3.941E-08	2.057E-08	1.351E-08	9.897E-09
WNW	2.050E-06	7.200E-07	3.521E-07	2.272E-07	1.642E-07	8.656E-08	3.598E-08	1.883E-08	1.238E-08	9.079E-09
NW	1.877E-06	6.678E-07	3.263E-07	2.092E-07	1.504E-07	7.861E-08	3.226E-08	1.672E-08	1.093E-08	7.982E-09
NNW	1.986E-06	7.111E-07	3.467E-07	2.215E-07	1.589E-07	8.267E-08	3.371E-08	1.738E-08	1.133E-08	8.251E-09
N	2.039E-06	7.319E-07	3.568E-07	2.273E-07	1.627E-07	8.438E-08	3.424E-08	1.760E-08	1.145E-08	8.325E-09
NNE	2.286E-06	8.027E-07	3.918E-07	2.521E-07	1.819E-07	9.562E-08	3.960E-08	2.068E-08	1.358E-08	9.945E-09
NE	2.923E-06	1.021E-06	4.985E-07	3.217E-07	2.326E-07	1.227E-07	5.108E-08	2.677E-08	1.763E-08	1.293E-08
ENE	2.843E-06	9.930E-07	4.847E-07	3.127E-07	2.260E-07	1.192E-07	4.958E-08	2.598E-08	1.710E-08	1.254E-08
E	2.624E-06	9.106E-07	4.425E-07	2.854E-07	2.064E-07	1.089E-07	4.539E-08	2.383E-08	1.571E-08	1.154E-08
ESE	1.961E-06	6.867E-07	3.333E-07	2.138E-07	1.540E-07	8.068E-08	3.328E-08	1.733E-08	1.137E-08	8.321E-09
SE	1.562E-06	5.440E-07	2.629E-07	1.688E-07	1.217E-07	6.390E-08	2.645E-08	1.382E-08	9.086E-09	6.660E-09
SSE	1.456E-06	5.035E-07	2.430E-07	1.562E-07	1.127E-07	5.925E-08	2.460E-08	1.289E-08	8.486E-09	6.228E-09

Table 2.7-20 Long-Term Average χ/Q Values (sec/m^3) for Routine Releases at Distances Between 0.25 and 50 mi, 2.26-Day Decay, Undepleted

2.260 DAY DECAY, UNDEPLETED

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) SECTOR	DISTANCE IN MILES FROM THE SITE .250	.500	.750	1.000	1.500	2.000	2.500	3.000	3.500	4.000	4.500
S	1.094E-05	3.291E-06	1.685E-06	1.078E-06	5.950E-07	3.926E-07	2.903E-07	2.275E-07	1.850E-07	1.547E-07	1.320E-07
SSW	9.877E-06	2.971E-06	1.534E-06	9.859E-07	5.488E-07	3.634E-07	2.682E-07	2.096E-07	1.701E-07	1.419E-07	1.208E-07
SW	1.322E-05	3.970E-06	2.046E-06	1.314E-06	7.293E-07	4.824E-07	3.565E-07	2.790E-07	2.266E-07	1.892E-07	1.613E-07
WSW	1.339E-05	4.007E-06	2.062E-06	1.324E-06	7.381E-07	4.895E-07	3.620E-07	2.835E-07	2.305E-07	1.926E-07	1.643E-07
W	1.418E-05	4.218E-06	2.154E-06	1.380E-06	7.698E-07	5.114E-07	3.795E-07	2.981E-07	2.430E-07	2.035E-07	1.740E-07
WNW	1.279E-05	3.784E-06	1.933E-06	1.239E-06	6.915E-07	4.596E-07	3.416E-07	2.686E-07	2.191E-07	1.836E-07	1.570E-07
NW	1.154E-05	3.433E-06	1.777E-06	1.145E-06	6.424E-07	4.275E-07	3.165E-07	2.480E-07	2.017E-07	1.685E-07	1.438E-07
NNW	1.208E-05	3.609E-06	1.887E-06	1.221E-06	6.849E-07	4.556E-07	3.368E-07	2.635E-07	2.140E-07	1.787E-07	1.524E-07
N	1.237E-05	3.704E-06	1.940E-06	1.256E-06	7.066E-07	4.707E-07	3.476E-07	2.717E-07	2.206E-07	1.841E-07	1.569E-07
NNE	1.421E-05	4.222E-06	2.158E-06	1.384E-06	7.729E-07	5.139E-07	3.815E-07	2.998E-07	2.445E-07	2.048E-07	1.751E-07
NE	1.828E-05	5.416E-06	2.757E-06	1.764E-06	9.828E-07	6.529E-07	4.855E-07	3.821E-07	3.120E-07	2.616E-07	2.240E-07
ENE	1.778E-05	5.276E-06	2.682E-06	1.716E-06	9.571E-07	6.363E-07	4.734E-07	3.727E-07	3.044E-07	2.554E-07	2.187E-07
E	1.642E-05	4.877E-06	2.474E-06	1.580E-06	8.761E-07	5.806E-07	4.316E-07	3.398E-07	2.774E-07	2.327E-07	1.993E-07
ESE	1.208E-05	3.614E-06	1.852E-06	1.187E-06	6.598E-07	4.372E-07	3.238E-07	2.539E-07	2.067E-07	1.729E-07	1.476E-07
SE	9.629E-06	2.877E-06	1.474E-06	9.430E-07	5.206E-07	3.436E-07	2.543E-07	1.993E-07	1.621E-07	1.355E-07	1.157E-07
SSE	9.014E-06	2.698E-06	1.372E-06	8.751E-07	4.822E-07	3.180E-07	2.355E-07	1.848E-07	1.505E-07	1.259E-07	1.076E-07

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) SECTOR	DISTANCE IN MILES FROM THE SITE 5.000	7.500	10.000	15.000	20.000	25.000	30.000	35.000	40.000	45.000	50.000
S	1.146E-07	6.625E-08	4.475E-08	2.555E-08	1.704E-08	1.237E-08	9.479E-09	7.538E-09	6.161E-09	5.143E-09	4.365E-09
SSW	1.047E-07	6.009E-08	4.035E-08	2.281E-08	1.510E-08	1.089E-08	8.297E-09	6.564E-09	5.340E-09	4.439E-09	3.753E-09
SW	1.398E-07	8.037E-08	5.400E-08	3.052E-08	2.017E-08	1.453E-08	1.105E-08	8.735E-09	7.099E-09	5.895E-09	4.980E-09
WSW	1.425E-07	8.232E-08	5.556E-08	3.170E-08	2.114E-08	1.535E-08	1.177E-08	9.371E-09	7.669E-09	6.410E-09	5.448E-09
W	1.512E-07	8.787E-08	5.958E-08	3.421E-08	2.292E-08	1.671E-08	1.285E-08	1.025E-08	8.402E-09	7.033E-09	5.985E-09
WNW	1.365E-07	7.939E-08	5.383E-08	3.087E-08	2.064E-08	1.501E-08	1.152E-08	9.172E-09	7.505E-09	6.270E-09	5.325E-09
NW	1.248E-07	7.200E-08	4.855E-08	2.763E-08	1.839E-08	1.332E-08	1.019E-08	8.096E-09	6.610E-09	5.513E-09	4.676E-09
NNW	1.321E-07	7.604E-08	5.121E-08	2.911E-08	1.936E-08	1.402E-08	1.072E-08	8.517E-09	6.954E-09	5.799E-09	4.918E-09
N	1.360E-07	7.827E-08	5.275E-08	3.006E-08	2.005E-08	1.457E-08	1.118E-08	8.907E-09	7.293E-09	6.099E-09	5.186E-09
NNE	1.522E-07	8.863E-08	6.019E-08	3.466E-08	2.328E-08	1.701E-08	1.311E-08	1.048E-08	8.613E-09	7.225E-09	6.161E-09
NE	1.949E-07	1.139E-07	7.753E-08	4.482E-08	3.019E-08	2.211E-08	1.708E-08	1.368E-08	1.126E-08	9.457E-09	8.075E-09
ENE	1.904E-07	1.115E-07	7.610E-08	4.418E-08	2.989E-08	2.197E-08	1.702E-08	1.367E-08	1.128E-08	9.497E-09	8.125E-09
E	1.735E-07	1.015E-07	6.923E-08	4.014E-08	2.711E-08	1.990E-08	1.540E-08	1.235E-08	1.017E-08	8.554E-09	7.309E-09
ESE	1.282E-07	7.428E-08	5.025E-08	2.876E-08	1.922E-08	1.398E-08	1.073E-08	8.548E-09	6.998E-09	5.850E-09	4.972E-09
SE	1.004E-07	5.796E-08	3.906E-08	2.217E-08	1.470E-08	1.061E-08	8.086E-09	6.396E-09	5.200E-09	4.319E-09	3.648E-09
SSE	9.345E-08	5.419E-08	3.667E-08	2.098E-08	1.401E-08	1.018E-08	7.804E-09	6.208E-09	5.075E-09	4.237E-09	3.596E-09

Table 2.7-21 Long-Term Average χ/Q Values (sec/m^3) for Routine Releases at the Standard Distance Segments Between 0.5 and 50 mi, 2.26-Day Decay, Undepleted

	SEGMENT BOUNDARIES IN MILES FROM THE SITE									
DIRECTION FROM SITE	.5-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
S	1.772E-06	6.124E-07	2.925E-07	1.856E-07	1.323E-07	6.743E-08	2.603E-08	1.246E-08	7.568E-09	5.157E-09
SSW	1.610E-06	5.635E-07	2.701E-07	1.706E-07	1.211E-07	6.123E-08	2.328E-08	1.098E-08	6.593E-09	4.452E-09
SW	2.148E-06	7.494E-07	3.590E-07	2.273E-07	1.616E-07	8.186E-08	3.114E-08	1.464E-08	8.774E-09	5.913E-09
WSW	2.167E-06	7.579E-07	3.646E-07	2.312E-07	1.646E-07	8.381E-08	3.231E-08	1.546E-08	9.409E-09	6.427E-09
W	2.269E-06	7.905E-07	3.821E-07	2.437E-07	1.743E-07	8.936E-08	3.483E-08	1.682E-08	1.029E-08	7.050E-09
WNW	2.036E-06	7.101E-07	3.439E-07	2.197E-07	1.573E-07	8.072E-08	3.142E-08	1.512E-08	9.208E-09	6.286E-09
NW	1.864E-06	6.587E-07	3.187E-07	2.023E-07	1.441E-07	7.330E-08	2.817E-08	1.342E-08	8.129E-09	5.528E-09
NNW	1.973E-06	7.020E-07	3.392E-07	2.147E-07	1.526E-07	7.746E-08	2.968E-08	1.412E-08	8.552E-09	5.815E-09
N	2.028E-06	7.238E-07	3.501E-07	2.213E-07	1.572E-07	7.975E-08	3.065E-08	1.468E-08	8.942E-09	6.115E-09
NNE	2.273E-06	7.935E-07	3.841E-07	2.452E-07	1.754E-07	9.012E-08	3.528E-08	1.712E-08	1.052E-08	7.242E-09
NE	2.907E-06	1.010E-06	4.888E-07	3.128E-07	2.244E-07	1.157E-07	4.559E-08	2.225E-08	1.373E-08	9.478E-09
ENE	2.829E-06	9.832E-07	4.765E-07	3.053E-07	2.191E-07	1.133E-07	4.492E-08	2.210E-08	1.372E-08	9.517E-09
E	2.611E-06	9.012E-07	4.346E-07	2.782E-07	1.996E-07	1.032E-07	4.082E-08	2.002E-08	1.239E-08	8.573E-09
ESE	1.948E-06	6.780E-07	3.261E-07	2.073E-07	1.479E-07	7.558E-08	2.930E-08	1.408E-08	8.582E-09	5.865E-09
SE	1.550E-06	5.358E-07	2.561E-07	1.626E-07	1.159E-07	5.899E-08	2.261E-08	1.069E-08	6.423E-09	4.332E-09
SSE	1.446E-06	4.966E-07	2.372E-07	1.509E-07	1.078E-07	5.513E-08	2.137E-08	1.025E-08	6.232E-09	4.248E-09

Table 2.7-22 Long-Term Average χ/Q Values (sec/m^3) for Routine Releases at Distances Between 0.25 and 50 mi, 8.00-Day Decay, Depleted

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) SECTOR	.250	.500	.750	1.000	DISTANCE IN MILES FROM THE SITE 1.500	2.000	2.500	3.000	3.500	4.000	4.500
S	1.037E-05	3.015E-06	1.509E-06	9.497E-07	5.103E-07	3.294E-07	2.391E-07	1.843E-07	1.478E-07	1.219E-07	1.029E-07
SSW	9.366E-06	2.723E-06	1.375E-06	8.692E-07	4.710E-07	3.052E-07	2.211E-07	1.701E-07	1.361E-07	1.121E-07	9.441E-08
SW	1.254E-05	3.640E-06	1.834E-06	1.159E-06	6.264E-07	4.055E-07	2.943E-07	2.267E-07	1.816E-07	1.498E-07	1.263E-07
WSW	1.269E-05	3.671E-06	1.847E-06	1.167E-06	6.328E-07	4.105E-07	2.979E-07	2.295E-07	1.839E-07	1.517E-07	1.279E-07
W	1.344E-05	3.864E-06	1.928E-06	1.215E-06	6.597E-07	4.286E-07	3.121E-07	2.412E-07	1.937E-07	1.601E-07	1.352E-07
WNW	1.213E-05	3.468E-06	1.731E-06	1.092E-06	5.933E-07	3.858E-07	2.814E-07	2.178E-07	1.751E-07	1.448E-07	1.224E-07
NW	1.094E-05	3.146E-06	1.592E-06	1.010E-06	5.511E-07	3.588E-07	2.608E-07	2.011E-07	1.612E-07	1.330E-07	1.121E-07
NNW	1.145E-05	3.307E-06	1.689E-06	1.075E-06	5.872E-07	3.821E-07	2.772E-07	2.133E-07	1.708E-07	1.407E-07	1.185E-07
N	1.172E-05	3.392E-06	1.736E-06	1.105E-06	6.050E-07	3.940E-07	2.855E-07	2.194E-07	1.755E-07	1.444E-07	1.216E-07
NNE	1.347E-05	3.867E-06	1.931E-06	1.218E-06	6.620E-07	4.304E-07	3.135E-07	2.423E-07	1.946E-07	1.609E-07	1.359E-07
NE	1.732E-05	4.961E-06	2.467E-06	1.553E-06	8.418E-07	5.468E-07	3.989E-07	3.087E-07	2.483E-07	2.055E-07	1.737E-07
ENE	1.685E-05	4.830E-06	2.399E-06	1.510E-06	8.188E-07	5.321E-07	3.882E-07	3.005E-07	2.417E-07	2.000E-07	1.691E-07
E	1.556E-05	4.465E-06	2.214E-06	1.390E-06	7.498E-07	4.858E-07	3.542E-07	2.741E-07	2.205E-07	1.824E-07	1.543E-07
ESE	1.145E-05	3.311E-06	1.658E-06	1.046E-06	5.657E-07	3.666E-07	2.664E-07	2.055E-07	1.649E-07	1.361E-07	1.149E-07
SE	9.132E-06	2.638E-06	1.321E-06	8.317E-07	4.472E-07	2.888E-07	2.099E-07	1.620E-07	1.300E-07	1.073E-07	9.057E-08
SSE	8.546E-06	2.472E-06	1.229E-06	7.713E-07	4.138E-07	2.670E-07	1.941E-07	1.499E-07	1.203E-07	9.942E-08	8.395E-08

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) SECTOR	5.000	7.500	10.000	15.000	DISTANCE IN MILES FROM THE SITE 20.000	25.000	30.000	35.000	40.000	45.000	50.000
S	8.830E-08	4.910E-08	3.212E-08	1.750E-08	1.128E-08	7.974E-09	5.973E-09	4.658E-09	3.742E-09	3.075E-09	2.573E-09
SSW	8.093E-08	4.473E-08	2.913E-08	1.576E-08	1.011E-08	7.112E-09	5.306E-09	4.124E-09	3.302E-09	2.706E-09	2.257E-09
SW	1.083E-07	6.005E-08	3.917E-08	2.123E-08	1.362E-08	9.585E-09	7.151E-09	5.556E-09	4.447E-09	3.642E-09	3.037E-09
WSW	1.097E-07	6.089E-08	3.977E-08	2.162E-08	1.391E-08	9.820E-09	7.348E-09	5.727E-09	4.598E-09	3.776E-09	3.158E-09
W	1.162E-07	6.485E-08	4.253E-08	2.325E-08	1.502E-08	1.063E-08	7.975E-09	6.228E-09	5.010E-09	4.122E-09	3.453E-09
WNW	1.053E-07	5.888E-08	3.865E-08	2.115E-08	1.367E-08	9.672E-09	7.254E-09	5.662E-09	4.553E-09	3.744E-09	3.134E-09
NW	9.623E-08	5.340E-08	3.487E-08	1.894E-08	1.217E-08	8.583E-09	6.417E-09	4.996E-09	4.007E-09	3.289E-09	2.748E-09
NNW	1.016E-07	5.621E-08	3.662E-08	1.983E-08	1.272E-08	8.959E-09	6.692E-09	5.207E-09	4.174E-09	3.424E-09	2.861E-09
N	1.042E-07	5.750E-08	3.742E-08	2.024E-08	1.299E-08	9.151E-09	6.839E-09	5.326E-09	4.274E-09	3.509E-09	2.935E-09
NNE	1.168E-07	6.523E-08	4.280E-08	2.342E-08	1.514E-08	1.073E-08	8.055E-09	6.296E-09	5.069E-09	4.174E-09	3.499E-09
NE	1.495E-07	8.375E-08	5.508E-08	3.024E-08	1.960E-08	1.391E-08	1.046E-08	8.186E-09	6.598E-09	5.439E-09	4.564E-09
ENE	1.455E-07	8.155E-08	5.366E-08	2.950E-08	1.915E-08	1.361E-08	1.025E-08	8.034E-09	6.485E-09	5.353E-09	4.498E-09
E	1.327E-07	7.444E-08	4.899E-08	2.694E-08	1.749E-08	1.244E-08	9.364E-09	7.338E-09	5.921E-09	4.886E-09	4.104E-09
ESE	9.864E-08	5.490E-08	3.594E-08	1.960E-08	1.264E-08	8.935E-09	6.696E-09	5.224E-09	4.199E-09	3.452E-09	2.889E-09
SE	7.778E-08	4.330E-08	2.833E-08	1.543E-08	9.936E-09	7.011E-09	5.243E-09	4.081E-09	3.272E-09	2.684E-09	2.241E-09
SSE	7.214E-08	4.026E-08	2.640E-08	1.443E-08	9.323E-09	6.599E-09	4.948E-09	3.863E-09	3.105E-09	2.553E-09	2.137E-09

Table 2.7-23 Long-Term Average χ/Q Values (sec/m^3) for Routine Releases at the Standard Distance Segments Between 0.5 and 50 mi, 8.00-Day Decay, Depleted

	SEGMENT BOUNDARIES IN MILES FROM THE SITE									
DIRECTION FROM SITE	.5-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
S	1.595E-06	5.275E-07	2.412E-07	1.484E-07	1.031E-07	5.027E-08	1.799E-08	8.056E-09	4.685E-09	3.087E-09
SSW	1.450E-06	4.858E-07	2.231E-07	1.367E-07	9.466E-08	4.584E-08	1.622E-08	7.189E-09	4.149E-09	2.716E-09
SW	1.935E-06	6.465E-07	2.969E-07	1.824E-07	1.266E-07	6.150E-08	2.184E-08	9.688E-09	5.589E-09	3.657E-09
WSW	1.950E-06	6.526E-07	3.006E-07	1.847E-07	1.282E-07	6.235E-08	2.223E-08	9.923E-09	5.760E-09	3.791E-09
W	2.042E-06	6.805E-07	3.148E-07	1.945E-07	1.355E-07	6.634E-08	2.387E-08	1.074E-08	6.263E-09	4.138E-09
WNW	1.833E-06	6.119E-07	2.838E-07	1.758E-07	1.227E-07	6.020E-08	2.171E-08	9.769E-09	5.694E-09	3.758E-09
NW	1.678E-06	5.675E-07	2.630E-07	1.618E-07	1.124E-07	5.468E-08	1.947E-08	8.674E-09	5.025E-09	3.301E-09
NNW	1.776E-06	6.045E-07	2.796E-07	1.715E-07	1.188E-07	5.760E-08	2.040E-08	9.056E-09	5.238E-09	3.438E-09
N	1.824E-06	6.224E-07	2.880E-07	1.762E-07	1.219E-07	5.895E-08	2.084E-08	9.250E-09	5.357E-09	3.523E-09
NNE	2.045E-06	6.826E-07	3.162E-07	1.954E-07	1.362E-07	6.672E-08	2.404E-08	1.084E-08	6.331E-09	4.189E-09
NE	2.615E-06	8.687E-07	4.023E-07	2.493E-07	1.742E-07	8.562E-08	3.103E-08	1.405E-08	8.231E-09	5.458E-09
ENE	2.544E-06	8.449E-07	3.915E-07	2.426E-07	1.695E-07	8.336E-08	3.027E-08	1.374E-08	8.077E-09	5.372E-09
E	2.348E-06	7.747E-07	3.572E-07	2.213E-07	1.546E-07	7.609E-08	2.764E-08	1.256E-08	7.377E-09	4.904E-09
ESE	1.753E-06	5.838E-07	2.688E-07	1.655E-07	1.151E-07	5.619E-08	2.014E-08	9.027E-09	5.254E-09	3.465E-09
SE	1.396E-06	4.622E-07	2.118E-07	1.305E-07	9.079E-08	4.431E-08	1.586E-08	7.084E-09	4.105E-09	2.694E-09
SSE	1.302E-06	4.280E-07	1.959E-07	1.208E-07	8.416E-08	4.118E-08	1.482E-08	6.665E-09	3.884E-09	2.563E-09

Table 2.7-24 Long-Term Average D/Q Values ($1/m^2$) for Routine Releases at Distances Between 0.25 and 50 mi

GROUND LEVEL RELEASE - NO PURGE RELEASES

********** RELATIVE DEPOSITION PER UNIT AREA (M**-2) AT FIXED POINTS BY DOWNWIND SECTORS **********											
DIRECTION					DISTANCES IN MILES						
FROM SITE	.25	.50	.75	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50
S	3.128E-08	1.058E-08	5.431E-09	3.335E-09	1.663E-09	1.008E-09	6.817E-10	4.940E-10	3.756E-10	2.959E-10	2.396E-10
SSW	2.900E-08	9.807E-09	5.035E-09	3.092E-09	1.541E-09	9.348E-10	6.321E-10	4.580E-10	3.483E-10	2.744E-10	2.221E-10
SW	4.066E-08	1.375E-08	7.059E-09	4.334E-09	2.161E-09	1.311E-09	8.861E-10	6.421E-10	4.882E-10	3.847E-10	3.114E-10
WSW	4.440E-08	1.502E-08	7.710E-09	4.734E-09	2.360E-09	1.431E-09	9.678E-10	7.013E-10	5.333E-10	4.201E-10	3.401E-10
W	3.911E-08	1.323E-08	6.791E-09	4.170E-09	2.079E-09	1.261E-09	8.525E-10	6.177E-10	4.697E-10	3.701E-10	2.996E-10
WNW	2.948E-08	9.971E-09	5.119E-09	3.143E-09	1.567E-09	9.505E-10	6.426E-10	4.657E-10	3.541E-10	2.790E-10	2.258E-10
NW	2.963E-08	1.002E-08	5.145E-09	3.159E-09	1.575E-09	9.552E-10	6.458E-10	4.680E-10	3.559E-10	2.804E-10	2.270E-10
NNW	3.119E-08	1.055E-08	5.415E-09	3.325E-09	1.658E-09	1.005E-09	6.797E-10	4.925E-10	3.745E-10	2.951E-10	2.389E-10
N	3.408E-08	1.152E-08	5.917E-09	3.633E-09	1.811E-09	1.099E-09	7.427E-10	5.382E-10	4.092E-10	3.224E-10	2.610E-10
NNE	3.910E-08	1.322E-08	6.789E-09	4.169E-09	2.078E-09	1.260E-09	8.522E-10	6.175E-10	4.696E-10	3.699E-10	2.995E-10
NE	4.897E-08	1.656E-08	8.503E-09	5.221E-09	2.603E-09	1.579E-09	1.067E-09	7.735E-10	5.882E-10	4.634E-10	3.751E-10
ENE	4.850E-08	1.640E-08	8.422E-09	5.171E-09	2.578E-09	1.564E-09	1.057E-09	7.661E-10	5.825E-10	4.589E-10	3.715E-10
E	4.798E-08	1.622E-08	8.330E-09	5.115E-09	2.550E-09	1.547E-09	1.046E-09	7.578E-10	5.762E-10	4.539E-10	3.675E-10
ESE	3.612E-08	1.221E-08	6.271E-09	3.851E-09	1.920E-09	1.164E-09	7.872E-10	5.704E-10	4.338E-10	3.417E-10	2.766E-10
SE	2.507E-08	8.478E-09	4.353E-09	2.673E-09	1.333E-09	8.082E-10	5.464E-10	3.960E-10	3.011E-10	2.372E-10	1.920E-10
SSE	2.440E-08	8.252E-09	4.237E-09	2.602E-09	1.297E-09	7.867E-10	5.319E-10	3.854E-10	2.931E-10	2.309E-10	1.869E-10

0DIRECTION					DISTANCES IN MILES						
FROM SITE	5.00	7.50	10.00	15.00	20.00	25.00	30.00	35.00	40.00	45.00	50.00
S	1.982E-10	9.712E-11	6.094E-11	3.080E-11	1.864E-11	1.250E-11	8.956E-12	6.725E-12	5.229E-12	4.177E-12	3.409E-12
SSW	1.837E-10	9.004E-11	5.650E-11	2.856E-11	1.728E-11	1.159E-11	8.304E-12	6.235E-12	4.848E-12	3.873E-12	3.161E-12
SW	2.576E-10	1.262E-10	7.920E-11	4.003E-11	2.423E-11	1.625E-11	1.164E-11	8.741E-12	6.796E-12	5.429E-12	4.431E-12
WSW	2.813E-10	1.379E-10	8.651E-11	4.372E-11	2.646E-11	1.774E-11	1.271E-11	9.547E-12	7.423E-12	5.930E-12	4.840E-12
W	2.478E-10	1.214E-10	7.620E-11	3.851E-11	2.331E-11	1.563E-11	1.120E-11	8.409E-12	6.538E-12	5.223E-12	4.263E-12
WNW	1.868E-10	9.155E-11	5.744E-11	2.903E-11	1.757E-11	1.178E-11	8.442E-12	6.339E-12	4.929E-12	3.937E-12	3.214E-12
NW	1.877E-10	9.200E-11	5.773E-11	2.918E-11	1.766E-11	1.184E-11	8.484E-12	6.371E-12	4.954E-12	3.957E-12	3.230E-12
NNW	1.976E-10	9.683E-11	6.075E-11	3.071E-11	1.859E-11	1.246E-11	8.929E-12	6.705E-12	5.213E-12	4.164E-12	3.399E-12
N	2.159E-10	1.058E-10	6.639E-11	3.356E-11	2.031E-11	1.362E-11	9.757E-12	7.327E-12	5.697E-12	4.551E-12	3.714E-12
NNE	2.477E-10	1.214E-10	7.617E-11	3.850E-11	2.330E-11	1.562E-11	1.120E-11	8.406E-12	6.536E-12	5.221E-12	4.262E-12
NE	3.103E-10	1.521E-10	9.541E-11	4.823E-11	2.919E-11	1.957E-11	1.402E-11	1.053E-11	8.187E-12	6.540E-12	5.338E-12
ENE	3.073E-10	1.506E-10	9.450E-11	4.776E-11	2.891E-11	1.938E-11	1.389E-11	1.043E-11	8.109E-12	6.477E-12	5.287E-12
E	3.040E-10	1.490E-10	9.347E-11	4.724E-11	2.859E-11	1.917E-11	1.374E-11	1.032E-11	8.021E-12	6.407E-12	5.229E-12
ESE	2.288E-10	1.121E-10	7.036E-11	3.557E-11	2.153E-11	1.443E-11	1.034E-11	7.766E-12	6.038E-12	4.823E-12	3.937E-12
SE	1.588E-10	7.784E-11	4.884E-11	2.469E-11	1.494E-11	1.002E-11	7.178E-12	5.390E-12	4.191E-12	3.348E-12	2.733E-12
SSE	1.546E-10	7.577E-11	4.754E-11	2.403E-11	1.454E-11	9.752E-12	6.988E-12	5.247E-12	4.080E-12	3.259E-12	2.660E-12

Table 2.7-25 Long-Term Average D/Q Values (1/m^2) for Routine Releases at the Standard Distance Segments Between 0.5 and 50 mi

GROUND LEVEL RELEASE - NO PURGE RELEASES

********** RELATIVE DEPOSITION PER UNIT AREA (M**-2) BY DOWNWIND SECTORS **********										
	SEGMENT BOUNDARIES IN MILES									
DIRECTION FROM SITE	.5-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
S	5.643E-09	1.743E-09	6.937E-10	3.791E-10	2.409E-10	1.035E-10	3.209E-11	1.272E-11	6.793E-12	4.204E-12
SSW	5.232E-09	1.616E-09	6.432E-10	3.515E-10	2.234E-10	9.595E-11	2.975E-11	1.179E-11	6.298E-12	3.898E-12
SW	7.335E-09	2.266E-09	9.017E-10	4.927E-10	3.132E-10	1.345E-10	4.171E-11	1.653E-11	8.829E-12	5.465E-12
WSW	8.011E-09	2.475E-09	9.848E-10	5.382E-10	3.420E-10	1.469E-10	4.556E-11	1.806E-11	9.643E-12	5.968E-12
W	7.056E-09	2.180E-09	8.675E-10	4.740E-10	3.013E-10	1.294E-10	4.013E-11	1.591E-11	8.494E-12	5.257E-12
WNW	5.319E-09	1.643E-09	6.539E-10	3.574E-10	2.271E-10	9.756E-11	3.025E-11	1.199E-11	6.403E-12	3.963E-12
NW	5.346E-09	1.652E-09	6.572E-10	3.591E-10	2.283E-10	9.804E-11	3.040E-11	1.205E-11	6.435E-12	3.983E-12
NNW	5.626E-09	1.738E-09	6.917E-10	3.780E-10	2.402E-10	1.032E-10	3.200E-11	1.268E-11	6.772E-12	4.192E-12
N	6.148E-09	1.899E-09	7.558E-10	4.130E-10	2.625E-10	1.128E-10	3.496E-11	1.386E-11	7.400E-12	4.580E-12
NNE	7.054E-09	2.179E-09	8.672E-10	4.739E-10	3.012E-10	1.294E-10	4.012E-11	1.590E-11	8.491E-12	5.255E-12
NE	8.835E-09	2.730E-09	1.086E-09	5.936E-10	3.773E-10	1.620E-10	5.025E-11	1.992E-11	1.064E-11	6.583E-12
ENE	8.751E-09	2.703E-09	1.076E-09	5.879E-10	3.736E-10	1.605E-10	4.977E-11	1.972E-11	1.053E-11	6.520E-12
E	8.656E-09	2.674E-09	1.064E-09	5.815E-10	3.696E-10	1.587E-10	4.923E-11	1.951E-11	1.042E-11	6.449E-12
ESE	6.516E-09	2.013E-09	8.011E-10	4.377E-10	2.782E-10	1.195E-10	3.706E-11	1.469E-11	7.843E-12	4.855E-12
SE	4.523E-09	1.397E-09	5.560E-10	3.039E-10	1.931E-10	8.295E-11	2.572E-11	1.020E-11	5.444E-12	3.370E-12
SSE	4.403E-09	1.360E-09	5.413E-10	2.958E-10	1.880E-10	8.075E-11	2.504E-11	9.924E-12	5.300E-12	3.280E-12

Table 2.7-26 Predicted Existing VEGP Noise Levels at Locations Along the Northern, Western, and Southern Site Boundaries

Measurement Location	Average Measured Background Noise Level (dBa)	Predicted VEGP Units 1 and 2 Noise Emission Level (dBa)	Predicted Total Noise Level (dBa)
River Road at North Boundary	27-30	15	27-30
River Road at the Construction Entrance	25-30	19	26-30
River Road West of Proposed Cooling Towers	25-34	21	26-34
River Road at the Entrance Road	22-25	22	25-27
River Road at South Boundary	25	25	28
Plant Wilson	39	35	40
Augusta Newsprint Transmission Corridor at Northern Plant Boundary	34	20	34

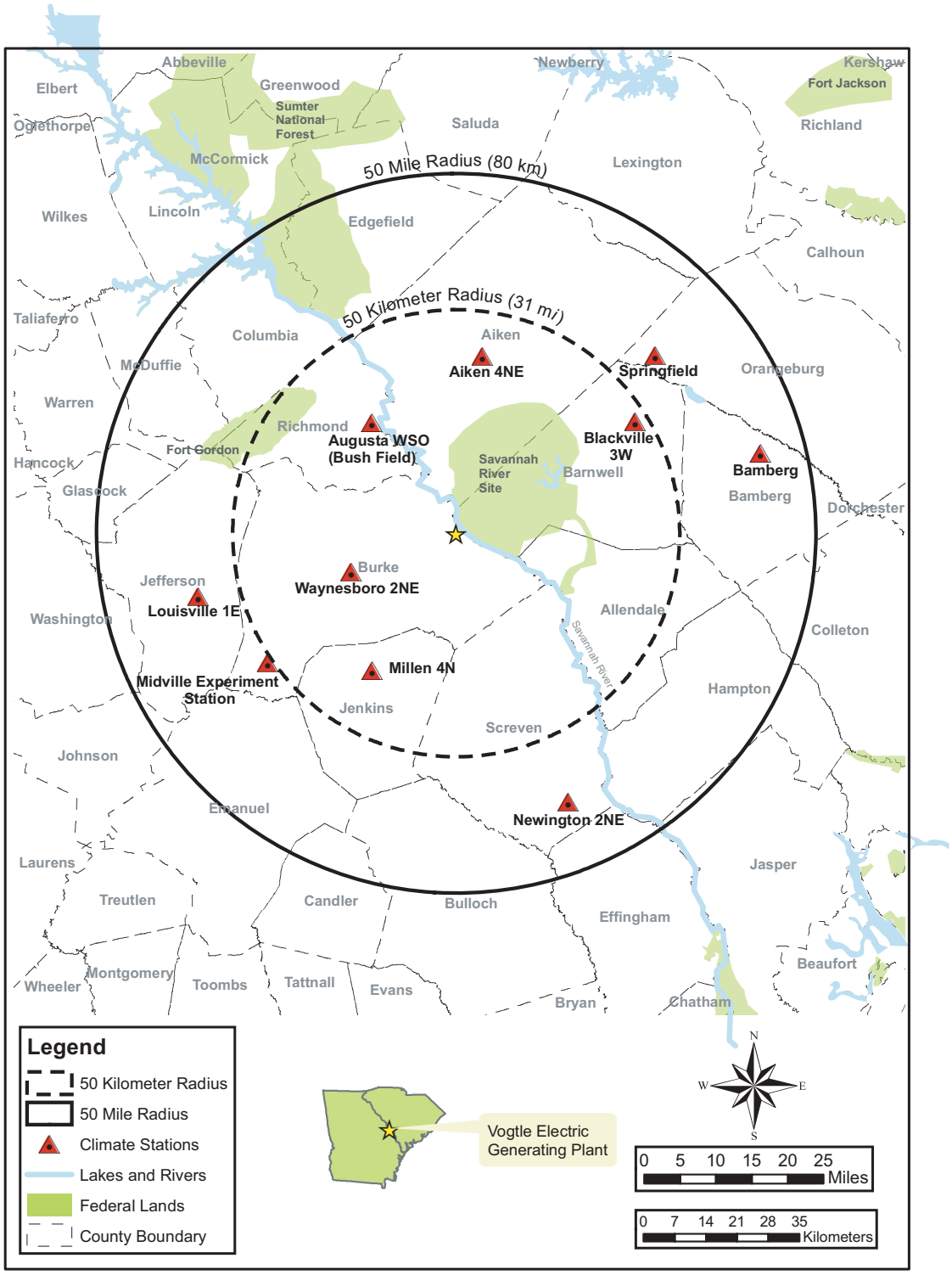


Figure 2.7-1 Climatological Observing Stations near the VEGP Site

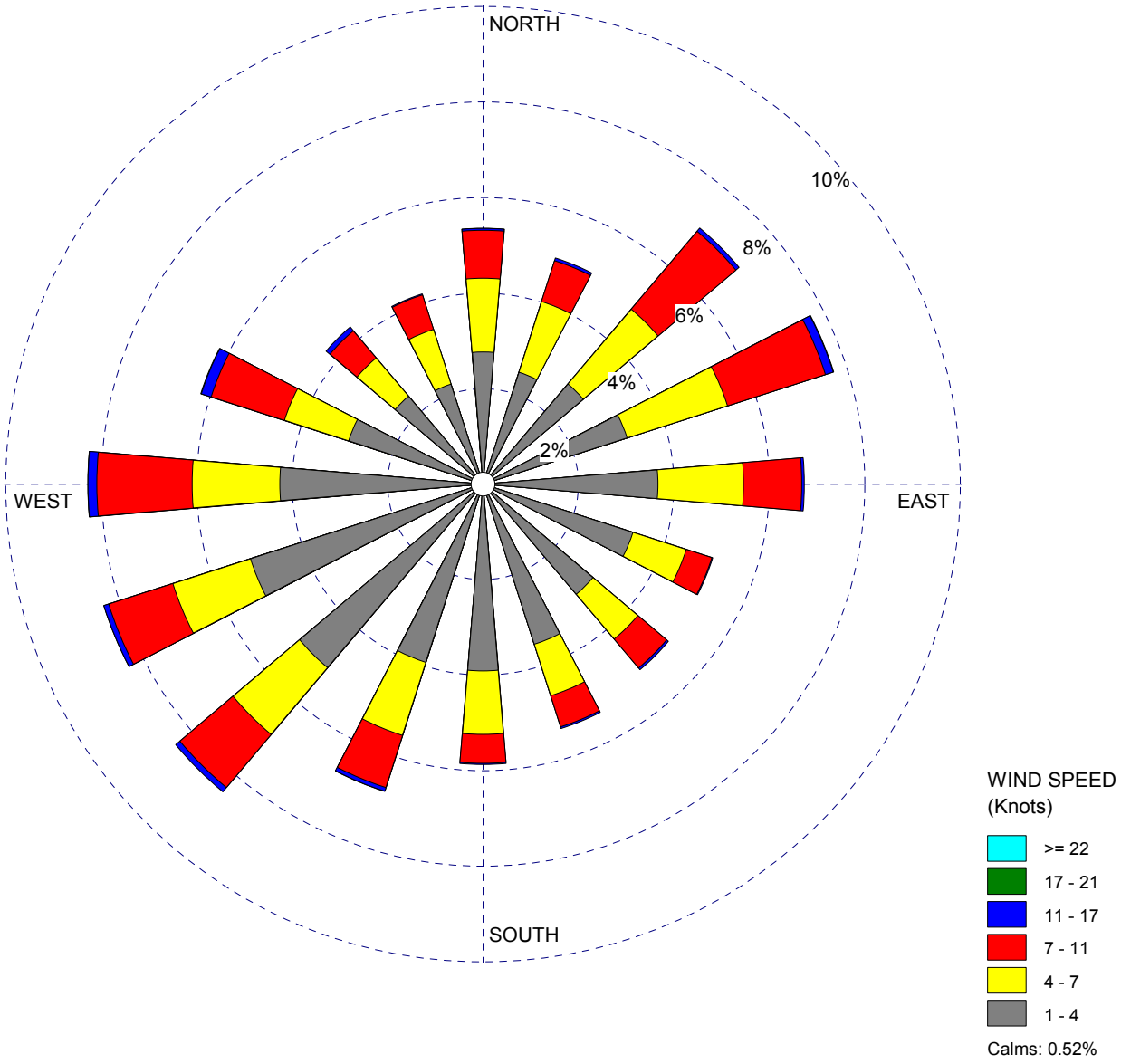


Figure 2.7-2 VEGP 10-m Level Annual Wind Rose (1998-2002)

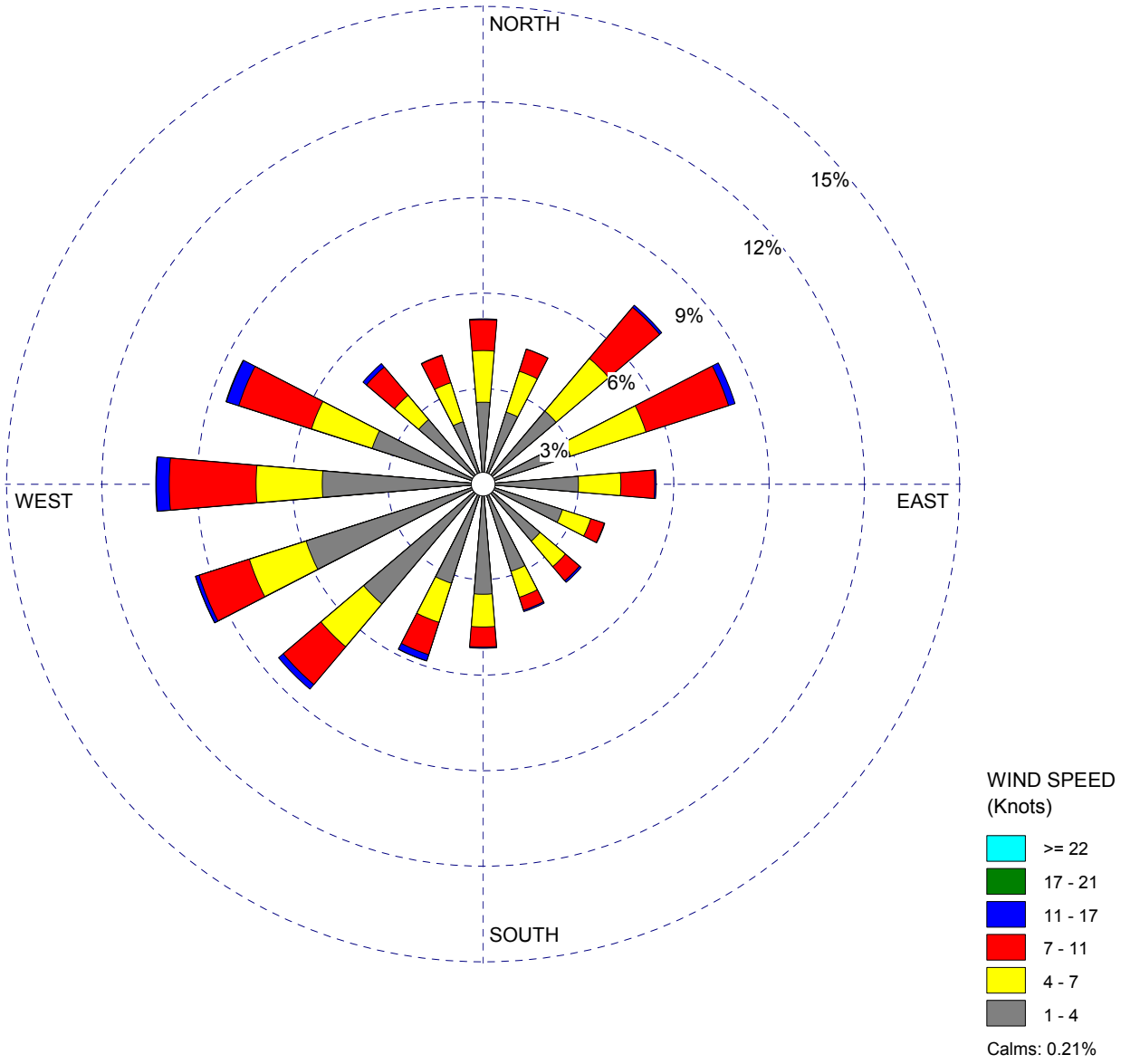


Figure 2.7-3 VEGP 10-m Level Winter Wind Rose (1998-2002)

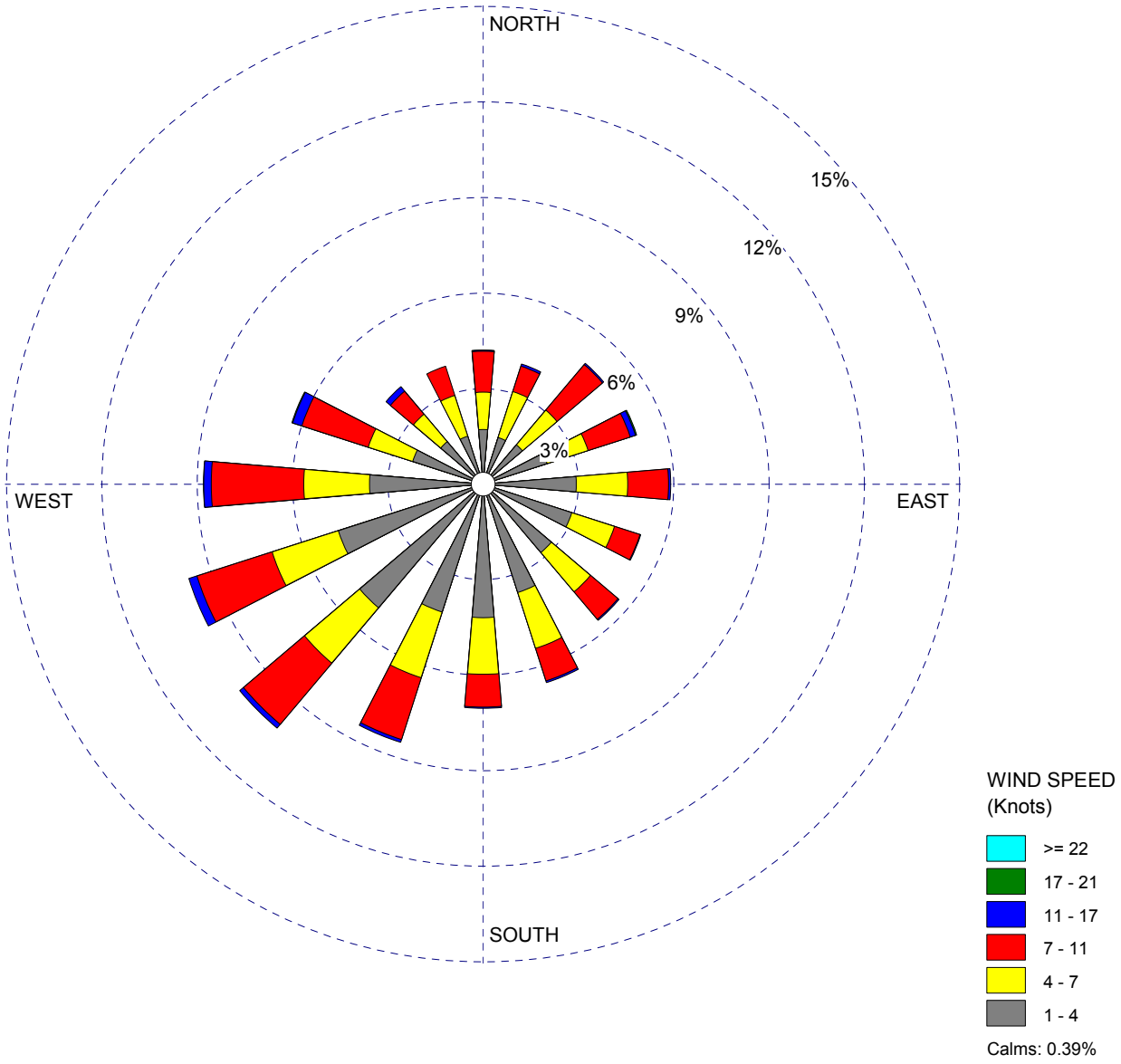


Figure 2.7-4 VEGP 10-m Level Spring Wind Rose (1998-2002)

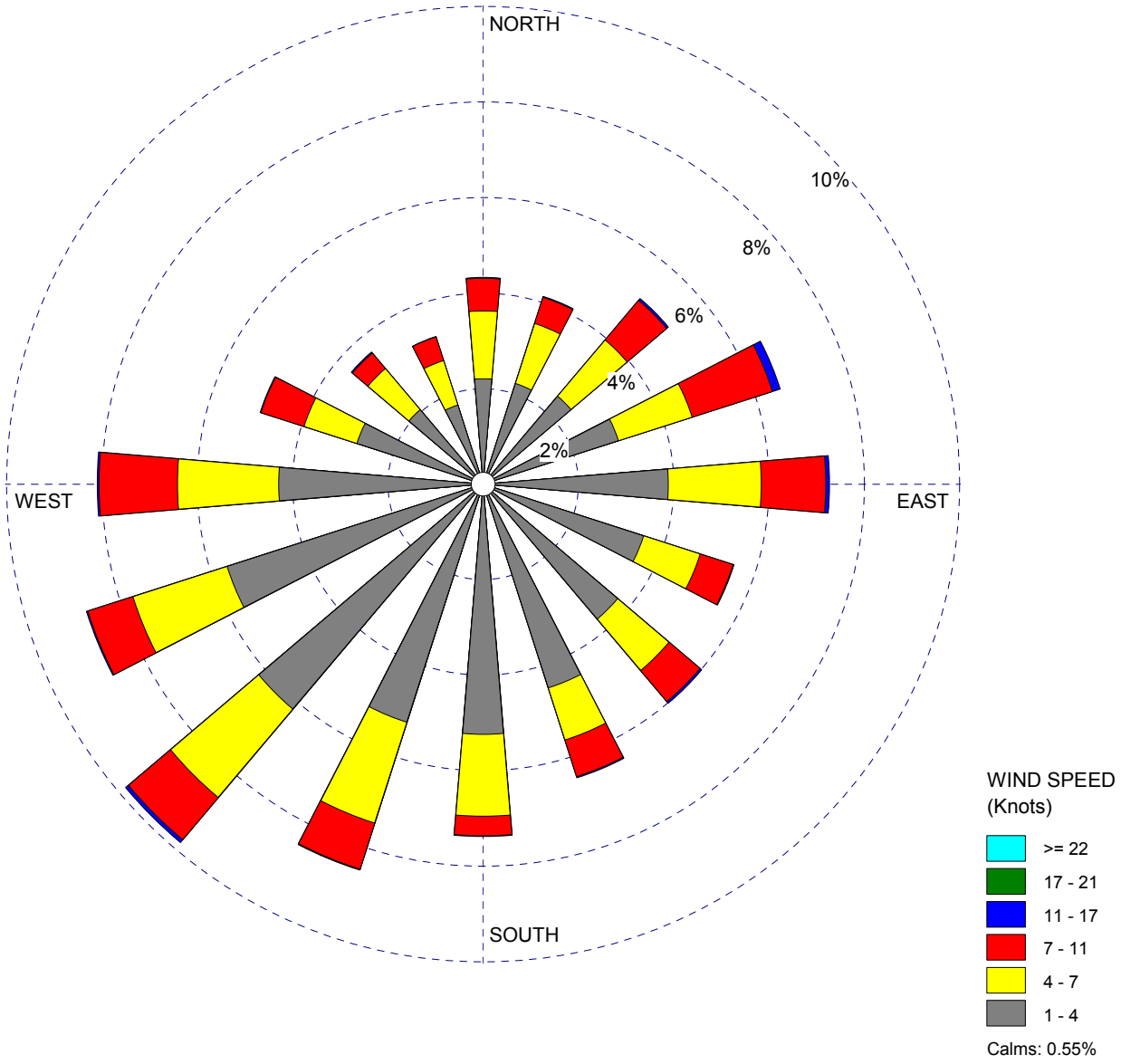


Figure 2.7-5 VEGP 10-m Level Summer Wind Rose (1998-2002)

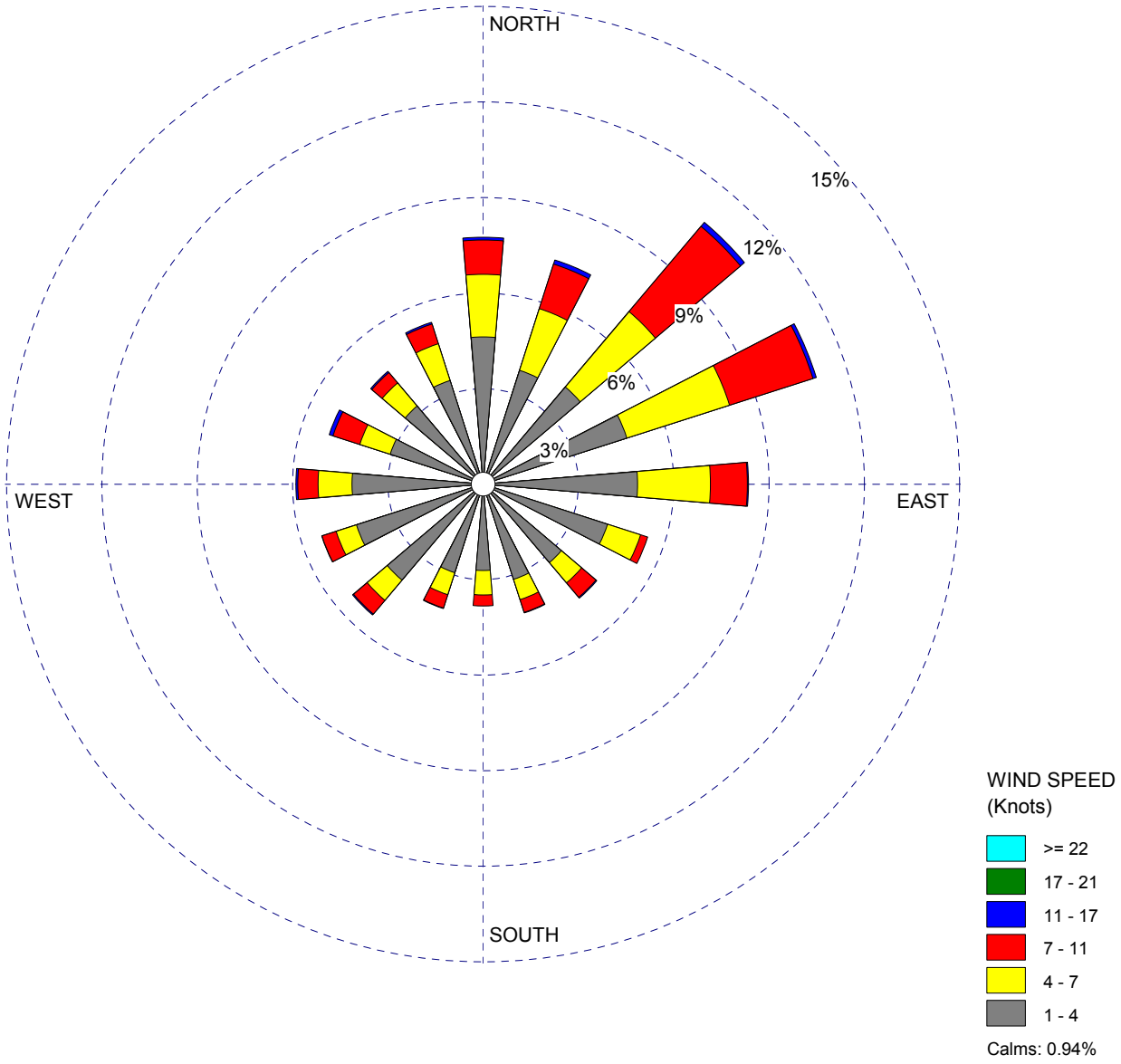


Figure 2.7-6 VEGP 10-m Level Autumn Wind Rose (1998-2002)

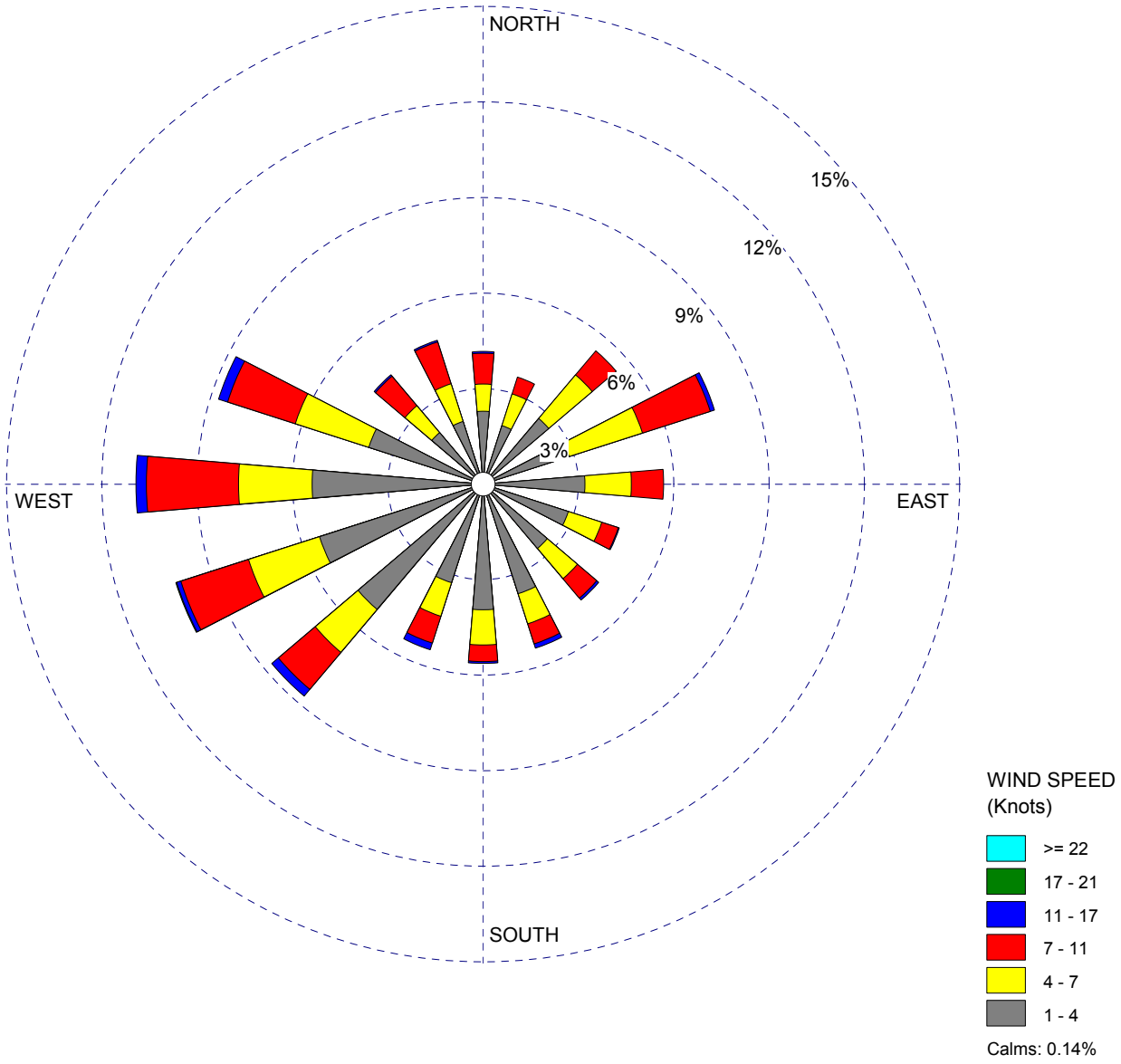


Figure 2.7-7 VEGP 10-m Level January Wind Rose (1998–2002) (Sheet 1 of 12)

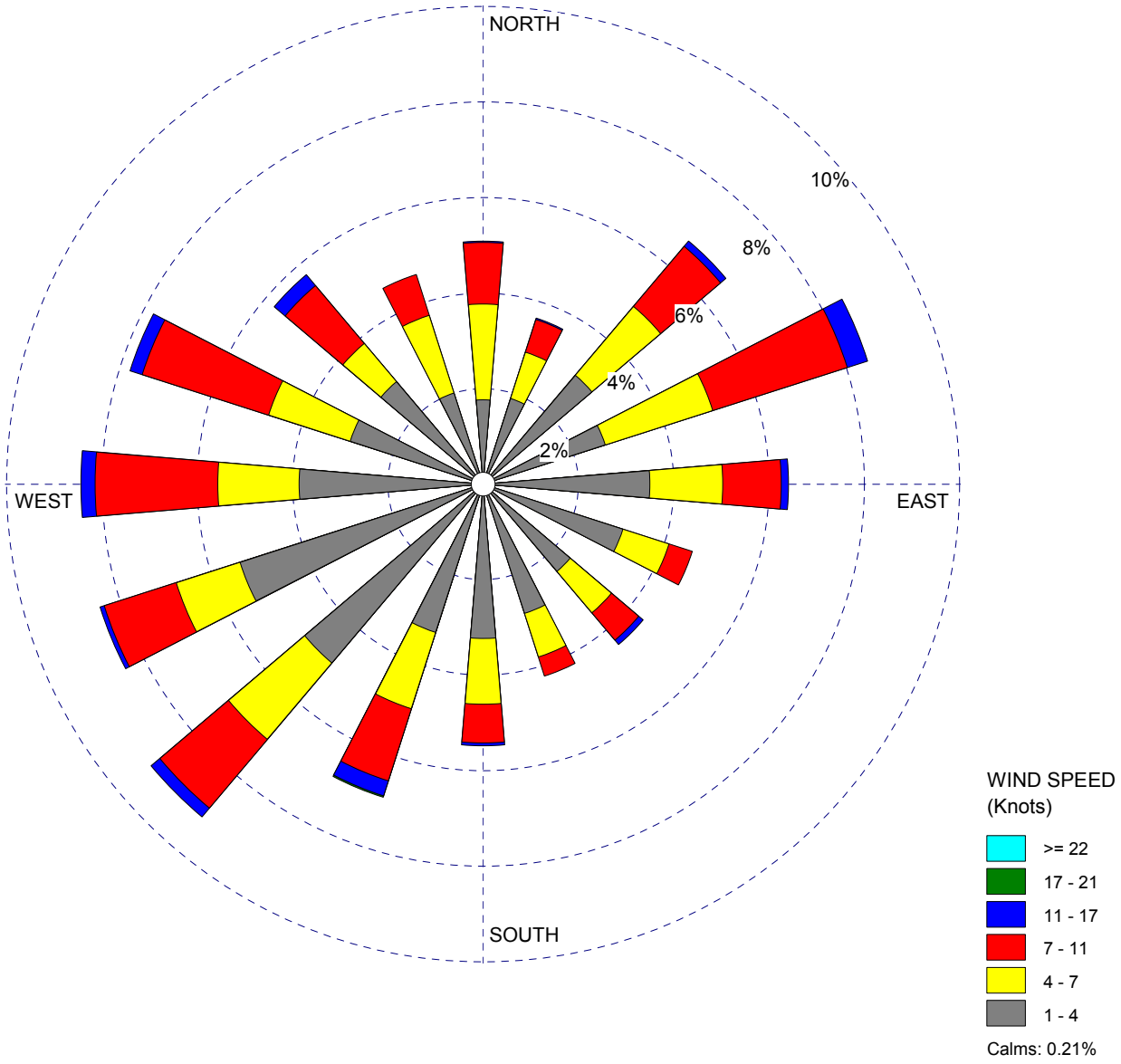


Figure 2.7-7 VEGP 10-m Level February Wind Rose (1998–2002) (Sheet 2 of 12)

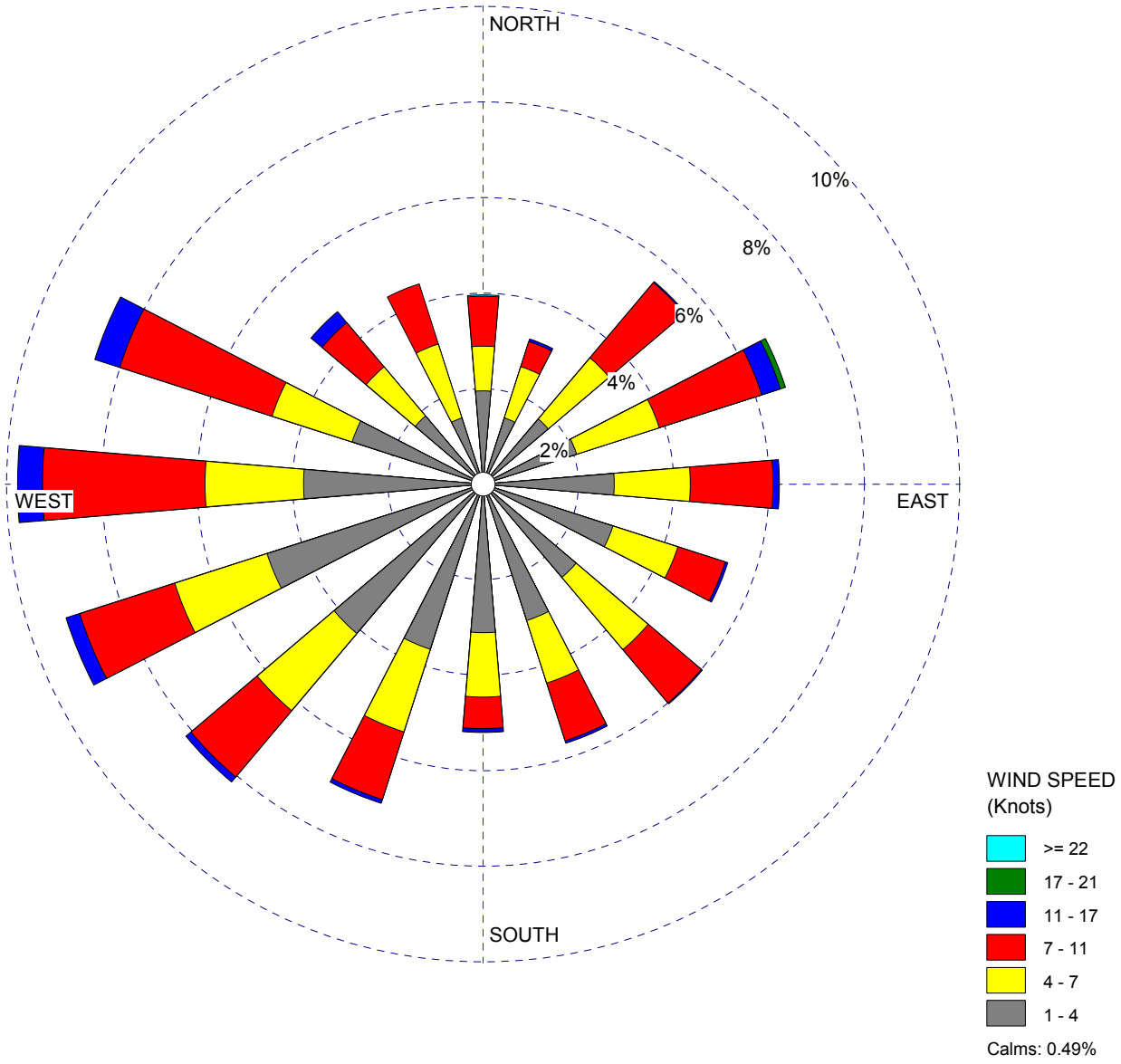


Figure 2.7-7 VEGP 10-m Level March Wind Rose (1998–2002) (Sheet 3 of 12)

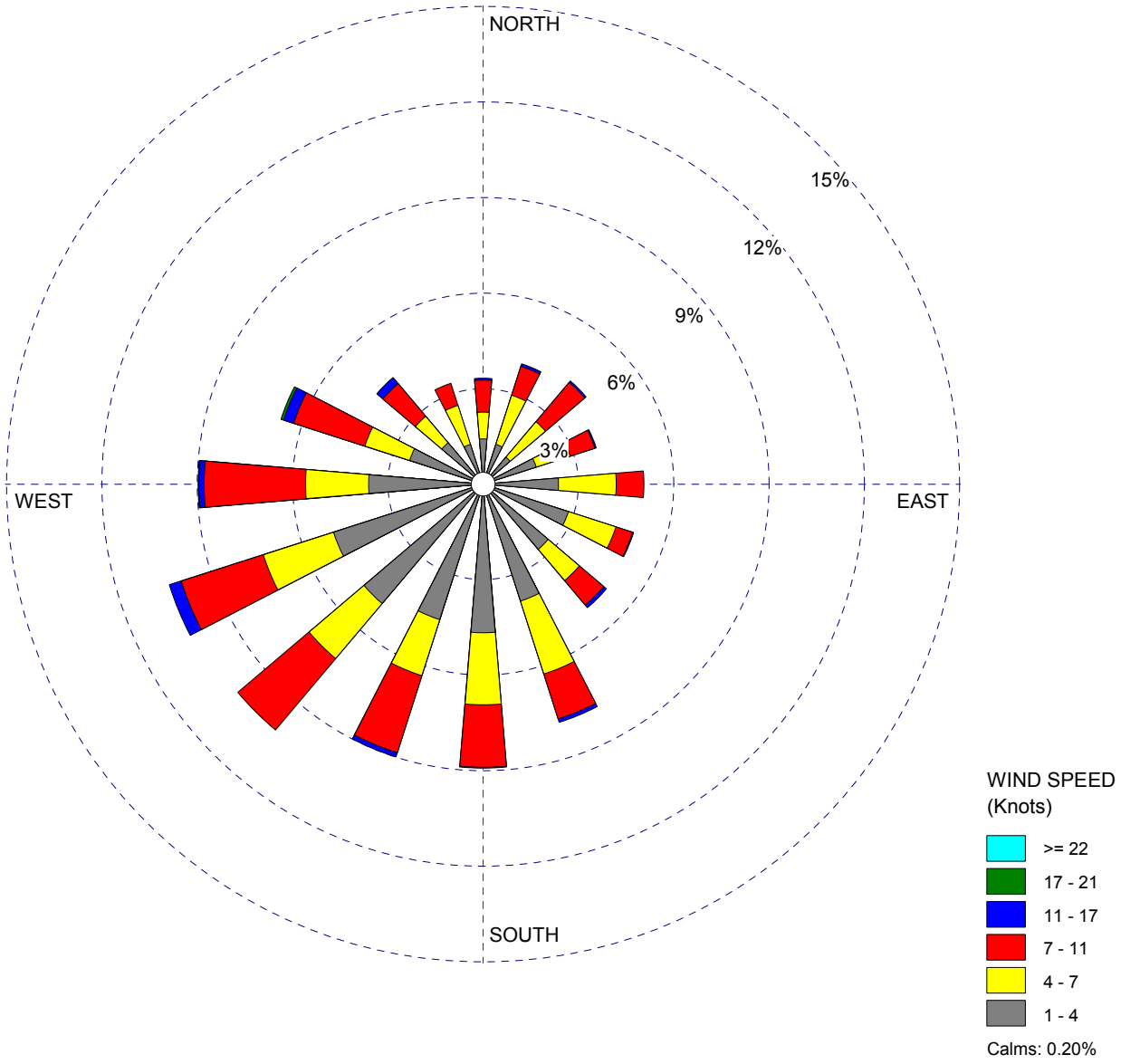
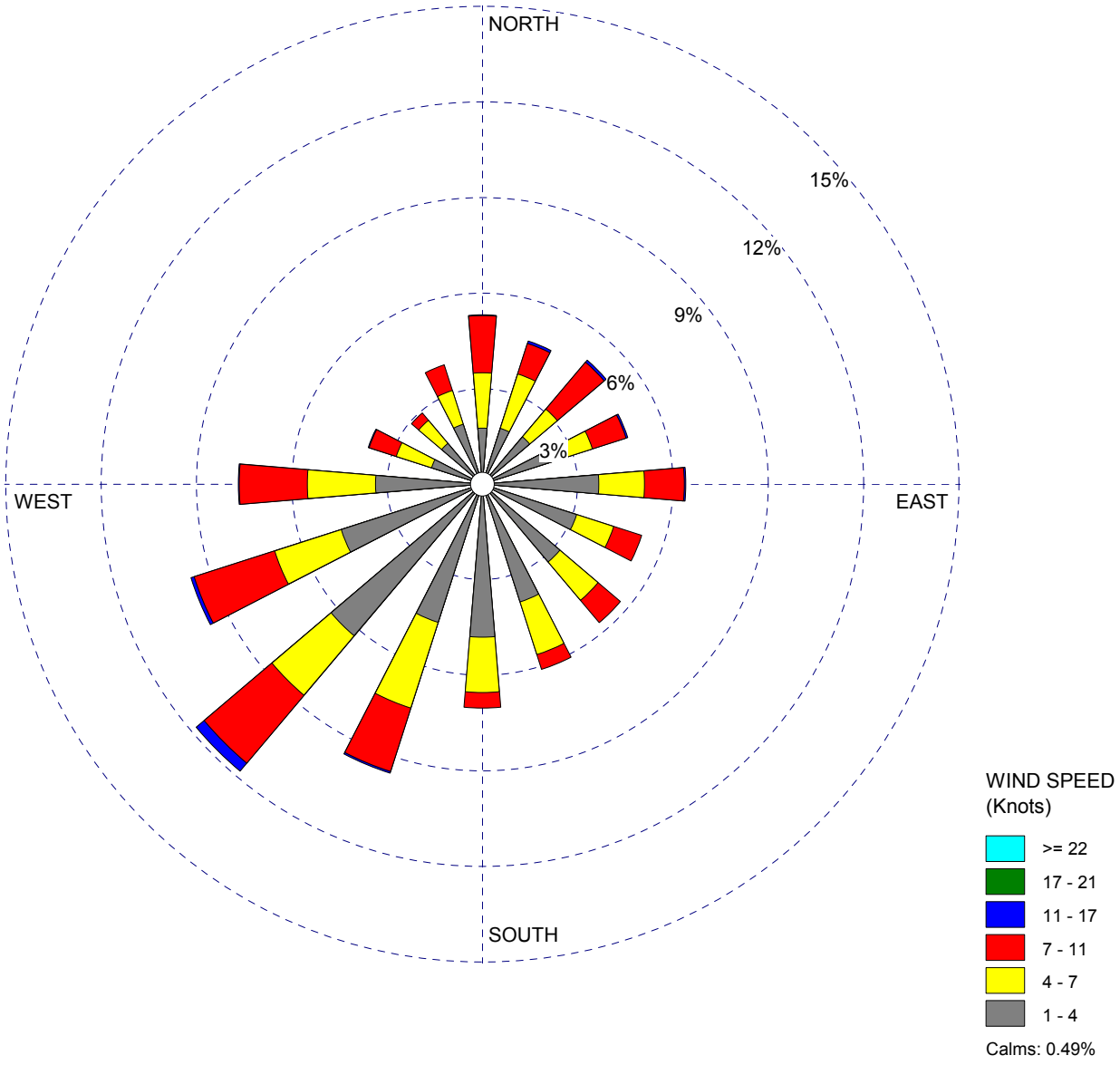


Figure 2.7-7 VEGP 10-m Level April Wind Rose (1998–2002) (Sheet 4 of 12)



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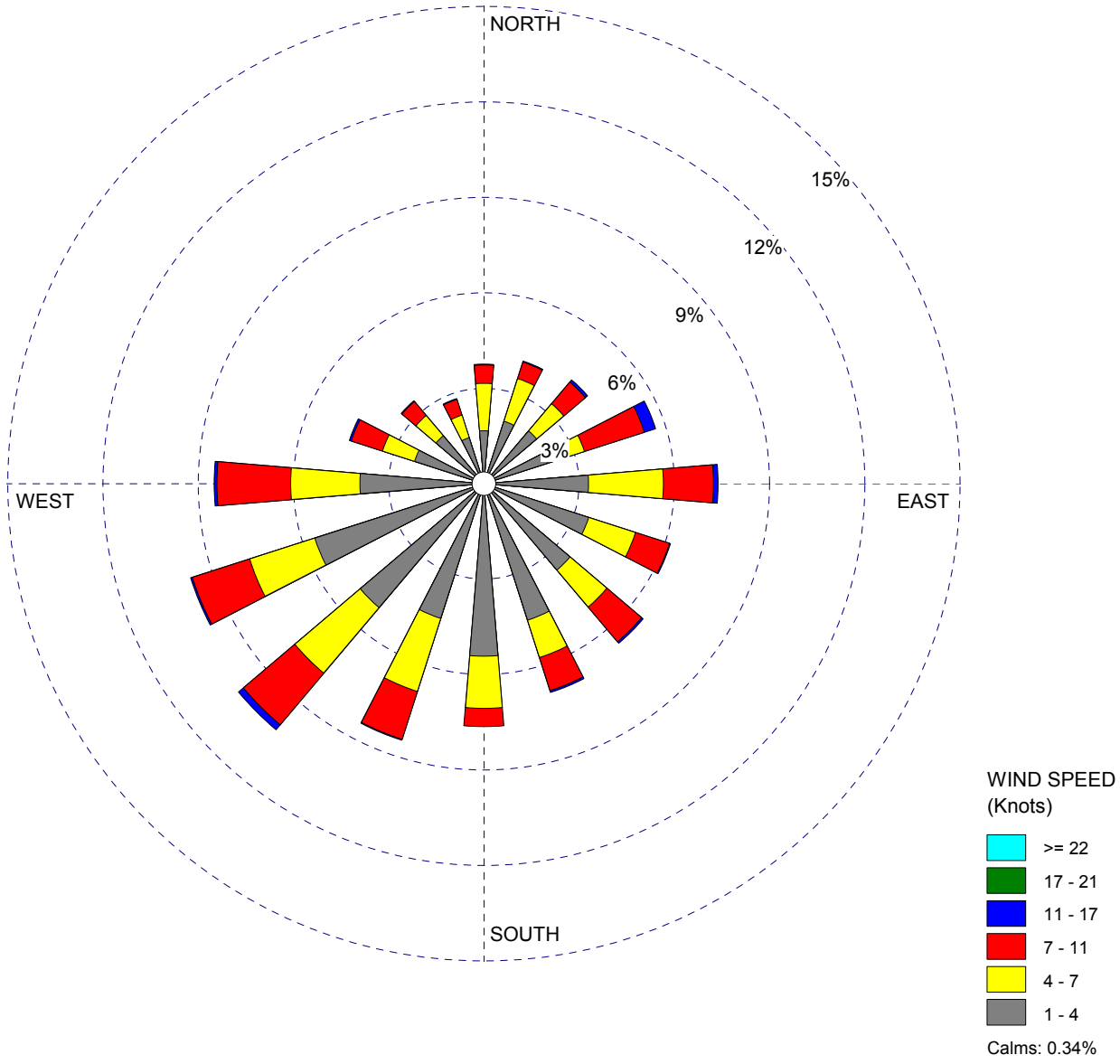

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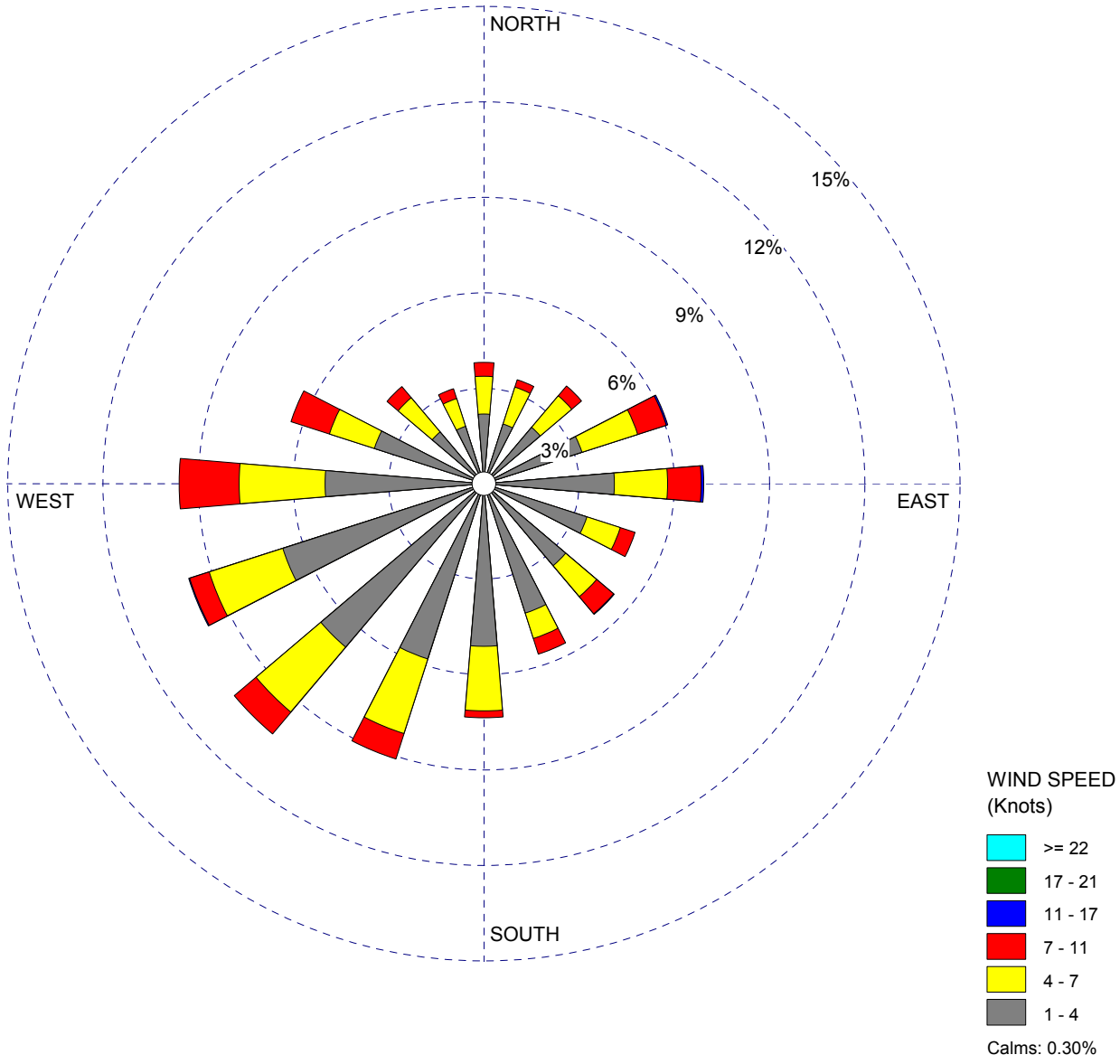

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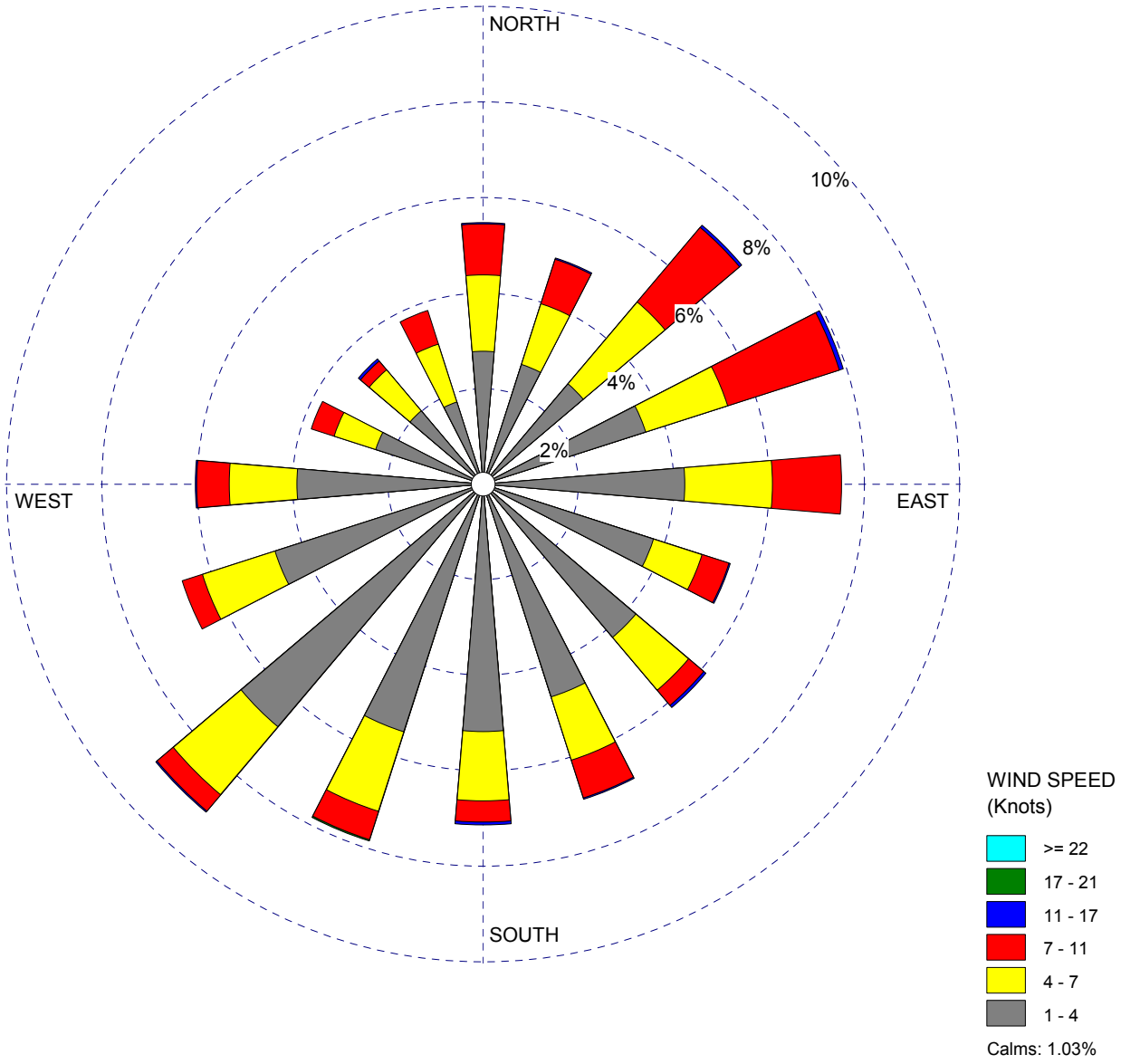

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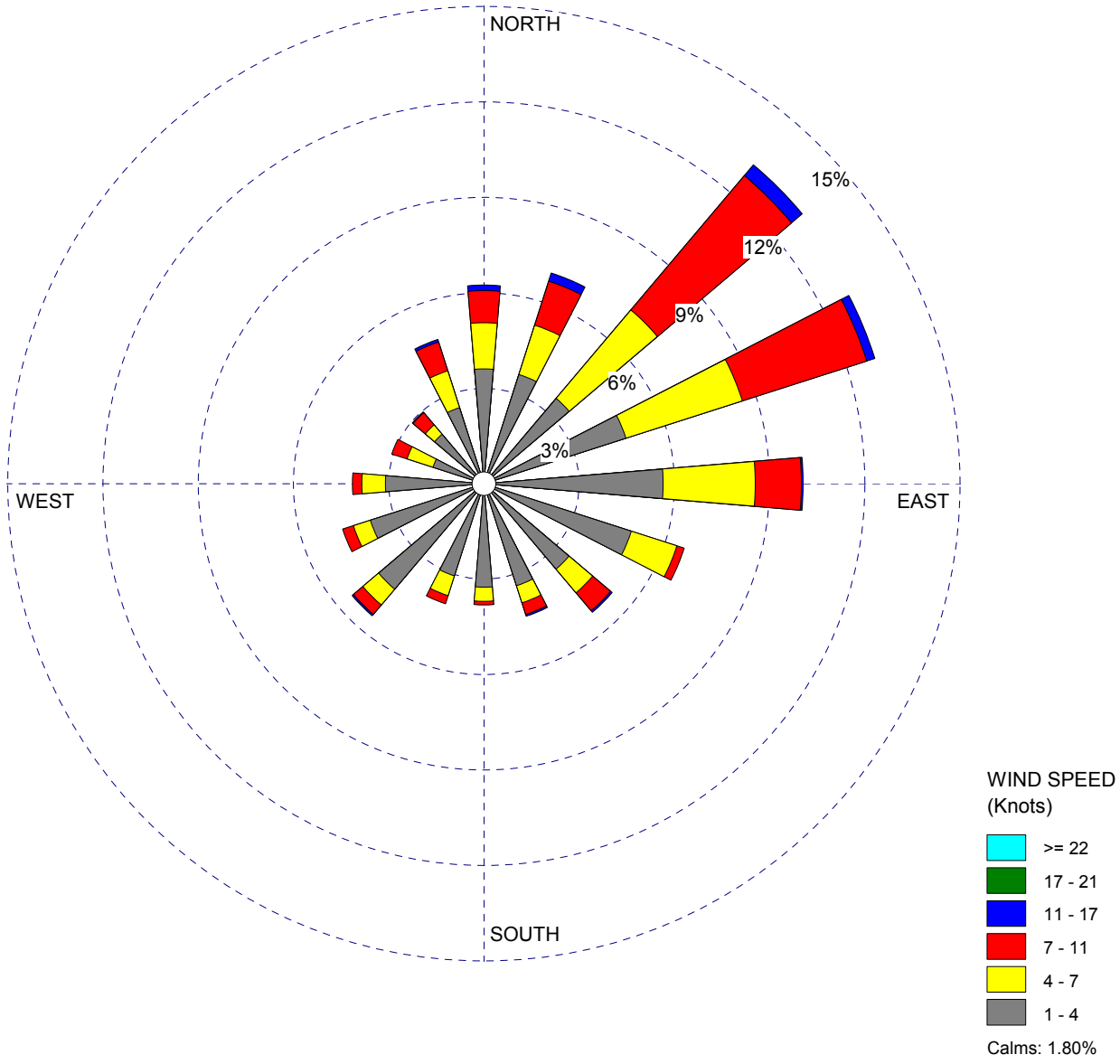

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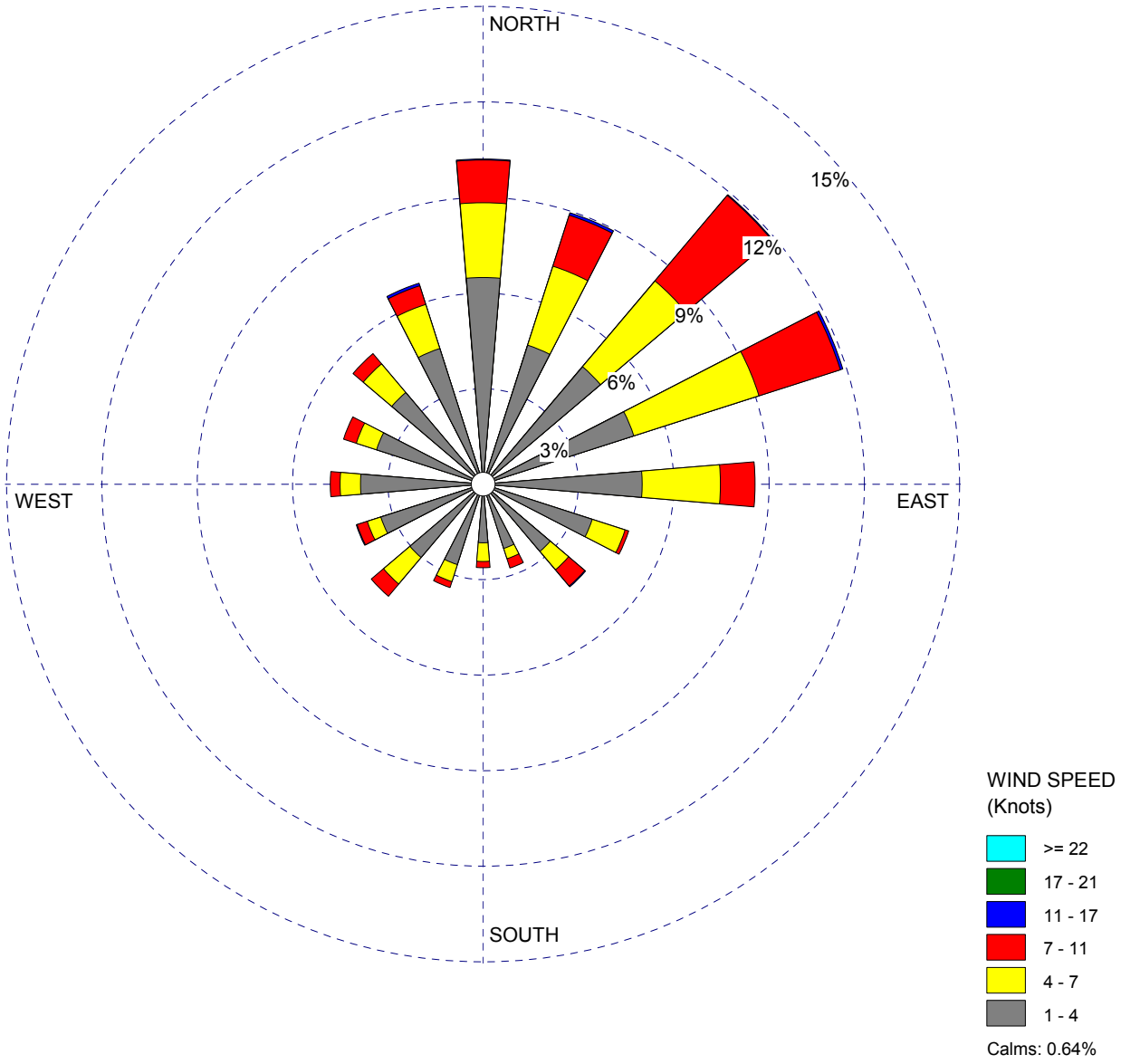

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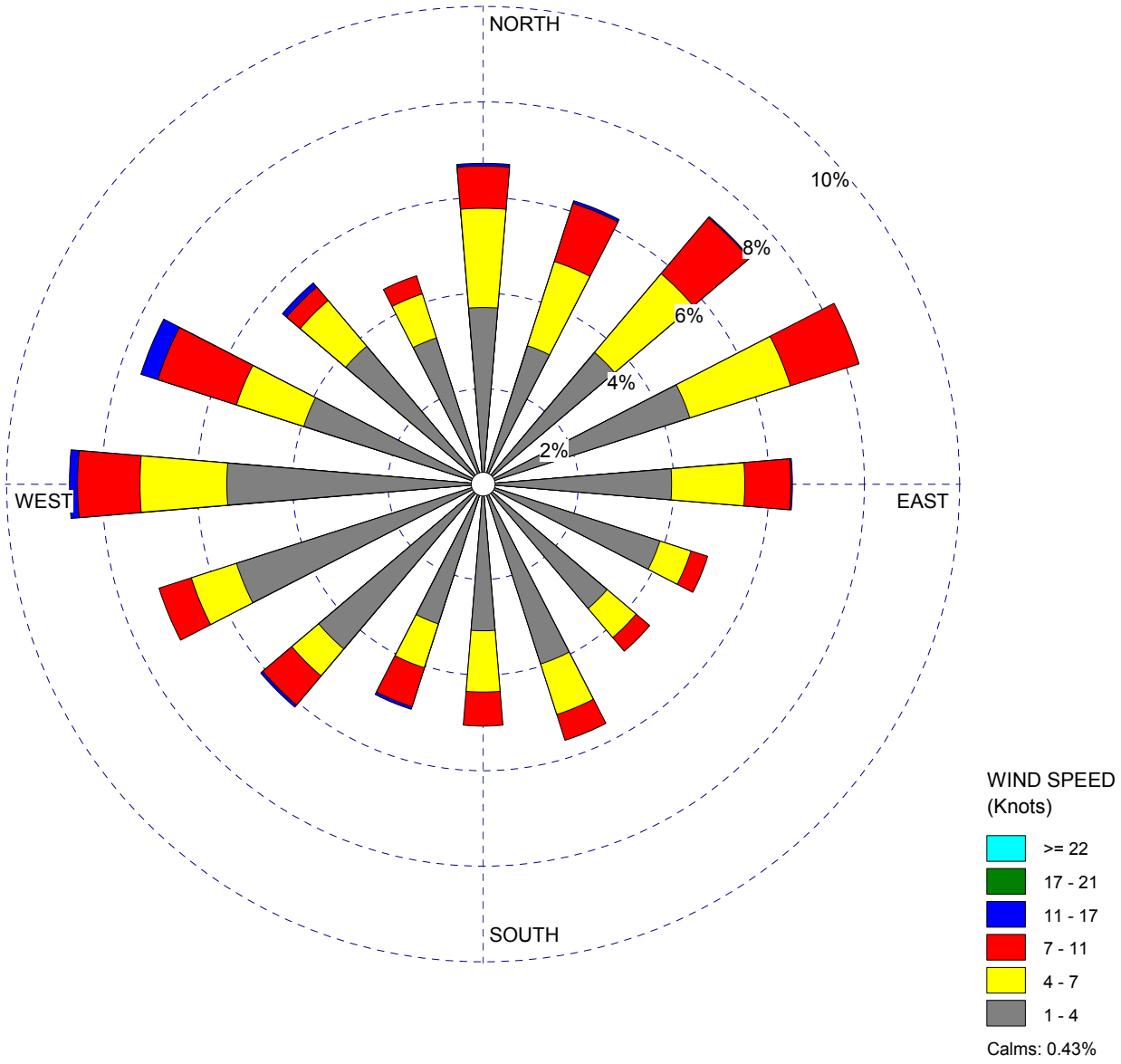

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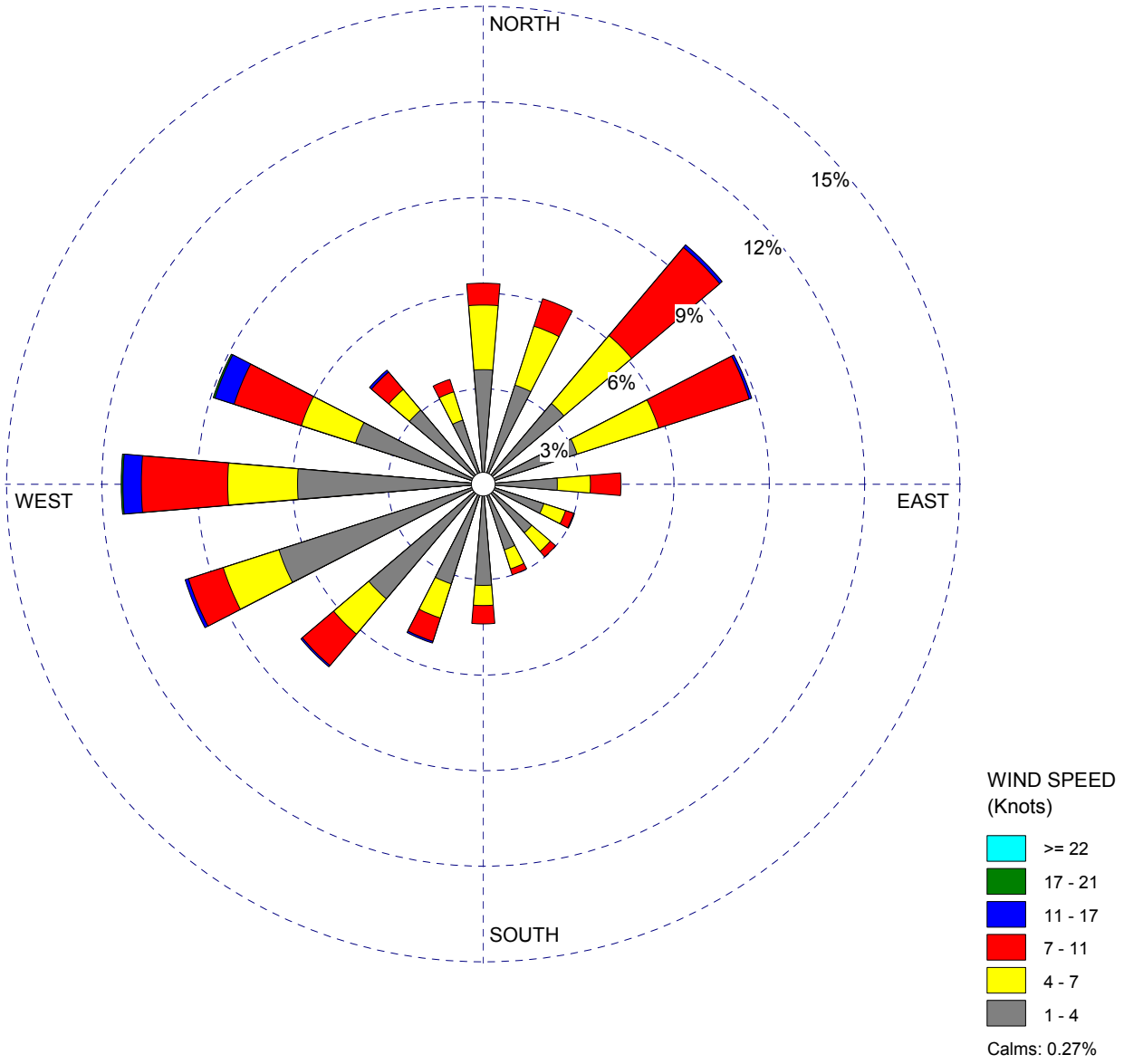


Figure 2.7-7 VEGP 10-m Level December Wind Rose (1998–2002) (Sheet 12 of 12)

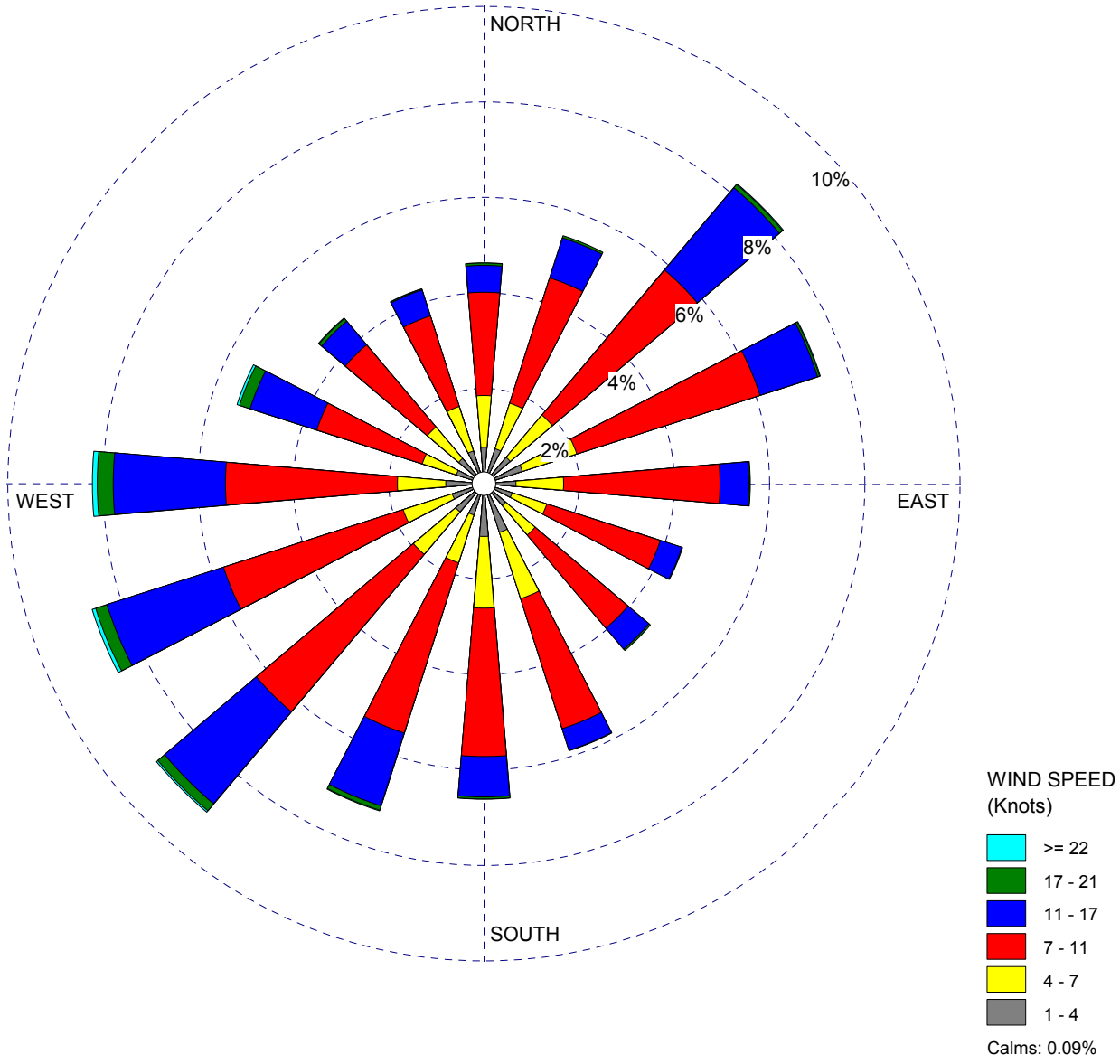
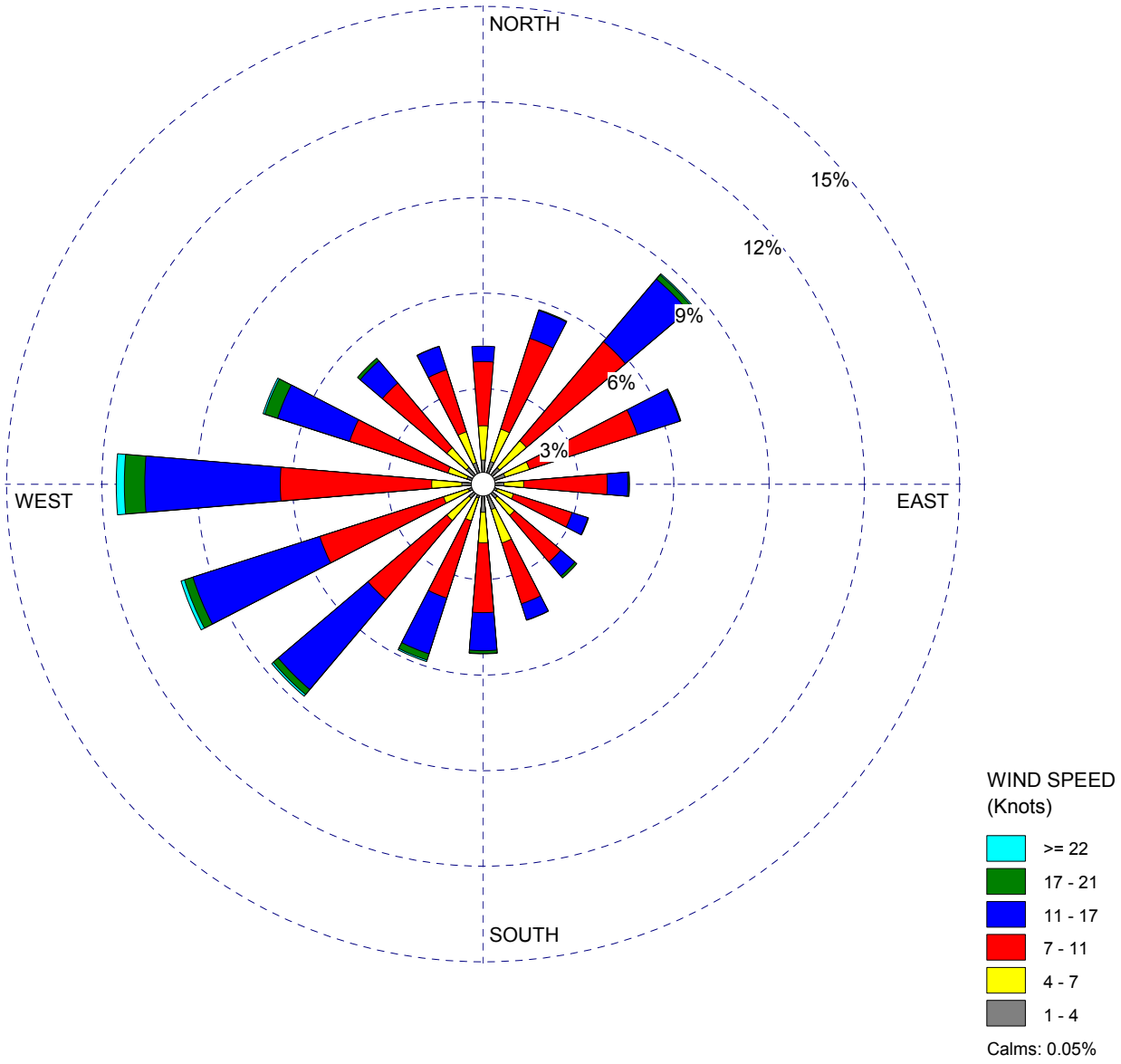


Figure 2.7-8 VEGP 60-m Level Annual Wind Rose (1998-2002)



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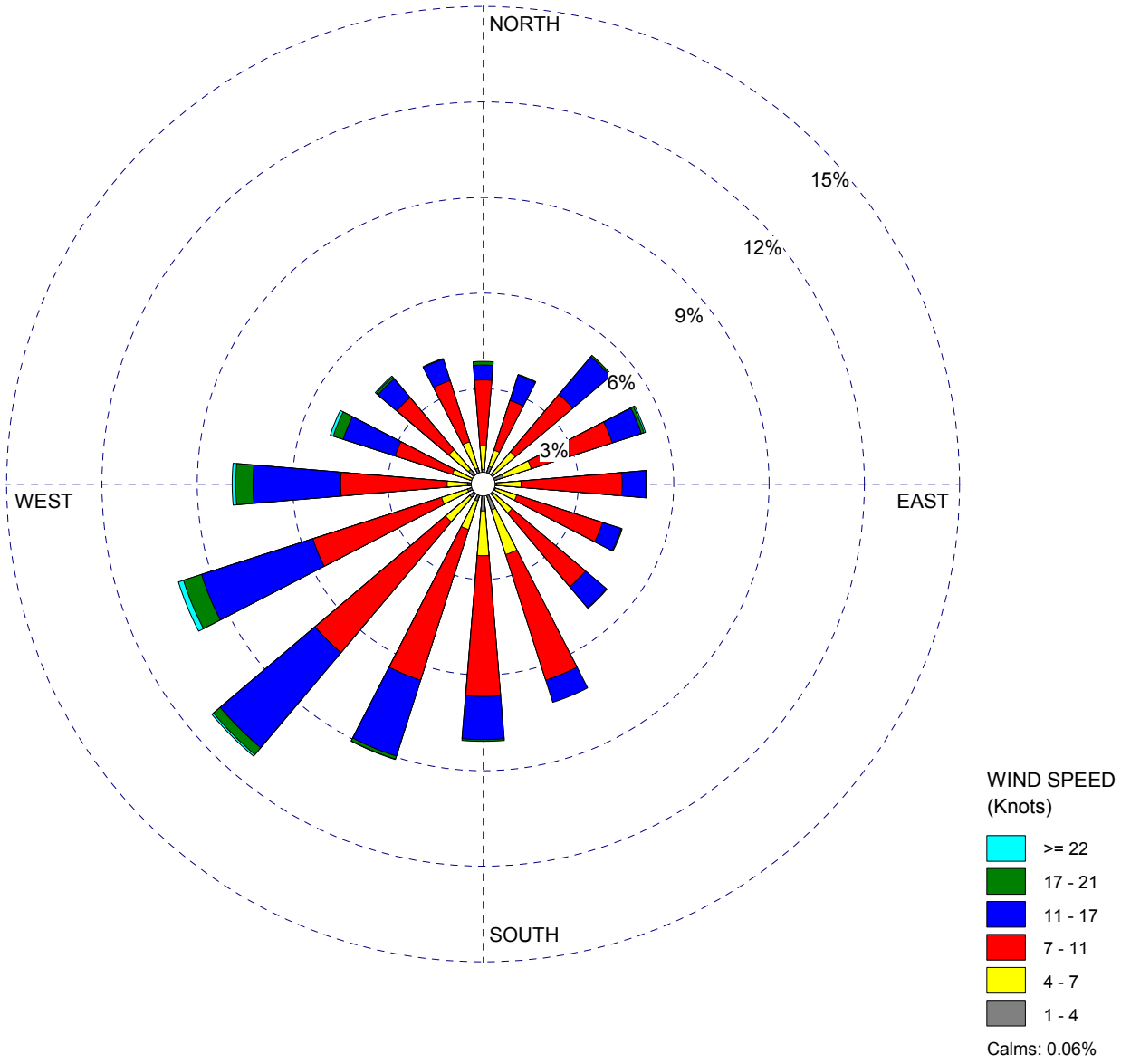


Figure 2.7-10 VEGP 60-m Level Spring Wind Rose (1998-2002)

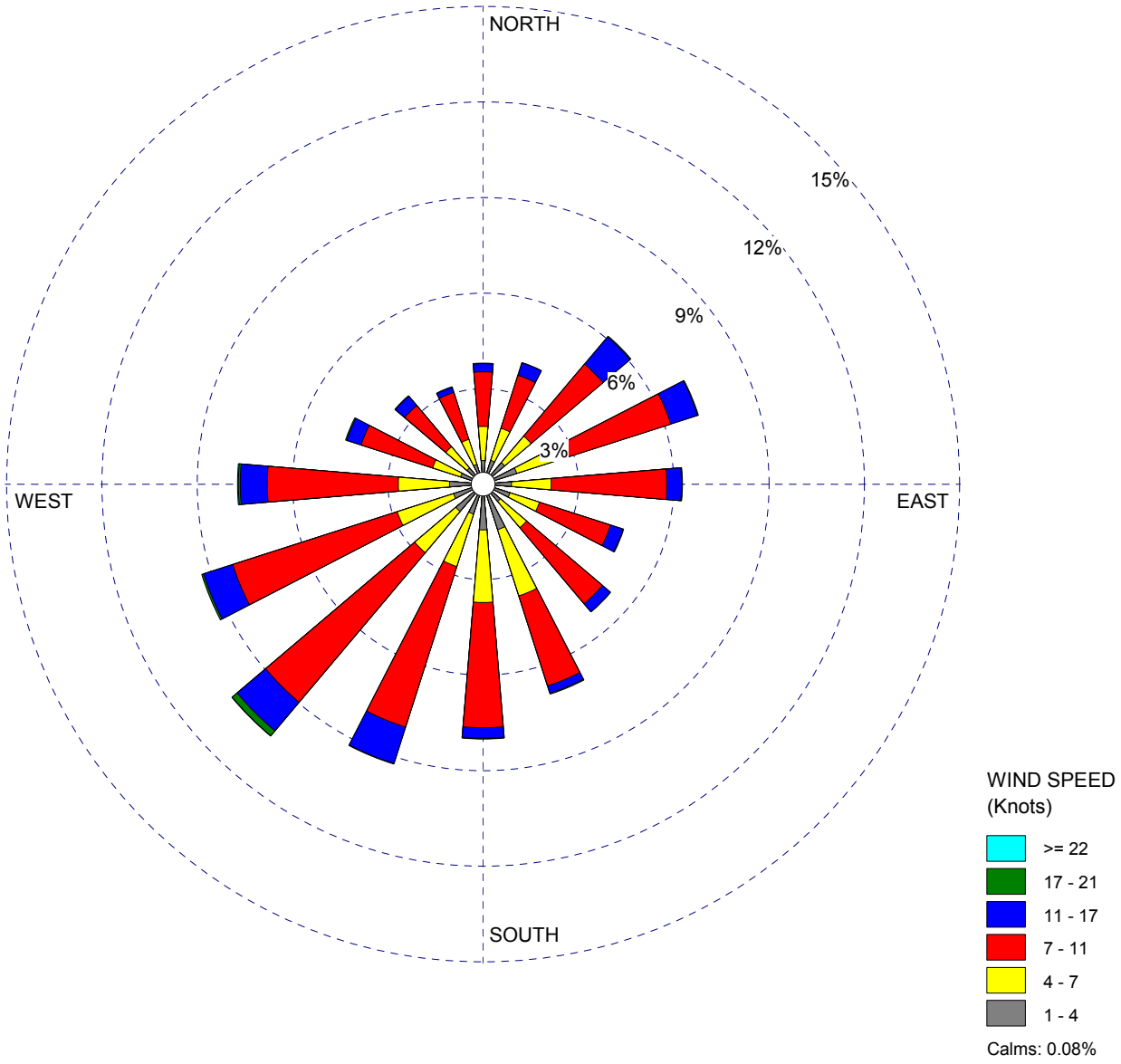


Figure 2.7-11 VEGP 60-m Level Summer Wind Rose (1998-2002)

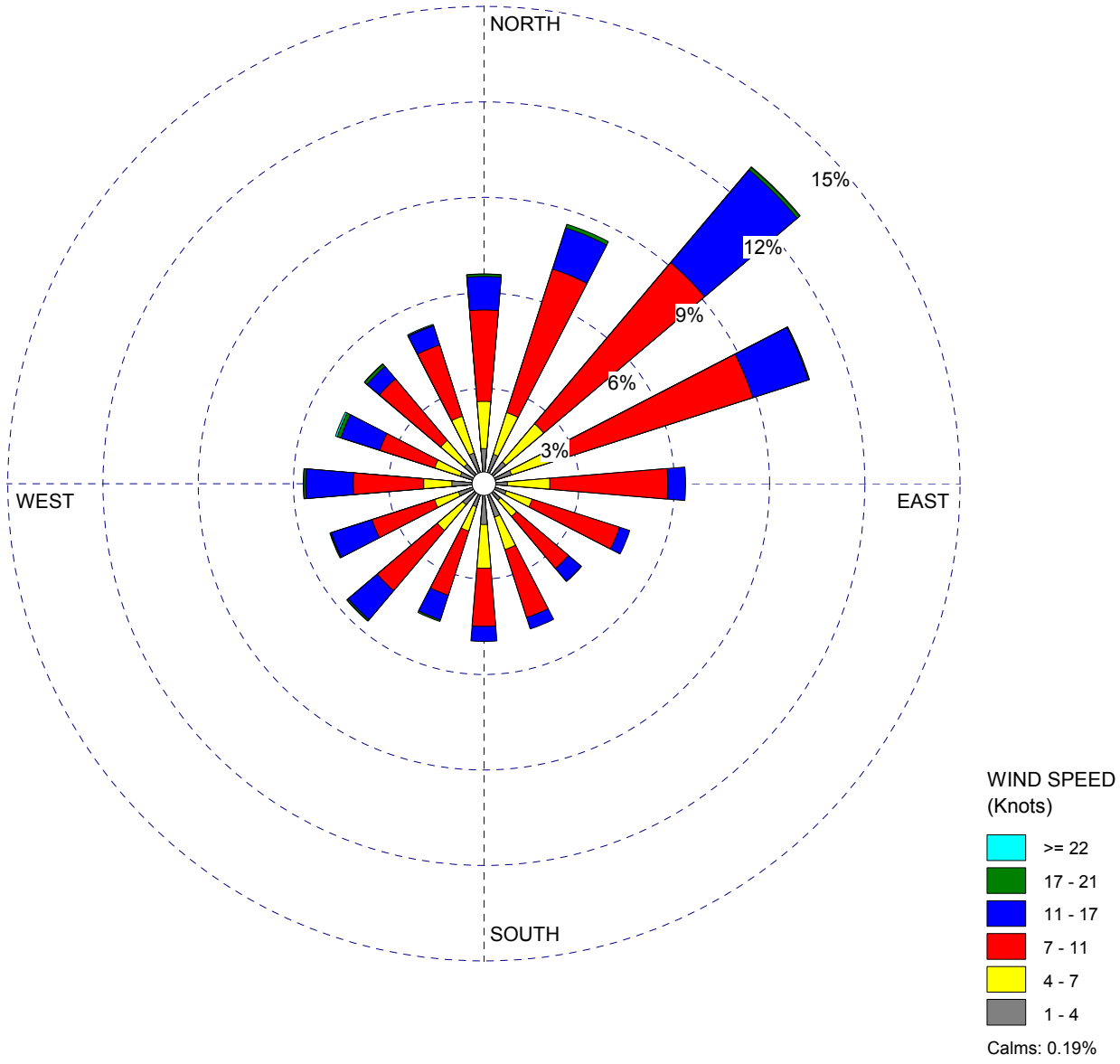


Figure 2.7-12 VEGP 60-m Level Autumn Wind Rose (1998-2002)

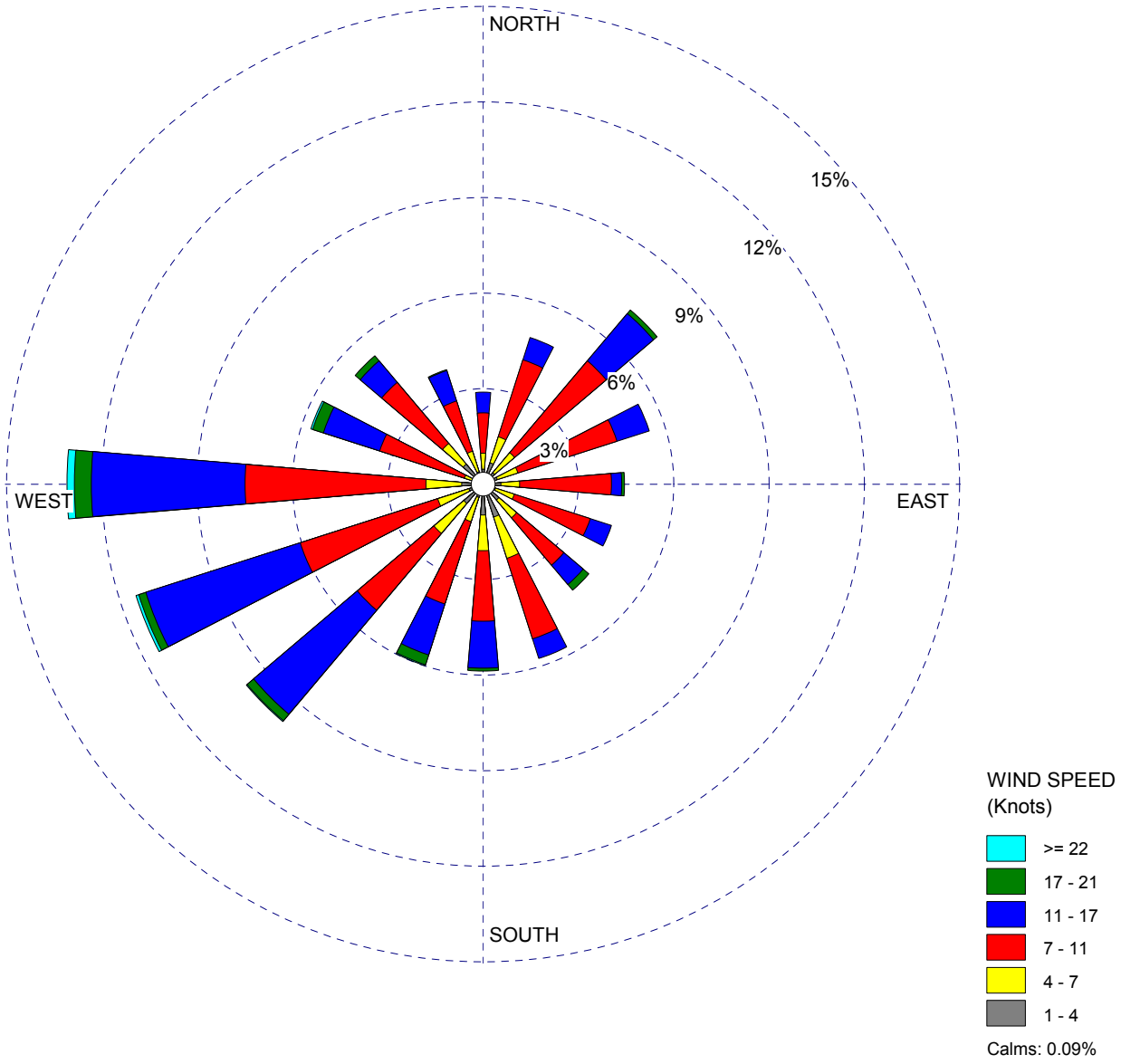


Figure 2.7-13 VEGP 60-m Level January Wind Rose (1998–2002) (Sheet 1 of 12)

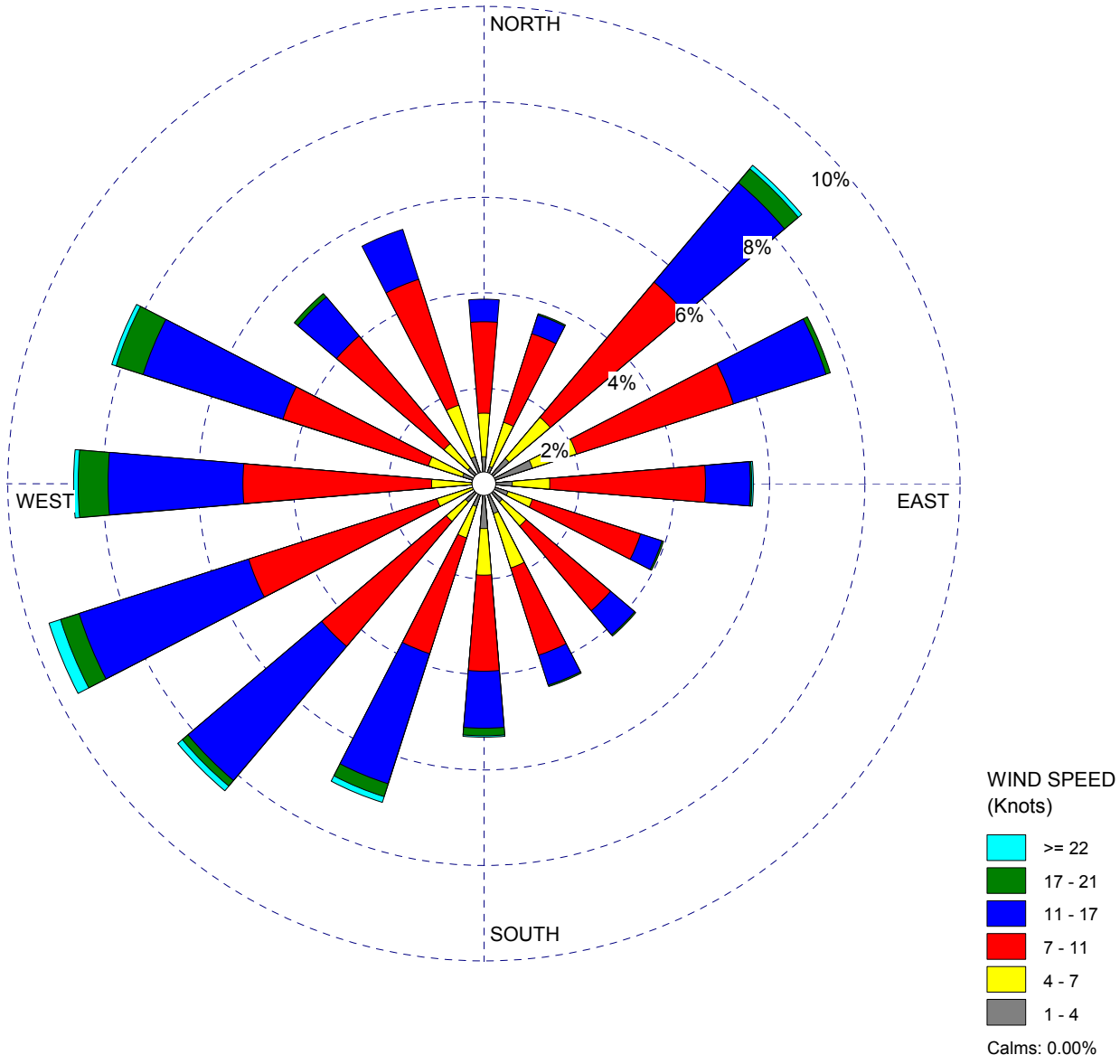


Figure 2.7-13 VEGP 60-m Level February Wind Rose (1998–2002) (Sheet 2 of 12)

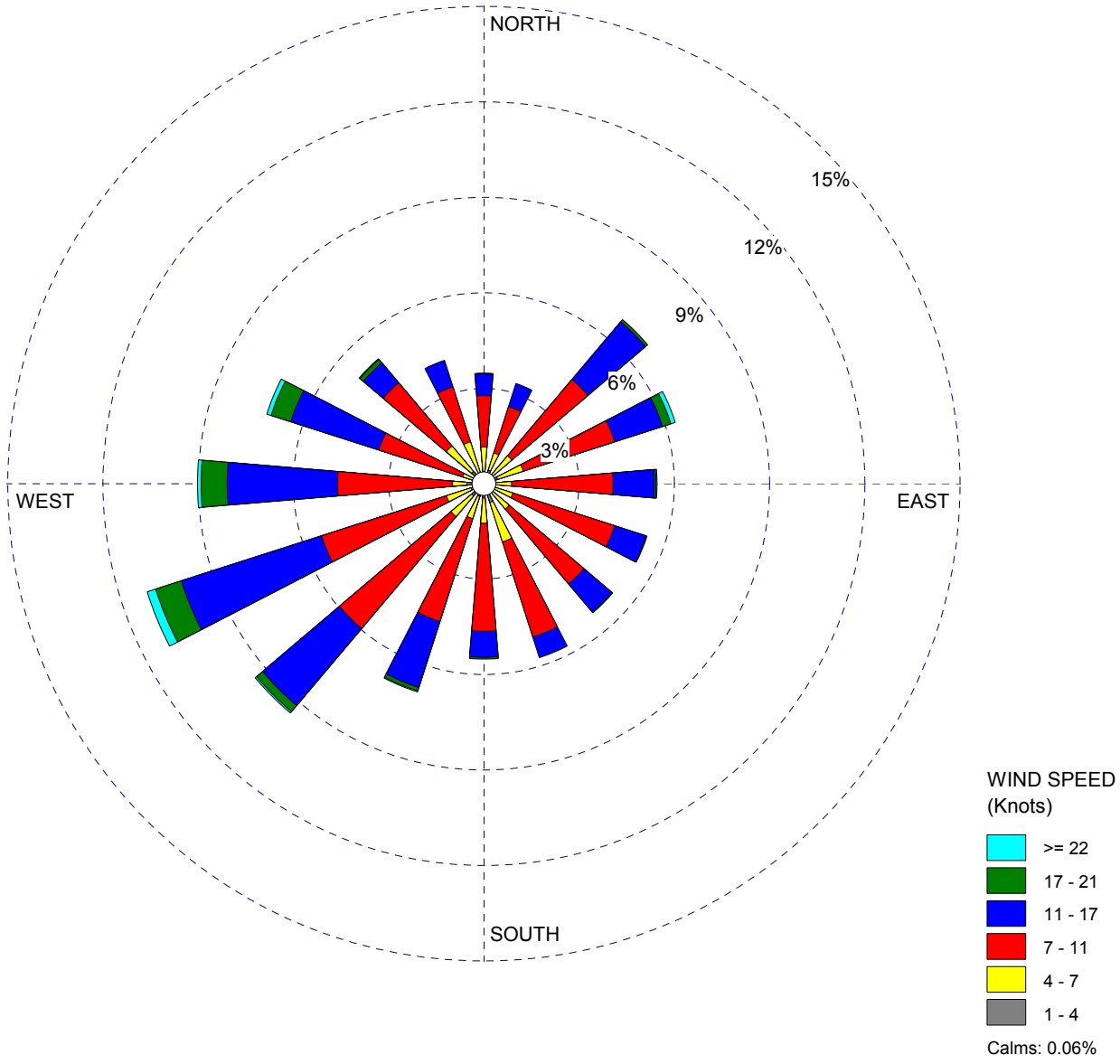


Figure 2.7-13 VEGP 60-m Level March Wind Rose (1998–2002) (Sheet 3 of 12)

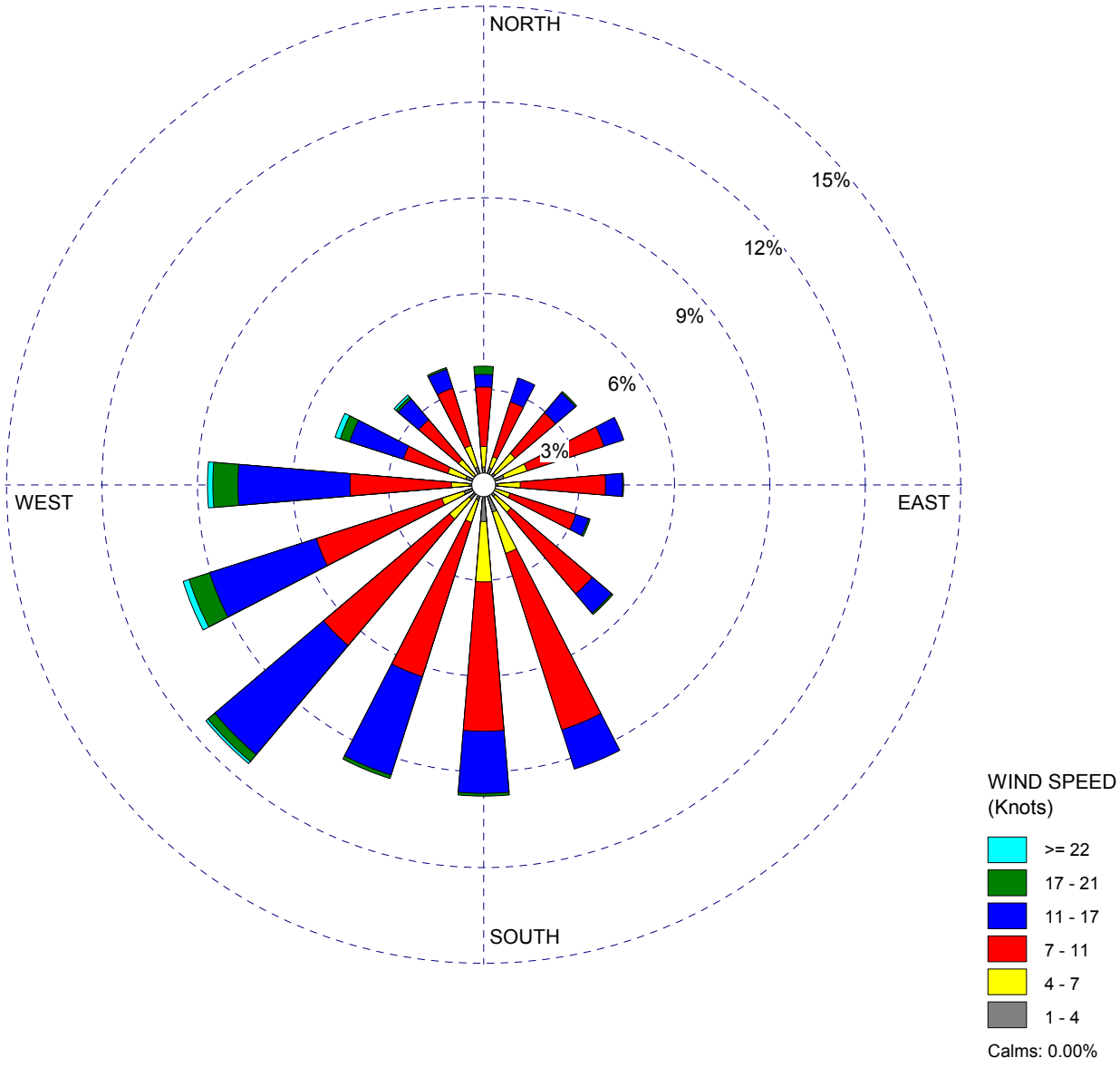
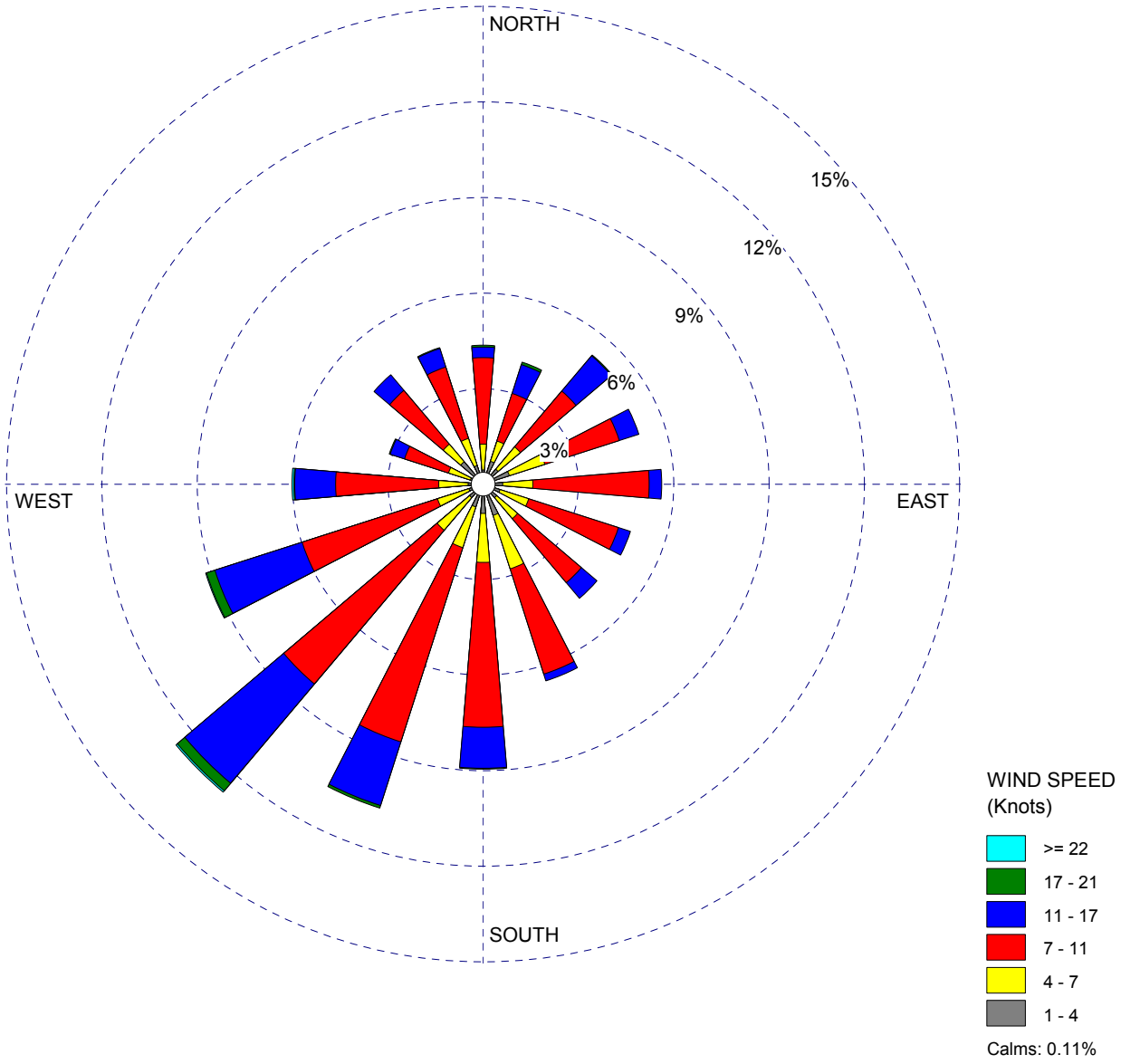


Figure 2.7-13 VEGP 60-m Level April Wind Rose (1998–2002) (Sheet 4 of 12)



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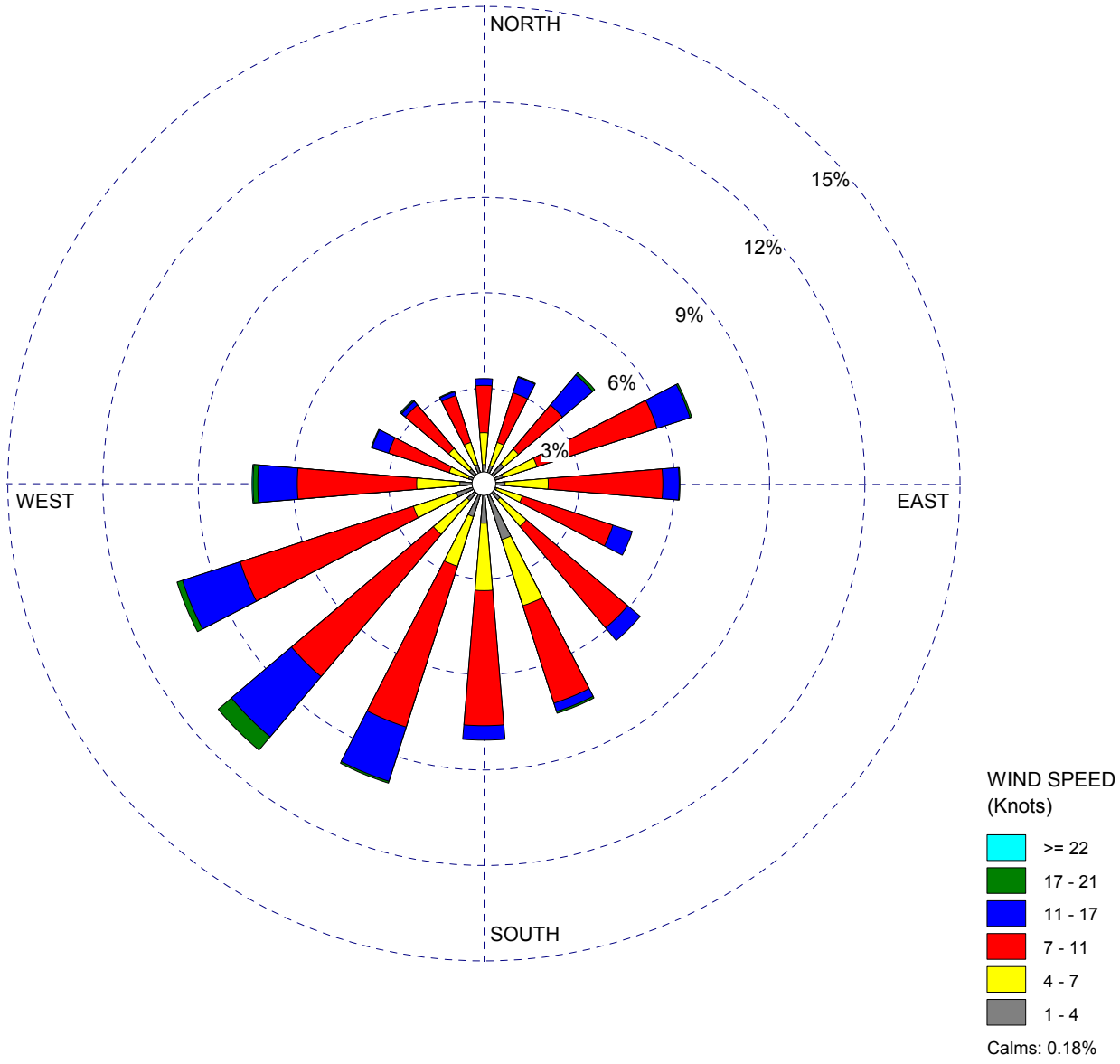


Figure 2.7-13 VEGP 60-m Level June Wind Rose (1998–2002) (Sheet 6 of 12)

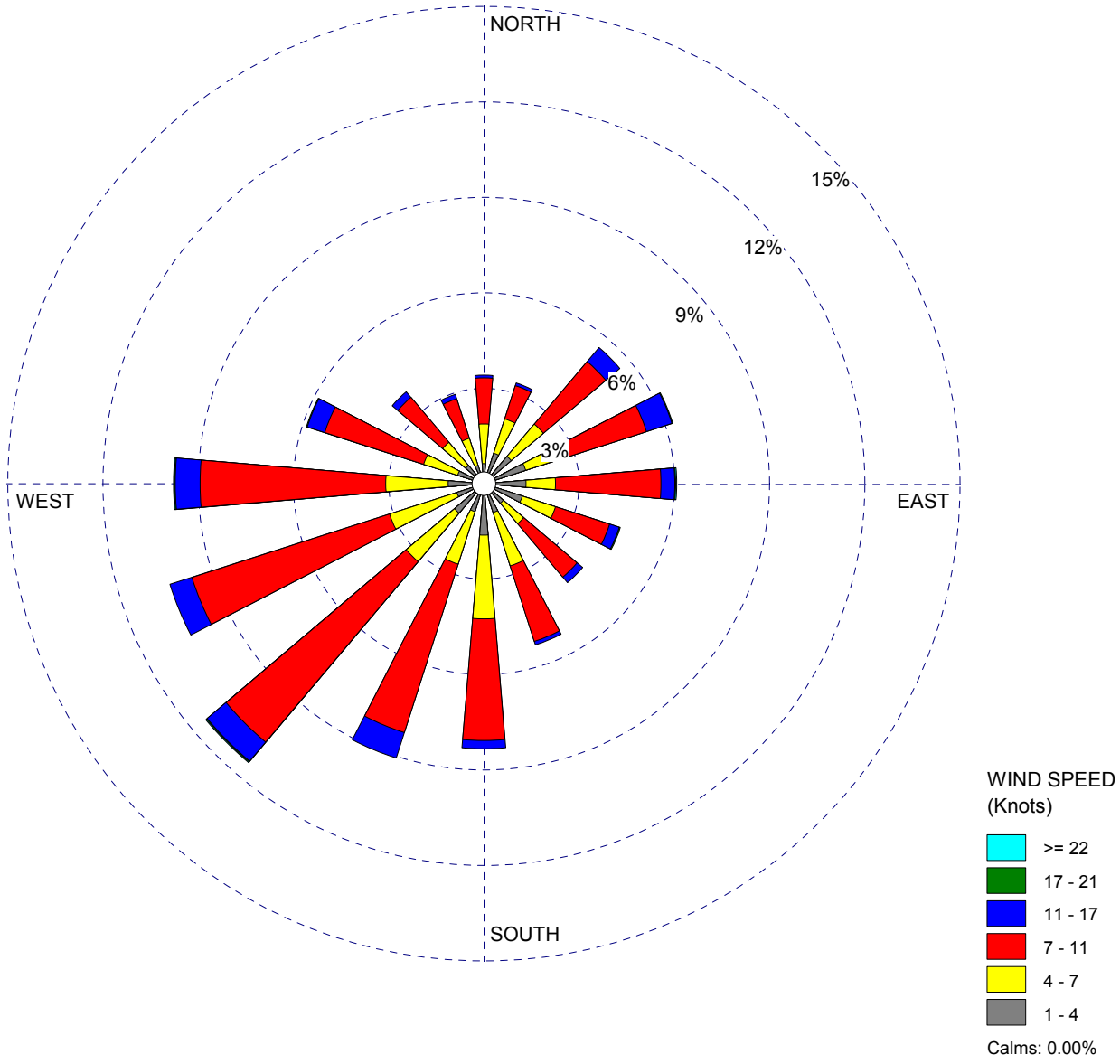


Figure 2.7-13 VEGP 60-m Level July Wind Rose (1998–2002) (Sheet 7 of 12)

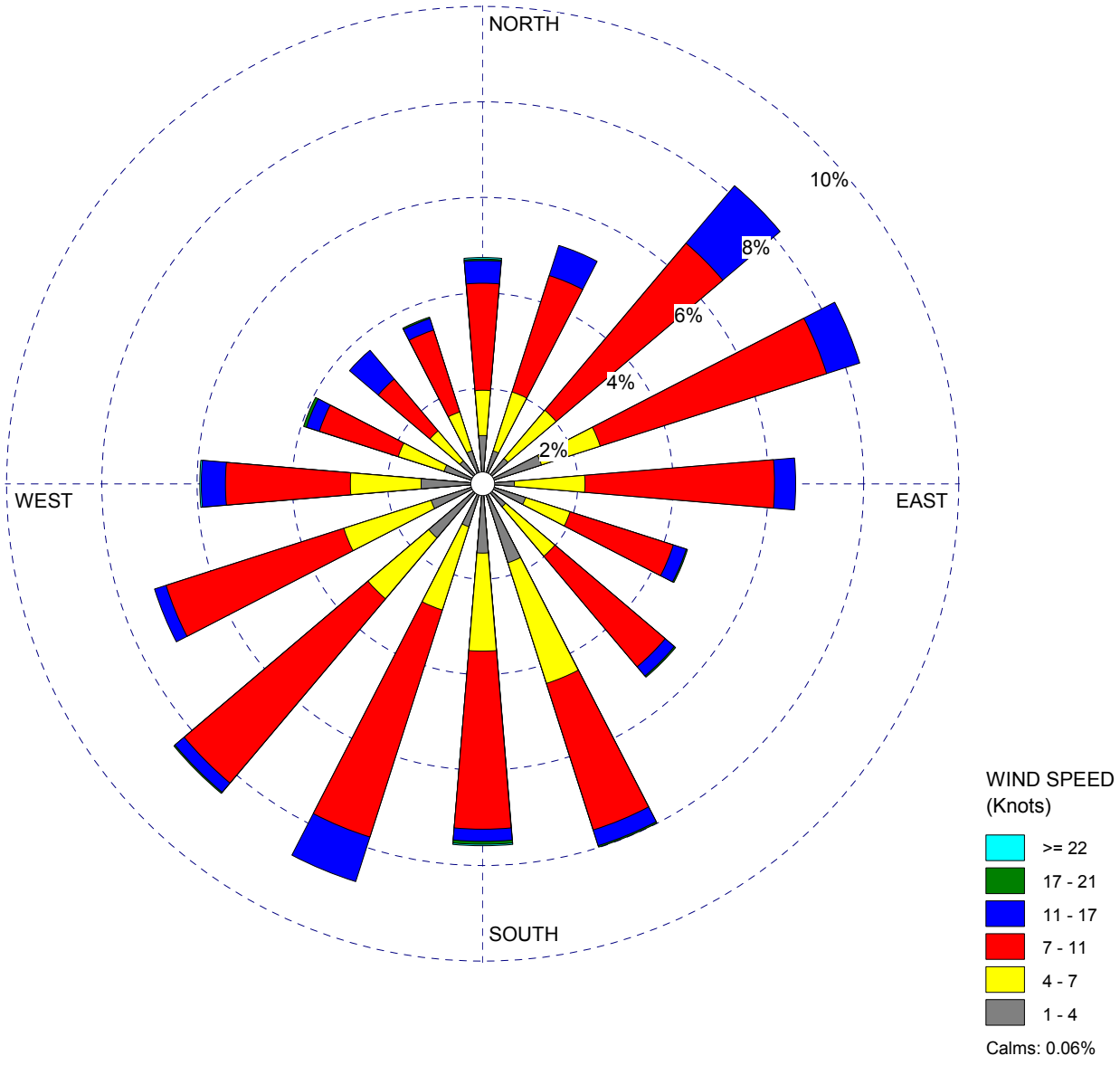


Figure 2.7-13 VEGP 60-m Level August Wind Rose (1998–2002) (Sheet 8 of 12)

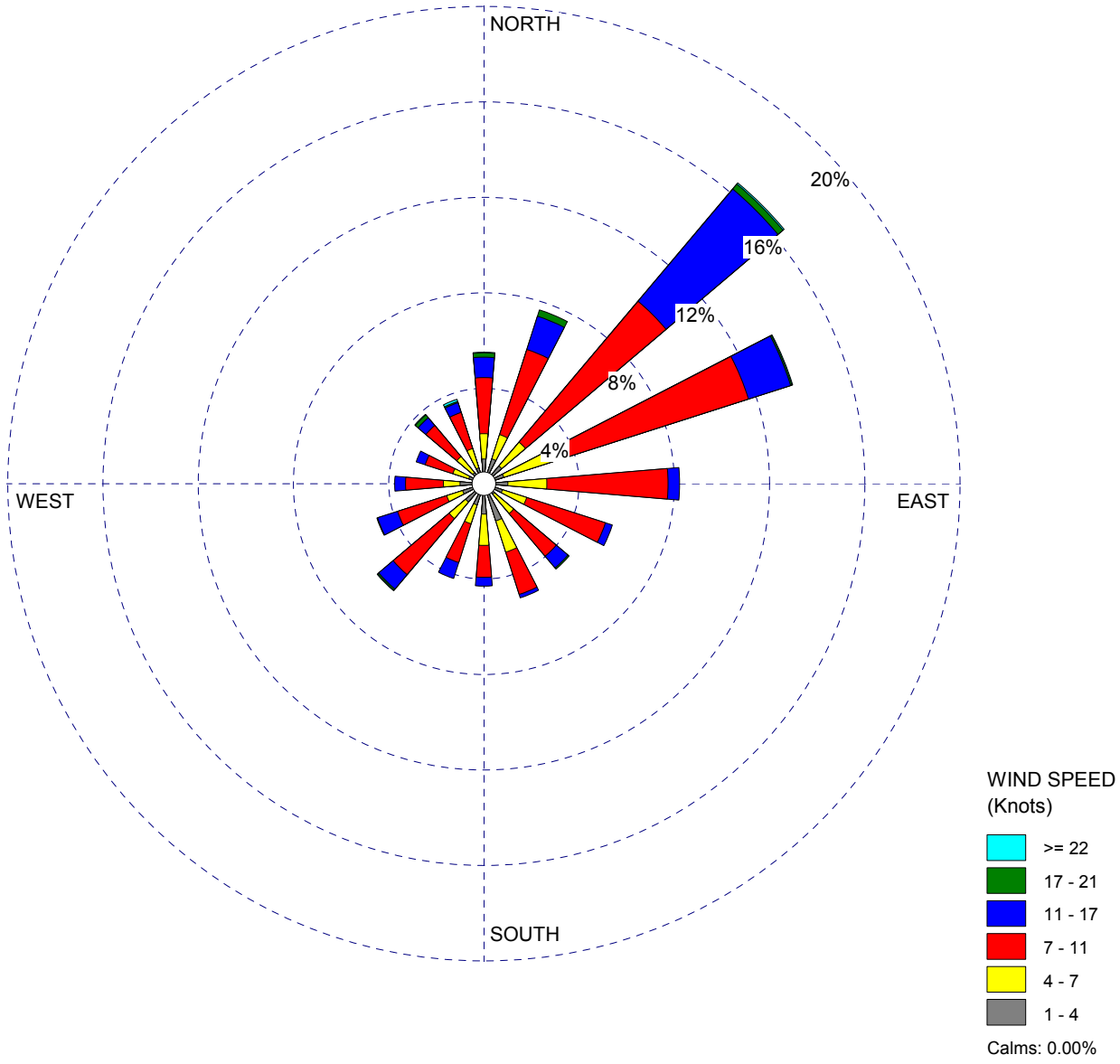


Figure 2.7-13 VEGP 60-m Level September Wind Rose (1998–2002) (Sheet 9 of 12)

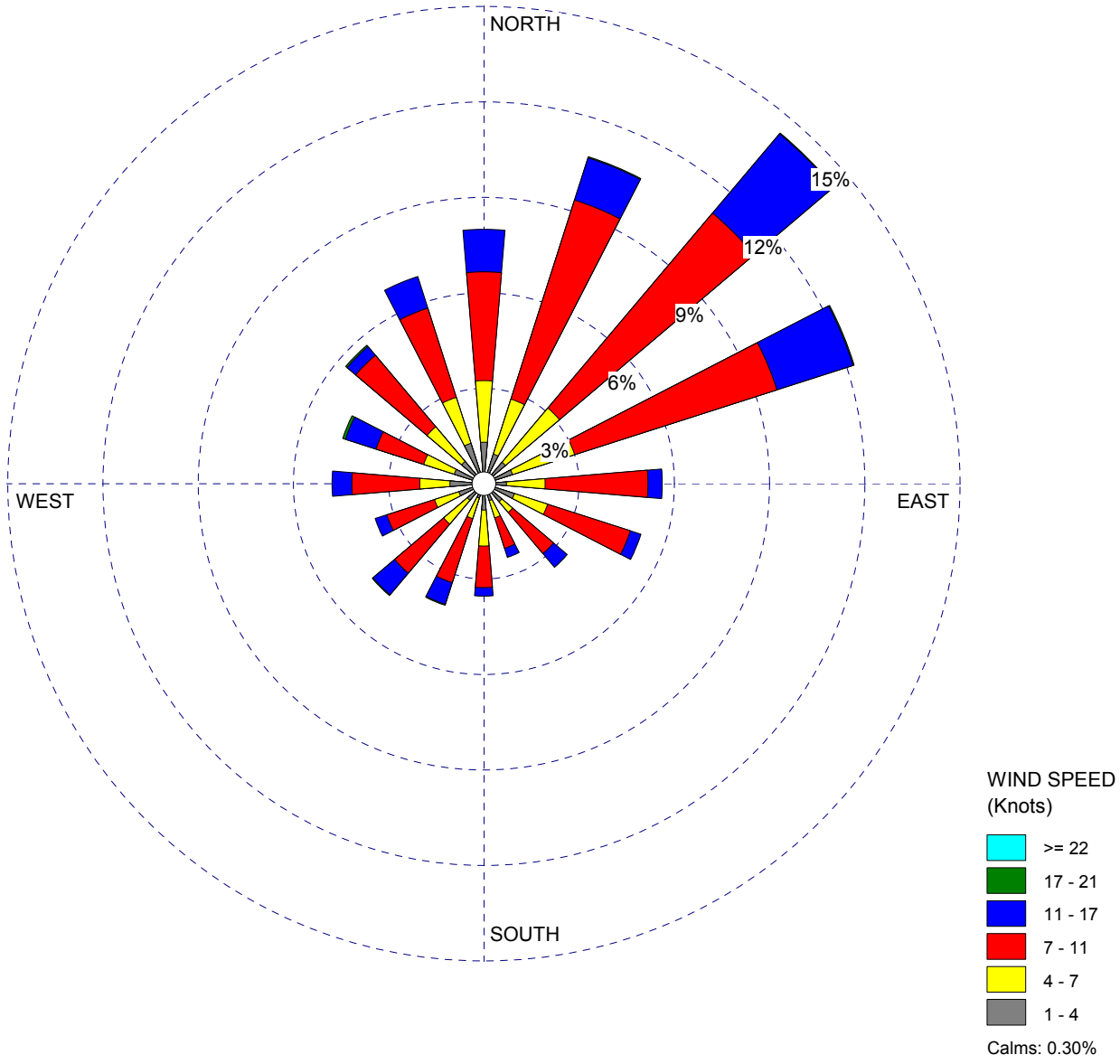


Figure 2.7-13 VEGP 60-m Level October Wind Rose (1998–2002) (Sheet 10 of 12)

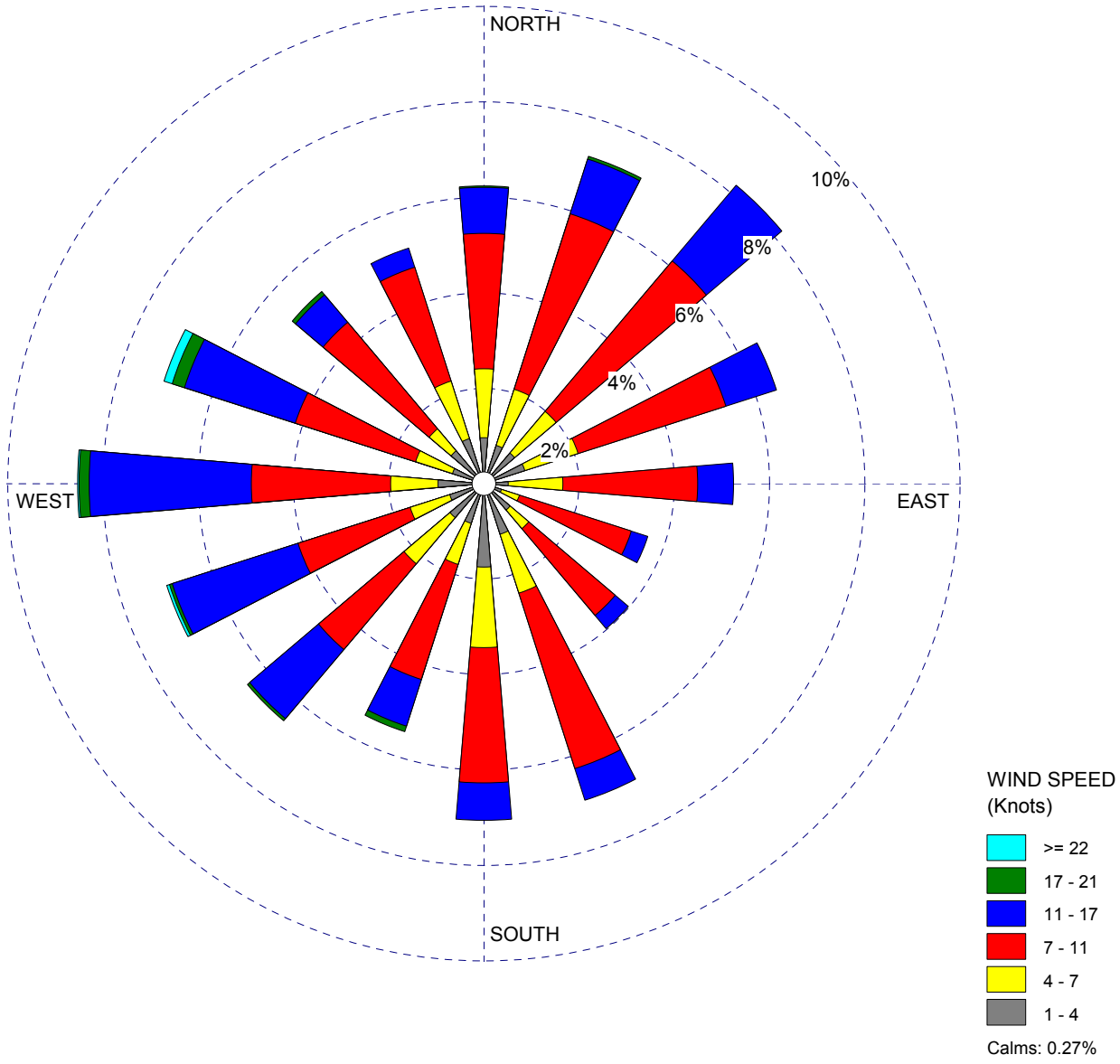


**Figure 2.7-13 VEGP 60-m Level November Wind Rose (1998–2002)
(Sheet 11 of 12)**

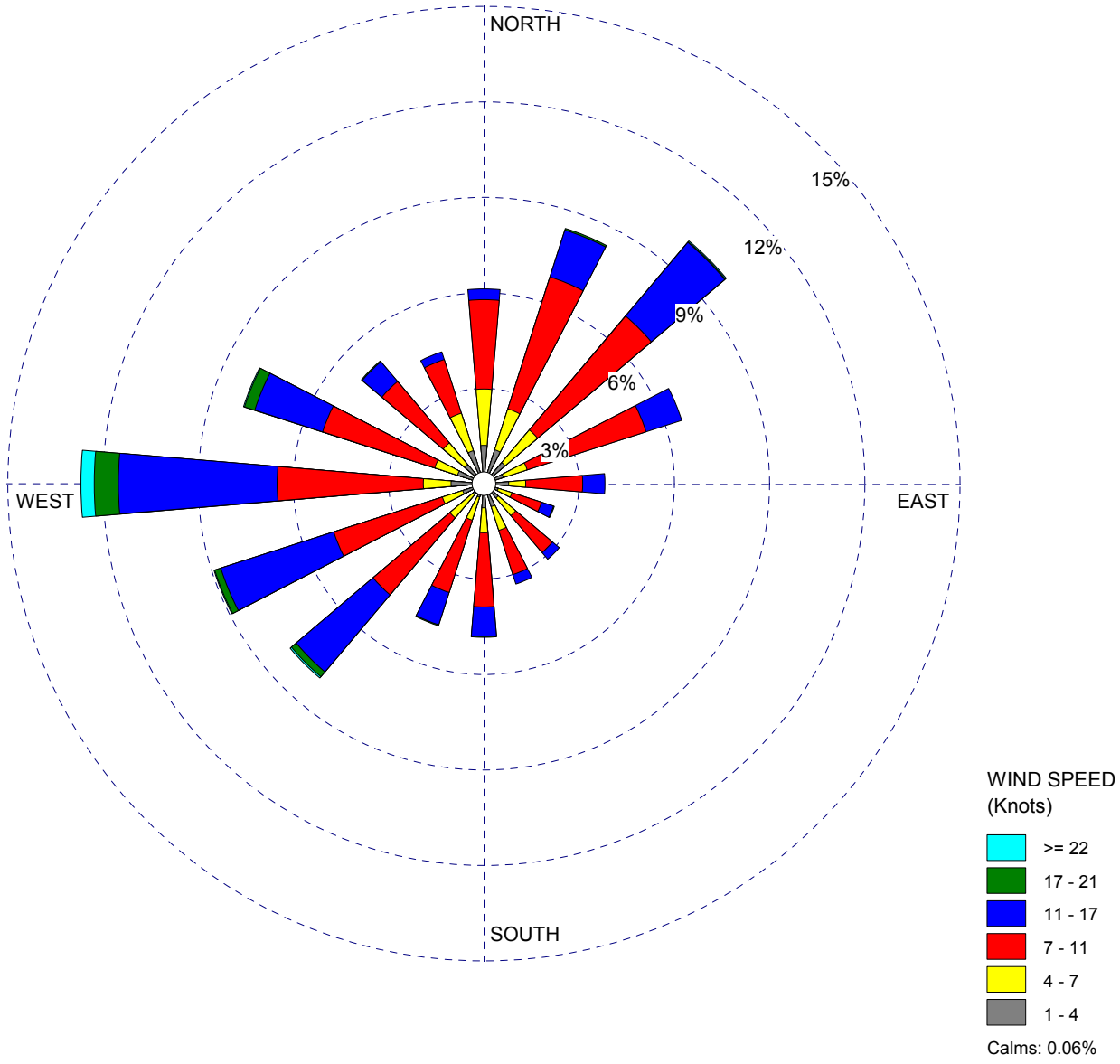


**Figure 2.7-13 VEGP 60-m Level December Wind Rose (1998–2002)
(Sheet 12 of 12)**

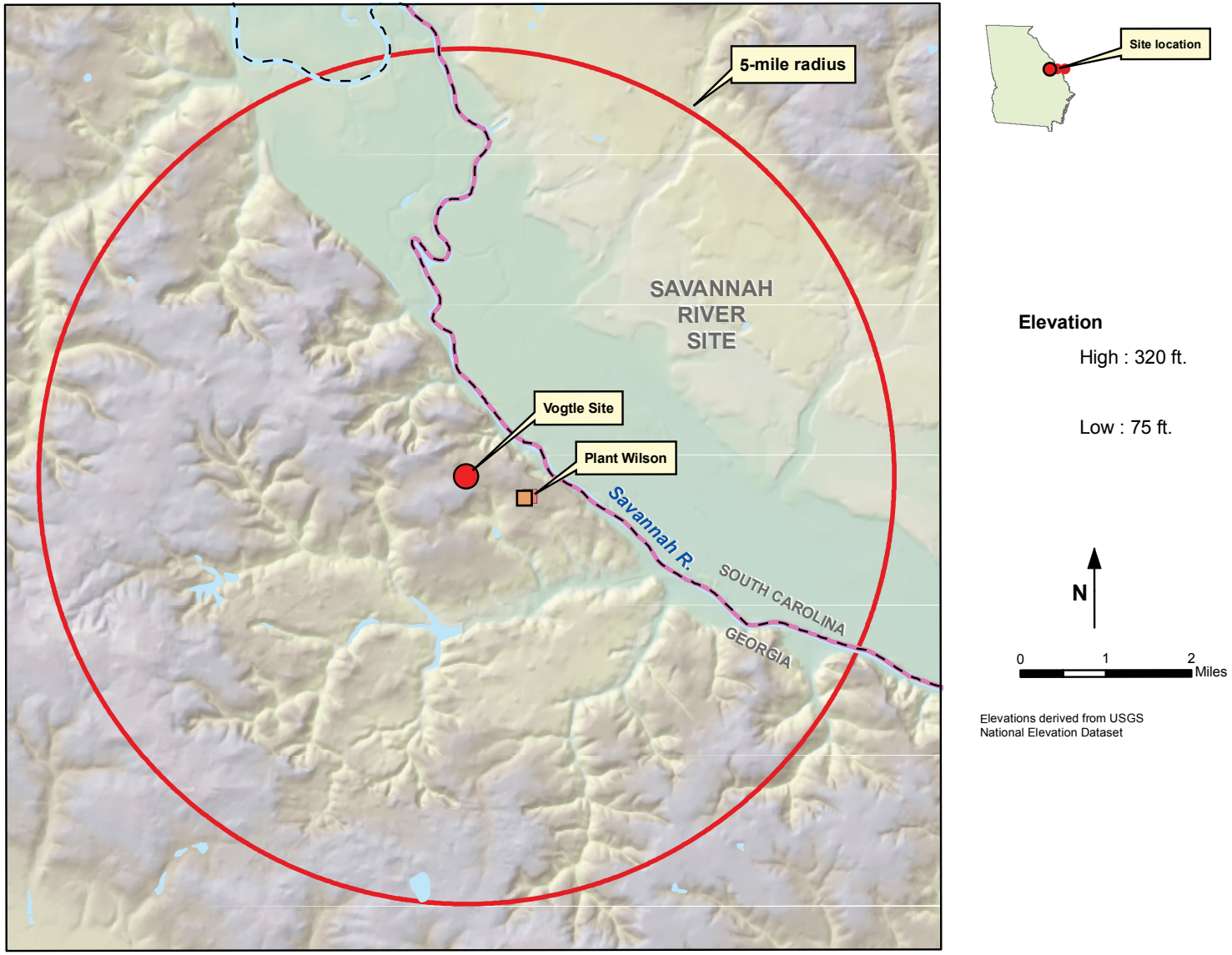


Figure 2.7-14 Topographic Features Within a 5-Mile Radius of the VEGP Site

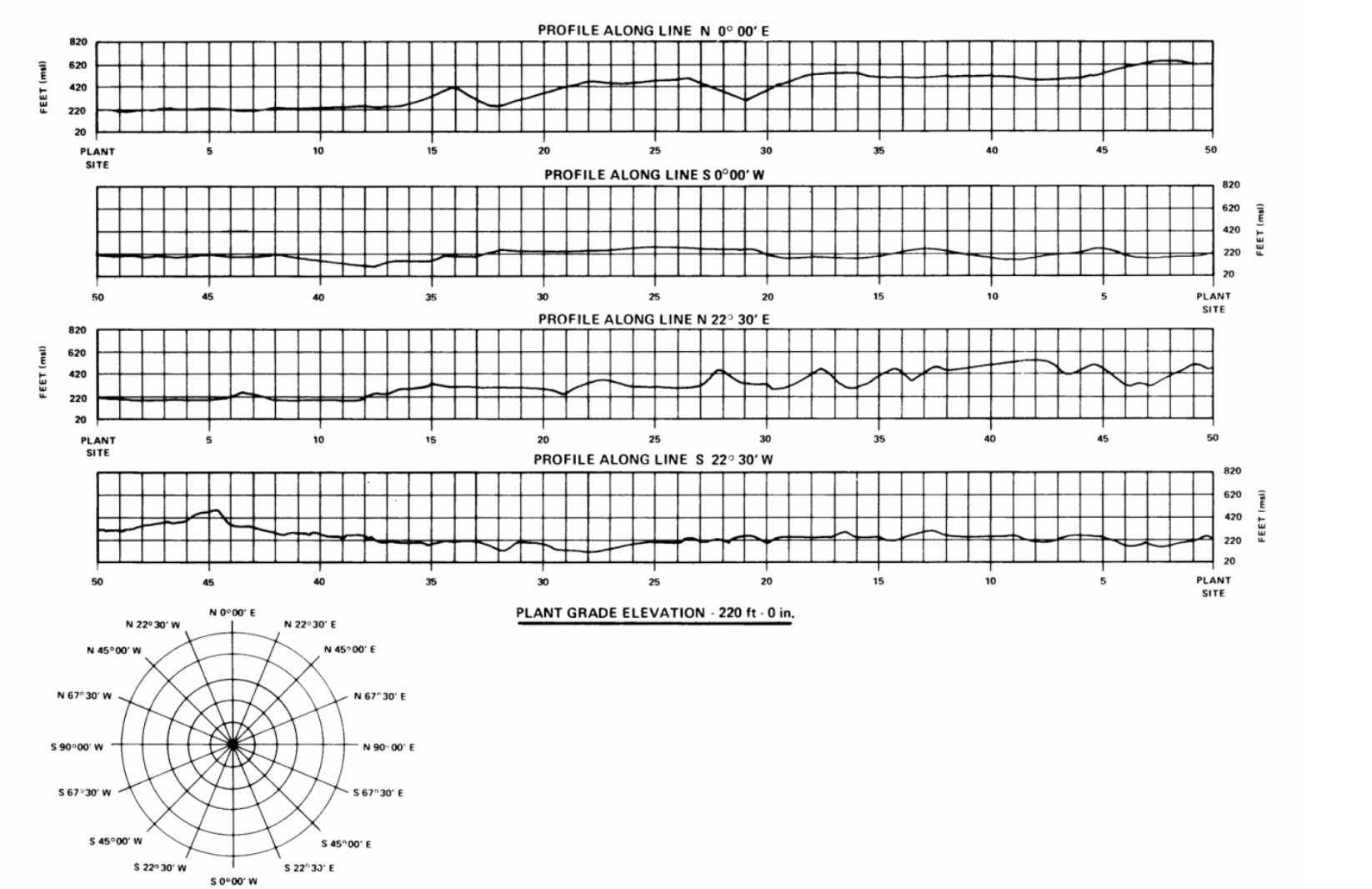
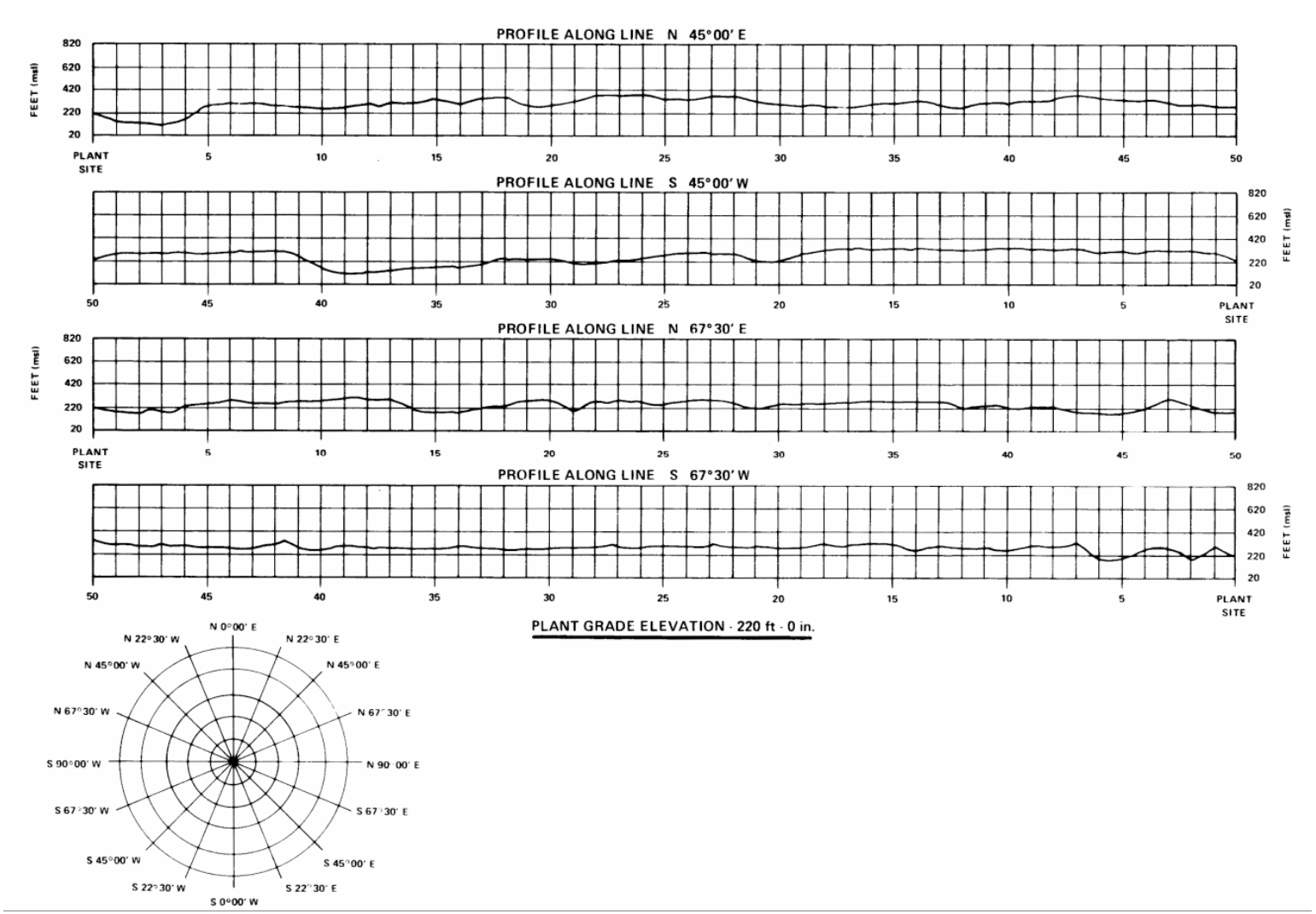


Figure 2.7-15 Terrain Elevation Profiles Within 50 Miles of the VEGP Site (Sheet 1 of 4)



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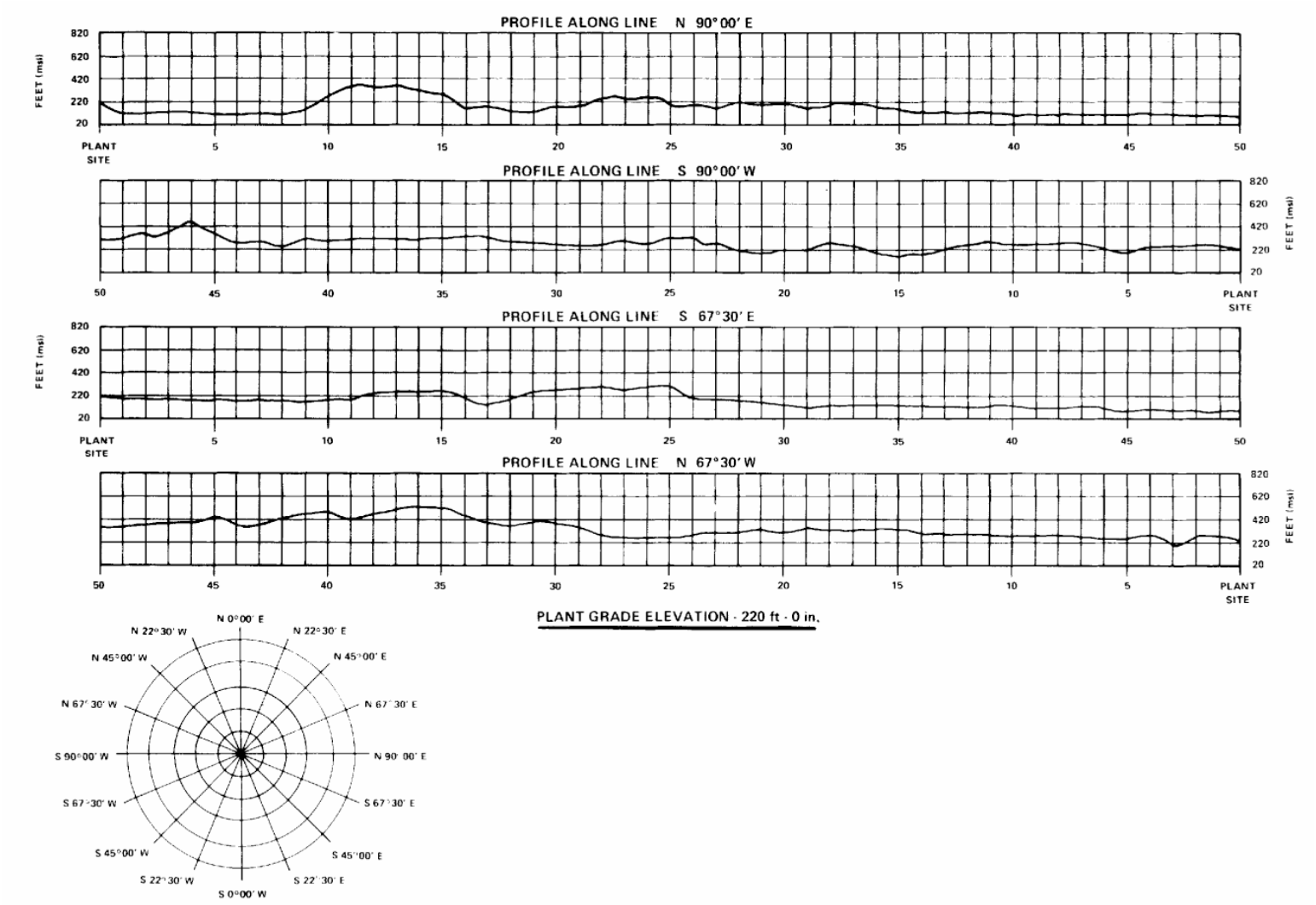

Figure 2.7-15 Terrain Elevation Profiles Within 50 Miles of the VEGP Site (Sheet 3 of 4)

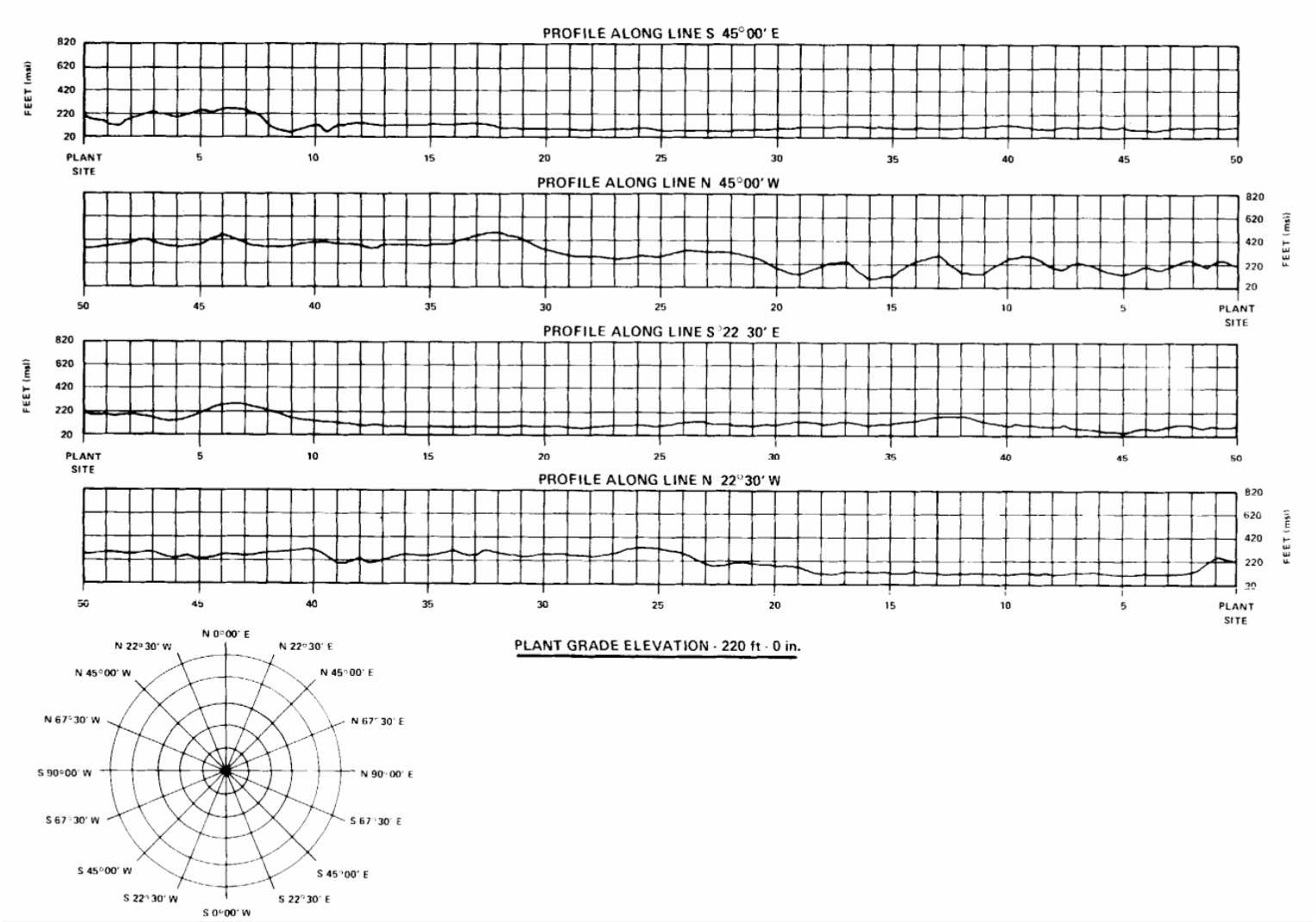

Figure 2.7-15 Terrain Elevation Profiles Within 50 Miles of the VEGP Site (Sheet 4 of 4)

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2.8 Related Federal and Other Project Activities

This section briefly describes Federal and other activities within the region that could have cumulative impacts with the proposed action.

Two existing Westinghouse pressurized water reactors, Units 1 and 2, are located on the VEGP site. Unit 1 began operation in 1987 and Unit 2 began operation in 1989. Each unit currently produces 1232 MWe of power. The units are cooled by natural draft cooling towers and the Savannah River supplies the makeup water. VEGP Units 1 and 2 are currently licensed to operate through 2027 and 2029, respectively. SNC will apply to the NRC to renew the licenses of these facilities. If the renewal is granted, these nuclear reactors will operate through 2047 and 2049.

Adjacent to the VEGP site and inside the exclusion area boundary, Georgia Power Company maintains a small oil-fired peaking facility, known as Plant Wilson, which is operated by SNC employees.

Two fossil-fueled plants are located near VEGP. The first, the SRS D-Area Powerhouse, is directly across the Savannah River and within 6 miles of VEGP. It burns 42 tons of pulverized coal per hour at full load and can produce a maximum of 45 MW of electricity in its four units (its main purpose is to provide steam to SRS facilities). **(SCE&G 2006)**

Urquhart Station is a 250 MW plant located on the Savannah River, 4 miles below Augusta, GA, owned by South Carolina Electric & Gas. The plant has three units and burns 99 tons of pulverized coal per hour at full load. Urquhart can burn natural gas as an alternate fuel.

The Army Signal Corps is stationed at Fort Gordon in Richmond County, Georgia. The Fort has a population of approximately 19,000. The individuals in the population change, but the population remains fairly constant. At this time there are no plans to expand the installation or reduce its size.

The U.S. Department of Energy's SRS is directly across the Savannah River from VEGP site. The SRS has released radioactive and hazardous contaminants into groundwater and surface water, including the Savannah River. SRS is remediating past releases, disposing of low-level radioactive waste in a designated disposal facility and preparing high level radioactive waste and spent [non-commercial] nuclear fuel for ultimate disposal in a geologic repository. SRS has a tritium processing facility, and releases tritium into the atmosphere and on-site streams which drain into the Savannah River. SRS continues to reduce its workforce as missions are completed. Additional information on the SRS is available at its web site, www.srs.gov.

Besides the SRS and VEGP, two other sources of radiation, hospitals and a state owned commercial facility, are within the 50-mile radius of VEGP. The hospitals include Medical College of Georgia and its teaching hospital, a VA hospital, an Army hospital at Fort Gordon, and several large private hospitals located in Augusta. All of these hospitals use medical

isotopes that are discharged into the municipal water treatment system, and ultimately, the Savannah River. Chem-Nuclear operates a commercial radioactive waste disposal facility in Barnwell County, SC, adjacent to the eastern side of the SRS. The Barnwell facility is the only state-owned facility currently available to most of the nation for disposal of commercially-generated low-level radioactive waste. After June 30, 2008, the site will accept waste only from facilities located in South Carolina, Connecticut or New Jersey. In accordance with Federal guidelines (10 CFR 61.59) and State law (13-7-30 S.C.C.), the State of South Carolina accepts and assumes responsibility for ongoing monitoring, maintenance and custodial care of the site after it is closed **(South Carolina Energy Office, no date).**

The USACE is responsible for the water quantity in the Savannah River. The Corps is conducting a basin-wide water resources management study focusing on water-quantity related issues. It is investigating current operational plans for the three Federal reservoirs on the river to determine if changes or reallocations are warranted to meet current and future needs for, among other things, flood control, water supply, and water quality. Much of the impetus for the study is the realization that consumptive water use demands will increase in the future. The Corps also maintains the New Savannah Bluff Lock and Dam located between VEGP and Augusta. The lock and dam was constructed in 1937 to serve commercial navigation, which ceased in 1979. The lock and dam are necessary to maintain a constant pool elevation, which serves Augusta and North Augusta municipal and industrial water supply intakes and boat races and regattas, even during periods of low flow. **(USACE 2004)**

Approximately 80 percent of the water withdrawn from the Savannah River is returned **(USACE no date)**, however there are several significant consumptive users on the river. In addition to the existing units at VEGP, major consumptive users include the Augusta and North Augusta water systems, the Beaufort-Jasper Water Authority and the Savannah City water supply.

Section 2.8 References

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2.9 Existing Plant Site Characteristics, Design Parameters, and Site Interface Values

Impacts of the proposed reactors are cumulative with the impacts of the existing Units 1 and 2. Therefore, parameters describing the existing plant comprise a baseline of impacts against which parameters for the new reactors can be analyzed. Accordingly, Table 2.9-1 presents existing plant parameters that are important for assessing the environmental impacts of constructing and operating proposed new nuclear power plants at the VEGP site. The table is organized into the resource or impact topics discussed in Chapters 2, 4, and 5, as appropriate: land use, water, socioeconomics, radiological impacts, and nonradiological impacts. The ecology resource area is not listed, because plant parameters that affect this resource are identified under other topics.

The existing plant parameters are used variously in analyses in Chapters 4, 5, and 10.5, Cumulative Impacts.

Table 2.9-1 Plant Parameters for VEGP Units 1 and 2

Parameter	Quantity and Units	Explanation
Land Use		
Developed acreage	3,169 acres; Plant facilities occupy 717 acres with remaining 2,452 acres landscaped, fertilized, and reseeded after completion of construction. 1,778 acres not involved in construction.	Source: OLSER 2.1.3; 5.7; See also OLSER pg 5.7.3 for detailed breakdown of land use
Exclusion Area Boundary	~1 mile radius (Owner Controlled Area)	Source: SNC Emergency Plan
Low Population Zone Boundary	2 miles radius	Source: FSAR
Water		
River water consumptive use	30,000 gallons per minute	Source: FES p. 4-14 (OLSER 3.3.3) Average 2 units
Groundwater withdrawal	730 gallons per minute average 2,300 gallons per minute maximum	Source: Groundwater Use Reports Average/Maximum, 2 units
Blowdown flow rate	5,000 gallons per minute/unit	Source: OLSER 3.3.1 Expected value at 4 cycles of concentration
Blowdown temperature	89 degrees Fahrenheit	Source: OLSER Table 3.4.1 Design water outlet temperature (prior to mixing)
Cycles of concentration	2 to 6	Source: FES p. 4-45; OSLER Table 3.4-2
Evaporation/drift rate	30,000 gallons per minute	Source: Maximum expected, 2 units, FES p. 4-45
Socioeconomics		
Permanent plant workforce[1]	888	
Outage workforce	2000 – 937 2001 – 674 2002 – 479 Spring/575 Fall * 2003 – 665 2004 – 755 2005 – 738 Spring/600 Fall** Average = 817 (2000-2004) 897.2 (2000-2005)** * two outage year ** fall outage workforce is estimated	Source: 5-year average (2000-2004), 2 units
Population within 10 miles	3,560 people	Source: 2000 Census as calculated by SECPOP 2000

Table 2.9-1 (cont.) Plant Parameters for VEGP Units 1 and 2

Parameter	Quantity and Units	Explanation
Population within 50 miles	674,101	Source: 2000 Census as calculated by SECPOP 2000
Radiological Impacts		
Airborne emissions (curies/yr)	Fission/Activation Products 22.52	
	Radioiodines – 0.00451 Particulates – 1.07E-05 Tritium - 115	Source: Vogtle Annual Effluent Reports Five-year average (curies/year), 2 units (2000-2004)
Airborne pathway collective dose	Unit 1 – 5.42E0-5 mrem Unit 2 – 1.95E-04 mrem	Source: Vogtle Effluent Reports Five-year average (mrem), 2 units (2000-2004)
Liquid discharges (curies/yr)	Fission/Activation Products 0.142 Tritium – 1414 Dissolved/Entrained Gases 0.00172 Gross Alpha – 2.98E-05	Source: Vogtle Effluent Report Five-year average (curies/year), 2 units (2000-2004)
Liquid pathway collective dose	Unit 1 – 0.0451 mrem Unit 2 – 0.0195 mrem	Source: Vogtle Effluent Report Five-year average (mrem), 2 units (2000–2004)
Solid radiological waste volume	49 m^3/yr (average)	Source: Vogtle Effluent Report Five-year average (m^3), 2 units (2000-2004)
Solid radiological waste radioactivity	583 curies/yr (average)	Source: Vogtle Annual Effluent Report Five-year average (curies/year), 2 units (2000-2004)
	Year Dose 2000 – 121.312 rem 2001 – 129.270 rem	
Worker collective dose	2002 – 243.957 rem (two outage year) 2003 – 84.344 rem 2004 – 80.763 rem	Source: Vogtle Annual Effluent Report
	Average 131.929 rem/year	Five-year average (rem/year), 2 units (2000-2004)
Nonradiological Impacts		
	VEGP Units 1 and 2 Tons per year of criteria pollutants NOx = 26 tons/year Sox = 4.1 tons/year Ozone = N/A PM_{10} = 0.46 tons/year $PM_{2.5}$ = 0.57 tons/year CO = 6.9 tons/year	Source: Vogtle/Wilson Title V permit documentation

Table 2.9-1 (cont.) Plant Parameters for VEGP Units 1 and 2

Parameter	Quantity and Units	Explanation
Air emissions	Plant Wilson Tons per year of criteria pollutants NOx =163 tons/year Sox = 93 tons/year Ozone = N/A PM_{10} = N/A $PM_{2.5}$ = 2.2 tons/year CO = 0.92 tons/year	Five-year average for diesel generators and combustion turbines and Black Start diesel at Plant Wilson. Vogtle no longer has an auxiliary boiler. The original auxiliary boiler was taken out of service and subsequently removed from the site many years ago.
Noise	Ambient 22 - 44 dBa; Operating plant conditions 25 - 40 dBa measured at 7 points along Vogtle property line.	Source: OLSER 5.6.1
Building height	Containment dome: 180 feet above grade Cooling towers: 550 feet above grade	Source: OLSER 3.1.2; 3.1.4
Other		
Megawatts thermal	3565 MWt per unit	Source: FSAR
Gross megawatts electrical	1232 MWe per unit	Source: FSAR

[1] Includes SNC/GPC and long-term contractors

mrem = millirem (1/1000 rem.)

NOx – oxides of nitrogen

Sox – sulphur dioxide

PM_{10} – Particulate matter <10 microns in diameter

$PM_{2.5}$ – Particulate matter <2.5 microns in diameter

CO – carbon monoxide

FSAR – Final Safety Analysis Report, VEGP Units 1 and 2

OLSER – Operating License Safety Evaluation Report, VEGP Units 1 and 2

FES – Final Environmental Statement, VEGP Units 1 and 2