2.7 METEOROLOGY, AIR QUALITY, AND NOISE

This section describes the regional and local climatological and meteorological characteristics applicable to the site for VCSNS Units 2 and 3. 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 site and expected noise levels relative to measured background conditions.

2.7.1 REGIONAL CLIMATOLOGY

This subsection identifies sources of climatological data used to characterize various aspects of the climate representative of the site region and area around Units 2 and 3 (as discussed in Subsections 2.7.1 through 2.7.4), describes large-scale general climatic features and their relationship to conditions in the site region and vicinity (Subsection 2.7.1.2), and summarizes normals, means, and extremes of several standard weather elements (Subsection 2.7.1.3).

2.7.1.1 Data Sources

Several sources of data are used to characterize regional climatological conditions pertinent to the site for Units 2 and 3. This includes data collected by the National Weather Service (NWS) at its Columbia, South Carolina, first-order station and from 13 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 Fairfield, Newberry, Lexington, Union, Chester, Saluda, Kershaw, Lancaster, York, and Edgefield Counties, South Carolina. Table 2.7-1 identifies the specific stations and lists their approximate distance and direction from the midpoint between the Units 2 and 3 reactors at the site. Figure 2.7-1 illustrates these station locations relative to the site for Units 2 and 3.

The objective of selecting nearby, offsite 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 VCSNS site. The 50-mile radius circle shown in Figure 2.7-1 provides a relative indication of the distance between the climate observing stations and the VCSNS site.

The identification of stations to be included was based on the following general considerations:

- Proximity to the site (*i.e.*, within the nominal 50-mile 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 included if it contributed one or more extreme conditions (*e.g.*, rainfall, snowfall, maximum or minimum temperatures) for that general direction or added context for variation of conditions over the site region.

Nevertheless, if an overall extreme precipitation or temperature condition was identified for a station located within a reasonable distance beyond the nominal 50-mile radius and that event was considered to be reasonably representative for the site region, 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:

- *2004 Local Climatological Data, Annual Summary with Comparative Data for Columbia, South Carolina* (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 South Carolina* (SERCC 2007)
- *Cooperative Summary of the* Day, *TD3200, Period of Record Through 2001, for the Eastern United States, Puerto Rico, and the Virgin Islands* (NCDC 2002d)
- *U.S. Summary of Day Climate Data (DS 3200/3210), POR 2002-2005* (NCDC 2006)

First-order NWS stations also record measurements, typically hourly, 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 summary for the Columbia, South Carolina, NWS station, presents the long-term characteristics of these parameters.

Additional data sources were also used in describing the climatological characteristics of the site region, including, among others:

- *Engineering Weather Data, 2000 Interactive Edition*, Version 1.0 (AFCCC-NCDC 1999)
- *Minimum Design Loads for Buildings and Other Structures* (ASCE 2002)

- *Historical Hurricane Tracks Storm Query*, 1851 through 2006 (NOAA-CSC 2006-2007)
- *The Climate Atlas of the United States* (NCDC 2002c)
- *Storm Events for South Carolina*, Hail Event and Snow and Ice Event Summaries for Fairfield, Newberry, Lexington, and Richland Counties (NCDC 2007)
- *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)
- *Ventilation Climate Information System* (USDA – Forest Service 2003, 2007)
- *Climatography of the United States, No. 85, Divisional Normals and Standard Deviations of Temperature, Precipitation, and Heating and Cooling Degree Days 1971-2000 (and previous normal periods)* (NCDC 2002b)

2.7.1.2 General Climate Description

The site for Units 2 and 3 is located in the Piedmont region, lying between the Appalachian Mountains and the Atlantic Ocean, just north of the Fall Line that separates the Piedmont from the Coastal Plain (see Figure 2.6-1). The Appalachian Mountains, situated about 100 miles to the northwest of the site, have a general southwest-northeast orientation. The Atlantic Ocean is approximately 140 miles to the southeast.

Topographic features within 50 miles and 5 miles of the site are addressed in Subsection 2.7.4.5. Terrain in the site region generally consists of gently to moderately rolling hills. Elevations range from about 80 feet above MSL at a point approximately 50 miles to the southeast to about 920 feet above MSL at a point approximately 45 miles to the northwest.

A climate division represents a region within a state that is as climatically homogeneous as possible. The VCSNS site is located near the boundaries of three separate climate divisions within the state of South Carolina. It is physically situated in the southwestern portion of Climate Division SC-03 (North Central), but also lies directly adjacent to the eastern extent of Climate Division SC-05 (West Central), and just north of the northwestern portion of Climate Division SC-06 (Central) (NCDC 2002b).

Nevertheless, 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. Because of 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 South Carolina's summertime temperature and precipitation patterns. This macro-circulation feature also has an effect on 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 Subsection 2.7.2.3.

The influence of this macroscale circulation feature continues during the transitional seasons and winter months; however, it is regularly disrupted by the passage of synoptic- and mesoscale weather systems. During winter, cold air masses may briefly intrude into the region with the cyclonic (*i.e.*, counterclockwise) 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 Subsection 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 occasionally affect the site region. However, these weather conditions are moderated by the Appalachian Mountains to the northwest, which shelter the region in winter from these cold air masses as they sweep down through the continental interior. In general, the cold air that does reach the site region 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 somewhat cyclical pattern. The predominant maximum occurs during the summer (June, July, and August), accounting for a third of the annual total rainfall. A more variable, secondary maximum period occurs during winter into early spring (January through March) (see Subsection 2.7.1.3.3). The summer maximum is due to thunderstorm activity. Heavy precipitation associated with late summer and early autumn tropical cyclones, as discussed in Subsection 2.7.3.5, is also not uncommon. The winter 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 site for Units 2 and 3 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 region.

2.7.1.3 Normal, Mean, and Extreme Climatological Conditions

This subsection discusses normals and period-of-record means and extremes for several standard weather elements (*i.e.*, temperature, atmospheric water vapor, precipitation, and 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 Columbia, South Carolina, NWS station located approximately 26 miles south-southeast of the site for Units 2 and 3. 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 Columbia, South Carolina, and the 13 other nearby cooperative observing stations.

With the exception of temperature measurements from Blair and Catawba, 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 Southeast Regional Climate Center.

More detailed discussions of these and other climatological characteristics, including measured extremes, are addressed in Subsection 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 over the site region range from 59.9°F at the Camden 3W station to 63.6°F at the Columbia, South Carolina, NWS station. The lower normal temperatures at Camden 3W may be due to local topographic effects because the station elevation for this location (*i.e.,* 140 feet above MSL) is the lowest among all of the stations considered. Nevertheless, daily mean ambient temperatures are fairly similar over the site region.

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 21.1°F at Little Mountain to 26.8°F at the Johnston 4SW station (NCDC 2002a). The breadth of this range also may be a reflection of the station elevation with Little Mountain 711 feet above MSL (the highest among all of the stations considered).

On a monthly basis, the local climatological data summary for Columbia, South Carolina, indicates that the daily normal temperature is highest during July (82.0°F) and reaches a minimum in January (44.6°F) (NCDC 2005a).

The highest temperature observed at the site area (111°F) was recorded on June 28, 1954, at the Camden 3W station, located about 38 miles east of the site for Units 2 and 3. The lowest temperature observed in the site region (–5°F) was recorded on December 13, 1962, at the Chester 1NW station, located about 30 miles north of the site region. Refer to Table 2.7-5 for more details on temperature extremes (NCDC 2005b; SERCC 2007).

2.7.1.3.2 Atmospheric Water Vapor

Based on a 21-year period of record, the local climatological data summary for the Columbia, South Carolina, NWS station (see Table 2.7-2) indicates that the mean annual wet bulb temperature is 57.0°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 73.5°F in July (only slightly less during August); the lowest monthly mean value (40.1°F) occurs during January (NCDC 2005a).

The local climatological data summary shows a mean annual dew point temperature of 51.6°F, also reaching its seasonal maximum and minimum during the summer and winter, respectively. The highest monthly mean dew point temperature is 69.9°F in July; again, only slightly less during August. The lowest monthly mean dewpoint temperature (33.2°F) occurs during January (NCDC 2005a).

The 30-year normal daily relative humidity averages 70% annually, typically reaching its diurnal maximum in the early morning hours (around 0700 local standard time) and its diurnal minimum during the early afternoon hours (around 1300 local standard time). There is less variability in this daily pattern with the passage of weather systems, persistent cloud cover, and precipitation. Nevertheless, this diurnal pattern is evident throughout the year. The local climatological data summary indicates that average early morning relative humidity levels are greater than or equal to 90% during the months of August, September, and October (NCDC 2005a).

2.7.1.3.3 Precipitation

With the exception of the Pelion 4NW station, normal annual rainfall totals for the 13 other nearby observing stations listed in Table 2.7-3 differ by about 5.7 inches (or about 12%), ranging from 43.59 inches at the Blair 1NE observing station, about 10 miles to the north-northwest, to 49.33 inches at the Newberry station, about 18 miles to the west (NCDC 2002a). The normal rainfall total for Blair 1NE is based on the current station location; other precipitation extremes and normal annual snowfall totals are based on summaries available for the previous station location referred to only as Blair. The current 30-year average for the Pelion 4NW station, about 39 miles to the south, is somewhat higher, at 51.03 inches (NCDC 2002a).

The local climatological data summary of normal rainfall totals for Columbia, South Carolina, indicates two seasonal maximums—the highest (15.94 inches) during the summer (June through August) and the second (13.09 inches) during the winter into early spring (January through March). Together, these periods account for almost 60% of the annual total for the Columbia, South Carolina, NWS station, although rainfall is greater than 2.8 inches during every month of the year. The overall maximum monthly total rainfall occurs during July (5.54 inches) (NCDC 2005a).

The overall highest 24-hour rainfall total in the site region—10.42 inches on August 18, 1986—was recorded at the Newberry station (NCDC 2005b, SERCC 2007). While Subsection 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 100 nautical miles of the site for Units 2 and 3, this particular event was not. However, the region was generally unsettled as Tropical Storm Charley had formed well off the South Carolina coast moving to the northeast only a few days earlier (NCDC 2004).

The overall highest monthly rainfall total recorded in the site region—18.55 inches during August 1952 at the Kershaw 2SW cooperative observing station, about 44 miles east-northeast of the site—represents the accumulation of 13 days of measurable precipitation during that month (SERCC 2007, NCDC 2002d). Only a portion (*i.e.*, less than 25%) of that total was attributable to Hurricane (later Tropical Storm) Able, which traversed the state on August 30 and 31, 1952 (see Subsection 2.7.3.5).

Snow in the site region is not an unusual event, having occurred as early as mid-November and as late as the last week of March. However, Table 2.7-3 indicates that normal annual totals range from only 1.4 to 3.9 inches (NCDC 2005b, SERCC 2007). Heavy snows, on the other hand, generally occur infrequently as discussed in Subsection 2.7.3.4. The 24-hour snowfall record for the site region (*i.e.*, 15.7 inches) was set on February 10, 1973 at the Columbia Metro Airport, about 26 miles south-southeast of the site. The overall highest monthly snowfall total (*i.e.*, 16.5 inches) was recorded during March 1960 at the Chester 1NW observing station (NCDC 2002d, 2005a, 2005b; SERCC 2007).

See Subsection 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 33-year period of record, the local climatological data summary for the Columbia, South Carolina, 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° (*i.e.*, west-southwest). Monthly prevailing winds are from the west-southwest or southwest during most of the year (*i.e.*, December through August) (NCDC 2005a). These characteristics are a direct effect of the presence of the Appalachian Mountains to the northwest and, in summer, are further enhanced by the establishment of the Bermuda High (see Subsection 2.7.1.2).

North-northeast winds prevail during September and October according to the local climatological data (NCDC 2005a) and, again, reflect the influence of the Appalachians, this time in conjunction with the predominant continental high-pressure pattern usually centered to the north over New England with the mountains acting as a deflecting barrier for the clockwise circulation around the high.

Based on a 49-year period of record, the local climatological data summary shows an annual mean wind speed of 6.8 mph. Seasonally, the highest average wind speeds occur during the spring (about 7.1 mph) and are lowest during the summer and autumn months (about 6.1 mph). On average, the local climatological data indicates that the highest monthly average wind speed (8.2 mph) occurs during March and April (NCDC 2005a).

Characteristics of extreme wind conditions for design basis purposes are discussed in Subsection 2.7.3.2. Wind data summaries, based on measurements from the onsite meteorological monitoring program operated in support of Units 2 and 3, for the purpose of climatological characterization as related to the dispersion of radioactive and nonradioactive effluents released into the atmosphere, are discussed in Subsections 2.7.4.2 and 2.7.4.3.

2.7.2 AIR QUALITY

This subsection addresses current ambient air quality conditions in the site region (*e.g.*, the compliance status of various air pollutants) that have a bearing on plant design, construction, and operating basis considerations (Subsection 2.7.2.1), cross-references other subsections of this Environmental Report that address the types and characteristics of nonradiological emission sources associated with plant construction and operation and the expected impacts associated with those activities (Subsection 2.7.2.2), and characterizes conditions (from a climatological standpoint) in the site region that may be restrictive to atmospheric dispersion (Subsection 2.7.2.3).

2.7.2.1 Regional Air Quality Conditions

The site region for Units 2 and 3 is located within the Columbia Intrastate Air Quality Control Region and includes Fairfield, Lexington, Newberry, and Richland Counties (40 CFR 81.108). Attainment areas are areas where the ambient levels of criteria air pollutants are designated as being “better than,” “unclassifiable/ attainment,” or “cannot be classified or better than” the EPA-promulgated National Ambient Air Quality Standards. Criteria pollutants are those for which the National Ambient Air Quality Standards 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).

Fairfield and Newberry Counties are designated as being in attainment for all criteria air pollutants (40 CFR 81.341). Similarly, Lexington and Richland Counties, to the south and southeast of the site, are in attainment for all criteria pollutants with the exception of the 8-hour National Ambient Air Quality Standards for ozone (40 CFR 81.341). The 8-hour ozone non-attainment area comprises the Columbia, South Carolina, Metropolitan Planning Organization whose boundaries basically include the northeastern half of Lexington County, most of Richland County, and a small portion of southwestern Kershaw County (FHWA 2006). The northern extent of this Metropolitan Planning Organization in Richland County is about 3 miles to the south of the VCSNS site; the Lexington County portion is about 6 miles away from the site.

There are no pristine areas designated as “Mandatory Class I Federal Areas Where Visibility is an Important Value” that are located within 100 miles of the site for Units 2 and 3. The two closest Class I areas are both about 120 miles away—the Shining Rock Wilderness Area to the northwest and the Linville Gorge Wilderness Area to the north-northwest in North Carolina (40 CFR 81.422).

2.7.2.2 Projected Air Quality Conditions

The new nuclear steam supply system and other related radiological systems are not sources of criteria air pollutant or other air toxics emissions. Nonradiological emission-generating sources associated with routine facility operations are identified and discussed further in Subsection 3.6.3.1.

Characteristics of these emission sources and the potential effects on air quality and visibility associated with their operation are addressed in Subsections 5.8.1 and 5.3.3, respectively. Emission-generating sources and activities related to construction of Units 2 and 3, potential impacts, and mitigation measures are addressed in Subsection 4.4.1.3. Current federal and South Carolina Department of Health and Environmental Control air quality-related regulations and permits, expected to be applicable to Units 2 and 3, are identified in Section 1.2.

2.7.2.3 Restrictive Dispersion Conditions

Atmospheric dispersion can be described as the horizontal and vertical transport and turbulent diffusion of pollutants released into the atmosphere. Horizontal and along-wind dispersion is controlled primarily by wind direction variation and wind speed. Subsection 2.7.4.2 addresses wind characteristics for the VCSNS site vicinity based on measurements from the existing meteorological monitoring program operated in support of Units 2 and 3. The persistence of those wind conditions is discussed in Subsection 2.7.4.3.

In general, lower wind speeds represent less-turbulent airflow, which is restrictive to both 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 recirculate 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 four consecutive days or more. An updated air stagnation climatology has been published with data for the continental United States based on over 50 years of observations from 1948 through 1998. Although interannual frequency varies, the data in Figures 1 and 2 of that report indicates that, on average, the VCSNS site region can expect about 15 to 20 days per year with stagnation conditions, or about three to four cases per year, with the mean duration of each case lasting about five 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 local climatological data summary for Columbia, South Carolina, in Table 2.7-2 indicates, this three-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 because of 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).

An interactive, spatial data base developed by the U.S. Department of Agriculture–Forest Service, referred to as the Ventilation Climate Information System, is readily available and provides monthly and annual graphical and tabular summaries of relevant dispersion-related characteristics (*e.g.*, morning and afternoon horizontally interpolated mixing heights, modeled surface wind speeds, and resultant ventilation indices) (USDA–Forest Service 2003). The system, although developed primarily for fire management and related air quality purposes, extends the period of record to a climatologically representative duration of 40 years.

Table 2.7-4 summarizes minimum, maximum, and mean morning and afternoon mixing heights, surface wind speeds, and ventilation indices on a monthly, seasonal, and annual basis for the VCSNS site region. Because atmospheric sounding measurements are still only made from a relatively small number of observation stations, these statistics represent horizontally interpolated values within the interactive data base from specific locations (USDA-Forest Service 2003)—in this case, the site for Units 2 and 3. The seasonal and annual values listed in Table 2.7-4 were derived as weighted means based on the corresponding monthly values.

From a climatological standpoint, the lowest morning mixing heights occur in the autumn and are highest during the spring although, on average, morning mixing heights are only slightly lower in the winter and summer months. Conversely, afternoon mixing heights reach a seasonal minimum in the winter and a maximum during the summer (only slightly lower during the spring) (USDA-Forest Service 2007), as might be expected due to more intense summertime heating.

The wind speeds listed in Table 2.7-4 are reasonably consistent with the regional climatological data summary for Columbia, South Carolina, in Table 2.7-2 in that the lowest mean wind speeds are shown to occur during summer into early autumn (USDA-Forest Service 2007, NCDC 2005a). 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.

The ventilation index is based on the product of the wind speed and the mixing height. Because it uses surface winds instead of higher trajectory winds, the index values represent conservative estimates of ventilation potential and so would be more of indicative of the dispersion potential near the ground (USDA-Forest Service 2003).

Based on the classification system for ventilation indices (USDA-Forest Service 2003), the morning ventilation indices for the VCSNS regional area indicate only marginal ventilation potential on an annual average basis with conditions rated as marginal during the winter and spring and poor during the summer and autumn, again consistent with the characteristics reported by Wang and Angell (1999).

Ventilation indices markedly improve during the afternoon with conditions rated as good on an annual average basis and during the spring and summer seasons; afternoon ventilation potential is rated as fair during the autumn and winter. Because mean wind speeds do not vary significantly in the regional area over the course of the year, the relatively better ventilation classifications are attributable to the higher mixing height levels, which for the summer season tends to mask the general potential for more restrictive dispersion conditions during the "extended" summer referred to by Wang and Angell (1999). Nevertheless, the transition from good to fair ventilation indices between the summer and autumn months is still evident and consistent with the monthly variations and July minimum for air stagnation discussed previously.

2.7.3 SEVERE WEATHER

This subsection addresses severe weather phenomena that affect the VCSNS site region and that are considered in the design and operating bases for Units 2 and 3. These include:

- The frequencies of thunderstorms and lightning (Subsection 2.7.3.1)
- Observed and probabilistic extreme wind conditions (Subsection 2.7.3.2)
- Tornadoes and related wind and pressure characteristics (Subsection 2.7.3.3)

- The frequency and magnitude of hail, snowstorms, and ice storms (Subsection 2.7.3.4)
- Tropical cyclones and related effects (Subsection 2.7.3.5)

2.7.3.1 Thunderstorms and Lightning

Thunderstorms can occur in the Unit 2 and 3 regional area at any time during the year. Based on a 57-year period of record, Columbia, South Carolina, 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% of thunderstorm-days are recorded between late spring and midsummer (*i.e.*, from June through August). From October through January, a thunderstorm might be expected to occur about one 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 U.S. Department of Agriculture Rural Utilities Service in the publication entitled *Summary of Items of Engineering Interest* (U.S. 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 Columbia, South Carolina (*i.e.*, 52; see Table 2.7-2), the frequency of lightning strokes to earth per square mile is about 16 per year in the VCSNS site region. This frequency is essentially equivalent to the mean of the five-year (1996 to 2000) flash density for the area that includes the site for Units 2 and 3, as reported by the NWS—4 to 8 flashes per square kilometer per year (NWS 2002)—and, therefore, is considered to be a reasonable indicator.

The power block area (PBA) circle for the Units 2 and 3 site is represented in Figure 2.7-17 as an area bounded by a 750-foot-radius circle with its centroid at a point between the two units. The equivalent area of the PBA circle is approximately 0.063 square mile. Given the estimated annual average frequency of lightning strokes to earth in the VCSNS site region, the frequency of lightning strokes in the PBA circle can be estimated as follows:

$$(16 \text{ lightning strokes/mi}^2\text{/year}) \times (0.063 \text{ mi}^2) = 1.01 \text{ lightning strokes/year}$$

or about once each year in the PBA circle.

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 feet

(10 meters) 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 is about 95 mph, as estimated by linear interpolation from the plot of basic wind speeds in Figure 6-1 of ASCE (2002) for that region of the United States that includes the site for Units 2 and 3. This interpolated value is about 5% higher than the basic wind speed reported in the Engineering Weather Data summary for the Columbia, South Carolina, NWS station (*i.e.*, 90 mph) (AFCCC-NCDC 1999), which is located about 26 miles south-southeast of the site. The former value is, therefore, considered to be a reasonably conservative indicator of the basic wind speed for the Units 2 and 3 site location.

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 basic wind speed value by a scaling factor of 1.07, which yields a 100-year return period 3-second-gust wind speed for the site of about 102 mph.

Subsection 2.7.3.5 addresses rainfall extremes associated with tropical cyclones that have passed within 100 nautical miles of the site for Units 2 and 3 and concludes with a discussion of observed wind speeds and/or wind gusts accompanying several of the more intense hurricanes that have tracked through this radial area. All of these tropical cyclones—Hurricanes Hugo, Able, and Gracie—had maximum sustained wind speeds and/or peak gusts below the 100-year return period 3-second gust wind speed indicated above, although a slightly higher peak gust of 109 mph was recorded at a station about 45 miles southeast of the VCSNS site as Hurricane Hugo moved through the area.

2.7.3.3 Tornadoes

The design basis tornado characteristics applicable to structures, systems, and components important to safety include the following parameters as identified in Regulatory Guide 1.76, *Design-Basis Tornado and Tornado Missiles for Nuclear Power Plants, Revision 1*, March 2007 (NRC 2007b):

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

Based on Figure 1 of Regulatory Guide 1.76, the VCSNS site is located within Tornado Intensity Region I. In confirming the applicability of this tornado intensity region to the site, information in Revision 2 of NUREG/CR-4461, *Tornado Climatology of the Contiguous United States*, (NUREG/CR-4461, Rev. 2; PNNL-15112, Rev. 1) (U.S. NRC 2007a), February 2007, was taken into consideration. That document was the basis for most of the technical revisions to Regulatory Guide 1.76.

Table 6-1 of NUREG/CR-4461 lists tornado wind speed estimates for U.S. nuclear power plant sites, including the "Summer" site. The tornado wind speed associated with a 10^{-7} exceedance probability of occurrence, based on the Enhanced Fujita Scale of wind speeds, is 208 mph. Revision 1 of Regulatory Guide 1.76 retains the 10^{-7} exceedance probability for tornado wind speeds, the same as the original version of that regulatory guide. NUREG/CR-4461 discusses the relationship between and previous use of the original Fujita scale of wind speed ranges for different tornado intensity classifications and the Enhanced Fujita Scale wind speed ranges in the revised analysis of tornado characteristics.

Consequently, the design basis tornado characteristics for Tornado Intensity Region I considered to be applicable to the site for Units 2 and 3 (from NUREG/CR-4461 Table 8-1 and Regulatory Guide 1.76) are:

- Maximum wind speed = 230 mph
- Translational speed = 46 mph
- Maximum rotational speed = 184 mph
- Radius of maximum rotational speed = 150 ft
- Pressure drop = 1.2 pounds per square inch (psi)
- Rate of pressure drop = 0.5 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 frequencies of occurrence and characteristics of these types of weather events in the Unit 2 and 3 site region are based on the current version of *The Climate Atlas of the United States* (NCDC 2002c), which has been developed from observations made over the 30-year period of record from 1961 to 1990, and from the NCDC online *Storm Events* database (NCDC 2007).

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 (*i.e.*, April through July), reaching a peak during May, and occurring least often from late summer to late winter (*i.e.*, September through February) (NCDC 2007). The Climate Atlas indicates that Lexington, Richland, and the very southern portion of Fairfield County (which includes the VCSNS site), can expect, on average, hail with diameters 0.75 inch or greater about two to three days per year. The occurrence of hailstorms with hail greater than or equal to 1.0 inch in diameter averages about one to two days per year in Lexington and Richland Counties, the southern half of Fairfield County, and the extreme southeast portion of Newberry County (NCDC 2002c), all of which surround the site.

The NCDC cautions that hailstorm events are point observations and somewhat dependent on population density. This explains the areal extent of the higher frequencies reported above for most of Lexington and Richland Counties to the south of the site, which comprise the Columbia, South Carolina, metropolitan area, and what could be interpreted as lower frequencies of occurrence in much of Fairfield County and most of Newberry County, which are relatively less populated. The slightly higher annual mean number of hail days is considered to be a more representative indicator for the Unit 2 and 3 site.

Despite these long-term statistics, no hailstorms of note have been recorded in some years, while multiple events have been observed in this four-county area in other years, including:

- 9 events on 8 separate dates in 1988, and 7 events on 7 separate dates during 1996 in Richland County.
- 14 events on 7 separate dates in 2005, and 10 events on 7 separate dates during 2003 in Lexington County.
- 12 events on 7 separate dates in 2006 in Newberry County (NCDC 2007).

Golfball-size hail (about 1.75 inches in diameter) is not a rare occurrence, having been observed numerous times in all four counties surrounding the VCSNS site (NCDC 2007). However, in terms of extreme hailstorm events, baseball-size hail (about 2.75 inches in diameter) was reported in Richland County on May 2, 1984, about 26 miles southeast of the site, and 3.00-inch diameter hail stones were reported about 33 miles east-southeast of the site, also in Richland County.

Snow is not unusual in the Piedmont of South Carolina, where the VCSNS site is located, but heavy snowfalls occur only occasionally 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 2002c) indicates that the occurrence of snowfalls 1 inch or greater in the VCSNS site region averages less than one day per year (see also Table 2.7-2). Additional details regarding extreme snowfall events in the site region are given in Subsection 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 VCSNS region. The Climate Atlas (NCDC 2002c) indicates that, on average, freezing precipitation occurs about 3 to 5 days per year in the region that includes the site for Units 2 and 3.

Storm event records from the winters of 1994 through 2006 for the four-county area surrounding the VCSNS site note that ice accumulations of up to 1 inch have occurred, although it is typically less than this thickness (NCDC 2007).

2.7.3.5 Tropical Cyclones

Tropical cyclones include not only hurricanes and tropical storms, but systems classified as tropical depressions, subtropical depressions and tropical storms that have become extratropical, 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 region.

NOAA’s Coastal Services Center (NOAA-CSC) provides a comprehensive historical database, extending from 1851 through 2006, of tropical cyclone tracks based on information compiled by the National Hurricane Center. This database indicates that a total of 85 tropical cyclone centers or storm tracks have passed within 100 nautical miles of the region of Units 2 and 3 during this historical period (NOAA-CSC 2006-2007). Storm classifications and respective frequencies of occurrence over this 156-year period of record are as follows:

- Hurricanes — Category 4 (1), Category 3 (1), Category 2 (3), Category 1 (7)
- Tropical storms — 37
- Tropical depressions — 22
- Subtropical storms — 1
- Subtropical depressions — 1
- Extratropical storms — 12

Tropical cyclones within this 100-nautical-mile radius have occurred as early as May and as late as November, with the highest frequency (31 out of 85 events) recorded during September, including all classifications except subtropical depressions. October and August account for 16 and 15 events, respectively, indicating that more than 70% of the tropical cyclones that affect the site region occur from midsummer to early autumn. Tropical storms and tropical depressions have occurred in all months from May to November. Two-thirds of the hurricanes (*i.e.*, 8 of the 12) that have passed within 100 nautical miles of the site occurred during September, including one Category 4 and one Category 3 storm. Only three Category 2 hurricanes have occurred—two in August and one in September. Seven Category 1 hurricanes have been recorded within this radial distance of the site—one each in July and October, and five during September (NOAA-CSC 2006-2007).

Tropical cyclones are responsible for at least 15 separate rainfall records among the 14 NWS and cooperative observer network stations listed in Table 2.7-1 — nine 24-hour (daily) rainfall totals and six monthly rainfall totals (see Subsection 2.7.4.1.3 and Table 2.7-5).

In early September 1998, rainfall associated with Extratropical Storm Earl resulted in historical 24-hour maximum totals of 10.14 inches at the Kershaw 2SW station, 7.10 inches at the Pelion 4NW station, and 7.08 inches at the Parr observing station. Two 24-hour records were established due to Tropical Storm Cindy in early July 1959, at the Winnsboro cooperative observing station and at the Columbia, South Carolina, NWS station, 7.77 and 5.79 inches, respectively. Late August 1964 saw Tropical Depression Cleo result in maximum 24-hour rainfall totals of 6.35 inches at the Johnston 4SW station, and 6.05 inches at the Saluda observing station. In October 1990, a 24-hour rainfall total of 9.62 inches was recorded at the Camden 3W station due to Extratropical Storm Marco (along with a slow-moving cold frontal system), and in July 1997 Tropical Depression Danny produced 7.77 inches of rain in a 24-hour period at the Catawba observing station (NCDC 2005b, 2002d; SERCC 2007; NOAA-CSC 2006–2007).

Monthly station records were established because of partial contributions from the following tropical cyclones (NCDC 2004, 2005b, 2002d, 2006; SERCC 2007; NOAA-CSC 2006-2007):

- Hurricane Able in August 1952 (18.55 inches at Kershaw 2SW and 14.90 inches at Winnsboro)
- Extratropical Storm Marco in October 1990 (16.93 inches at Camden 3W)
- An unnamed storm in June 1965 (15.88 inches at Johnston 4SW)
- Hurricane Gracie in September 1959 (14.96 inches at Saluda)
- Tropical Depression Jeanne in September 2004 (14.76 inches at Santuck)

As indicated above, significant amounts of rainfall can still be associated with a tropical cyclone once the system moves inland. Wind speed intensity, however, noticeably decreases as the system passes over terrain and is subjected to increased frictional forces. Examples of such effects associated with some of the more intense tropical cyclones that have passed within 100 nautical miles of the VCSNS region, are:

- <u>Hurricane Hugo (September 1989)</u>. Hugo was still estimated to be of hurricane strength as its center passed between Shaw Air Force Base, about 45 miles southeast of the VCSNS site, and Columbia, South Carolina. A maximum one-minute average surface wind speed of 58 knots (about 67 mph) with a peak gust of 95 knots (about 109 mph) was recorded at Shaw Air Force Base. A maximum one-minute average surface wind speed of 46 knots (about 53 mph) with a peak gust of 61 knots (about 70 mph) was measured at the Columbia, South Carolina, NWS station. At another location in the Columbia area, designated Columbia AT&T, a peak gust of 86 knots (about 99 mph) was observed (NCDC 2004).

- Hurricane Able (August 1952). Able passed through central South Carolina, having been downgraded from a Category 2 to a Category 1 hurricane. It remained so during much of its overland track within the state, being further downgraded to tropical storm status in the northern part of South Carolina before exiting into west-central North Carolina. Category 1 hurricanes are characterized by maximum sustained surface (10 meters) wind speeds of 74 to 95 mph. NOAA Coastal Services Center records indicate a wind speed of 70 knots (about 81 mph) associated with this Category 1 status (NOAA-CSC 2006-2007).

- Hurricane Gracie (September 1959). Gracie traversed central South Carolina, retaining a Category 3 hurricane designation for about 75 miles of its initial overland track, losing strength as it continued to move inland, and being downgraded to tropical storm status by the time it passed through the center of the state and exiting into western North Carolina. Tropical storms are characterized by maximum sustained surface (10-meter) wind speeds of 39 to 73 mph. NOAA Coastal Services Center records indicate a wind speed of 60 knots (about 69 mph) associated with this tropical storm status (NOAA-CSC 2006-2007).

Subsection 2.7.3.2 discussed the wind speeds associated with Hurricane Hugo in relation to the other design basis wind speed characteristics developed for the Unit 2 and 3 site region.

2.7.4 LOCAL METEOROLOGY

Regional data acquired by the NWS at its Columbia, South Carolina, first-order station and from 13 other nearby locations in its network of cooperative observer stations, as compiled and summarized by the NCDC and the Southeast Regional Climate Center, are used to characterize normals, and period-of-record means and extremes of temperature, rainfall, and snowfall in the site region for Units 2 and 3. Subsection 2.7.1.1 identifies the sources of these climatological summaries and other data resources. The approximate distances and directions of these climatological observing stations relative to the site are listed in Table 2.7-1; their locations are shown in Figure 2.7-1.

As indicated in Subsection 2.7.1.1, first-order NWS stations also record measurements, typically every hour, of other weather elements including winds, relative humidity, dew point and wet bulb temperatures, barometric pressure, and other observations when those conditions occur (*e.g.*, fog, thunderstorms).

Besides using data from these nearby climatological observing stations, measurements from the tower-mounted meteorological monitoring system are used to characterize dispersion conditions in support of this COL Application for Units 2 and 3. Refer to Subsection 6.4.3 for a discussion of relevant details about this preoperational monitoring program, including: tower location; terrain features and elevations at the tower for Units 2 and 3; instrumentation and measurement levels; data recording and processing; and system operation, maintenance, and calibration activities.

Subsections 6.4.2 and 6.4.3 address whether the measurements from the Units 2 and 3tower are representative of dispersion conditions at Units 2 and 3.

2.7.4.1 Normal, Mean, and Extreme Values

Subsection 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 the regional stations, based on their long-term records of observations, are representative of conditions that might be expected at the site for Units 2 and 3, this subsection provides additional details regarding the individual station records from which the values presented in Subsection 2.7.1.3 were obtained.

Historical extremes of temperature, rainfall, and snowfall are listed in Table 2.7-5 for the 14 NWS and cooperative observing stations in the Unit 2 and 3 region.

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 12 regional climatological observing stations that make such measurements are discussed in Subsection 2.7.1.3.1 and presented in Table 2.7-3. The overall maximum and minimum temperature extremes observed in the VCSNS site region are summarized in Subsection 2.7.1.3.1 as well.

Extreme maximum temperatures recorded in the site region for Units 2 and 3 have ranged from 106°F to 111°F, with the highest reading observed at the Camden 3W cooperative station on June 28, 1954. The station record high temperature for the Columbia, South Carolina, NWS station (*i.e.*, 107°F) has been reached on five separate occasions; three times within a period of seven days in July 1952. As Table 2.7-5 and the accompanying notes show, individual station extreme maximum temperature records were set at multiple locations on the same or adjacent dates (*e.g.*, Winnsboro, Camden 3W, Kershaw 2SW, and Columbia on June 27 and 28, 1954; Columbia, Newberry, Chester 1NW, and Parr on August 21 and 22, 1983; Little Mountain and Columbia July 23 and 24, 1952; and Columbia and Santuck on July 29, 1952 (NCDC 2005b, SERCC 2007).

Extreme minimum temperatures in the site region for Units 2 and 3 have ranged from –1°F to –5°F, with the lowest reading on record observed at the Chester 1NW cooperative station on December 13, 1962. Station record low temperatures were also set at Parr and Winnsboro on December 12 and 13, 1962. More noteworthy, though, Table 2.7-5 and the accompanying notes indicate that record low temperatures were established at 10 of the regional cooperative observing stations on January 21 and 22, 1985 (NCDC 2005b, SERCC 2007).

The extreme maximum and minimum temperature data indicates that synoptic-scale conditions responsible for periods of record-setting excessive heat as well as significant cold air outbreaks tend to affect the overall VCSNS site region. The similarity of the respective extremes and their dates of occurrence suggests that these statistics are reasonably representative of the temperature extremes that might be expected to be observed at the site for Units 2 and 3.

2.7.4.1.2 Atmospheric Water Vapor

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 nearby Columbia, South Carolina, NWS station, are discussed in Subsection 2.7.1.3.2.

2.7.4.1.3 Precipitation

Characteristics of the normal annual rainfall and snowfall totals for the 14 regional climatological observing stations, listed in Table 2.7-1, are discussed in Subsection 2.7.1.3.3 and presented in Table 2.7-3. The overall maximum daily and monthly totals observed in the VCSNS site region for these forms of precipitation are summarized in Subsection 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 in an effort to evaluate whether the available long-term regional data is representative of conditions at the site for Unit 2 and 3, is largely dependent on station coverage.

Historical precipitation extremes (rainfall and snowfall) are presented in Table 2.7-5 for these same 14 observing stations. Maximum recorded 24-hour rainfall totals range from 5.79 inches at the Columbia, South Carolina, NWS station, about 26 miles south-southeast of the site for Units 2 and 3, to 10.42 inches at the Newberry cooperative observing station about 18 miles to the west (NCDC 2005b, 2002d, SERCC 2007). Maximum monthly rainfall totals range from 12.00 inches at Blair, about 10 miles to the north-northwest, to 18.55 inches at the Kershaw 2SW observing station about 44 miles to the east-northeast (NCDC 2005b, 2002d, 2006; SERCC 2007).

As indicated in Subsection 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 100 nautical miles of the site region for Units 2 and 3. However, the overall highest 24-hour rainfall total in the site region—10.42 inches (see above), recorded on August 18, 1986 (NCDC 2005b; SERCC 2007)—was not directly associated with a tropical cyclone, although the region was generally unsettled as Tropical Storm Charley had formed well off the South Carolina coast moving to the northeast only a few days earlier (NCDC 2004).

Similarly, the overall highest monthly rainfall total in the site region—18.55 inches at the Kershaw 2SW station (see above), recorded during August 1952 (SERCC 2007, NCDC 2002d)—represents the accumulation of 13 days of measurable precipitation during that month (NCDC 2002d) with less than 25% of that total attributable to Hurricane (later Tropical Storm) Able, which passed through South Carolina on August 30 and 31 (see Subsection 2.7.3.5).

When a 24-hour rainfall record was established at a given observing station, significant amounts of rain were frequently measured at other stations in the site region on the same date (NCDC 2002d), particularly when associated with the passage of a tropical cyclone. Greater variability among concurrent 24-hour station totals is seen for station records associated with more local-scale events such as thunderstorms. Monthly station rainfall totals concurrent with individual station monthly records are generally more variable (NCDC 2002d) primarily because of the length of time and varying synoptic conditions over the time interval that these totals are accumulated.

Although the disruptive effects of any winter storm accompanied by frozen precipitation can be significant in the Piedmont of South Carolina, storms that produce large amounts of snow occur only occasionally. Among the 14 nearby observing stations listed in Table 2.7-5, six of the 24-hour maximum snowfall records were established as a result of the storm on February 10, 1973, the highest—15.7 inches—being measured at the Columbia Metro Airport about 26 miles to the south-southeast of the site for Units 2 and 3. Other station records on this date range from 7.5 inches at Parr, about 1 mile to the southwest, to 14.0 inches at the Johnston 4SW cooperative observing station (NCDC 2005a, 2005b; SERCC 2007).

Record 24-hour snowfall totals, greater than or equal to 10 inches, on other dates include:

- 13.5 inches at the Catawba observing station on February 27, 2004, about 45 miles to the north-northeast of the site for Units 2 and 3 (SERCC 2007, NCDC 2006)
- 12.0 inches at both the Kershaw 2SW station on December 12, 1958 and the Blair observing station on February 26, 1969 (SERCC 2007, NCDC 2002d)
- 10.0 inches at the Little Mountain observing station on December 11, 1958, about 8 miles to the southwest of the site (SERCC 2007, NCDC 2002d)

Seven of the maximum monthly snowfall totals in the VCSNS site region were also due to the early February 1973 storm, ranging from 7.5 inches at the Parr observing station to 16.0 inches at the Columbia, South Carolina, NWS station (NCDC 2005b, 2002d; SERCC 2007). However, the overall highest monthly snowfall total (*i.e.*, 16.5 inches) was recorded in March 1960 at the Chester 1NW station, about 30 miles to the north of the site for Units 2 and 3 as a result of two smaller snow events—the first occurring on March 2 and 3, and the second on March 9 and 11 (SERCC 2007, NCDC 2002d). Monthly snowfall totals ranging from 3.2 to 10.0 inches were measured during March 1960 at 10 of the other cooperative observing stations in the VCSNS site region; three of the 14 stations did not record snowfall during that month (NCDC 2002d).

Based on the maximum 24-hour and monthly precipitation totals recorded among these 14 climatological observing stations in the VCSNS region and, more importantly, the areal distribution of these stations around the site, the data suggests that these statistics are reasonably representative of the extremes of rainfall and snowfall that might be expected to be observed at the site for Units 2 and 3.

2.7.4.1.4 Fog

The closest station to the site for Units 2 and 3 at which observations of fog are made and routinely recorded is the Columbia, South Carolina, NWS station about 26 miles to the south-southeast. The 2004 local climatological data summary for this station (Table 2.7-2) indicates an average of about 26 days per year of heavy fog conditions, based on a 56-year period of record. The NWS defines heavy fog as fog that reduces visibility to 1/4 mile or less (NCDC 2005a).

On a seasonal basis, heavy fog conditions occur most often during the autumn and winter months, reaching a peak frequency in November and December, averaging about three days per month. Heavy fog conditions occur least often from mid-spring to early summer (*i.e.*, April to June), averaging less than 1.5 days per month (NCDC 2005a).

The frequency of heavy fog conditions at the site for Units 2 and 3 would be expected to be somewhat greater than at Columbia, South Carolina, because of the site's nearness to the Monticello and Parr Reservoirs, its location near the Broad River, and gradually increasing elevations towards the northwest. This is consistent with the higher frequency of occurrence reported in *The Climate Atlas of the United States* which indicates an annual average frequency of 31 to 35 days per year in the area that includes the VCSNS site and a lower annual frequency of 26 to 30 days in the area that includes Columbia, South Carolina. The seasonal variation is similar to that in the 2004 local climatological data for the Columbia NWS station, although peak months are December and January (NCDC 2002c).

Enhancement of naturally occurring fog conditions because of operation of the mechanical draft cooling towers associated with Units 2 and 3 is addressed in Subsection 5.3.3.1.

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 macroscales 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 macroscale and by large-scale topographic features (*e.g.*, mountain ranges). These characteristics are addressed in Subsections 2.7.1.2 and 2.7.1.3.4.

Site-specific or microscale (*i.e.*, on the order of 2 kilometers or less) wind conditions, while they may reflect these larger-scale circulation effects, are influenced primarily by local and, to a lesser extent (in general), by mesoscale or regional-scale (*i.e.*, up to about 200 kilometers), topographic features. Wind measurements at these smaller scales are currently available from the meteorological monitoring program operated in support of Units 2 and 3 and, for comparison, from data recorded at the regional Columbia, South Carolina, NWS station.

Section 6.4 includes a summary description of the preoperational monitoring program that provides the onsite meteorological data used in this COL Application. Wind direction and wind speed measurements were made at three levels on a 60-meter instrumented tower (*i.e.*, the lower level at 10 meters, a backup instrument at 30 meters, and the upper level at 60 meters). (see Subsection 6.4.3 for details).

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° compass sectors centered on north, north-northeast, northeast, etc.) for the 10-meter level based on measurements over the 2007 annual cycle.

The wind direction distribution at the 10-meter level has prevailing wind (i.e., defined as the direction from which the wind blows most often) from the west-southwest, with about 30% of the winds blowing from the south-southwest through west sectors. There is also a component of the wind from the northwest and southeast sectors for all seasons (see Figure 2.7-2). This is noteable as this corresponds with the Broad River valley orientation (northwest-southeast).

Seasonally, 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) because of 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-meter measurement level are presented in Figure 2.7-7 (Sheets 1 to 12).

Wind rose plots based on measurements at the 60-meter level are shown in Figures 2.7-8 through 2.7-13. By comparison, wind direction distributions for the 60-meter level are fairly similar to the 10-meter level wind roses on composite annual and seasonal bases in terms of the predominant directional quadrants and variation over the course of the year. Prevailing winds differ between the two levels by one adjacent direction sector, generally veering (*i.e.,* turning clockwise) with height as might be expected. Plots of individual monthly wind roses at the 60-meter measurement level are presented in Figure 2.7-13 (Sheets 1 to 12).

Wind information summarized in the local climatological data for the Columbia, South Carolina, NWS station (see Table 2.7-2) indicates a prevailing west-southwesterly wind direction annually (NCDC 2005a). Subsection 2.7.1.3.4 discusses the variation of the prevailing winds at this station throughout the year and their relationship to regional-scale influences. Differences between the two wind direction distributions are attributable to many factors (*e.g.*, topographic setting, sensor exposure, instrument threshold and accuracy, length of record). Nevertheless, these large-scale circulation effects are evident in the 10-meter level wind flow at the VCSNS site.

Table 2.7-6 summarizes seasonal and annual mean wind speeds based on measurements from the upper and lower levels of the meteorological tower operated in support of Units 2 and 3 from January 1, 2007 to December 31, 2007, and from wind instrumentation at the Columbia, South Carolina, NWS station based on a 49-year period of record (NCDC 2005a). The elevation of the wind instruments at the Columbia NWS station is nominally 20 feet (about 6.1 meters) (NCDC 2005a), comparable to the lower (10-meter) level measurements at the VCSNS site.

Annually, mean wind speeds at the 10- and 60-meter levels are 2.3 and 4.2 meters per second, respectively, at the VCSNS site. The annual mean wind speed at Columbia (*i.e.*, 3.0 meters per second) is slightly higher than the 10-meter level at the VCSNS site, differing by only 0.7 meter per second. Seasonal average wind speeds at Columbia are greater throughout every season of the year than at the VCSNS site. Seasonal mean wind speeds for both locations follow the same pattern discussed in Subsection 2.7.2.3 in relation to the seasonal variation of relatively higher air stagnation and restrictive dispersion conditions in the site region.

There were no reported hours with calm winds during the period of record. Minimal incidence of calm conditions can be attributed to the low measurement threshold of the sonic anemometers that were in place (see Subsection 6.4.3).

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° 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 from the Units 2 and 3 monitoring program for the period of January 1, 2007 through December 31, 2007. The distributions account for durations ranging from 1 to 48 hours for wind directions from 22.5° upwind sectors centered on each of the 16 standard compass radials (*i.e.*, north, north-northeast, northeast, etc.) and for wind speed groups greater than or equal to 5, 10, 15, 20, 25, and 30 mph. Distributions are provided for wind measurements made at the lower (10-meter) and the upper (60-meter) tower levels, respectively, identified in the preceding subsection.

At the 10-meter level, the longest persistence period is 18 hours for winds from the north-northeast sector. This duration appears only in the lowest wind speed group (*i.e.*, for wind speeds greater than or equal to 5 mph). Persistence periods lasting for at least 12 hours are indicated for several direction sectors for wind speeds greater than or equal to 5 mph, including winds from the north-northeast, northeast, and southwest sectors. Wind speeds greater than or equal to 20 mph persisted for only one hour in the southwest and west-southwest sectors. There were no periods greater than or equal to 24 hours or persistent periods of wind speeds greater than or equal to 25 mph.

At the 60-meter level, the longest persistence period is 18 hours and occurs for winds from the west-southwest directional sectors (see Table 2.7-8) for wind speeds greater than or equal to 5 mph. For wind speeds greater than or equal to 10 mph, maximum persistence periods are limited to 12 hours in six different sectors. For wind speeds greater than or equal to 15 mph, maximum persistence periods are limited to eight hours (in five different sectors) with the exception of 12-hour duration periods for winds from the north-northeast and west sectors. Wind speeds greater than or equal to 30 mph persisted for only one hour in the west-southwest and west sectors.

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 Environmental Report, was based on the vertical temperature difference (Δ**T**) method defined in Table 1 of Proposed Revision 1 to Regulatory Guide 1.23, *Meteorological Programs in Support of Nuclear Power Plants*, September 1980 (U.S. NRC 1980), and in Draft Regulatory Guide DG-1164, *Meteorological Monitoring Programs for Nuclear Power Plants*, Third Proposed Revision 1 to Regulatory Guide 1.23 (Safety Guide 23), October 2006 (DG-1164) (U.S. NRC 2006). These are the same numerical range limits in Table 1 of Revision 1 to Regulatory Guide 1.23 (dated March 2007) (U.S. NRC 2007c) of the same name as DG-1164.

The approach classifies stability based on the temperature change with height (*i.e.*, the difference in °C per 100 meters, or $\Delta \mathbf{Z}$). 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.

Over the period of record from January 1, 2007 through December 31, 2007 for the monitoring program operated in support of Units 2 and 3, $\Delta \mathbf{T}$ was determined from the difference between temperature measurements made at the 60- and 10-meter tower levels. Seasonal and annual frequencies of atmospheric stability class and associated 10-meter level mean wind speeds for this period of record are presented in Table 2.7-9.

The data indicate a predominance of neutral stability (Class D) and slightly stable (Class E) conditions throughout the year, ranging from about 58% to 72% of the time for these stability classes combined. Extremely unstable conditions (Class A) are more frequent during the spring and occur least often during the winter months owing, in large part, to greater and lesser solar insolation, respectively, and relatively lower (summertime) and, generally, relatively higher (wintertime) mean wind speeds. Extremely and moderately stable conditions (Classes G and F, respectively) are most frequent during the autumn (about 26% of the time), owing in part to increased radiational cooling at night, and occur least often during the summer months.

Joint frequency distributions of wind speed and wind direction by atmospheric stability class and for all stability classes combined for the 10-meter and 60-meter wind measurement levels are presented in Tables 2.7-10 and 2.7-11. The 10-meter level joint frequency distributions are used to evaluate short-term dispersion estimates for accidental atmospheric releases (see Subsection 2.7.5) and long-term diffusion estimates of routine releases to the atmosphere (see Subsection 2.7.6).

2.7.4.5 Topographic Description and Potential Modifications

The site for Units 2 and 3 lies within the larger VCSNS site property that encompasses about 2,560 acres. The area for Units 2 and 3 covers about 870 acres, within which the PBA circle takes up about 32 acres. Section 2.1 and Subsection 2.2.1 provide additional details about the general site location.

The site for Units 2 and 3 is about one mile inland (to the south) of the southern shore of the Monticello Reservoir, and, at its closest approach, approximately 0.75 mile east of the Parr Reservoir along the Broad River. Unit 2 is located about 4,600 feet to the south-southwest of Unit 1; Unit 3 is situated about 900 feet south-southwest of Unit 2 (see Figure 2.1-1).

Terrain features within 50 miles of the site for Units 2 and 3, based on digital map elevations, are illustrated in Figure 2.7-14. Terrain elevation profiles along each of the sixteen standard 22.5° compass radials out to a distance of 50 miles from the site are shown in Figure 2.7-15 (Sheets 1 through 6). Because Units 2 and 3 are located relatively close to one another and because of the distance covered by these profiles, the locus of these radial lines is the center point between the Unit 2 and 3 shield buildings.

The nominal plant grade elevation for Units 2 and 3 is around 400 feet above MSL. Located within the Piedmont, terrain within 50 miles of the site for Units 2 and 3 is gently rolling to hilly with elevations decreasing to the east through the southeast beyond about 15 to 20 miles. Figure 2.7-14 indicates that the lowest elevation within 50 miles of the site, 80 feet above MSL (NAVD 88), is to the southeast near the confluence of the Congaree and Wateree Rivers above Lake Marion (see Figure 2.3-1).

Relief of up to about 300 feet is found along headings to the south-southwest through the west starting at distances of about 20 to 25 miles from the site for Units 2 and 3. Terrain elevations tend to increase to the west-northwest through to the north-northeast beyond about 20 miles from the site with relief of up to about 400 feet relative to nominal plant grade. Figure 2.7-14 indicates that the highest elevation within 50 miles of the site is 920 feet above MSL (NAVD 88). This spot elevation does not fall along one of the 16 standard direction radials presented in Figure 2.7-15.

More detailed topographic features within 5 miles of the site for Units 2 and 3, also based on digital map elevations, are shown in Figure 2.7-16. Terrain within this radial distance of the site primarily consists of gentle, low rolling hills with relief, relative to nominal plant grade, up to about 160 feet higher (towards the south-southwest), and to about 190 feet lower in a number of direction headings primarily due to the Broad River, which traverses this area from the north-northwest to the south-southeast (see Figure 2.7-16) and to the Little River (see Figure 2.3-1) along the eastern perimeter of this radial area. The closest topographic feature of note is the 6,800-acre Monticello Reservoir located about one mile to the north of the site as mentioned previously.

While there will be site clearing, grubbing, excavation, leveling, and landscaping activities associated with the construction of the new units (see Section 3.9), these alterations to the existing site terrain would be localized and will not represent a significant change to the gently rolling topographic character of the site vicinity or surrounding site region. Neither the mean and extreme climatological characteristics of the site region nor the meteorological characteristics of the site and vicinity would be affected as a result of plant construction. Potential impacts to air quality associated with construction activities are addressed in Subsection 4.4.1.3.

The dimensions and operating characteristics of the Units 2 and 3 and existing Unit 1 facilities and the associated paved, concrete, or other improved surfaces are considered to be insufficient to generate discernable, long-term effects to local- or microscale meteorological conditions.

Wind flow will be altered in areas immediately adjacent to and downwind of larger site structures. However, these effects will likely dissipate within ten structure heights downwind of the intervening structure(s). Similarly, while ambient temperatures immediately above any improved surfaces could increase, these temperature effects will be too limited in their vertical profile and horizontal extent to alter local-, let alone area- or regional-scale mean or extreme ambient temperature patterns.

Units 2 and 3 use mechanical draft cooling towers as a means of heat dissipation during normal operation (see Section 3.4). Potential meteorological effects due to the operation of these cooling towers could include enhanced ground-level fogging and icing, cloud shadowing and precipitation enhancement, and increased ground-level humidity. These effects and other potential related environmental impacts (*e.g.*, solids deposition, visible plume formation, transport and extent) are addressed in detail in Subsections 5.3.3.1 and 5.3.3.2.

2.7.5 SHORT-TERM DIFFUSION ESTIMATES

2.7.5.1 Basis

To evaluate potential health effects for 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) (U.S. NRC 1999), specifically requires the applicant to account for the 50 percentile X/Q (relative concentration) values at appropriate distances from the release points of effluents to the atmosphere. These 50 percentile X/Q values are to be determined using onsite meteorological data and represent more realistic dispersion conditions for the Unit 2 and 3 site vicinity.

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]) (U.S. NRC 1982b) has been used to generate these 50 percentile X/Q values.

Data from the Units 2 and 3 meteorological monitoring program for the period of January 1, 2007 through December 31, 2007 has been used for the quantitative evaluation of a hypothetical accident at the Unit 2 and 3 site. This one year of data is half of the two years required to satisfy Regulatory Guide 1.206, *Combined License Applicants for Nuclear Power Plants (LWR Edition)*, Rev. 0, June 2007 (Regulatory Guide 1.206) (U.S. NRC 2007d). An additional analysis will be performed using the second year of data.

The PAVAN program implements the guidance provided in Regulatory Guide 1.145, *Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants*, Rev. 1, November 1982 (Reissued February 1983) (Regulatory Guide 1.145) (U.S. NRC 1983). The code computes X/Q values at the exclusion area boundary (EAB) and the boundary of the 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 X/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 (*i.e.*, 180° opposite). The X/Q values are also ranked independently of wind direction into a cumulative frequency distribution for the entire site.

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

- Meteorological data from January 1, 2007 through December 31, 2007 composite onsite joint frequency distributions of wind speed, wind direction, and atmospheric stability
- Wind sensor height: 10 meters
- Vertical temperature difference: (60 meters–10 meters)
- Number of wind speed categories: 12
- Type of release: Ground-level
- Release height: 10 meters (default height)
- Distances from release point to EAB: 805 meters, for all sectors
- Sector-specific distances from release point to LPZ boundary

The one-year composite joint frequency distributions of wind speed, wind direction, and atmospheric stability class, input to the PAVAN dispersion modeling analysis, are presented in Table 2.7-10 (see also Subsection 2.7.4.4 for additional information). The joint frequency distributions in Table 2.7-10 include 12 wind speed classes; however, only 11 were input to the model because there were no occurrences of winds greater than 18.0 meters per second.

The EAB for Units 1, 2, and 3 is entirely contained within the site property line and is represented in Figure 2.1-1. No residential areas are located within this overall EAB. The LPZ boundary for Units 2 and 3 is the same as the LPZ boundary for Unit 1 and consists of the area within a 3-mile radius of Unit 1 (see Figure 2.5-1).

For the purpose of determining X/Qs input to subsequent radiation dose analyses, Units 2 and 3 were treated as being encompassed within an area referred to as the PBA circle. The PBA circle has a radius of 750 feet from a point centered between the two units — 450 feet (138 meters) from each unit's shield building. To ensure conservatism in the X/Q dispersion modeling, an accidental release was assumed to have occurred at any point on the PBA circle instead of occurring at the actual location of Unit 2 or Unit 3 (minimizing the travel distance for any direction sector). As a result, the estimated X/Qs and subsequent radiation doses are conservatively higher.

One of the downwind distances for estimating X/Qs is referred to as the *dose evaluation periphery* and is illustrated in Figure 2.7-17, along with the PBA circle. This dose evaluation periphery is a concentric circle around the PBA circle located at a distance equal to the minimum radial distance between the PBA circle and the actual site boundary/EAB (*i.e.*, 2,640 feet or 805 meters downwind). The distance to the dose evaluation periphery and site boundary/EAB is the same for the east-southeast clockwise through the west-northwest direction radials evaluated by the PAVAN model.

For the northwest clockwise through the east direction radials, the distance to the dose evaluation periphery is less than the distance between the PBA circle and the actual site boundary/EAB (see Figure 2.7-17). An additional level of conservatism (*i.e.*, due to a shorter travel distance) is reflected in the modeled X/Q values for these direction radials.

As NUREG/CR-2858 indicates, ground-level releases include all release points or areas that are lower than 2.5 times the height of adjacent solid structures. The tallest structures within the PBA circle are the Unit 2 and Unit 3 shield buildings with an elevation of 228 feet 9 inches (69.7 meters) above grade for the roof high point (Westinghouse 2008). Because the AP1000 design does not include a plant stack, there will be no releases above the 2.5 times threshold height. Consequently, all accidental releases were assumed to be at ground level and were assigned the default release height of 10 meters. 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.

The PAVAN model was also configured to calculate X/Q values assuming both wake credit allowed and wake credit not allowed. Obstructions to airflow have a wake region that extends 10 times the obstruction height downwind. The dose evaluation periphery is 2,640 feet (805 meters) away from the PBA circle in all directions. As a result, the entire dose evaluation periphery is located beyond the wake influence zone induced by either of the shield buildings. Furthermore, the LPZ boundary is a 3-mile (4,828-meter)-radius circle centered at the Unit 1 reactor building. Because the LPZ boundary is located beyond the dose evaluation periphery, the “wake credit not allowed” scenario of the PAVAN modeling results was used for the X/Q analyses at both the dose evaluation periphery and the LPZ boundary.

The distance between the dose evaluation periphery and the PBA circle (*i.e.*, 805 meters) for Units 2 and 3 was entered as the receptor distance for each downwind sector in calculating the X/Q values at the dose evaluation periphery. On the other hand, because the LPZ boundary is centered on Unit 1, the shortest distance between the PBA circle for Units 2 and 3 and the LPZ boundary was determined for all direction sectors; these distances are listed in Table 2.7-12. Each of these distances was input to the PAVAN model and evaluated as separate model runs with the same distance assigned to all 16 direction sectors within a given model run.

2.7.5.2 PAVAN Modeling Results

A relatively conservative approach was followed in determining the bounding 50 percentile X/Q value at the dose evaluation periphery. The highest 50 percentile value was selected from among the upper envelopes of the ordered distributions of sector-specific X/Q values, rather than the 50 percentile value taken from the upper envelope of the ordered 5% overall site limit X/Q values.

The bounding 50 percentile X/Q value at the dose evaluation periphery occurred for the north (downwind) sector. The upper envelope of the ordered distribution for this sector is shown in Table 2.7-13. The bounding 50 percentile X/Q for the dose evaluation periphery is estimated to be 9.91×10^{-5} sec/m^3.

A similarly conservative approach was used to determine the bounding 50 percentile X/Q value for the LPZ boundary by considering the results of the distance-specific, separate model runs discussed in the preceding subsection. The highest X/Q value was associated with the shortest distance between the PBA circle and the LPZ boundary (*i.e.*, 3,057 meters to the south-southwest), occurring for the north sector at that distance. The upper envelope of the ordered distribution, taken from the PAVAN modeling results, for that sector is shown in Table 2.7-14. The bounding 50-percentile X/Q at the LPZ boundary is estimated to be 2.12×10^{-5} sec/m^3.

These model-predicted X/Q values represent a 0- to 2-hour time interval with no credit taken for building wake effects as indicated previously. To estimate X/Qs for longer time intervals, the program calculates sector-dependent and overall site limit annual average X/Q values using the procedure described in NUREG/CR-2858. 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 X/Qs at the dose evaluation periphery and the LPZ boundary, and the corresponding annual average X/Qs.

Annual average X/Q values were chosen as the end point for the interpolation. The annual average X/Q used for the dose evaluation periphery was a sector-dependent value for the east (downwind) sector. This corresponds to the sector associated with the limiting, safety-related, 0.5% X/Q value. The highest annual average X/Q at the LPZ boundary was an overall site limit value. These results, along with the 50 percentile, 0- to 2-hour and the annual average X/Q values, are summarized below.

Summary of Interpolated X/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
PBA Circle	Dose Evaluation Periphery	9.91E-05	8.55E-05	7.95E-05	6.77E-05	5.39E-05	4.07E-05
PBA Circle	LPZ Boundary	2.12E-05	1.45E-05	1.20E-05	7.95E-06	4.40E-06	2.13E-06

The PAVAN modeling results presented in Subsection 2.7.5.2 meet the requirement in DCD Tier 2, Subsection 2.3.6.4 with regard to supporting the assessment of the postulated impact of an accident on the environment.

2.7.6 LONG-TERM (ROUTINE) DIFFUSION ESTIMATES

2.7.6.1 Basis

The NRC-sponsored XOQDOQ computer program (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]) (U.S. NRC 1982a), was used to estimate X/Q values due to routine releases of gaseous effluents to the atmosphere. The XOQDOQ computer code has the primary function of calculating annual average X/Q values and annual average relative deposition (*D*/Q) values at receptors of interest (*e.g.*, the EAB, the nearest milk cow, residence, garden, meat animal). X/Q and *D*/Q values due to intermittent releases, which occur during routine operation, may also be evaluated using the XOQDOQ model.

The XOQDOQ dispersion model implements the assumptions outlined in Regulatory Guide 1.111, *Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors*, Rev. 1, July 1977 (U.S. NRC 1977). 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. A straight-line trajectory is assumed between the release point and all receptors.

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

- Meteorological data: (January 1, 2007 to December 31, 2007) onsite joint frequency distribution of wind speed, wind direction, and atmospheric stability.
- Wind sensor height: 10 meters
- Vertical temperature difference: (60 meters–10 meters)
- Number of wind speed categories: 12
- Type of release: Ground level
- Release height: 10 meters (default height)
- Minimum building cross-sectional area: 2,636 square meters
- Shield building height: 69.7 meters
- Distances from the release point to the nearest meat animal, milk animal, residence, vegetable garden, site boundary (dose evaluation periphery), and nearby reactor (see Table 2.7-15)

The XOQDOQ and PAVAN dispersion models use the same meteorological data summary (*i.e.*, 10-meter wind level joint frequency distributions). The characteristics of this data have been described previously in Subsection 2.7.5.1 including the number of wind speed classes input to the model (*i.e.*, 11) in relation to the number of wind speed classes in the joint frequency distribution (*i.e.*, 12), and the absence of calm wind conditions at the 10-meter level during the one year period of record used in the analyses.

Compared to an elevated release, a ground-level release usually results in higher concentrations at downwind receptors located at ground level due to less dilution from shorter traveling distances. Consequently, as a conservative approach, only ground-level releases were assumed in the XOQDOQ modeling analysis.

Potential releases were assumed to occur at any point on the PBA circle as a conservative approach to minimizing the travel distance of any release to all receptors of interest (with one exception as noted below). Distances from a potential release point to the nearest meat animal, milk animal, residence, vegetable garden, and dose evaluation periphery, in each of the 16, 22.5° compass sectors (*i.e.*, north, north-northeast, northeast, etc.), are listed in Table 2.7-15.

The downwind distance from the PBA circle to the dose evaluation periphery is 0.5 mile (805 meters) and is discussed in Subsection 2.7.5.1 and illustrated in Figure 2.7-17. The distance between this dose evaluation periphery and the PBA circle is uniform in all directions. Distances and directions to other sensitive receptors (*i.e.*, meat animals, milk animals, residences, and vegetable gardens) considered as part of Unit 1 operations were adjusted in relation to the PBA circle for Units 2 and 3 because location information was relative to existing Unit 1. These adjusted receptor distances and directions are reflected in the respective entries in Table 2.7-15.

One other set of receptors of interest was identified in order to estimate X/Q and *D*/Q values at Unit 3 with the primary release point being located at Unit 2. This scenario was considered in order to evaluate the impact on Unit 3 when Unit 2 is operational and Unit 3 is still under construction. Because of the relative orientation of the two units, only three sectors were considered.

2.7.6.2 XOQDOQ Modeling Results

Among all of the modeled receptors of interest, the overall maximum annual average X/Q value, 1.6 x 10^{-5} sec/m^3 (no decay, undepleted), occurred at Unit 3 due to an assumed routine release from Unit 2, as discussed above. The maximum annual average X/Q values (along with the downwind sectors and corresponding receptor distances relative to the PBA circle) for the other sensitive receptor types are:

- 6.0 x 10^{-6} sec/m^3 at the dose evaluation periphery in the southeast sector at a receptor distance of 0.50 mile (805 meters)
- 9.0 x 10^{-7} sec/m^3 for the nearest residence in the southeast sector at a receptor distance of 1.68 miles (2,703 meters)
- 4.6 x 10^{-7} sec/m^3 for the nearest meat animal in the west-northwest sector at a receptor distance of 1.74 miles (2,795 meters)
- 1.2 x 10^{-7} sec/m^3 for the nearest milk animal in the west sector at a receptor distance of 4.74 miles (7,625 meters)
- 9.0 x 10^{-7} sec/m^3 for the nearest vegetable garden receptor in the southeast sector at a receptor distance of 1.68 miles (2,703 meters)

Table 2.7-16 summarizes the maximum X/Q and *D*/Q values estimated by the XOQDOQ dispersion model for various radioactive decay and plume depletion scenarios at sensitive receptors of interest around the VCSNS site. Table 2.7-17 presents annual average X/Q and *D*/Q values for the southeast and east-northeast sectors at the 22 standard radial distances between 0.25 and 50 miles downwind and for the model's 10 standard distance-segment boundaries between 0.5 and 50 miles downwind. Among the 16, 22.5° compass sectors (centered on north, north-northeast, northeast, etc.) that are evaluated by the model, the results for the southeast and east-northeast sectors are provided in Table 2.7-17 because the highest relative concentrations and relative deposition values occur within those sectors at all downwind distances.

Detailed annual average X/Q and *D*/Q estimates generated by the XOQDOQ model for the receptors of interest, at the 22 standard radial distances, and for the

10 standard distance-segment boundaries, are also provided in Tables 2.7-18 through 2.7-26.

Table 2.7-18 presents X/Q and *D*/Q estimates at all of the modeled receptors of interest identified in Table 2.7-15. Tables 2.7-19 and 2.7-20 list X/Q estimates with no radioactive decay and no plume depletion for each of the 16 22.5° compass sectors at the 22 standard radial distances and for the 10 standard distance-segment boundaries, respectively. Tables 2.7-21 and 2.7-22 contain X/Q estimates that include radioactive decay with a half-life of 2.26 days for short-lived noble gases and no plume depletion. Tables 2.7-23 and 2.7-24 show X/Q estimates that include radioactive decay with a half-life of eight days for all iodines released to the atmosphere, as well as incorporation of plume depletion. Finally, Tables 2.7-25 and 2.7-26 list modeled estimates of long-term average relative deposition at the 22 standard radial distances and for the 10 standard distance-segment boundaries, respectively.

The XOQDOQ modeling results presented in Subsection 2.7.6.2 meet the requirement in DCD Tier 2, Subsection 2.3.6.5 with regards to environmental assessment by providing estimates of annual average X/Q values for 16 radial sectors to a distance of 50 miles from the plant. Note, however, that the maximum annual average X/Q value at the dose evaluation periphery, presented above, is a direct counterpart to the “Site Boundary (annual average)” Atmospheric Dispersion Factor in DCD Tier 1, Table 5.0-1 and to the “Site Boundary (annual average)” Atmospheric Dispersion Value in DCD Tier 2, Table 2-1.

2.7.7 NOISE

The only sources of man-made noise at the Units 2 and 3 location are railroad operations approximately 1 mile to the west, Unit 1 operations approximately 1 mile north, and occasional noise (during times of peak electrical demand) from the Parr Combustion Turbines 1.4 miles to the south-southeast. Railroad operations are subject to federal noise regulations. Moving locomotives are required to operate at less than 90 decibels and railcar noise should not exceed 93 decibels (40 CFR 201.12 and 201.13).

SCE&G does not have noise measurements for the VCSNS site. Sources of noise from Unit 1 include transformers and other electrical equipment, circulating water pumps, steam blowdown, and the public address system. However, noises generated by Unit 1 operations are mitigated by the undeveloped land surrounding the plant and the distance to the Units 2 and 3 project and to the site boundary (also approximately one mile). Also, most equipment is located within the plant buildings, which serves to dampen noises. These noise sources are sufficiently distant from the Units 2 and 3 site and the VCSNS site boundary that the noise generated diminishes to near ambient levels before reaching receptors outside the Unit 1 site boundary.

NRC considered noise impacts when reviewing the license renewal application for Unit 1. NRC stated in Supplement 15 to the Generic Environmental Impact Statement (U.S. NRC 2004) for license renewal that noise from the plant was "generally not an issue because the actual facilities are within exclusion and buffer zone and front the reservoir." However, because the plant fronts the Monticello Reservoir, recreational boaters may be within a distance that noise from operations could be heard.

In the absence of VCSNS noise data, SCE&G reviewed the noise determinations made by NRC with regard to similar nuclear power plants (*i.e.*, those using a cooling lake or other body of water, operating water pumps, and without cooling towers). These NRC determinations are discussed below.

NRC's determination regarding operations noise near the Point Beach Nuclear Plant was, "Noise from operations at the PBNP site is barely noticeable, except very close to the reactor containment buildings…no noise from normal plant operations reaches the residential areas around the town of Two Creeks." (U.S. NRC 2005). Two Creeks is approximately one mile from the plant.

During a license renewal application review, NRC assessed noise levels at the North Anna Power Station in rural Louisa County, Virginia. NRC stated that "Noise from plant operations is not noticeable. The exception is boiler blowdown, which lasts for only a short time" (U.S. NRC 2002a).

NRC also reviewed noise levels at the Surry Power Station located on the James River in Virginia and stated, "There is no noise other than from minimal onsite traffic and from materials-handling and construction equipment, when these are in use" (U.S. NRC 2002b).

SCE&G assumes that the noise from Unit 1 is not greater than the normal operations noise occurring at these other nuclear power plants. From NRC's statements that "noise is not noticeable" and "no noise," the noise level emitting from the plant sites appear to not be above background. Background or ambient sound levels at VCSNS with its rural setting would compare to the ambient sound level of a quiet wilderness area, 20 to 30 decibels, or farm, 44 decibels (U.S. EPA 1974). The exception could be when the public address system is used and warning sirens are tested, which are both very short-lived occurrences. Also, just as NRC indicated for the North Anna plant, the blowdown of steam from the relief valves at VCSNS would generate louder noises, but for a short period of time.

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Table 2.7-1
NWS and Cooperative Observing Stations Near the Site for Units 2 and 3

Station[(a)]	County	Climate Division	Approximate Distance (miles)	Direction Relative to Site	Elevation (feet)
Parr	Fairfield	3	1	SW	258
Little Mountain	Newberry	5	8	SW	711
Blair	Fairfield	3	10	NNW	280
Winnsboro	Fairfield	3	14	ENE	560
Newberry	Newberry	5	18	W	476
Columbia Metro Airport (WSFO)	Lexington	6	26	SSE	213
Santuck	Union	2	26	NNW	520
Chester 1NW	Chester	3	30	N	520
Saluda	Saluda	5	32	SW	480
Camden 3W	Kershaw	3	38	E	140
Pelion 4NW	Lexington	6	39	S	450
Kershaw 2SW	Lancaster	3	44	ENE	500
Catawba	York	3	45	NNE	560
Johnston 4SW	Edgefield	5	46	SW	620

a) Numeric and letter designators following a station name (*e.g.*, Chester 1NW) indicate the station's approximate distance in miles (*e.g.*, 1) and direction (*e.g.*, northwest) relative to the place name (*e.g.*, Chester).

Table 2.7-2
Local Climatological Data Summary for Columbia, South Carolina

NORMALS, MEANS, AND EXTREMES

COLUMBIA, SC (CAE)

LATITUDE: 33° 56′ 31″ N | LONGITUDE: 81° 07′ 05″ W | ELEVATION (FT): GRND: 240 BARO: 243 | TIME ZONE: EASTERN (UTC + 5) | WBAN: 13883

	ELEMENT	POR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F	NORMAL DAILY MAXIMUM	30	55.1	59.5	67.4	75.7	83.1	89.1	92.1	90.0	84.8	75.8	66.7	57.8	74.8
	MEAN DAILY MAXIMUM	57	56.3	60.3	67.5	76.5	83.9	89.5	92.3	90.6	85.2	76.4	67.1	58.3	75.3
	HIGHEST DAILY MAXIMUM	57	84	84	91	94	101	107	107	107	101	101	90	83	107
	YEAR OF OCCURRENCE		1975	1997	1974	1986	2000	1954	1952	1983	1954	1954	1961	1978	AUG 1983
	MEAN OF EXTREME MAXS.	57	74.2	77.3	84.0	89.8	94.0	98.7	99.7	98.5	94.7	88.2	81.5	75.6	88.0
	NORMAL DAILY MINIMUM	30	34.0	36.3	43.5	50.7	60.0	67.9	71.8	70.6	64.6	51.5	42.6	36.1	52.5
	MEAN DAILY MINIMUM	57	33.6	35.8	42.3	50.2	59.3	66.8	70.7	69.6	63.6	50.8	41.4	34.9	51.6
	LOWEST DAILY MINIMUM	57	-1	5	4	26	34	44	54	53	40	23	12	4	-1
	YEAR OF OCCURRENCE		1985	1973	1980	1983	1963	1984	1951	1969	1967	1952	1970	1958	JAN 1985
	MEAN OF EXTREME MINS.	57	16.6	19.7	25.0	33.1	43.5	54.8	62.7	60.7	49.3	33.9	24.5	18.0	36.8
	NORMAL DRY BULB	30	44.6	47.9	55.4	63.2	71.6	78.5	82.0	80.3	74.7	63.7	54.7	47.0	63.6
	MEAN DRY BULB	57	45.0	47.9	55.0	63.5	71.7	78.1	81.5	80.2	74.5	63.8	54.3	46.6	63.5
	MEAN WET BULB	21	40.1	43.6	49.0	55.2	63.7	70.3	73.5	72.4	67.4	57.8	49.8	41.7	57.0
	MEAN DEW POINT	21	33.2	36.5	41.6	47.9	58.1	66.2	69.9	69.2	63.6	53.5	44.6	35.4	51.6
	NORMAL NO. DAYS WITH:														
	MAXIMUM ≥ 90°	30	0.0	0.0	0.1	1.6	6.2	15.8	22.9	18.1	8.9	0.6	0.0	0.0	74.2
	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	15.5	12.0	5.7	1.0	0.0	0.0	0.0	0.0	0.0	0.8	7.0	13.6	55.6
	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	628	485	321	131	23	0	0	0	8	121	325	552	2594
	NORMAL COOLING DEG. DAYS	30	2	4	20	69	211	390	519	467	296	76	15	5	2074
RH	NORMAL (PERCENT)	30	70	66	65	62	68	70	72	76	75	73	73	71	70
	HOUR 01 LST	30	78	77	77	77	83	85	86	89	89	88	85	81	83
	HOUR 07 LST	30	83	82	84	84	85	86	88	92	92	90	89	84	87
	HOUR 13 LST	30	55	50	48	43	48	50	53	56	55	50	51	54	51
	HOUR 19 LST	30	65	58	54	50	56	61	65	69	72	73	71	69	64
S	PERCENT POSSIBLE SUNSHINE	45	55	59	64	70	68	67	66	66	64	67	63	59	64
W/O	MEAN NO. DAYS WITH:														
	HEAVY FOG(VISBY≤1/4 MI)	56	2.7	2.4	1.8	1.3	1.4	1.4	1.6	2.3	2.6	2.6	2.9	2.9	25.9
	THUNDERSTORMS	57	0.9	1.5	2.5	3.6	6.1	9.4	12.3	9.4	3.7	1.4	0.9	0.4	52.1
CLOUDINESS	MEAN:														
	SUNRISE-SUNSET (OKTAS)	1					2.4	4.0							
	MIDNIGHT-MIDNIGHT (OKTAS)														
	MEAN NO. DAYS WITH:														
	CLEAR	1	2.0	4.0	5.0		12.0	8.0							
	PARTLY CLOUDY	1		2.0	3.0		5.0	8.0							
	CLOUDY	1	5.0	3.0	8.0		4.0	4.0							
PR	MEAN STATION PRESSURE(IN)	32	29.90	29.89	29.80	29.80	29.79	29.80	29.80	29.80	29.80	29.90	29.90	29.89	29.84
	MEAN SEA-LEVEL PRES. (IN)	19	30.13	30.12	30.06	30.00	30.00	29.99	30.03	30.02	30.03	30.10	30.13	30.15	30.06
WINDS	MEAN SPEED (MPH)	49	7.1	7.6	8.2	8.2	6.9	6.5	6.3	5.6	6.1	5.9	6.2	6.6	6.8
	PREVAIL.DIR(TENS OF DEGS)	33	24	24	25	24	24	24	23	23	03	03	27	25	24
	MAXIMUM 2-MINUTE:														
	SPEED (MPH)	9	36	38	45	44	47	47	39	48	35	29	33	41	48
	DIR. (TENS OF DEGS)		28	28	31	28	28	27	05	30	18	27	27	26	30
	YEAR OF OCCURRENCE		2000	2003	2000	1997	1999	2001	2002	2002	2004	2001	2004	2000	AUG 2002
	MAXIMUM 5-SECOND:														
	SPEED (MPH)	9	47	45	52	56	71	58	63	64	46	35	43	49	71
	DIR. (TENS OF DEGS)		27	27	26	25	36	27	03	29	18	27	33	26	36
	YEAR OF OCCURRENCE		2000	1999	1999	1997	1999	2000	2002	2002	2004	2003	1999	2000	MAY 1999
PRECIPITATION	NORMAL (IN)	30	4.66	3.84	4.59	2.98	3.17	4.99	5.54	5.41	3.94	2.89	2.88	3.38	48.27
	MAXIMUM MONTHLY (IN)	57	9.26	8.68	10.89	6.85	9.39	14.81	17.46	16.72	8.78	12.09	7.20	8.54	17.46
	YEAR OF OCCURRENCE		1978	1961	1973	1979	2002	1973	1991	1949	1953	1959	1957	1981	JUL 1991
	MINIMUM MONTHLY (IN)	57	0.84	0.87	0.56	0.29	0.29	0.49	0.57	0.22	0.07	T	0.41	0.32	T
	YEAR OF OCCURRENCE		1981	1976	1985	1994	1951	2002	1977	1997	1985	1963	1973	1955	OCT 1963
	MAXIMUM IN 24 HOURS (IN)	57	3.15	3.69	3.59	3.66	5.57	5.44	5.81	7.66	6.23	5.46	2.60	3.18	7.66
	YEAR OF OCCURRENCE		1993	1962	1960	1956	1967	1973	1959	1949	1953	1964	1986	1970	AUG 1949
	NORMAL NO. DAYS WITH:														
	PRECIPITATION ≥ 0.01	30	11.0	9.1	10.0	7.7	8.6	10.3	11.5	10.3	8.1	6.4	7.5	9.6	110.1
	PRECIPITATION ≥ 1.00	30	1.3	1.2	1.3	0.8	0.8	1.4	1.9	1.9	1.4	0.9	1.0	0.9	14.8
SNOWFALL	NORMAL (IN)	30	0.6	1.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.*	0.1	2.1
	MAXIMUM MONTHLY (IN)	56	4.3	16.0	4.1	T	T	0.0	0.0	T	0.0	0.0	T	9.1	16.0
	YEAR OF OCCURRENCE		1988	1973	1980	1992	2001			1993			1976	1958	FEB 1973
	MAXIMUM IN 24 HOURS (IN)	56	4.3	15.7	4.1	T	T	0.0	0.0	T	0.0	0.0	T	8.8	15.7
	YEAR OF OCCURRENCE		1988	1973	1980	1992	2001			1993			1976	1958	FEB 1973
	MAXIMUM SNOW DEPTH (IN)	55	4	14	4	0	0	0	0	0	0	0	0	8	14
	YEAR OF OCCURRENCE		2000	1973	1980									1958	FEB 1973
	NORMAL NO. DAYS WITH:														
	SNOWFALL ≥ 1.0	30	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4

published by: NCDC Asheville, NC 3

Source: NCDC 2005a

Table 2.7-3
Climatological Normals (Means) at Selected NWS and Cooperative Observing Stations in the Unit 2 and 3 Site Area

Station	Normal Annual Temperatures (°F)[a]			Normal Annual Precipitation	
	Daily Maximum	Daily Minimum	Daily Mean	Rainfall[a] (inches)	Snowfall[b] (inches)
Parr	74.6	48.7	61.6	45.75	2.0
Little Mountain	72.0	50.9	61.5	48.27	2.6
Blair	—	—	—	43.59	2.5[c]
Winnsboro	72.8	50.0	61.4	45.84	2.8
Newberry	74.1	48.6	61.4	49.33	2.1
Columbia Metro Airport (WSFO)	74.8	52.5	63.6	48.27	2.1
Santuck	72.9	51.0	62.0	46.20	3.9
Chester 1NW	72.2	48.0	60.1	47.87	3.4
Saluda	74.3	49.5	61.9	47.79	2.8
Camden 3W	71.8	47.9	59.9	46.65	2.4
Pelion 4NW	75.2	51.1	63.2	51.03	1.4
Kershaw 2SW	73.2	48.2	60.7	47.97	1.5
Catawba	—	—	—	46.51	3.7[d]
Johnston 4SW	73.9	47.1	60.5	48.65	2.1

a) NCDC 2002a
b) NCDC 2005b
c) SERCC 2007, based on available Period of Record (1948–1982); represents sum of individual monthly means
d) SERCC 2007, based on available Period of Record (1948–2006); represents sum of individual monthly means

Table 2.7-4
Morning and Afternoon Mixing Heights, Wind Speeds, and Ventilation Indices for the VCSNS Site Area

		Mixing Height (m, above ground level)		Wind Speed (m/sec)		Ventilation Index (m2/sec)[b]			
Period	Statistic[a]	AM	PM	AM	PM	AM	AM Class.	PM	PM Class.
January	Min	262	667	3.0	2.7	773	P	1,832	M
	Max	544	1,034	4.0	4.0	2,095	M	3,490	F
	Mean	398	844	3.3	3.3	1,359	M	2,718	F
February	Min	252	841	2.7	2.7	847	P	1,945	M
	Max	582	1,322	4.2	4.1	2,299	M	4,821	G
	Mean	421	1,081	3.4	3.4	1,537	M	3,586	G
March	Min	322	956	2.9	2.9	1,000	P[c]	3,259	F
	Max	552	1,676	3.9	3.9	2,400	F[d]	5,922	G
	Mean	428	1,360	3.4	3.4	1,600	M[d]	4,457	G
April	Min	269	1,414	2.7	2.9	928	P	4,193	G
	Max	546	2,078	3.8	3.7	2,249	M	6,440	G
	Mean	401	1,665	3.3	3.2	1,488	M	5,245	G
May	Min	211	1,383	2.4	2.6	626	P	3,734	G
	Max	570	2,243	4.0	3.5	1,992	M	7,279	G
	Mean	393	1,745	3.0	3.0	1,302	M	5,137	G
June	Min	281	1,439	2.5	2.4	752	P	3,679	G
	Max	480	2,105	3.4	3.4	1,681	M	5,940	G
	Mean	389	1,725	2.9	2.8	1,177	M	4,742	G
July	Min	265	1,369	2.5	2.3	731	P	3,466	F
	Max	619	2,153	3.4	3.2	1,846	M	6,433	G
	Mean	398	1,673	2.8	2.8	1,183	M	4,597	G
August	Min	207	1,392	2.3	2.1	523	P	3,294	F
	Max	594	2,012	3.4	3.0	1,799	M	5,450	G
	Mean	386	1,592	2.7	2.6	1,099	P	4,138	G
September	Min	251	1,044	2.3	2.2	602	P	2,974	F
	Max	621	1,654	3.4	3.3	2,237	M	4,620	G
	Mean	370	1,431	2.9	2.7	1,144	P	3,773	G
October	Min	193	1,047	2.4	2.3	510	P	2,722	F
	Max	435	1,676	3.5	3.2	1,644	M	5,204	G
	Mean	313	1,265	3.0	2.8	1,020	P	3,440	F
November	Min	210	708	2.6	2.7	690	P	2,144	M
	Max	477	1,187	3.8	3.5	1,966	M	3,673	G
	Mean	344	1,039	3.1	3.0	1,194	M	3,054	F
December	Min	253	701	2.6	2.7	785	P	2,164	M
	Max	469	945	4.0	4.3	1,807	M	3,172	F
	Mean	374	831	3.2	3.2	1,282	M	2,678	F
Winter	Mean	397	913	3.3	3.3	1,388	M	2,974	F
Spring	Mean	407	1,589	3.2	3.2	1,463	M	4,943	G
Summer	Mean	391	1,663	2.8	2.7	1,153	P	4,490	G
Autumn	Mean	342	1,245	3.0	2.8	1,118	P	3,423	F
Annual	Mean	384	1,355	3.1	3.0	1,280	M	3,964	G

a) Monthly minimum, maximum and mean values are based directly on summaries available from USDA - Forest Service Ventilation Climate Information System (VCIS) (USDA 2007). Seasonal and annual mean values represent weighted averages based on the number of days in the appropriate months.

b) Classifications of ventilation potential from Ventilation Index: P = Poor (0 to 1175 m^2/sec); M = Marginal (1176 to 2350 m^2/sec); F = Fair (2351 to 3525 m^2/sec); G = Good (>3525 m^2/sec).

c) The mixing height is set to an arbitrary “free height” by VCIS when the mixing height for a given location, as interpolated by the VCIS from observed mixing heights, is mapped to be at or below local ground level elevation.

Sources: USDA-Forest Service 2003; 2007

Table 2.7-5
Climatological Extremes at Selected NWS and Cooperative Observing Stations in the Units 2 and 3 Site Area

Station	Maximum Temperature[a] (°F)	Minimum Temperature[a] (°F)	Max 24-Hr Rainfall[a] (inches)	Max Monthly Rainfall[a] (inches)	Max 24-Hr Snowfall[a] (inches)	Max Monthly Snowfall[a] (inches)
Parr	107[b] [c] [d] (07/20/86)	-1[b] [c] (12/12/62)	7.08[b] [c] (09/04/98)	12.20[b] [e] (06/89)	7.5[b] [c] (02/10/73)	7.5[b] [e] [f] (02/73)
Little Mountain	108[b] [c] [g] (07/24/52)	-2[b] [c] (01/21/85)	6.46[b] [c] (08/18/86)	15.70[b] [e] (08/86)	10.0[c] [e] (12/11/58)	11.0[c] [e] (02/69)
Blair	—	—	7.14[c] [e] (08/23/67)	12.00[c] [e] (03/80)	12.0[c] [e] (02/26/69)	12.5[c] [e] (02/69)
Winnsboro	107[b] [c] (06/28/54)	-1[b] [c] [h] (01/22/85)	7.77[b] [c] (07/10/59)	14.90[c] [e] (08/52)	12.0[b] [c] (02/10/73)	12.0[b] [e] (02/73)
Newberry	108[b] [c] (08/21/83)	-1[b] [c] [i] (01/21/85)	10.42[b] [c] (08/18/86)	17.04[b] [e] (08/86)	8.0[b] [c] [e] (01/25/00)	8.0[b] [c] [e] [j] (01/00)
Columbia Metro Airport (WSFO)	107[b] [c] [k] (08/21/83)	-1[b] [c] (01/21/85)	5.79[b] [c] (07/09/59)	17.46[b] [e] (07/91)	15.7[q] (02/10/73)	16.0[b] [e] (02/73)
Santuck	108[b] [c] (07/29/52)	-4[b] [c] (01/21/85)	6.14[b] [c] (08/23/67)	14.76[c] [l] (09/04)	9.5[c] [e] (12/29/35)	12.9[b] [e] (01/00)
Chester 1NW	106[b] [c] (08/21/83)	-5[b] [c] (12/13/62)	8.40[b] [e] (08/23/67)	15.23[c] [e] (08/67)	7.5[c] [e] (02/09/67)	16.5[c] [e] (03/60)
Saluda	109[b] [c] (07/14/80)	-2[b] [c] [m] (01/22/85)	6.05[b] [c] (08/30/64)	14.96[c] [e] (09/59)	8.0[c] [e] (12/11/58)	10.0[b] [c] [e] [n] (02/73)
Camden 3W	111[b] [c] (06/28/54)	-3[b] [c] (01/22/85)	9.62[b] [c] (10/11/90)	16.93[b] [e] (10/90)	9.0[b] [c] (02/10/73)	12.0[b] [e] (02/73)
Pelion 4NW	107[b] [c] [o] (08/01/80)	-2[b] [c] (01/21/85)	7.10[b] [c] (09/04/98)	14.61[c] [l] (07/03)	9.0[b] [c] (02/10/73)	15.5[b] [e] (02/73)
Kershaw 2SW	107[b] [c] (06/28/54)	-4[b] [c] [m] (01/22/85)	10.14[b] [e] (09/04/98)	18.55[c] [e] (08/52)	12.0[c] [e] (12/12/58)	12.0[c] [e] (12/58)
Catawba	—	—	7.77[c] [e] (07/24/97)	18.26[c] [e] (08/67)	13.5[c] [l] (02/27/04)	14.1[c] [l] (02/04)
Johnston 4SW	107[b] [c] [p] (08/25/02)	-2[b] [c] [m] (01/22/85)	6.35[b] [c] (08/30/64)	15.88[c] [e] (06/65)	14.0[b] [c] (02/10/73)	14.0[c] [e] (02/73)

a) Most recent date of occurrence shown in table
b) NCDC 2005b
c) SERCC 2007
d) Occurs on multiple dates: 07/20/86; 08/22/83
e) NCDC 2002d
f) Occurs for multiple months: 02/73; 12/58
g) Occurs on multiple dates: 07/24/52; 07/21/52
h) Occurs on multiple dates: 01/22/85; 01/21/85; 12/13/62
i) Occurs on multiple dates: 01/21/85; 03/03/80
j) Occurs for multiple months: 01/00; 03/60
k) Occurs on multiple dates: 08/21/83; 07/29/52; 07/24/52; 07/23/52; 06/27/54
l) NCDC 2006
m) Occurs on multiple dates: 01/22/85; 01/21/85
n) Occurs for multiple months: 02/73; 12/58
o) Occurs on multiple dates: 08/01/80; 07/13/80
p) Occurs on multiple dates: 08/25/02; 08/15/99; 07/14/80
q) NCDC 2005a

Table 2.7-6
Seasonal and Annual Mean Wind Speeds for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) and the Columbia, South Carolina, NWS Station

Primary Tower Elevation	Location	Winter	Spring	Summer	Autumn	Annual
Upper Level (60 meters) (m/sec)	Units 2 and 3 Site	4.6	4.5	3.6	4.2	4.2
Lower Level (10 meters) (m/sec)	Units 2 and 3 Site	2.5	2.5	2.1	2.1	2.3
Single Level (6.1 meters) (m/sec)	Columbia Metro Airport WSFO[a]	3.2	3.5	2.7	2.7	3.0

a) NCDC 2005a

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

Table 2.7-7 (Sheet 1 of 2)
Wind Direction Persistence/Wind Speed Distributions for the Units 2 and 3 Monitoring Program – 10-Meter Level

Site Name: Summer | Start Date: 1/1/2007 00:00 | End Date: 12/31/2007 23:00

Number of Sectors Included: 1 | Width in Degrees: 22.5

Measurement Height, m: 10 | Speed Sensor: 3 | Direction Sensor: 3

Speed Greater than or Equal to: 5.00 mph
Direction

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	212	265	326	178	131	101	155	229	222	321	474	411	264	210	168	199
2	102	148	194	72	49	34	51	97	97	163	263	203	131	100	77	99
4	19	68	95	17	6	11	9	21	20	53	99	49	40	33	32	36
8	0	20	35	1	0	0	1	0	1	6	20	3	7	3	6	7
12	0	9	11	0	0	0	0	0	0	0	4	0	0	0	0	0
18	0	3	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

Speed Greater than or Equal to: 10.00 mph
Direction

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	25	37	6	0	0	1	3	15	16	46	124	89	63	38	32	33
2	9	20	3	0	0	0	1	7	4	21	64	44	34	18	16	17
4	1	6	0	0	0	0	0	1	0	5	19	11	14	3	8	5
8	0	0	0	0	0	0	0	0	0	0	0	1	2	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

Speed Greater than or Equal to: 15.00 mph
Direction

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	0	0	0	0	0	0	0	1	1	1	2	15	9	3	7	0
2	0	0	0	0	0	0	0	0	0	0	0	8	5	1	4	0
4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	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 (Sheet 2 of 2)
Wind Direction Persistence/Wind Speed Distributions for the Units 2 and 3 Monitoring Program – 10-Meter Level

Site Name: Summer   Start Date: 1/1/2007 00:00   End Date: 12/31/2007 23:00
Number of Sectors Included: 1   Width in Degrees: 22.5
Measurement Height, m: 10   Speed Sensor: 3   Direction Sensor: 3

Speed Greater than or Equal to: 20.00 mph
Direction

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	0	0	0	0	0	0	0	0	0	0	1	1	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

Speed Greater than or Equal to: 25.00 mph
Direction

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	0	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

Speed Greater than or Equal to: 30.00 mph
Direction

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	0	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 (Sheet 1 of 2)
Wind Direction Persistence/Wind Speed Distributions for the Units 2 and 3 Monitoring Program – 60-Meter Level

Site Name: Summer | Start Date: 1/1/2007 00:00 | End Date: 12/31/2007 23:00

Number of Sectors Included: 1 | Width in Degrees: 22.5

Measurement Height, m: 60 | Speed Sensor: 4 | Direction Sensor: 4

Speed Greater than or Equal to: 5.00 mph
Direction

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	274	454	531	561	377	307	306	382	488	564	716	868	636	328	243	354
2	112	261	314	321	183	152	150	183	259	295	377	497	362	150	100	181
4	19	117	145	139	57	44	46	54	67	114	137	207	152	43	26	62
8	0	27	44	35	13	3	6	0	0	22	16	53	31	12	3	9
12	0	9	13	11	1	0	2	0	0	2	0	18	8	5	0	2
18	0	0	0	0	0	0	0	0	0	0	0	6	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

Speed Greater than or Equal to: 10.00 mph
Direction

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	127	245	305	256	168	138	170	189	242	273	377	474	364	105	96	171
2	56	160	194	137	84	67	86	87	124	151	206	266	225	40	45	96
4	13	81	94	48	31	19	27	21	33	60	78	102	107	8	17	42
8	0	27	33	11	10	2	6	0	0	8	5	13	26	1	3	9
12	0	9	8	1	0	0	2	0	0	0	0	0	8	0	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

Speed Greater than or Equal to: 15.00 mph
Direction

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	30	86	83	47	22	10	23	33	31	31	68	114	145	27	28	49
2	12	57	51	25	8	2	5	6	8	8	26	57	100	10	11	29
4	1	29	24	12	2	0	0	0	0	0	4	18	55	1	3	8
8	0	8	5	2	0	0	0	0	0	0	0	1	15	0	0	0
12	0	1	0	0	0	0	0	0	0	0	0	0	3	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 (Sheet 2 of 2)
Wind Direction Persistence/Wind Speed Distributions for the Units 2 and 3 Monitoring Program – 60-Meter Level

Site Name: Summer | Start Date: 1/1/2007 00:00 | End Date: 12/31/2007 23:00
Number of Sectors Included: 1 | Width in Degrees: 22.5

Measurement Height, m: 60 | Speed Sensor: 4 | Direction Sensor: 4

Speed Greater than or Equal to: 20.00 mph
Direction

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	3	9	0	0	0	0	0	1	1	1	2	23	43	6	7	8
2	1	2	0	0	0	0	0	0	0	0	0	10	30	1	4	1
4	0	0	0	0	0	0	0	0	0	0	0	1	16	0	1	0
8	0	0	0	0	0	0	0	0	0	0	0	0	2	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

Speed Greater than or Equal to: 25.00 mph
Direction

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	0	1	0	0	0	0	0	0	0	0	0	6	13	1	1	0
2	0	0	0	0	0	0	0	0	0	0	0	3	5	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	1	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

Speed Greater than or Equal to: 30.00 mph
Direction

Hours	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
1	0	0	0	0	0	0	0	0	0	0	0	1	2	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 2.7-9
Seasonal and Annual Vertical Stability Class and Mean 10-Meter Level Wind Speed Distributions for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007)

	Vertical Stability Categories[a]							
Period	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**All**
Winter								
Frequency (%)	0.09	1.09	3.99	38.06	34.27	12.48	10.01	
Wind Speed (m/sec)	5.23	4.52	4.02	2.91	2.41	1.56	1.21	2.46
Spring								
Frequency (%)	4.97	6.06	8.80	28.44	29.85	12.63	9.25	
Wind Speed (m/sec)	4.29	3.89	3.13	2.73	2.41	1.61	1.30	2.55
Summer								
Frequency (%)	4.45	6.49	10.31	28.43	33.97	13.81	2.54	
Wind Speed (m/sec)	3.40	2.95	2.68	2.28	1.74	1.52	1.25	2.10
Autumn								
Frequency (%)	4.13	4.04	7.57	28.82	29.88	15.28	10.28	
Wind Speed (m/sec)	3.80	3.26	2.86	2.37	2.06	1.56	1.21	2.15
Annual								
Frequency (%)	3.44	4.46	7.71	30.87	31.97	13.56	7.99	
Wind Speed (m/sec)	3.84	3.44	3.04	2.59	2.15	1.56	1.21	2.32

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

Table 2.7-10 (Sheet 1 of 8)
Joint Frequency Distribution of Wind Speed and Wind Direction (10-Meter Level) by Atmospheric Stability Class for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007)

Hours at Each Wind Speed and Direction

Period of Record = 1/1/2007 00:00 – 12/31/2007 23:00 Total Period

Elevation: **Speed:** SPD10NEW **Direction**: DIR10NEW **Lapse:** DT60NEW

Stability Class: A Delta Temperature Extremely Unstable

Wind Speed (m/s)

Wind Direction (from)	0.22 - 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	0	0	10	28	2	0	0	0	0	40
NNE	0	0	0	0	0	13	27	5	0	0	0	0	45
NE	0	0	0	0	0	6	44	0	0	0	0	0	50
ENE	0	0	0	0	0	8	22	0	0	0	0	0	30
E	0	0	0	0	0	1	10	0	0	0	0	0	11
ESE	0	0	0	0	0	0	2	0	0	0	0	0	2
SE	0	0	0	0	0	0	4	0	0	0	0	0	4
SSE	0	0	0	0	0	0	0	0	0	0	0	0	0
S	0	0	0	0	0	1	0	0	0	0	0	0	1
SSW	0	0	0	0	1	3	2	0	0	0	0	0	6
SW	0	0	0	0	0	0	6	4	0	0	0	0	10
WSW	0	0	0	0	0	1	18	6	1	0	0	0	26
W	0	0	0	0	1	2	10	5	0	0	0	0	18
WNW	0	0	0	1	0	2	10	1	0	0	0	0	14
NW	0	0	0	0	2	3	11	4	1	0	0	0	21
NNW	0	0	0	0	1	2	13	5	0	0	0	0	21
Totals	0	0	0	1	5	52	207	32	2	0	0	0	299

Number of Calm Hours for this Table:	0
Number of Variable Direction Hours for this Table:	0
Number of Invalid Hours:	78
Number of Valid Hours for this Table:	299
Total Hours for the Period:	8760

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

Table 2.7-10 (Sheet 2 of 8)
Joint Frequency Distribution of Wind Speed and Wind Direction (10-Meter Level) by Atmospheric Stability Class for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007)

Hours at Each Wind Speed and Direction

Period of Record = 1/1/2007 00:00 – 12/31/2007 23:00 Total Period

Elevation: **Speed:** SPD10NEW **Direction:** DIR10NEW **Lapse:** DT60NEW

Stability Class: B Delta Temperature Moderately Unstable

Wind Speed (m/s)

Wind Direction (from)	0.22 - 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	0	1	26	15	0	0	0	0	0	42
NNE	0	0	0	0	2	19	9	1	0	0	0	0	31
NE	0	0	0	0	1	20	20	0	0	0	0	0	41
ENE	0	0	0	0	0	13	13	0	0	0	0	0	26
E	0	0	0	0	1	9	10	0	0	0	0	0	20
ESE	0	0	0	0	0	0	4	0	0	0	0	0	4
SE	0	0	0	0	0	0	2	0	0	0	0	0	2
SSE	0	0	0	0	0	2	2	1	0	0	0	0	5
S	0	0	0	0	0	5	13	0	0	0	0	0	18
SSW	0	0	0	0	1	5	15	6	0	0	0	0	27
SW	0	0	0	0	0	5	12	8	0	0	0	0	25
WSW	0	0	0	0	0	3	28	7	4	0	0	0	42
W	0	0	0	0	1	7	21	6	0	0	0	0	35
WNW	0	0	0	1	5	8	16	1	0	0	0	0	31
NW	0	0	0	0	2	13	8	1	2	0	0	0	26
NNW	0	0	0	0	2	6	3	1	0	0	0	0	12
Totals	0	0	0	1	16	141	191	32	6	0	0	0	387

Number of Calm Hours not included for this Table:	0
Number of Variable Direction Hours for this Table:	0
Number of Invalid Hours:	78
Number of Valid Hours for this Table:	387
Total Hours for the Period:	8760

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

Table 2.7-10 (Sheet 3 of 8)
Joint Frequency Distribution of Wind Speed and Wind Direction (10-Meter Level) by Atmospheric Stability Class for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007)

Hours at Each Wind Speed and Direction

Period of Record = 1/1/2007 00:00 – 12/31/2007 23:00 Total Period

Elevation: **Speed:** SPD10NEW **Direction:** DIR10NEW **Lapse:** DT60NEW

Stability Class C Delta Temperature Slightly Unstable

Wind Speed (m/s)

Wind Direction (from)	0.22 - 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	0	6	25	8	0	0	0	0	0	39
NNE	0	0	0	0	1	19	13	0	0	0	0	0	33
NE	0	0	1	0	1	20	8	0	0	0	0	0	30
ENE	0	0	0	0	2	36	9	0	0	0	0	0	47
E	0	0	0	2	3	20	8	0	0	0	0	0	33
ESE	0	0	0	0	0	7	1	0	0	0	0	0	8
SE	0	0	0	1	1	6	8	0	0	0	0	0	16
SSE	0	0	0	0	3	7	10	0	0	0	0	0	20
S	0	0	0	0	3	16	17	0	0	0	0	0	36
SSW	0	0	0	0	1	18	29	4	0	0	0	0	52
SW	0	0	0	0	6	21	33	8	0	0	0	0	68
WSW	0	0	0	0	9	34	39	6	1	0	0	0	89
W	0	0	0	3	11	17	20	7	1	0	0	0	59
WNW	0	0	0	2	11	28	18	2	0	0	0	0	61
NW	0	0	1	2	7	17	12	6	1	0	0	0	46
NNW	0	0	0	1	9	15	6	1	0	0	0	0	32
Totals	0	0	2	11	74	306	239	34	3	0	0	0	669

Number of Calm Hours for this Table:	0
Number of Variable Direction Hours for this Table:	0
Number of Invalid Hours:	78
Number of Valid Hours for this Table:	669
Total Hours for this Period:	8760

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

Table 2.7-10 (Sheet 4 of 8)
Joint Frequency Distribution of Wind Speed and Wind Direction (10-Meter Level) by Atmospheric Stability Class for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007)

Hours at Each Wind Speed and Direction

Period of Record = 1/1/2007 00:00 – 12/31/2007 23:00 Total Period

Elevation: **Speed:** SPD10NEW **Direction:** DIR10NEW **Lapse:** DT60NEW

Stability Class D Delta Temperature Neutral

Wind Speed (m/s)

Wind Direction (from)	0.22 - 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	2	6	9	28	35	26	8	0	0	0	0	114
NNE	1	3	1	16	23	39	77	2	0	0	0	0	162
NE	0	1	1	18	40	102	61	0	0	0	0	0	223
ENE	0	0	8	32	41	65	23	0	0	0	0	0	169
E	0	2	5	16	36	53	12	0	0	0	0	0	124
ESE	0	1	3	14	31	53	6	0	0	0	0	0	108
SE	1	0	3	13	25	59	7	0	0	0	0	0	108
SSE	0	3	2	14	27	70	35	3	0	0	0	0	154
S	0	0	4	13	24	52	39	3	0	0	0	0	135
SSW	0	0	4	14	26	65	54	6	0	0	0	0	169
SW	0	0	2	15	24	69	137	34	1	0	0	0	282
WSW	0	1	2	31	53	71	74	21	5	0	0	0	258
W	1	1	7	23	42	51	52	9	6	0	0	0	192
WNW	0	0	8	39	32	70	24	14	2	0	0	0	189
NW	0	2	10	37	41	42	19	3	1	0	0	0	155
NNW	0	0	2	27	29	44	25	11	0	0	0	0	138
Totals	3	16	68	331	522	940	671	114	15	0	0	0	2680

Number of Calm Hours for this Table:	0
Number of Variable Direction Hours for this Table:	0
Number of Invalid Hours:	78
Number of Valid Hours for this Table:	2680
Total Hours for the Period:	8760

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

Table 2.7-10 (Sheet 5 of 8) Joint Frequency Distribution of Wind Speed and Wind Direction (10-Meter Level) by Atmospheric Stability Class for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007)

Hours at Each Wind Speed and Direction

Period of Record = 1/1/2007 00:00 – 12/31/2007 23:00 Total Period

Elevation: **Speed:** SPD10NEW **Direction:** DIR10NEW **Lapse:** DT60NEW

Stability Class E Delta Temperature Slightly Stable

Wind Speed (m/s)

Wind Direction (from)	0.22 - 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	5	10	16	21	29	21	1	0	0	0	0	104
NNE	0	7	9	18	13	28	29	1	0	0	0	0	105
NE	0	2	8	40	30	59	27	0	0	0	0	0	166
ENE	1	3	8	48	40	19	3	0	0	0	0	0	122
E	0	1	11	39	35	21	1	0	0	0	0	0	108
ESE	3	6	14	31	40	35	0	0	0	0	0	0	129
SE	2	0	10	43	63	65	14	0	0	0	0	0	197
SSE	1	4	9	30	71	102	25	1	1	0	0	0	244
S	0	5	20	59	36	61	33	4	1	0	0	0	219
SSW	0	4	14	43	18	74	55	9	0	0	0	0	217
SW	1	6	10	33	41	87	71	13	1	0	0	0	263
WSW	0	8	11	35	68	65	52	10	0	0	0	0	249
W	0	4	10	45	47	45	42	4	0	0	0	0	197
WNW	1	11	15	48	39	33	17	2	0	0	0	0	166
NW	0	4	8	41	27	34	14	6	0	0	0	0	134
NNW	1	3	13	27	28	44	39	1	0	0	0	0	156
Totals	11	73	180	596	617	801	443	52	3	0	0	0	2776

Number of Calm Hours for this Table:	0
Number of Variable Direction Hours for this Table	0
Number of Invalid Hours:	78
Number of Valid Hours for this Table:	2776
Total Hours for the Period:	8760

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

Table 2.7-10 (Sheet 6 of 8)
Joint Frequency Distribution of Wind Speed and Wind Direction (10-Meter Level) by Atmospheric Stability Class for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007)

Hours at Each Wind Speed and Direction

Period of Record = 1/1/2007 00:00 – 12/31/2007 23:00 Total Period

Elevation: **Speed:** SPD10NEW **Direction:** DIR10NEW **Lapse:** DT60NEW

Stability Class F Delta Temperature Moderately Stable

Wind Speed (m/s)

Wind Direction (from)	0.22 - 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	1	9	14	9	6	0	0	0	0	0	0	40
NNE	0	4	2	7	2	5	0	0	0	0	0	0	20
NE	1	5	5	14	8	2	0	0	0	0	0	0	35
ENE	0	2	3	18	39	18	0	0	0	0	0	0	80
E	3	2	9	36	41	14	0	0	0	0	0	0	105
ESE	2	0	10	28	21	17	0	0	0	0	0	0	78
SE	3	1	7	26	35	41	0	0	0	0	0	0	113
SSE	3	1	5	30	46	45	0	0	0	0	0	0	130
S	2	1	9	23	29	17	3	0	0	0	0	0	84
SSW	2	3	9	30	19	15	1	0	0	0	0	0	79
SW	2	1	9	23	11	6	0	0	0	0	0	0	52
WSW	1	5	5	18	16	6	3	0	0	0	0	0	54
W	1	2	11	17	10	6	1	0	0	0	0	0	48
WNW	2	6	9	24	21	2	0	0	0	0	0	0	64
NW	0	7	16	36	20	8	0	0	0	0	0	0	87
NNW	1	6	10	30	38	20	3	0	0	0	0	0	108
Totals	24	47	128	374	365	228	11	0	0	0	0	0	1177

Number of Calm Hours for this Table:	0
Number of Variable Direction Hours for this Table:	0
Number of Invalid Hours:	78
Number of Valid Hours for this Table:	1177
Total Hours for the Period:	8760

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

Table 2.7-10 (Sheet 7 of 8)
Joint Frequency Distribution of Wind Speed and Wind Direction (10-Meter Level) by Atmospheric Stability Class for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007)

Hours at Each Wind Speed and Direction

Period of Record = 1/1/2007 00:00 – 12/31/2007 23:00 Total Period

Elevation: **Speed:** SPD10NEW **Direction:** DIR10NEW **Lapse:** DT60NEW

Stability Class G Delta Temperature Extremely Stable

Wind Speed (m/s)

Wind Direction (from)	0.22 - 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	3	7	10	9	3	0	0	0	0	0	0	35
NNE	0	2	2	2	2	1	0	0	0	0	0	0	9
NE	2	3	0	5	0	0	0	0	0	0	0	0	10
ENE	2	1	4	2	1	0	0	0	0	0	0	0	10
E	3	3	2	9	9	9	0	0	0	0	0	0	35
ESE	1	6	5	8	14	12	2	0	0	0	0	0	48
SE	1	7	7	17	12	5	0	0	0	0	0	0	49
SSE	4	3	4	11	8	0	0	0	0	0	0	0	30
S	1	4	5	11	10	2	0	0	0	0	0	0	33
SSW	5	3	3	13	4	0	0	0	0	0	0	0	28
SW	2	3	4	10	1	0	0	0	0	0	0	0	20
WSW	6	4	5	7	1	1	0	0	0	0	0	0	24
W	7	3	8	3	1	0	0	0	0	0	0	0	22
WNW	0	7	12	6	4	0	0	0	0	0	0	0	29
NW	8	10	38	73	27	0	0	0	0	0	0	0	156
NNW	7	6	17	66	43	17	0	0	0	0	0	0	156
Totals	52	68	123	253	146	50	2	0	0	0	0	0	694

Number of Calm Hours for this Table:	0
Number of Variable Direction Hours for this Table:	0
Number of Invalid Hours:	78
Number of Valid Hours for this Table:	694
Total Hours for the Period:	8760

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

Table 2.7-10 (Sheet 8 of 8)
Joint Frequency Distribution of Wind Speed and Wind Direction (10-Meter Level) by Atmospheric Stability Class for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007)

Hours at Each Wind Speed and Direction

Period of Record = 1/1/2007 00:00 – 12/31/2007 23:00 Total Period

Elevation: **Speed:** SPD10NEW **Direction:** DIR10NEW **Lapse:** DT60NEW

Summary of All Stability Classes Delta Temperature

Wind Speed (m/s)

Wind Direction (from)	0.22 - 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	5	11	32	49	74	134	98	11	0	0	0	0	414
NNE	1	16	14	43	43	124	155	9	0	0	0	0	405
NE	3	11	15	77	80	209	160	0	0	0	0	0	555
ENE	3	6	23	100	123	159	70	0	0	0	0	0	484
E	6	8	27	102	125	127	41	0	0	0	0	0	436
ESE	6	13	32	81	106	124	15	0	0	0	0	0	377
SE	7	8	27	100	136	176	35	0	0	0	0	0	489
SSE	8	11	20	85	155	226	72	5	1	0	0	0	583
S	3	10	38	106	102	154	105	7	1	0	0	0	526
SSW	7	10	30	100	70	180	156	25	0	0	0	0	578
SW	5	10	25	81	83	188	259	67	2	0	0	0	720
WSW	7	18	23	91	147	181	214	50	11	0	0	0	742
W	9	10	36	91	113	128	146	31	7	0	0	0	571
WNW	3	24	44	121	112	143	85	20	2	0	0	0	554
NW	8	23	73	189	126	117	64	20	5	0	0	0	625
NNW	9	15	42	151	150	148	89	19	0	0	0	0	623
Totals	90	204	501	1567	1745	2518	1764	264	29	0	0	0	8682

Number of Calm Hours for this Table:	0
Number of Variable Direction Hours for this Table:	0
Number of Invalid Hours:	78
Number of Valid Hours for this Table:	8682
Total Hours for the Period:	8760

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

Table 2.7-11 (Sheet 1 of 8)
Joint Frequency Distribution of Wind Speed and Wind Direction (60-Meter Level) by Atmospheric Stability Class for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007)

Hours at Each Wind Speed and Direction

Period of Record = 1/1/2007 00:00 – 12/31/2007 23:00 Total Period

Elevation: **Speed:** SPD60NEW **Direction:** DIR60NEW **Lapse:** DT60NEW

Stability Class: A Delta Temperature Extremely Unstable

Wind Speed (m/s)

Wind Direction (from)	0.22 - 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	0	0	1	14	14	3	0	0	0	32
NNE	0	0	0	0	0	3	19	14	14	0	0	0	50
NE	0	0	0	0	0	0	22	27	4	0	0	0	53
ENE	0	0	0	0	0	0	19	17	0	0	0	0	36
E	0	0	0	0	0	1	4	6	0	0	0	0	11
ESE	0	0	0	0	0	0	0	1	0	0	0	0	1
SE	0	0	0	0	0	0	1	3	0	0	0	0	4
SSE	0	0	0	0	0	0	1	0	0	0	0	0	1
S	0	0	0	0	0	0	1	0	0	0	0	0	1
SSW	0	0	0	0	0	2	1	2	0	0	0	0	5
SW	0	0	0	0	0	0	2	4	2	0	0	0	8
WSW	0	0	0	0	1	1	9	5	6	1	0	0	23
W	0	0	0	0	1	1	5	9	11	0	0	0	27
WNW	0	0	0	0	0	2	2	5	1	0	0	0	10
NW	0	0	0	1	0	1	6	5	3	1	0	0	17
NNW	0	0	0	0	1	2	8	5	4	0	0	0	20
Totals	0	0	0	1	3	14	114	117	48	2	0	0	299

Number of Calm Hours for this Table:	0
Number of Variable Direction Hours for this Table:	0
Number of Invalid Hours:	104
Number of Valid Hours for this Table:	299
Total Hours for the Period:	8760

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

Table 2.7-11 (Sheet 2 of 8)
Joint Frequency Distribution of Wind Speed and Wind Direction (60-Meter Level) by Atmospheric Stability Class for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007)

Hours at Each Wind Speed and Direction

Period of Record = 1/1/2007 00:00 – 12/31/2007 23:00 Total Period

Elevation: **Speed:** SPD60NEW **Direction:** DIR60NEW **Lapse:** DT60NEW

Stability Class: B Delta Temperature Moderately Unstable

Wind Speed (m/s)

Wind Direction (from)	0.22 - 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	0	0	6	15	4	0	0	0	0	25
NNE	0	0	0	0	1	9	22	4	4	0	0	0	40
NE	0	0	0	0	1	8	18	10	3	0	0	0	40
ENE	0	0	0	0	1	1	26	8	0	0	0	0	36
E	0	0	0	0	0	1	14	7	0	0	0	0	22
ESE	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	3	0	0	0	0	0	3
SSE	0	0	0	0	0	1	5	1	1	0	0	0	8
S	0	0	0	0	0	3	12	3	0	0	0	0	18
SSW	0	0	0	0	0	3	11	4	4	0	0	0	22
SW	0	0	0	0	0	3	10	7	2	0	0	0	22
WSW	0	0	0	0	0	2	16	16	9	2	0	0	45
W	0	0	0	1	2	5	14	11	7	3	0	0	43
WNW	0	0	0	0	4	6	11	6	1	0	0	0	28
NW	0	0	0	0	1	7	6	5	0	2	0	0	21
NNW	0	0	0	0	2	2	7	2	1	0	0	0	14
Totals	0	0	0	1	12	57	190	88	32	7	0	0	387

Number of Calm Hours for this Table:	0
Number of Variable Direction Hours for this Table:	0
Number of Invalid Hours:	104
Number of Valid Hours for this Table:	387
Total Hours for the Period:	8760

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

Table 2.7-11 (Sheet 3 of 8)
Joint Frequency Distribution of Wind Speed and Wind Direction (60-Meter Level) by Atmospheric Stability Class for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007)

Hours at Each Wind Speed and Direction

Period of Record = 1/1/2007 00:00 – 12/31/2007 23:00 Total Period

Elevation: **Speed:** SPD60NEW **Direction:** DIR60NEW **Lapse:** DT60NEW

Stability Class C Delta Temperature Slightly Unstable

Wind Speed (m/s)

Wind Direction (from)	0.22 - 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	0	5	13	11	1	0	0	0	0	30
NNE	0	0	0	1	1	7	26	4	4	0	0	0	43
NE	0	0	1	0	2	3	22	7	0	0	0	0	35
ENE	0	0	0	0	2	12	31	5	0	0	0	0	50
E	0	0	0	0	2	4	22	3	0	0	0	0	31
ESE	0	0	0	0	0	4	6	0	0	0	0	0	10
SE	0	0	0	1	2	4	14	1	0	0	0	0	22
SSE	0	0	0	0	2	8	8	2	0	0	0	0	20
S	0	0	0	0	0	10	25	3	0	0	0	0	38
SSW	0	0	0	0	3	12	22	10	2	0	0	0	49
SW	0	0	0	0	2	12	21	12	1	0	0	0	48
WSW	0	0	0	1	10	20	46	15	7	1	0	0	100
W	0	0	0	3	9	12	23	11	9	4	1	0	72
WNW	0	0	0	4	4	16	14	7	3	0	0	0	48
NW	0	0	0	1	5	11	12	3	5	1	0	0	38
NNW	0	0	1	1	1	14	10	3	3	1	0	0	34
Totals	0	0	2	12	50	162	313	87	34	7	1	0	668

Number of Calm Hours for this Table:	0
Number of Variable Direction Hours for this Table:	0
Number of Invalid Hours:	104
Number of Valid Hours for this Table:	668
Total Hours for the Period:	8760

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

Table 2.7-11 (Sheet 4 of 8) Joint Frequency Distribution of Wind Speed and Wind Direction (60-Meter Level) by Atmospheric Stability Class for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007)

Hours at Each Wind Speed and Direction

Period of Record = 1/1/2007 00:00 – 12/31/2007 23:00 Total Period

Elevation: **Speed:** SPD60NEW **Direction:** DIR60NEW **Lapse:** DT60NEW

Stability Class: D Delta Temperature Neutral

Wind Speed (m/s)

Wind Direction (from)	0.22 - 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	5	9	12	17	18	11	13	0	0	0	86
NNE	0	1	2	8	10	33	27	61	28	2	0	0	172
NE	0	0	2	12	12	21	75	82	10	0	0	0	214
ENE	0	2	3	9	7	35	128	39	7	0	0	0	230
E	0	0	2	8	15	37	56	15	1	0	0	0	134
ESE	0	0	1	8	4	40	54	10	1	0	0	0	118
SE	0	1	2	5	6	33	51	14	3	0	0	0	115
SSE	0	1	0	7	13	38	54	18	5	0	0	0	136
S	0	0	0	5	11	34	51	20	4	0	0	0	125
SSW	0	0	5	5	24	35	57	28	6	0	0	0	160
SW	0	1	2	10	10	50	70	76	18	1	0	0	238
WSW	0	0	1	10	46	53	89	65	27	3	1	0	295
W	0	3	4	19	30	45	48	39	25	21	1	0	235
WNW	0	0	6	17	28	42	43	11	10	2	0	0	159
NW	1	3	4	25	30	26	17	12	5	1	0	0	124
NNW	0	0	4	11	15	36	40	8	17	1	0	0	132
Totals	1	13	43	168	273	575	878	509	180	31	2	0	2673

Number of Calm Hours for this Table:	0
Number of Variable Direction Hours for this Table:	0
Number of Invalid Hours:	104
Number of Valid Hours for this Table:	2673
Total Hours for the Period:	8760

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

Table 2.7-11 (Sheet 5 of 8)
Joint Frequency Distribution of Wind Speed and Wind Direction (60-Meter Level) by Atmospheric Stability Class for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007)

Hours at Each Wind Speed and Direction

Period of Record = 1/1/2007 00:00 – 12/31/2007 23:00 Total Period

Elevation: **Speed:** SPD60NEW **Direction:** DIR60NEW **Lapse:** DT60NEW

Stability Class E Delta Temperature Slightly Stable

Wind Speed (m/s)

Wind Direction (from)	0.22 - 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	1	2	12	22	28	4	0	0	0	69
NNE	0	0	0	9	6	10	21	42	19	1	0	0	108
NE	1	0	2	7	3	12	56	41	44	0	0	0	166
ENE	0	1	1	3	5	19	68	45	7	0	0	0	149
E	0	0	4	3	5	15	56	28	0	0	0	0	111
ESE	0	0	1	3	3	16	60	31	1	0	0	0	115
SE	0	0	1	2	2	6	55	62	8	0	0	0	136
SSE	0	1	2	6	5	20	55	63	7	0	0	0	159
S	0	1	2	3	4	18	94	88	9	0	0	0	219
SSW	0	0	3	3	3	31	115	85	9	0	0	0	249
SW	0	1	1	3	11	44	129	83	22	0	0	0	294
WSW	0	1	3	4	9	32	163	112	33	0	0	0	357
W	0	1	2	7	7	28	114	66	39	0	0	0	264
WNW	1	2	1	12	4	25	54	15	7	0	0	0	121
NW	0	0	1	6	15	26	29	20	5	0	0	0	102
NNW	0	1	1	6	5	25	41	45	15	0	0	0	139
Totals	2	9	25	78	89	339	132	854	229	1	0	0	2758

Number of Calm Hours for this Table:	0
Number of Variable Direction Hours for this Table:	0
Number of Invalid Hours:	104
Number of Valid Hours for this Table:	2758
Total Hours for the Period:	8760

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

Table 2.7-11 (Sheet 6 of 8)
Joint Frequency Distribution of Wind Speed and Wind Direction (60-Meter Level) by Atmospheric Stability Class for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007)

Hours at Each Wind Speed and Direction

Period of Record = 1/1/2007 00:00 – 12/31/2007 23:00 Total Period

Elevation: **Speed:** SPD60NEW **Direction:** DIR60NEW **Lapse:** DT60NEW

Stability Class F Delta Temperature Moderately Stable

Wind Speed (m/s)

Wind Direction (from)	0.22 - 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	3	2	2	25	9	2	0	0	0	45
NNE	1	0	2	3	0	8	27	4	0	0	0	0	45
NE	1	1	1	0	5	14	7	5	0	0	0	0	34
ENE	1	0	0	1	4	11	21	26	21	0	0	0	85
E	0	0	2	3	2	6	29	39	8	0	0	0	89
ESE	1	0	1	0	3	6	25	33	1	0	0	0	70
SE	0	1	0	4	1	5	28	18	3	0	0	0	60
SSE	0	1	0	4	3	8	24	41	7	0	0	0	88
S	0	0	1	1	3	12	35	42	2	0	0	0	96
SSW	0	0	1	4	3	13	45	39	4	0	0	0	109
SW	0	0	1	1	6	6	52	52	1	0	0	0	119
WSW	1	0	2	4	1	7	51	36	2	0	0	0	104
W	0	0	1	1	7	11	36	24	0	0	0	0	80
WNW	0	0	1	0	5	24	24	7	0	0	0	0	61
NW	0	1	0	2	1	11	19	7	0	0	0	0	41
NNW	0	0	1	3	2	6	21	18	0	0	0	0	51
Totals	5	5	15	34	48	150	469	400	51	0	0	0	1177

Number of Calm Hours for this Table:	0
Number of Variable Direction Hours for this Table:	0
Number of Invalid Hours:	104
Number of Valid Hours for this Table:	1177
Total Hours for the Period:	8760

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

Table 2.7-11 (Sheet 7 of 8)
Joint Frequency Distribution of Wind Speed and Wind Direction (60-Meter Level) by Atmospheric Stability Class for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007)

Hours at Each Wind Speed and Direction

Period of Record = 1/1/2007 00:00 – 12/31/2007 23:00 Total Period

Elevation: **Speed:** SPD60NEW **Direction:** DIR60NEW **Lapse:** DT60NEW

Stability Class G Delta Temperature Extremely Stable

Wind Speed (m/s)

Wind Direction (from)	0.22 - 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	2	0	1	6	5	22	11	1	0	0	0	48
NNE	0	1	0	3	5	15	37	8	0	0	0	0	69
NE	1	1	0	1	0	24	21	10	0	0	0	0	58
ENE	0	1	1	4	5	17	14	1	0	0	0	0	43
E	0	1	1	3	1	10	11	13	3	0	0	0	43
ESE	0	0	2	2	3	8	17	9	0	0	0	0	41
SE	0	0	0	1	4	1	4	6	0	0	0	0	16
SSE	0	0	0	0	2	4	13	10	0	0	0	0	29
S	0	2	0	2	3	3	28	6	0	0	0	0	44
SSW	0	0	1	2	2	13	21	9	0	0	0	0	48
SW	0	0	1	3	2	9	34	11	0	0	0	0	60
WSW	0	0	0	3	1	14	29	21	0	0	0	0	68
W	0	1	0	3	5	8	14	7	1	0	0	0	39
WNW	0	0	0	1	3	10	11	0	0	0	0	0	25
NW	0	0	0	0	2	12	10	1	0	0	0	0	25
NNW	0	1	1	0	4	5	22	5	0	0	0	0	38
Totals	1	10	7	29	48	158	308	128	5	0	0	0	694

Number of Calm Hours for this Table:	0
Number of Variable Direction Hours for this Table:	0
Number of Invalid Hours:	104
Number of Valid Hours for this Table:	694
Total Hours for the Period:	8760

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

Table 2.7-11 (Sheet 8 of 8)
Joint Frequency Distribution of Wind Speed and Wind Direction (60-Meter Level) by Atmospheric Stability Class for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007)

Hours at Each Wind Speed and Direction

Period of Record = 1/1/2007 00:00 – 12/31/2007 23:00 Total Period

Elevation: **Speed:** SPD60NEW **Direction:** DIR60NEW **Lapse:** DT60NEW

Summary of All Stability Classes Delta Temperature

Wind Speed (m/s)

Wind Direction (from)	0.22 - 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	4	6	14	27	56	127	78	23	0	0	0	335
NNE	1	2	4	24	23	85	179	137	69	3	0	0	527
NE	3	2	6	20	23	82	221	182	61	0	0	0	600
ENE	1	4	5	17	24	95	307	141	35	0	0	0	629
E	0	1	9	17	25	74	192	111	12	0	0	0	441
ESE	1	0	5	13	13	74	162	84	3	0	0	0	355
SE	0	2	3	13	15	49	156	104	14	0	0	0	356
SSE	0	3	2	17	25	79	160	135	20	0	0	0	441
S	0	3	3	11	21	80	246	162	15	0	0	0	541
SSW	0	0	10	14	35	109	272	177	25	0	0	0	642
SW	0	2	5	17	31	124	318	245	46	1	0	0	789
WSW	1	1	6	22	68	129	403	270	84	7	1	0	992
W	0	5	7	34	61	110	254	167	92	28	2	0	760
WNW	1	2	8	34	48	125	159	51	22	2	0	0	452
NW	1	4	5	35	54	94	99	53	18	5	0	0	368
NNW	0	2	8	21	30	90	149	86	40	2	0	0	428
Totals	9	37	92	323	523	1455	3404	2183	579	48	3	0	8656

Number of Calm Hours for this Table:	0
Number of Variable Direction Hours for this Table:	0
Number of Invalid Hours:	104
Number of Valid Hours for this Table:	8656
Total Hours for the Period:	8760

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

Table 2.7-12
Sector-Specific Downwind Distances Between the PBA Circle and LPZ Boundary

Direction Sector	Distance to LPZ Boundary (feet)	Distance to LPZ Boundary (meters)
South	10,270	3,130
South-Southwest	10,028	3,057
Southwest	10,326	3,147
West-Southwest	11,165	3,403
West	12,542	3,823
West-Northwest	14,365	4,378
Northwest	16,431	5,008
North-Northwest	18,356	5,595
North	19,702	6,005
North-Northeast	20,151	6,142
Northeast	19,592	5,972
East-Northeast	18,163	5,536
East	16,208	4,940
East-Southeast	14,155	4,315
Southeast	12,363	3,768
South-Southeast	11,050	3,368

Table 2.7-13
PAVAN Output — Bounding 50 Percentile X/Q Value at the Dose Evaluation Periphery (Building Wake Credit Not Included)

SSE SECTOR BOUNDARY DISTANCE = 805.0 METERS

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
6.973E-04	.072	1.000
4.761E-04	.215	3.000
3.934E-04	.359	5.000
2.986E-04	.718	10.000
2.514E-04	1.076	15.000
2.213E-04	1.435	20.000
1.882E-04	1.794	25.000
1.619E-04	2.153	30.000
1.415E-04	2.512	35.000
1.249E-04	2.870	40.000
1.116E-04	3.229	45.000
9.907E-05	3.588	50.000
8.874E-05	3.947	55.000
8.012E-05	4.305	60.000
7.282E-05	4.664	65.000
6.656E-05	5.023	70.000
5.725E-05	5.382	75.000
4.770E-05	5.741	80.000

Table 2.7-14
PAVAN Output — Bounding 50 Percentile X/Q Value at the LPZ Boundary (Building Wake Credit Not Included)

SSE SECTOR   BOUNDARY DISTANCE = 3057.0 METERS

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
2.138E-04	.072	1.000
1.420E-04	.215	3.000
1.157E-04	.359	5.000
8.606E-05	.718	10.000
7.157E-05	1.076	15.000
6.174E-05	1.435	20.000
5.459E-05	1.794	25.000
4.655E-05	2.153	30.000
3.764E-05	2.512	35.000
3.118E-05	2.870	40.000
2.602E-05	3.229	45.000
2.124E-05	3.588	50.000
1.762E-05	3.947	55.000
1.481E-05	4.305	60.000
1.259E-05	4.664	65.000
1.081E-05	5.023	70.000
9.362E-06	5.382	75.000
7.765E-06	5.741	80.000

Table 2.7-15
Shortest Distances Between the Units 2 and 3 PBA Circle and Receptors of Interest by Downwind Direction Sector[a]

Downwind Direction Sector[b]	Meat Animal	Milk Animal	Residence	Vegetable Garden	Dose Evaluation Periphery	Unit 3 Reactor
North	6,756	—	7,264	—	805	—
North-Northeast	9,313	—	5,980	6,480	805	—
Northeast	3,436	—	3,436	3,703	805	—
East-Northeast	—	—	2,094	2,647	805	—
East	—	—	1,978	1,978	805	—
East-Southeast	—	—	—	7,931	805	—
Southeast	6,855	—	2,703	2,703	805	—
South-Southeast	—	—	—	—	805	—
South	6,403	—	4,099	4,099	805	274
South-Southwest	5,793	—	3,234	4,296	805	274
Southwest	5,955	—	3,719	3,719	805	274
West-Southwest	6,570	—	—	—	805	—
West	—	7,625	3,541	3,696	805	—
West-Northwest	2,795	—	3,597	3,973	805	—
Northwest	7,682	—	6,801	7,682	805	—
North-Northwest	5,656	—	5,656	5,656	805	—

a) Distances shown are in meters.
b) Not all direction sectors included receptors of interest.

Table 2.7-16
XOQDOQ-Predicted Maximum X/Q and D/Q Values at Receptors of Interest

Type of Location	Direction from Site	Distance (miles)	X/Q (sec/m^3) (No Decay)	X/Q (sec/m^3) (2.26-Day Decay)	X/Q (sec/m^3) (8-Day Decay)	D/Q ($1/m^2$)
Residence	East-Northeast	1.30	—	—	—	3.4E-09
	Southeast	1.68	9.0E-07	8.9E-07	7.5E-07	—
Dose Evaluation Periphery	East-Northeast	0.50	—	—	—	1.7E-08
	Southeast	0.50	6.0E-06	6.0E-06	5.5E-06	—
Meat Animal	West-Northwest	1.74	4.6E-07	4.6E-07	3.9E-07	—
	Northeast	2.14	—	—	—	1.4E-09
Milk Animal	West	4.74	1.2E-07	1.2E-07	9.2E-08	2.0E-10
Vegetable Garden	East	1.23	—	—	—	2.9E-09
	Southeast	1.68	9.0E-07	8.9E-07	7.5E-07	—
Unit 3 Reactor	South/Southwest	0.17	1.6E-05	1.6E-05	1.5E-05	—
	Southwest	0.17	—	—	—	6.5E-08

X/Q values at the Unit 3 Reactor location are used in evaluation of construction worker doses.

Table 2.7-17 (Sheet 1 of 2)
XOQDOQ-Predicted Maximum Annual Average X/Q and D/Q Values at the Standard Radial Distances and Distance-Segment Boundaries

No Decay Undepleted	DISTANCE IN MILES FROM SITE									
Southeast	0.25	0.5	0.75	1	1.5	2	2.5	3	3.5	4	4.5
X/Q (s/m^3)	2.038E-05	6.034E-06	3.018E-06	1.910E-06	1.056E-06	7.014E-07	5.159E-07	4.102E-07	3.380E-07	2.858E-07	2.466E-07
	DISTANCE IN MILES FROM SITE										
Southeast	5	7.5	10	15	20	25	30	35	40	45	50
X/Q (s/m^3)	2.161E-07	1.304E-07	9.127E-08	5.539E-08	3.896E-08	2.970E-08	2.381E-08	1.976E-08	1.682E-08	1.460E-08	1.286E-08
	SEGMENT BOUNDARIES IN MILES FROM SITE										
Southeast	.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)	3.195E-06	1.088E-06	5.231E-07	3.387E-07	2.469E-07	1.321E-07	5.606E-08	2.981E-08	1.980E-08	1.461E-08	
2.26 Day Decay Undepleted	DISTANCE IN MILES FROM SITE										
Southeast	0.25	0.5	0.75	1	1.5	2	2.5	3	3.5	4	4.5
X/Q (s/m^3)	2.034E-05	6.016E-06	3.004E-06	1.898E-06	1.047E-06	6.932E-07	5.084E-07	4.030E-07	3.310E-07	2.791E-07	2.400E-07
	DISTANCE IN MILES FROM SITE										
Southeast	5	7.5	10	15	20	25	30	35	40	45	50
X/Q (s/m^3)	2.097E-07	1.246E-07	8.589E-08	5.055E-08	3.449E-08	2.550E-08	1.983E-08	1.597E-08	1.320E-08	1.112E-08	9.513E-09
	SEGMENT BOUNDARIES IN MILES FROM SITE										
Southeast	.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)	3.182E-06	1.079E-06	5.155E-07	3.318E-07	2.404E-07	1.263E-07	5.126E-08	2.563E-08	1.602E-08	1.114E-08	

Table 2.7-17 (Sheet 2 of 2)
XOQDOQ-Predicted Maximum Annual Average X/Q and D/Q Values at the Standard Radial Distances and Distance-Segment Boundaries

8 Day Decay Depleted	DISTANCE IN MILES FROM SITE									
Southeast	0.25	0.5	0.75	1	1.5	2	2.5	3	3.5	4	4.5
X/Q (s/m^3)	1.928E-05	5.505E-06	2.686E-06	1.669E-06	8.946E-07	5.788E-07	4.162E-07	3.242E-07	2.622E-07	2.179E-07	1.850E-07
	DISTANCE IN MILES FROM SITE										
Southeast	5	7.5	10	15	20	25	30	35	40	45	50
X/Q (s/m^3)	1.597E-07	9.074E-08	6.027E-08	3.355E-08	2.197E-08	1.573E-08	1.191E-08	9.381E-09	7.603E-09	6.298E-09	5.308E-09
	SEGMENT BOUNDARIES IN MILES FROM SITE										
Southeast	.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)	2.860E-06	9.263E-07	4.228E-07	2.630E-07	1.854E-07	9.253E-08	3.434E-08	1.587E-08	9.427E-08	6.318E-09	
Relative Deposition	DISTANCE IN MILES FROM SITE										
East-Northeast	0.25	0.5	0.75	1	1.5	2	2.5	3	3.5	4	4.5
D/Q (1/m^2)	4.948E-08	1.673E-08	8.592E-09	5.276E-09	2.630E-09	1.59E-09	1.079E-09	7.815E-10	5.943E-10	4.682E-10	3.790E-10
	DISTANCE IN MILES FROM SITE										
East-Northeast	5	7.5	10	15	20	25	30	35	40	45	50
D/Q (1/m^2)	3.135E-10	1.536E-10	9.640E-11	4.873E-11	2.949E-11	1.977E-11	1.417E-11	1.064E-11	8.272E-12	6.608E-12	5.394E-12
	SEGMENT BOUNDARIES IN MILES FROM SITE										
East-Northeast	.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)	8.927E-09	2.758E-09	1.098E-09	5.997E-10	3.812E-10	1.637E-10	5.077E-11	2.012E-11	1.075E-11	6.651E-12	

Table 2.7-18
Long-Term Average X/Q and D/Q Values for Routine Releases at Specific Receptors of Interest

TYPE OF LOCATION	DIRECTION FROM SITE	DISTANCE (MILES)	DISTANCE (METERS)	X/Q (SEC/CUB.METER) NO DECAY UNDEPLETED	X/Q (SEC/CUB.METER) 2.260 DAY DECAY UNDEPLETED	X/Q (SEC/CUB.METER) 8.000 DAY DECAY DEPLETED	D/Q (PER SQ.METER)
Residential	S	2.55	4099.	2.1E-07	2.1E-07	1.7E-07	5.8E-10
Residential	SSW	2.01	3234.	2.1E-07	2.1E-07	1.7E-07	8.6E-10
Residential	SW	2.31	3719.	2.6E-07	2.6E-07	2.1E-07	9.3E-10
Residential	W	2.20	3541.	3.4E-07	3.4E-07	2.8E-07	7.9E-10
Residential	WNW	2.24	3597.	3.3E-07	3.2E-07	2.7E-07	6.7E-10
Residential	NW	4.23	6801.	1.7E-07	1.7E-07	1.3E-07	2.8E-10
Residential	NNW	3.51	5656.	2.3E-07	2.2E-07	1.8E-07	4.6E-10
Residential	N	4.51	7264.	1.4E-07	1.4E-07	1.1E-07	2.7E-10
Residential	NNE	3.72	5980.	1.8E-07	1.8E-07	1.4E-07	4.2E-10
Residential	NE	2.14	3436.	3.8E-07	3.8E-07	3.1E-07	1.4E-09
Residential	ENE	1.30	2094.	8.6E-07	8.5E-07	7.4E-07	3.4E-09
Residential	E	1.23	1978.	8.2E-07	8.1E-07	7.0E-07	2.9E-09
Residential	SE	1.68	2703.	9.0E-07	8.9E-07	7.5E-07	1.8E-09
Meat	S	3.98	6403.	1.2E-07	1.1E-07	8.9E-08	2.6E-10
Meat	SSW	3.60	5793.	9.3E-08	9.1E-08	7.2E-08	3.1E-10
Meat	SW	3.70	5955.	1.4E-07	1.3E-07	1.1E-07	4.0E-10
Meat	WSW	4.08	6570.	1.3E-07	1.2E-07	9.7E-08	2.9E-10
Meat	WNW	1.74	2795.	4.6E-07	4.6E-07	3.9E-07	1.0E-09
Meat	NW	4.77	7682.	1.4E-07	1.4E-07	1.1E-07	2.2E-10
Meat	NNW	3.51	5656.	2.3E-07	2.2E-07	1.8E-07	4.6E-10
Meat	N	4.20	6756.	1.6E-07	1.5E-07	1.2E-07	3.0E-10
Meat	NNE	5.79	9313.	1.0E-07	9.9E-08	7.4E-08	1.9E-10
Meat	NE	2.14	3436.	3.8E-07	3.8E-07	3.1E-07	1.4E-09
Meat	SE	4.26	6855.	2.6E-07	2.6E-07	2.0E-07	3.5E-10
Vegetable	S	2.55	4099.	2.1E-07	2.1E-07	1.7E-07	5.8E-10
Vegetable	SSW	2.67	4296.	1.4E-07	1.4E-07	1.1E-07	5.2E-10
Vegetable	SW	2.31	3719.	2.6E-07	2.6E-07	2.1E-07	9.3E-10
Vegetable	W	2.30	3696.	3.2E-07	3.2E-07	2.6E-07	7.4E-10
Vegetable	WNW	2.47	3973.	2.9E-07	2.8E-07	2.3E-07	5.6E-10
Vegetable	NW	4.77	7682.	1.4E-07	1.4E-07	1.1E-07	2.2E-10
Vegetable	NNW	3.51	5656.	2.3E-07	2.2E-07	1.8E-07	4.6E-10
Vegetable	NNE	4.03	6480.	1.6E-07	1.6E-07	1.3E-07	3.6E-10
Vegetable	NE	2.30	3703.	3.4E-07	3.4E-07	2.8E-07	1.2E-09
Vegetable	ENE	1.64	2647.	6.1E-07	6.1E-07	5.2E-07	2.2E-09
Vegetable	E	1.23	1978.	8.2E-07	8.1E-07	7.0E-07	2.9E-09
Vegetable	ESE	4.93	7931.	1.3E-07	1.3E-07	9.6E-08	2.4E-10
Vegetable	SE	1.68	2703.	9.0E-07	8.9E-07	7.5E-07	1.8E-09
Milk	W	4.74	7625.	1.2E-07	1.2E-07	9.2E-08	2.0E-10
EAB	S	.50	805.	2.4E-06	2.4E-06	2.2E-06	9.3E-09
EAB	SSW	.50	805.	1.6E-06	1.6E-06	1.5E-06	9.1E-09
EAB	SW	.50	805.	2.5E-06	2.5E-06	2.3E-06	1.3E-08
EAB	WSW	.50	805.	2.6E-06	2.6E-06	2.4E-06	1.1E-08
EAB	W	.50	805.	3.1E-06	3.1E-06	2.8E-06	9.8E-09
EAB	WNW	.50	805.	3.0E-06	3.0E-06	2.7E-06	8.5E-09
EAB	NW	.50	805.	3.6E-06	3.6E-06	3.3E-06	1.1E-08
EAB	NNW	.50	805.	3.7E-06	3.7E-06	3.4E-06	1.3E-08
EAB	N	.50	805.	3.3E-06	3.2E-06	3.0E-06	1.2E-08
EAB	NNE	.50	805.	3.3E-06	3.3E-06	3.0E-06	1.3E-08
EAB	NE	.50	805.	3.2E-06	3.2E-06	2.9E-06	1.6E-08
EAB	ENE	.50	805.	3.6E-06	3.6E-06	3.3E-06	1.7E-08
EAB	E	.50	805.	3.2E-06	3.2E-06	2.9E-06	1.3E-08
EAB	ESE	.50	805.	3.5E-06	3.5E-06	3.2E-06	1.2E-08
EAB	SE	.50	805.	6.0E-06	6.0E-06	5.5E-06	1.4E-08
EAB	SSE	.50	805.	5.4E-06	5.4E-06	5.0E-06	1.4E-08
Unit 2 to 3	S	.17	274.	1.6E-05	1.6E-05	1.5E-05	4.9E-08
Unit 2 to 3	SSW	.17	274.	1.1E-05	1.1E-05	1.0E-05	4.8E-08
Unit 2 to 3	SW	.17	274.	1.6E-05	1.6E-05	1.5E-05	6.5E-08

Note: The term “Dose Evaluation Periphery” means the same as the term “EAB” as input to and output by the XOQDOQ dispersion model. See Subsections 2.7.6.1 and 2.7.5.1 for additional details.

Table 2.7-19
Long-Term Average X/Q Values (sec/m^3) for Routine Releases at Distances Between 0.25 and 50 Miles, No Decay, Undepleted

RELEASE POINT - GROUND LEVEL - NO INTERMITTENT RELEASES
NO DECAY, UNDEPLETED

0ANNUAL 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	7.984E-06	2.399E-06	1.238E-06	7.940E-07	4.433E-07	2.947E-07	2.158E-07	1.693E-07	1.380E-07	1.156E-07	9.893E-08
SSW	5.304E-06	1.638E-06	8.810E-07	5.746E-07	3.219E-07	2.132E-07	1.550E-07	1.200E-07	9.665E-08	8.016E-08	6.799E-08
SW	8.022E-06	2.468E-06	1.322E-06	8.614E-07	4.849E-07	3.224E-07	2.352E-07	1.825E-07	1.474E-07	1.225E-07	1.040E-07
WSW	8.532E-06	2.620E-06	1.390E-06	9.007E-07	5.102E-07	3.407E-07	2.493E-07	1.939E-07	1.569E-07	1.306E-07	1.111E-07
W	1.028E-05	3.098E-06	1.597E-06	1.022E-06	5.822E-07	3.914E-07	2.885E-07	2.266E-07	1.848E-07	1.549E-07	1.326E-07
WNW	9.942E-06	2.985E-06	1.553E-06	1.001E-06	5.686E-07	3.817E-07	2.812E-07	2.212E-07	1.806E-07	1.515E-07	1.297E-07
NW	1.196E-05	3.578E-06	1.856E-06	1.196E-06	6.808E-07	4.578E-07	3.377E-07	2.658E-07	2.171E-07	1.823E-07	1.562E-07
NNW	1.235E-05	3.720E-06	1.948E-06	1.260E-06	7.198E-07	4.844E-07	3.571E-07	2.802E-07	2.283E-07	1.912E-07	1.635E-07
N	1.081E-05	3.260E-06	1.718E-06	1.115E-06	6.339E-07	4.251E-07	3.127E-07	2.449E-07	1.992E-07	1.666E-07	1.423E-07
NNE	1.097E-05	3.314E-06	1.734E-06	1.120E-06	6.341E-07	4.244E-07	3.119E-07	2.444E-07	1.989E-07	1.664E-07	1.422E-07
NE	1.038E-05	3.180E-06	1.699E-06	1.107E-06	6.244E-07	4.160E-07	3.042E-07	2.368E-07	1.917E-07	1.596E-07	1.359E-07
ENE	1.186E-05	3.629E-06	1.925E-06	1.250E-06	7.007E-07	4.653E-07	3.398E-07	2.647E-07	2.145E-07	1.788E-07	1.523E-07
E	1.055E-05	3.214E-06	1.693E-06	1.096E-06	6.146E-07	4.085E-07	2.987E-07	2.333E-07	1.894E-07	1.581E-07	1.349E-07
ESE	1.138E-05	3.465E-06	1.824E-06	1.180E-06	6.652E-07	4.436E-07	3.248E-07	2.536E-07	2.058E-07	1.718E-07	1.465E-07
SE	2.038E-05	6.034E-06	3.018E-06	1.910E-06	1.056E-06	7.014E-07	5.159E-07	4.102E-07	3.380E-07	2.858E-07	2.466E-07
SSE	1.842E-05	5.442E-06	2.726E-06	1.727E-06	9.610E-07	6.405E-07	4.720E-07	3.753E-07	3.092E-07	2.615E-07	2.256E-07

0ANNUAL 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	8.612E-08	5.067E-08	3.487E-08	2.069E-08	1.434E-08	1.081E-08	8.591E-09	7.079E-09	5.989E-09	5.170E-09	4.534E-09
SSW	5.871E-08	3.350E-08	2.256E-08	1.299E-08	8.818E-09	6.542E-09	5.131E-09	4.182E-09	3.505E-09	3.001E-09	2.613E-09
SW	8.997E-08	5.159E-08	3.486E-08	2.016E-08	1.372E-08	1.019E-08	8.008E-09	6.534E-09	5.482E-09	4.697E-09	4.092E-09
WSW	9.617E-08	5.536E-08	3.750E-08	2.176E-08	1.485E-08	1.106E-08	8.703E-09	7.111E-09	5.972E-09	5.123E-09	4.467E-09
W	1.154E-07	6.776E-08	4.654E-08	2.751E-08	1.901E-08	1.429E-08	1.133E-08	9.314E-09	7.865E-09	6.777E-09	5.934E-09
WNW	1.130E-07	6.648E-08	4.572E-08	2.707E-08	1.871E-08	1.407E-08	1.115E-08	9.173E-09	7.747E-09	6.677E-09	5.848E-09
NW	1.361E-07	8.017E-08	5.519E-08	3.271E-08	2.263E-08	1.703E-08	1.351E-08	1.111E-08	9.390E-09	8.095E-09	7.091E-09
NNW	1.422E-07	8.317E-08	5.697E-08	3.354E-08	2.309E-08	1.731E-08	1.369E-08	1.123E-08	9.469E-09	8.148E-09	7.125E-09
N	1.237E-07	7.217E-08	4.935E-08	2.899E-08	1.994E-08	1.494E-08	1.181E-08	9.688E-09	8.164E-09	7.023E-09	6.139E-09
NNE	1.236E-07	7.226E-08	4.948E-08	2.914E-08	2.008E-08	1.506E-08	1.192E-08	9.791E-09	8.259E-09	7.111E-09	6.221E-09
NE	1.177E-07	6.784E-08	4.601E-08	2.675E-08	1.828E-08	1.362E-08	1.073E-08	8.771E-09	7.370E-09	6.325E-09	5.518E-09
ENE	1.320E-07	7.633E-08	5.191E-08	3.030E-08	2.077E-08	1.553E-08	1.225E-08	1.004E-08	8.450E-09	7.262E-09	6.344E-09
E	1.171E-07	6.806E-08	4.645E-08	2.724E-08	1.874E-08	1.404E-08	1.110E-08	9.109E-09	7.678E-09	6.607E-09	5.778E-09
ESE	1.271E-07	7.380E-08	5.031E-08	2.945E-08	2.023E-08	1.514E-08	1.196E-08	9.805E-09	8.260E-09	7.103E-09	6.208E-09
SE	2.161E-07	1.304E-07	9.127E-08	5.539E-08	3.896E-08	2.970E-08	2.381E-08	1.976E-08	1.682E-08	1.460E-08	1.286E-08
SSE	1.977E-07	1.192E-07	8.334E-08	5.051E-08	3.550E-08	2.703E-08	2.166E-08	1.796E-08	1.528E-08	1.326E-08	1.168E-08

Table 2.7-20
Long-Term Average X/Q Values (sec/m^3) for Routine Releases at the Standard Distance Segments Between 0.5 and 50 Miles, No Decay, Undepleted

RELEASE POINT - GROUND LEVEL - NO INTERMITTENT RELEASES
NO DECAY, UNDEPLETED
0CHI/Q (SEC/METER CUBED) FOR EACH SEGMENT

	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	1.299E-06	4.552E-07	2.182E-07	1.384E-07	9.913E-08	5.152E-08	2.102E-08	1.086E-08	7.096E-09	5.177E-09
SSW	9.131E-07	3.297E-07	1.565E-07	9.704E-08	6.816E-08	3.424E-08	1.326E-08	6.584E-09	4.195E-09	3.007E-09
SW	1.372E-06	4.963E-07	2.374E-07	1.479E-07	1.043E-07	5.269E-08	2.056E-08	1.026E-08	6.554E-09	4.705E-09
WSW	1.446E-06	5.216E-07	2.515E-07	1.574E-07	1.113E-07	5.649E-08	2.219E-08	1.113E-08	7.132E-09	5.132E-09
W	1.675E-06	5.951E-07	2.912E-07	1.854E-07	1.328E-07	6.891E-08	2.796E-08	1.436E-08	9.337E-09	6.787E-09
WNW	1.626E-06	5.817E-07	2.840E-07	1.811E-07	1.300E-07	6.759E-08	2.750E-08	1.414E-08	9.196E-09	6.687E-09
NW	1.945E-06	6.962E-07	3.410E-07	2.178E-07	1.565E-07	8.149E-08	3.323E-08	1.712E-08	1.114E-08	8.107E-09
NNW	2.036E-06	7.351E-07	3.603E-07	2.290E-07	1.638E-07	8.464E-08	3.410E-08	1.740E-08	1.126E-08	8.161E-09
N	1.792E-06	6.480E-07	3.155E-07	1.998E-07	1.426E-07	7.348E-08	2.950E-08	1.502E-08	9.714E-09	7.034E-09
NNE	1.812E-06	6.488E-07	3.149E-07	1.995E-07	1.425E-07	7.355E-08	2.963E-08	1.515E-08	9.817E-09	7.122E-09
NE	1.765E-06	6.390E-07	3.070E-07	1.924E-07	1.362E-07	6.922E-08	2.726E-08	1.371E-08	8.796E-09	6.336E-09
ENE	2.004E-06	7.182E-07	3.432E-07	2.152E-07	1.526E-07	7.784E-08	3.087E-08	1.562E-08	1.007E-08	7.274E-09
E	1.766E-06	6.301E-07	3.018E-07	1.900E-07	1.352E-07	6.935E-08	2.773E-08	1.412E-08	9.133E-09	6.618E-09
ESE	1.903E-06	6.811E-07	3.280E-07	2.065E-07	1.468E-07	7.520E-08	2.999E-08	1.523E-08	9.832E-09	7.114E-09
SE	3.195E-06	1.088E-06	5.231E-07	3.387E-07	2.469E-07	1.321E-07	5.606E-08	2.981E-08	1.980E-08	1.461E-08
SSE	2.886E-06	9.888E-07	4.783E-07	3.099E-07	2.259E-07	1.207E-07	5.114E-08	2.714E-08	1.800E-08	1.327E-08

Table 2.7-21
Long-Term Average X/Q Values (sec/m^3) for Routine Releases at Distances Between 0.25 and 50 Miles, 2.26-Day Decay, Undepleted

RELEASE POINT - GROUND LEVEL - NO INTERMITTENT RELEASES
2.260 DAY DECAY, UNDEPLETED

0ANNUAL 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	7.973E-06	2.392E-06	1.233E-06	7.895E-07	4.396E-07	2.913E-07	2.127E-07	1.664E-07	1.352E-07	1.129E-07	9.636E-08
SSW	5.298E-06	1.634E-06	8.779E-07	5.720E-07	3.196E-07	2.112E-07	1.532E-07	1.183E-07	9.506E-08	7.864E-08	6.654E-08
SW	8.012E-06	2.462E-06	1.317E-06	8.573E-07	4.815E-07	3.193E-07	2.324E-07	1.799E-07	1.449E-07	1.201E-07	1.018E-07
WSW	8.522E-06	2.613E-06	1.385E-06	8.965E-07	5.066E-07	3.375E-07	2.464E-07	1.912E-07	1.543E-07	1.281E-07	1.087E-07
W	1.027E-05	3.090E-06	1.591E-06	1.017E-06	5.775E-07	3.872E-07	2.847E-07	2.230E-07	1.813E-07	1.516E-07	1.294E-07
WNW	9.928E-06	2.977E-06	1.546E-06	9.961E-07	5.641E-07	3.776E-07	2.774E-07	2.176E-07	1.771E-07	1.482E-07	1.266E-07
NW	1.194E-05	3.569E-06	1.849E-06	1.190E-06	6.757E-07	4.532E-07	3.335E-07	2.618E-07	2.133E-07	1.786E-07	1.527E-07
NNW	1.234E-05	3.711E-06	1.941E-06	1.253E-06	7.144E-07	4.796E-07	3.527E-07	2.760E-07	2.243E-07	1.873E-07	1.598E-07
N	1.080E-05	3.252E-06	1.712E-06	1.109E-06	6.293E-07	4.211E-07	3.089E-07	2.414E-07	1.959E-07	1.634E-07	1.393E-07
NNE	1.096E-05	3.305E-06	1.727E-06	1.114E-06	6.290E-07	4.199E-07	3.077E-07	2.404E-07	1.951E-07	1.628E-07	1.387E-07
NE	1.037E-05	3.173E-06	1.693E-06	1.102E-06	6.201E-07	4.122E-07	3.007E-07	2.335E-07	1.885E-07	1.566E-07	1.330E-07
ENE	1.185E-05	3.619E-06	1.918E-06	1.243E-06	6.952E-07	4.605E-07	3.353E-07	2.605E-07	2.104E-07	1.749E-07	1.485E-07
E	1.054E-05	3.204E-06	1.686E-06	1.090E-06	6.092E-07	4.038E-07	2.943E-07	2.292E-07	1.854E-07	1.543E-07	1.312E-07
ESE	1.136E-05	3.456E-06	1.817E-06	1.174E-06	6.599E-07	4.389E-07	3.205E-07	2.495E-07	2.019E-07	1.681E-07	1.429E-07
SE	2.034E-05	6.016E-06	3.004E-06	1.898E-06	1.047E-06	6.932E-07	5.084E-07	4.030E-07	3.310E-07	2.791E-07	2.400E-07
SSE	1.839E-05	5.427E-06	2.715E-06	1.718E-06	9.532E-07	6.336E-07	4.657E-07	3.692E-07	3.033E-07	2.558E-07	2.200E-07

0ANNUAL 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	8.362E-08	4.845E-08	3.284E-08	1.890E-08	1.271E-08	9.299E-09	7.172E-09	5.738E-09	4.715E-09	3.954E-09	3.369E-09
SSW	5.732E-08	3.230E-08	2.149E-08	1.207E-08	7.993E-09	5.786E-09	4.429E-09	3.523E-09	2.882E-09	2.409E-09	2.048E-09
SW	8.776E-08	4.967E-08	3.312E-08	1.864E-08	1.235E-08	8.935E-09	6.833E-09	5.429E-09	4.436E-09	3.702E-09	3.143E-09
WSW	9.387E-08	5.336E-08	3.570E-08	2.020E-08	1.344E-08	9.763E-09	7.492E-09	5.971E-09	4.893E-09	4.095E-09	3.485E-09
W	1.123E-07	6.501E-08	4.403E-08	2.531E-08	1.700E-08	1.243E-08	9.587E-09	7.670E-09	6.304E-09	5.289E-09	4.510E-09
WNW	1.099E-07	6.379E-08	4.327E-08	2.492E-08	1.676E-08	1.227E-08	9.471E-09	7.584E-09	6.239E-09	5.239E-09	4.470E-09
NW	1.327E-07	7.716E-08	5.244E-08	3.029E-08	2.042E-08	1.498E-08	1.159E-08	9.296E-09	7.661E-09	6.443E-09	5.507E-09
NNW	1.386E-07	8.001E-08	5.408E-08	3.100E-08	2.079E-08	1.518E-08	1.169E-08	9.352E-09	7.684E-09	6.447E-09	5.498E-09
N	1.207E-07	6.955E-08	4.697E-08	2.691E-08	1.805E-08	1.319E-08	1.017E-08	8.139E-09	6.692E-09	5.618E-09	4.793E-09
NNE	1.202E-07	6.927E-08	4.674E-08	2.672E-08	1.788E-08	1.303E-08	1.002E-08	7.991E-09	6.551E-09	5.483E-09	4.664E-09
NE	1.149E-07	6.540E-08	4.379E-08	2.481E-08	1.652E-08	1.201E-08	9.215E-09	7.346E-09	6.021E-09	5.039E-09	4.289E-09
ENE	1.284E-07	7.316E-08	4.900E-08	2.775E-08	1.846E-08	1.339E-08	1.026E-08	8.156E-09	6.666E-09	5.565E-09	4.723E-09
E	1.135E-07	6.495E-08	4.360E-08	2.473E-08	1.646E-08	1.193E-08	9.127E-09	7.248E-09	5.916E-09	4.930E-09	4.177E-09
ESE	1.237E-07	7.079E-08	4.758E-08	2.708E-08	1.808E-08	1.315E-08	1.010E-08	8.051E-09	6.595E-09	5.516E-09	4.689E-09
SE	2.097E-07	1.246E-07	8.589E-08	5.055E-08	3.449E-08	2.550E-08	1.983E-08	1.597E-08	1.320E-08	1.112E-08	9.513E-09
SSE	1.923E-07	1.143E-07	7.881E-08	4.645E-08	3.174E-08	2.351E-08	1.833E-08	1.479E-08	1.225E-08	1.035E-08	8.875E-09

Table 2.7-22
Long-Term Average X/Q Values (sec/m^3) for Routine Releases at the Standard Distance Segments Between 0.5 and 50 Miles, 2.26-Day Decay, Undepleted

RELEASE POINT - GROUND LEVEL - NO INTERMITTENT RELEASES
2.260 DAY DECAY, UNDEPLETED
0CHI/Q (SEC/METER CUBED) FOR EACH SEGMENT

	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	1.293E-06	4.514E-07	2.152E-07	1.356E-07	9.656E-08	4.933E-08	1.925E-08	9.358E-09	5.758E-09	3.963E-09
SSW	9.100E-07	3.275E-07	1.547E-07	9.544E-08	6.671E-08	3.305E-08	1.235E-08	5.832E-09	3.538E-09	2.416E-09
SW	1.367E-06	4.929E-07	2.346E-07	1.454E-07	1.020E-07	5.078E-08	1.906E-08	9.005E-09	5.452E-09	3.713E-09
WSW	1.441E-06	5.181E-07	2.486E-07	1.548E-07	1.090E-07	5.451E-08	2.064E-08	9.836E-09	5.995E-09	4.106E-09
W	1.669E-06	5.905E-07	2.874E-07	1.819E-07	1.296E-07	6.619E-08	2.578E-08	1.251E-08	7.697E-09	5.301E-09
WNW	1.620E-06	5.772E-07	2.802E-07	1.777E-07	1.268E-07	6.493E-08	2.538E-08	1.235E-08	7.611E-09	5.250E-09
NW	1.938E-06	6.911E-07	3.368E-07	2.140E-07	1.529E-07	7.851E-08	3.083E-08	1.507E-08	9.328E-09	6.457E-09
NNW	2.028E-06	7.298E-07	3.559E-07	2.250E-07	1.601E-07	8.150E-08	3.159E-08	1.528E-08	9.386E-09	6.462E-09
N	1.786E-06	6.435E-07	3.118E-07	1.965E-07	1.395E-07	7.088E-08	2.743E-08	1.328E-08	8.168E-09	5.631E-09
NNE	1.805E-06	6.438E-07	3.107E-07	1.957E-07	1.390E-07	7.058E-08	2.724E-08	1.312E-08	8.021E-09	5.496E-09
NE	1.759E-06	6.347E-07	3.035E-07	1.892E-07	1.333E-07	6.679E-08	2.534E-08	1.209E-08	7.375E-09	5.052E-09
ENE	1.996E-06	7.127E-07	3.388E-07	2.112E-07	1.489E-07	7.469E-08	2.835E-08	1.349E-08	8.188E-09	5.579E-09
E	1.758E-06	6.248E-07	2.975E-07	1.861E-07	1.315E-07	6.626E-08	2.525E-08	1.202E-08	7.277E-09	4.943E-09
ESE	1.895E-06	6.759E-07	3.237E-07	2.026E-07	1.432E-07	7.222E-08	2.763E-08	1.324E-08	8.082E-09	5.529E-09
SE	3.182E-06	1.079E-06	5.155E-07	3.318E-07	2.404E-07	1.263E-07	5.126E-08	2.563E-08	1.602E-08	1.114E-08
SSE	2.874E-06	9.811E-07	4.719E-07	3.040E-07	2.203E-07	1.159E-07	4.710E-08	2.363E-08	1.483E-08	1.037E-08

Table 2.7-23
Long-Term Average X/Q Values (sec/m^3) for Routine Releases at Distances Between 0.25 and 50 Miles, 8.00-Day Decay, Depleted

RELEASE POINT - GROUND LEVEL - NO INTERMITTENT RELEASES
8.000 DAY DECAY, DEPLETED
0ANNUAL 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	7.553E-06	2.189E-06	1.102E-06	6.939E-07	3.756E-07	2.432E-07	1.741E-07	1.338E-07	1.071E-07	8.816E-08	7.424E-08
SSW	5.018E-06	1.495E-06	7.843E-07	5.023E-07	2.728E-07	1.760E-07	1.252E-07	9.493E-08	7.506E-08	6.121E-08	5.109E-08
SW	7.589E-06	2.252E-06	1.177E-06	7.530E-07	4.110E-07	2.662E-07	1.898E-07	1.444E-07	1.144E-07	9.348E-08	7.817E-08
WSW	8.072E-06	2.391E-06	1.237E-06	7.874E-07	4.324E-07	2.813E-07	2.013E-07	1.534E-07	1.218E-07	9.969E-08	8.347E-08
W	9.725E-06	2.827E-06	1.422E-06	8.933E-07	4.933E-07	3.231E-07	2.328E-07	1.792E-07	1.434E-07	1.182E-07	9.955E-08
WNW	9.405E-06	2.724E-06	1.382E-06	8.753E-07	4.818E-07	3.151E-07	2.269E-07	1.749E-07	1.401E-07	1.156E-07	9.741E-08
NW	1.131E-05	3.265E-06	1.652E-06	1.045E-06	5.770E-07	3.780E-07	2.726E-07	2.102E-07	1.686E-07	1.391E-07	1.173E-07
NNW	1.169E-05	3.395E-06	1.734E-06	1.101E-06	6.100E-07	4.000E-07	2.883E-07	2.216E-07	1.772E-07	1.459E-07	1.228E-07
N	1.023E-05	2.975E-06	1.529E-06	9.745E-07	5.372E-07	3.511E-07	2.524E-07	1.937E-07	1.547E-07	1.272E-07	1.070E-07
NNE	1.038E-05	3.024E-06	1.543E-06	9.786E-07	5.373E-07	3.504E-07	2.517E-07	1.932E-07	1.543E-07	1.269E-07	1.068E-07
NE	9.819E-06	2.902E-06	1.512E-06	9.675E-07	5.292E-07	3.436E-07	2.456E-07	1.873E-07	1.489E-07	1.219E-07	1.021E-07
ENE	1.122E-05	3.312E-06	1.714E-06	1.093E-06	5.937E-07	3.842E-07	2.742E-07	2.093E-07	1.664E-07	1.364E-07	1.143E-07
E	9.984E-06	2.932E-06	1.507E-06	9.582E-07	5.207E-07	3.372E-07	2.409E-07	1.844E-07	1.469E-07	1.205E-07	1.012E-07
ESE	1.076E-05	3.162E-06	1.624E-06	1.031E-06	5.637E-07	3.662E-07	2.621E-07	2.005E-07	1.597E-07	1.310E-07	1.100E-07
SE	1.928E-05	5.505E-06	2.686E-06	1.669E-06	8.946E-07	5.788E-07	4.162E-07	3.242E-07	2.622E-07	2.179E-07	1.850E-07
SSE	1.743E-05	4.966E-06	2.426E-06	1.510E-06	8.143E-07	5.287E-07	3.809E-07	2.967E-07	2.400E-07	1.995E-07	1.693E-07

0ANNUAL 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	6.366E-08	3.527E-08	2.303E-08	1.253E-08	8.090E-09	5.727E-09	4.300E-09	3.362E-09	2.707E-09	2.231E-09	1.871E-09
SSW	4.347E-08	2.337E-08	1.495E-08	7.909E-09	5.007E-09	3.495E-09	2.594E-09	2.010E-09	1.606E-09	1.315E-09	1.097E-09
SW	6.659E-08	3.598E-08	2.308E-08	1.226E-08	7.773E-09	5.430E-09	4.033E-09	3.125E-09	2.498E-09	2.045E-09	1.705E-09
WSW	7.120E-08	3.862E-08	2.484E-08	1.325E-08	8.430E-09	5.905E-09	4.396E-09	3.413E-09	2.733E-09	2.241E-09	1.872E-09
W	8.535E-08	4.721E-08	3.078E-08	1.670E-08	1.075E-08	7.595E-09	5.692E-09	4.443E-09	3.574E-09	2.942E-09	2.466E-09
WNW	8.357E-08	4.632E-08	3.024E-08	1.644E-08	1.059E-08	7.483E-09	5.611E-09	4.383E-09	3.527E-09	2.905E-09	2.436E-09
NW	1.007E-07	5.591E-08	3.654E-08	1.990E-08	1.283E-08	9.081E-09	6.816E-09	5.328E-09	4.291E-09	3.536E-09	2.967E-09
NNW	1.052E-07	5.799E-08	3.771E-08	2.039E-08	1.308E-08	9.219E-09	6.895E-09	5.375E-09	4.318E-09	3.550E-09	2.972E-09
N	9.156E-08	5.035E-08	3.269E-08	1.765E-08	1.132E-08	7.976E-09	5.966E-09	4.651E-09	3.737E-09	3.073E-09	2.574E-09
NNE	9.142E-08	5.033E-08	3.271E-08	1.767E-08	1.134E-08	7.992E-09	5.977E-09	4.658E-09	3.741E-09	3.074E-09	2.573E-09
NE	8.712E-08	4.733E-08	3.048E-08	1.628E-08	1.037E-08	7.267E-09	5.413E-09	4.205E-09	3.368E-09	2.762E-09	2.308E-09
ENE	9.760E-08	5.317E-08	3.430E-08	1.837E-08	1.172E-08	8.229E-09	6.135E-09	4.768E-09	3.820E-09	3.133E-09	2.618E-09
E	8.650E-08	4.735E-08	3.065E-08	1.648E-08	1.054E-08	7.409E-09	5.529E-09	4.300E-09	3.447E-09	2.828E-09	2.363E-09
ESE	9.401E-08	5.142E-08	3.327E-08	1.788E-08	1.144E-08	8.047E-09	6.009E-09	4.678E-09	3.754E-09	3.083E-09	2.579E-09
SE	1.597E-07	9.074E-08	6.027E-08	3.355E-08	2.197E-08	1.573E-08	1.191E-08	9.381E-09	7.603E-09	6.298E-09	5.308E-09
SSE	1.462E-07	8.301E-08	5.511E-08	3.067E-08	2.008E-08	1.437E-08	1.088E-08	8.571E-09	6.948E-09	5.757E-09	4.854E-09

Table 2.7-24
Long-Term Average X/Q Values (sec/m^3) for Routine Releases at the Standard Distance Segments Between 0.5 and 50 Miles, 8.00-Day Decay, Depleted

RELEASE POINT - GROUND LEVEL - NO INTERMITTENT RELEASES
8.000 DAY DECAY, DEPLETED
0CHI/Q (SEC/METER CUBED) FOR EACH SEGMENT

DIRECTION FROM SITE	SEGMENT BOUNDARIES IN MILES FROM THE SITE .5-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
S	1.162E-06	3.875E-07	1.764E-07	1.075E-07	7.445E-08	3.614E-08	1.289E-08	5.786E-09	3.380E-09	2.239E-09
SSW	8.169E-07	2.808E-07	1.266E-07	7.546E-08	5.127E-08	2.409E-08	8.183E-09	3.538E-09	2.023E-09	1.321E-09
SW	1.227E-06	4.226E-07	1.920E-07	1.150E-07	7.842E-08	3.705E-08	1.267E-08	5.496E-09	3.146E-09	2.053E-09
WSW	1.294E-06	4.442E-07	2.035E-07	1.224E-07	8.373E-08	3.974E-08	1.368E-08	5.974E-09	3.435E-09	2.250E-09
W	1.499E-06	5.066E-07	2.355E-07	1.440E-07	9.981E-08	4.838E-08	1.719E-08	7.675E-09	4.469E-09	2.953E-09
WNW	1.455E-06	4.952E-07	2.296E-07	1.407E-07	9.766E-08	4.745E-08	1.690E-08	7.562E-09	4.408E-09	2.915E-09
NW	1.741E-06	5.926E-07	2.758E-07	1.693E-07	1.176E-07	5.725E-08	2.046E-08	9.176E-09	5.358E-09	3.549E-09
NNW	1.822E-06	6.258E-07	2.914E-07	1.780E-07	1.231E-07	5.947E-08	2.099E-08	9.319E-09	5.406E-09	3.563E-09
N	1.604E-06	5.517E-07	2.552E-07	1.554E-07	1.073E-07	5.166E-08	1.818E-08	8.064E-09	4.679E-09	3.085E-09
NNE	1.621E-06	5.523E-07	2.546E-07	1.550E-07	1.071E-07	5.163E-08	1.820E-08	8.078E-09	4.685E-09	3.086E-09
NE	1.579E-06	5.441E-07	2.484E-07	1.496E-07	1.024E-07	4.868E-08	1.681E-08	7.352E-09	4.231E-09	2.773E-09
ENE	1.793E-06	6.115E-07	2.776E-07	1.672E-07	1.147E-07	5.466E-08	1.896E-08	8.324E-09	4.797E-09	3.146E-09
E	1.580E-06	5.363E-07	2.440E-07	1.476E-07	1.015E-07	4.863E-08	1.699E-08	7.492E-09	4.326E-09	2.839E-09
ESE	1.702E-06	5.798E-07	2.652E-07	1.605E-07	1.103E-07	5.281E-08	1.844E-08	8.137E-09	4.706E-09	3.095E-09
SE	2.860E-06	9.263E-07	4.228E-07	2.630E-07	1.854E-07	9.253E-08	3.434E-08	1.587E-08	9.427E-09	6.318E-09
SSE	2.583E-06	8.419E-07	3.867E-07	2.408E-07	1.697E-07	8.465E-08	3.139E-08	1.450E-08	8.613E-09	5.775E-09

Table 2.7-25
Long-Term Average D/Q Values ($1/m^2$) for Routine Releases at Distances Between 0.25 and 50 Miles

RELEASE POINT - GROUND LEVEL - NO INTERMITTENT 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	2.761E-08	9.337E-09	4.794E-09	2.944E-09	1.467E-09	8.900E-10	6.018E-10	4.361E-10	3.316E-10	2.612E-10	2.115E-10
SSW	2.701E-08	9.134E-09	4.690E-09	2.880E-09	1.436E-09	8.707E-10	5.887E-10	4.266E-10	3.244E-10	2.555E-10	2.069E-10
SW	3.701E-08	1.252E-08	6.426E-09	3.946E-09	1.967E-09	1.193E-09	8.067E-10	5.846E-10	4.445E-10	3.502E-10	2.835E-10
WSW	3.228E-08	1.092E-08	5.604E-09	3.441E-09	1.716E-09	1.041E-09	7.035E-10	5.098E-10	3.876E-10	3.054E-10	2.472E-10
W	2.908E-08	9.833E-09	5.049E-09	3.100E-09	1.545E-09	9.373E-10	6.337E-10	4.592E-10	3.492E-10	2.751E-10	2.227E-10
WNW	2.514E-08	8.502E-09	4.365E-09	2.681E-09	1.336E-09	8.105E-10	5.480E-10	3.971E-10	3.019E-10	2.379E-10	1.926E-10
NW	3.261E-08	1.103E-08	5.662E-09	3.477E-09	1.733E-09	1.051E-09	7.108E-10	5.151E-10	3.916E-10	3.085E-10	2.498E-10
NNW	3.888E-08	1.315E-08	6.751E-09	4.145E-09	2.067E-09	1.253E-09	8.474E-10	6.141E-10	4.669E-10	3.679E-10	2.978E-10
N	3.508E-08	1.186E-08	6.091E-09	3.740E-09	1.865E-09	1.131E-09	7.646E-10	5.540E-10	4.213E-10	3.319E-10	2.687E-10
NNE	3.855E-08	1.304E-08	6.693E-09	4.110E-09	2.049E-09	1.243E-09	8.401E-10	6.088E-10	4.629E-10	3.647E-10	2.952E-10
NE	4.802E-08	1.624E-08	8.337E-09	5.119E-09	2.552E-09	1.548E-09	1.047E-09	7.584E-10	5.767E-10	4.543E-10	3.678E-10
ENE	4.948E-08	1.673E-08	8.592E-09	5.276E-09	2.630E-09	1.595E-09	1.079E-09	7.815E-10	5.943E-10	4.682E-10	3.790E-10
E	3.808E-08	1.288E-08	6.612E-09	4.060E-09	2.024E-09	1.228E-09	8.300E-10	6.014E-10	4.573E-10	3.603E-10	2.917E-10
ESE	3.695E-08	1.249E-08	6.415E-09	3.939E-09	1.964E-09	1.191E-09	8.053E-10	5.835E-10	4.437E-10	3.496E-10	2.830E-10
SE	4.168E-08	1.409E-08	7.237E-09	4.444E-09	2.215E-09	1.344E-09	9.085E-10	6.583E-10	5.006E-10	3.944E-10	3.193E-10
SSE	4.155E-08	1.405E-08	7.214E-09	4.430E-09	2.208E-09	1.339E-09	9.056E-10	6.562E-10	4.990E-10	3.931E-10	3.182E-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	1.749E-10	8.573E-11	5.379E-11	2.719E-11	1.646E-11	1.103E-11	7.906E-12	5.936E-12	4.616E-12	3.687E-12	3.009E-12
SSW	1.711E-10	8.386E-11	5.262E-11	2.660E-11	1.610E-11	1.079E-11	7.734E-12	5.807E-12	4.515E-12	3.607E-12	2.944E-12
SW	2.345E-10	1.149E-10	7.211E-11	3.645E-11	2.206E-11	1.479E-11	1.060E-11	7.958E-12	6.188E-12	4.943E-12	4.034E-12
WSW	2.045E-10	1.002E-10	6.288E-11	3.178E-11	1.924E-11	1.290E-11	9.242E-12	6.940E-12	5.396E-12	4.310E-12	3.518E-12
W	1.842E-10	9.028E-11	5.665E-11	2.863E-11	1.733E-11	1.162E-11	8.326E-12	6.252E-12	4.861E-12	3.883E-12	3.169E-12
WNW	1.593E-10	7.806E-11	4.898E-11	2.476E-11	1.498E-11	1.005E-11	7.199E-12	5.406E-12	4.203E-12	3.357E-12	2.740E-12
NW	2.066E-10	1.013E-10	6.353E-11	3.211E-11	1.944E-11	1.303E-11	9.338E-12	7.012E-12	5.452E-12	4.355E-12	3.555E-12
NNW	2.463E-10	1.207E-10	7.575E-11	3.829E-11	2.317E-11	1.554E-11	1.113E-11	8.359E-12	6.500E-12	5.192E-12	4.238E-12
N	2.223E-10	1.089E-10	6.834E-11	3.454E-11	2.091E-11	1.402E-11	1.004E-11	7.542E-12	5.864E-12	4.684E-12	3.824E-12
NNE	2.442E-10	1.197E-10	7.510E-11	3.796E-11	2.297E-11	1.540E-11	1.104E-11	8.288E-12	6.444E-12	5.147E-12	4.201E-12
NE	3.042E-10	1.491E-10	9.355E-11	4.728E-11	2.862E-11	1.919E-11	1.375E-11	1.032E-11	8.027E-12	6.412E-12	5.234E-12
ENE	3.135E-10	1.536E-10	9.640E-11	4.873E-11	2.949E-11	1.977E-11	1.417E-11	1.064E-11	8.272E-12	6.608E-12	5.394E-12
E	2.413E-10	1.182E-10	7.419E-11	3.750E-11	2.270E-11	1.522E-11	1.090E-11	8.187E-12	6.366E-12	5.085E-12	4.151E-12
ESE	2.341E-10	1.147E-10	7.198E-11	3.638E-11	2.202E-11	1.476E-11	1.058E-11	7.944E-12	6.176E-12	4.934E-12	4.027E-12
SE	2.641E-10	1.294E-10	8.120E-11	4.104E-11	2.484E-11	1.666E-11	1.193E-11	8.962E-12	6.968E-12	5.566E-12	4.543E-12
SSE	2.632E-10	1.290E-10	8.094E-11	4.091E-11	2.476E-11	1.660E-11	1.190E-11	8.933E-12	6.946E-12	5.548E-12	4.529E-12

Table 2.7-26
Long-Term Average D/Q Values ($1/m^2$) for Routine Releases at the Standard Distance Segments Between 0.5 and 50 Miles

RELEASE POINT - GROUND LEVEL - NO INTERMITTENT RELEASES

0************************ 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	4.981E-09	1.539E-09	6.124E-10	3.346E-10	2.127E-10	9.135E-11	2.833E-11	1.123E-11	5.996E-12	3.711E-12
SSW	4.873E-09	1.505E-09	5.990E-10	3.274E-10	2.081E-10	8.937E-11	2.771E-11	1.098E-11	5.865E-12	3.630E-12
SW	6.677E-09	2.063E-09	8.209E-10	4.486E-10	2.851E-10	1.225E-10	3.798E-11	1.505E-11	8.038E-12	4.975E-12
WSW	5.823E-09	1.799E-09	7.159E-10	3.912E-10	2.486E-10	1.068E-10	3.312E-11	1.313E-11	7.010E-12	4.339E-12
W	5.246E-09	1.621E-09	6.449E-10	3.524E-10	2.240E-10	9.621E-11	2.983E-11	1.182E-11	6.314E-12	3.908E-12
WNW	4.536E-09	1.401E-09	5.576E-10	3.047E-10	1.937E-10	8.319E-11	2.580E-11	1.022E-11	5.460E-12	3.379E-12
NW	5.883E-09	1.818E-09	7.233E-10	3.952E-10	2.512E-10	1.079E-10	3.346E-11	1.326E-11	7.082E-12	4.383E-12
NNW	7.014E-09	2.167E-09	8.623E-10	4.712E-10	2.995E-10	1.286E-10	3.989E-11	1.581E-11	8.443E-12	5.226E-12
N	6.328E-09	1.955E-09	7.780E-10	4.252E-10	2.702E-10	1.161E-10	3.599E-11	1.427E-11	7.618E-12	4.715E-12
NNE	6.954E-09	2.148E-09	8.549E-10	4.672E-10	2.969E-10	1.275E-10	3.955E-11	1.568E-11	8.371E-12	5.181E-12
NE	8.663E-09	2.676E-09	1.065E-09	5.820E-10	3.699E-10	1.589E-10	4.927E-11	1.953E-11	1.043E-11	6.454E-12
ENE	8.927E-09	2.758E-09	1.098E-09	5.997E-10	3.812E-10	1.637E-10	5.077E-11	2.012E-11	1.075E-11	6.651E-12
E	6.870E-09	2.122E-09	8.446E-10	4.615E-10	2.933E-10	1.260E-10	3.907E-11	1.549E-11	8.270E-12	5.118E-12
ESE	6.665E-09	2.059E-09	8.194E-10	4.478E-10	2.846E-10	1.222E-10	3.791E-11	1.502E-11	8.023E-12	4.966E-12
SE	7.520E-09	2.323E-09	9.245E-10	5.052E-10	3.211E-10	1.379E-10	4.277E-11	1.695E-11	9.052E-12	5.603E-12
SSE	7.496E-09	2.316E-09	9.215E-10	5.036E-10	3.200E-10	1.375E-10	4.263E-11	1.690E-11	9.023E-12	5.585E-12

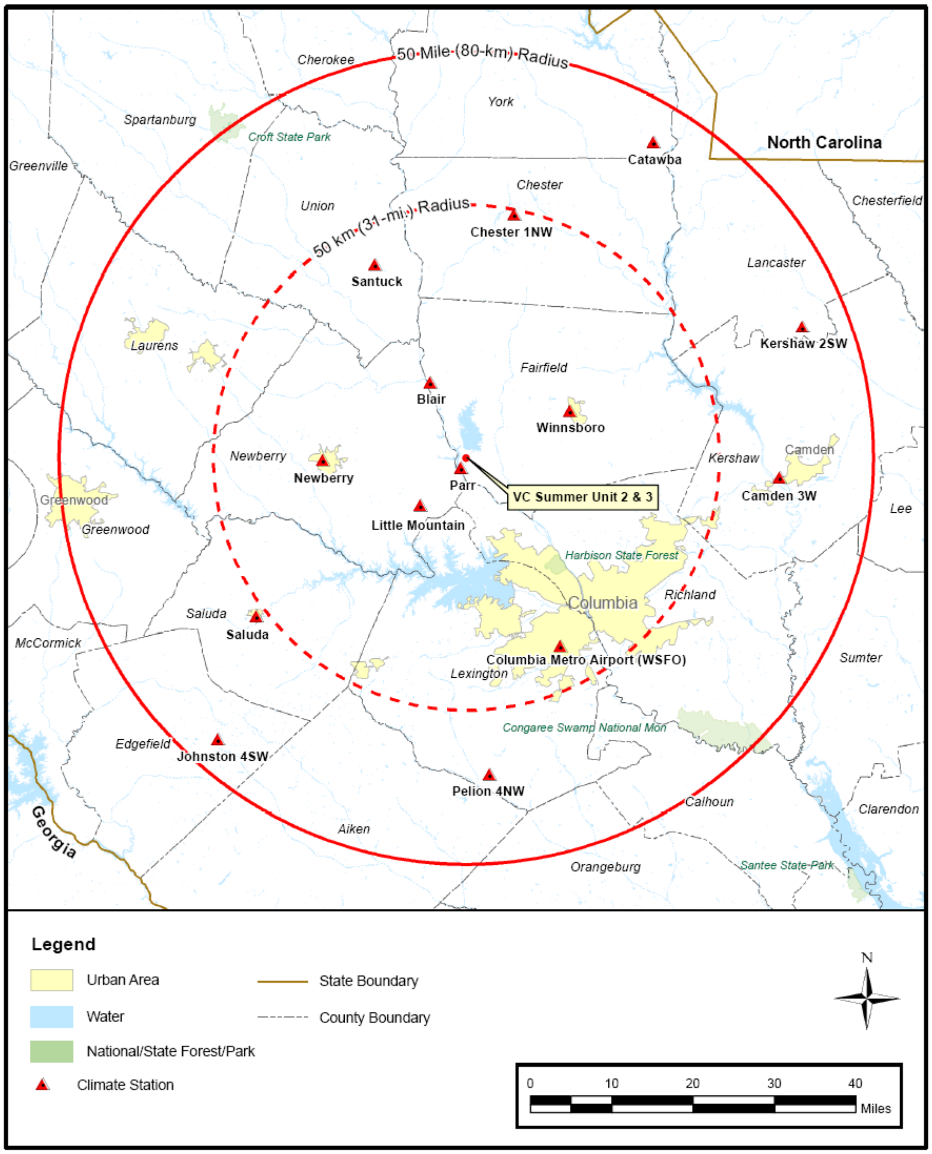


Figure 2.7-1. Climatological Observing Stations near the VCSNS Site

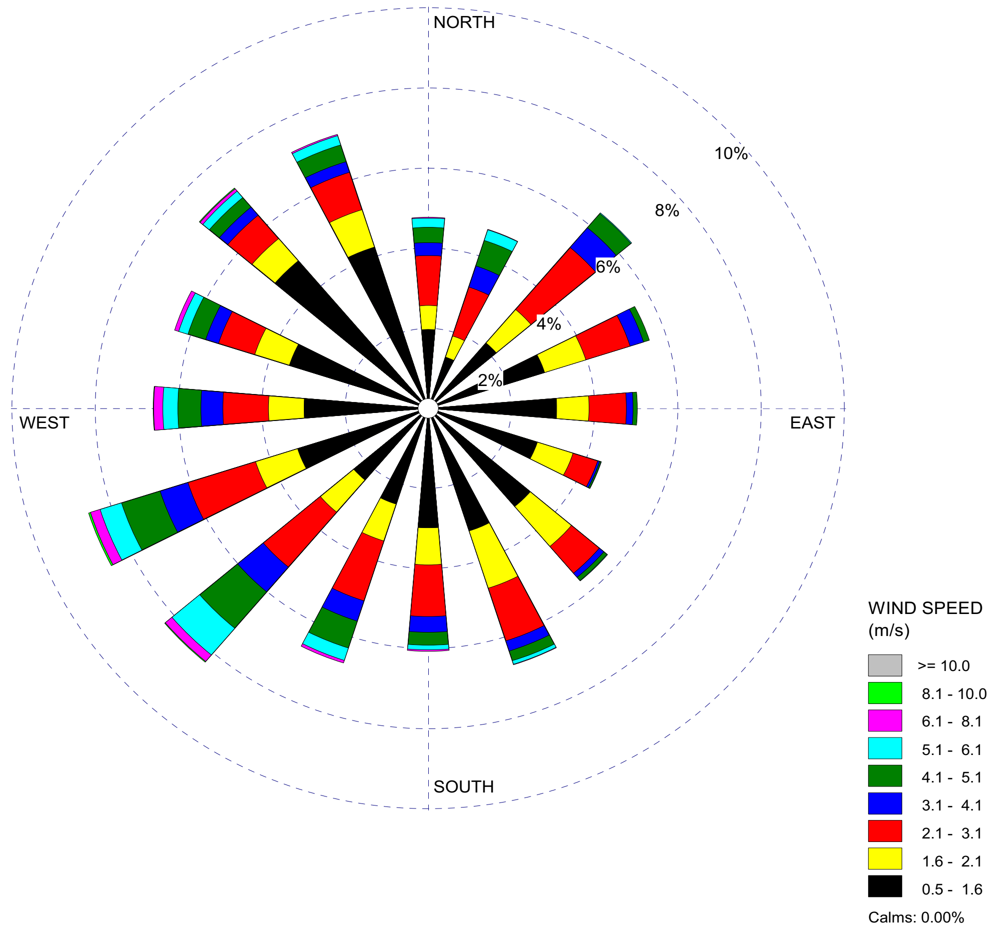


Figure 2.7-2. 10-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — Annual

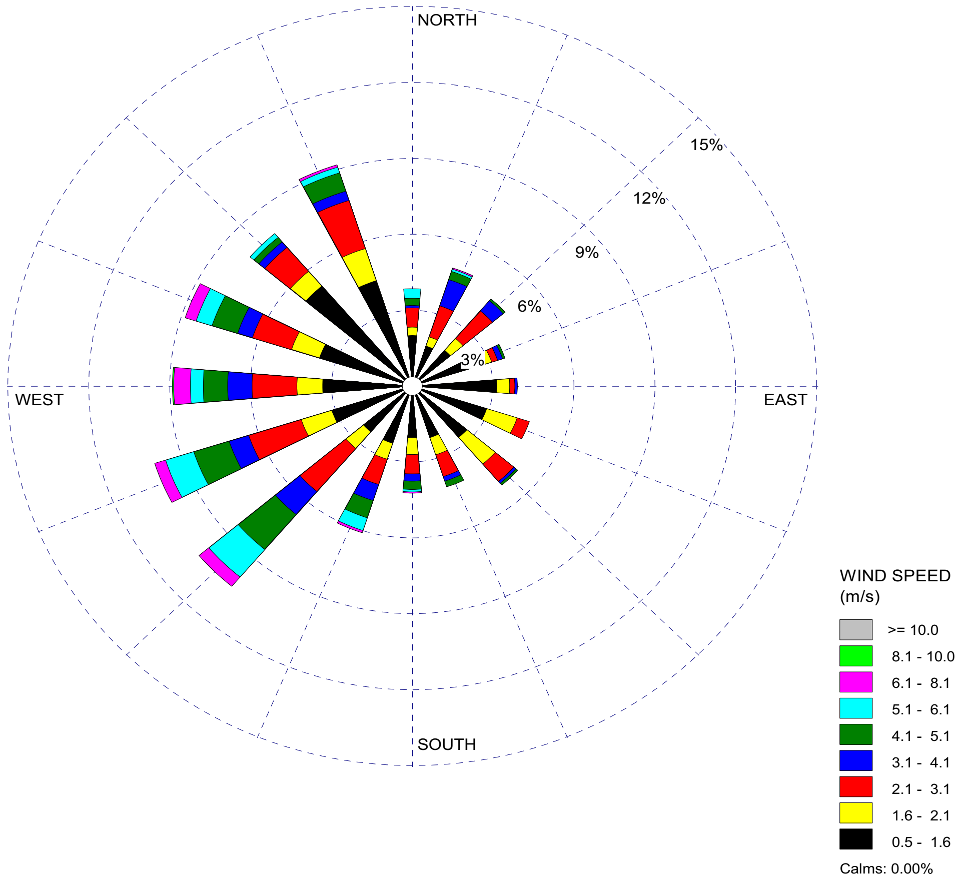


Figure 2.7-3. 10-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — Winter

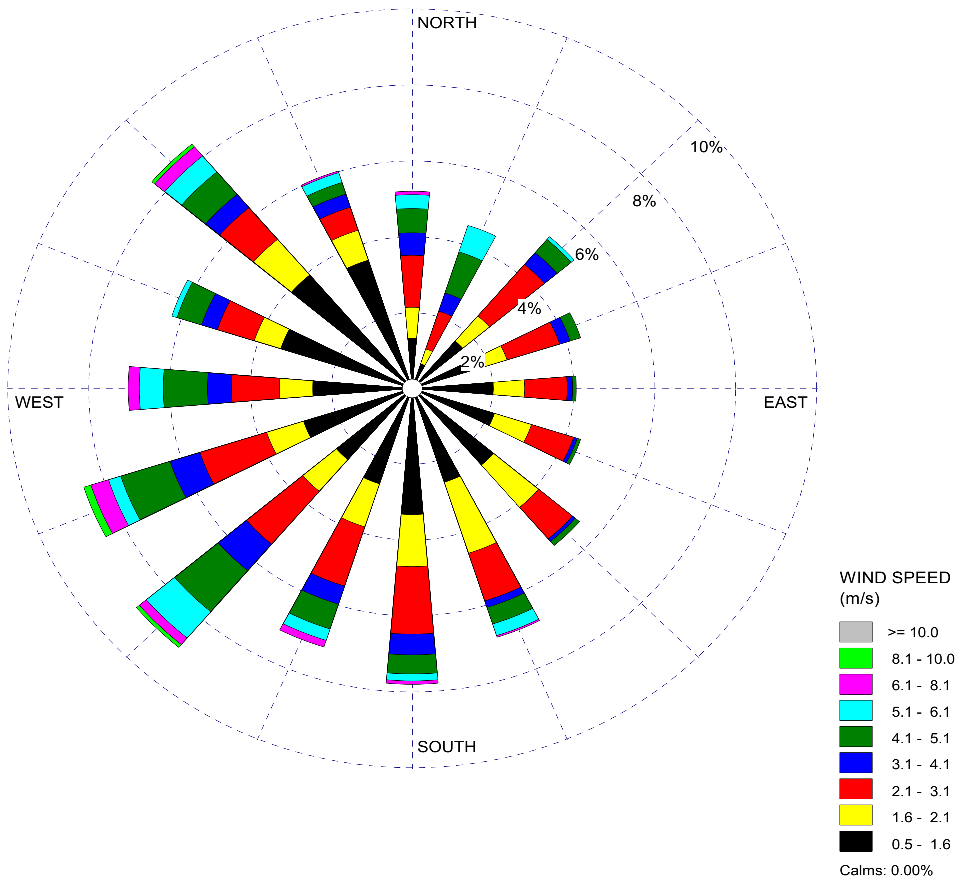


Figure 2.7-4. 10-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — Spring

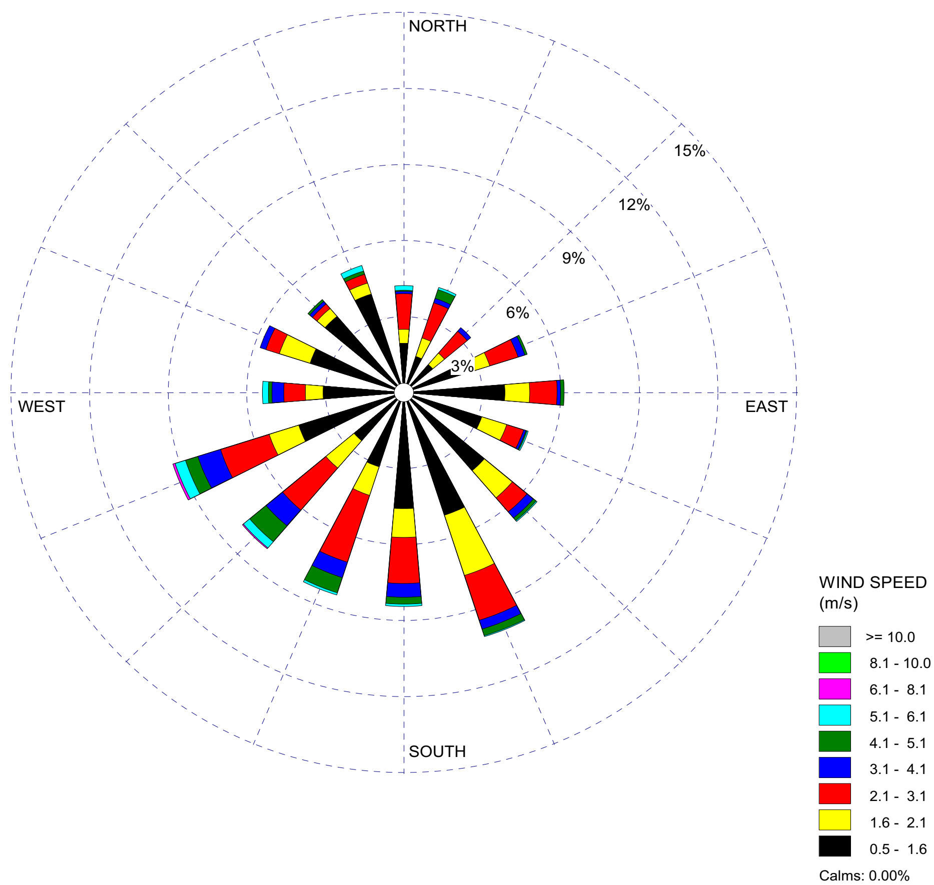


Figure 2.7-5. 10-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — Summer

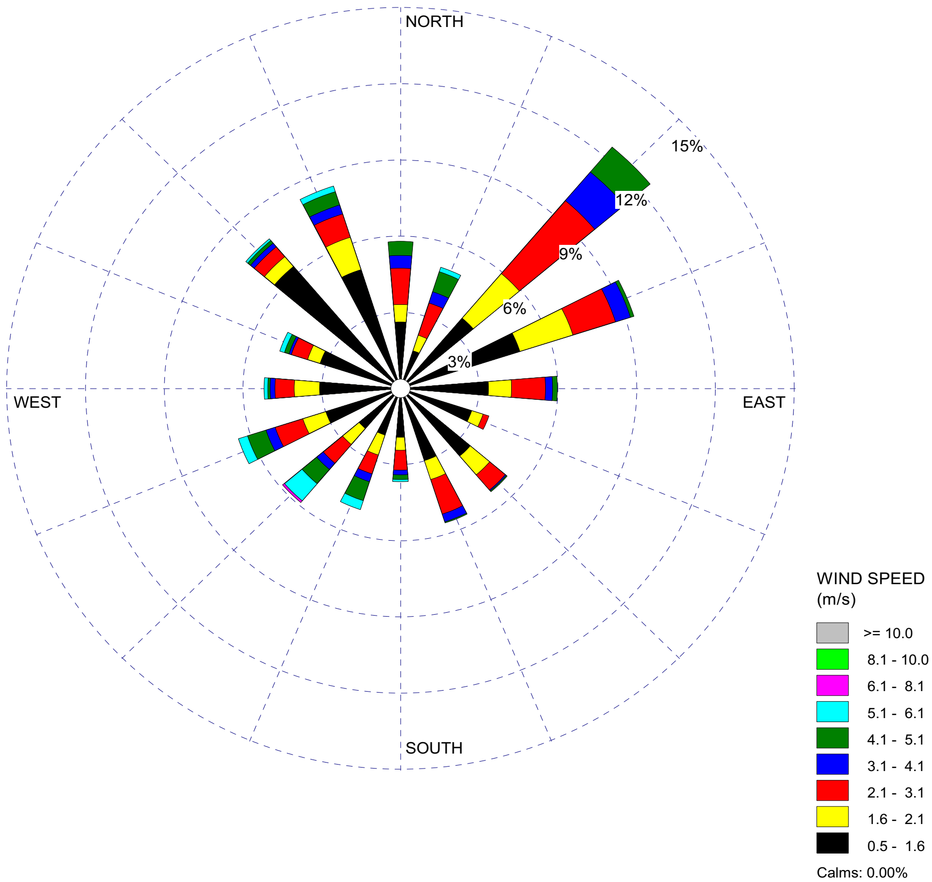


Figure 2.7-6. 10-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — Autumn

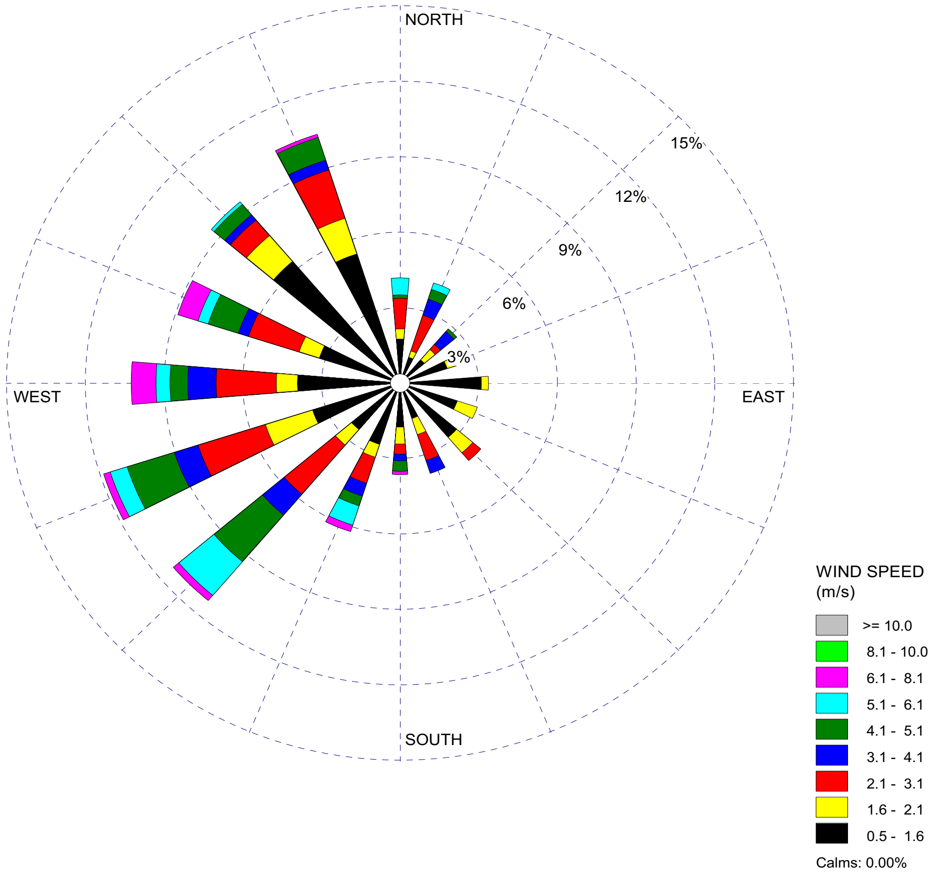


Figure 2.7-7. 10-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — January (Sheet 1 of 12)

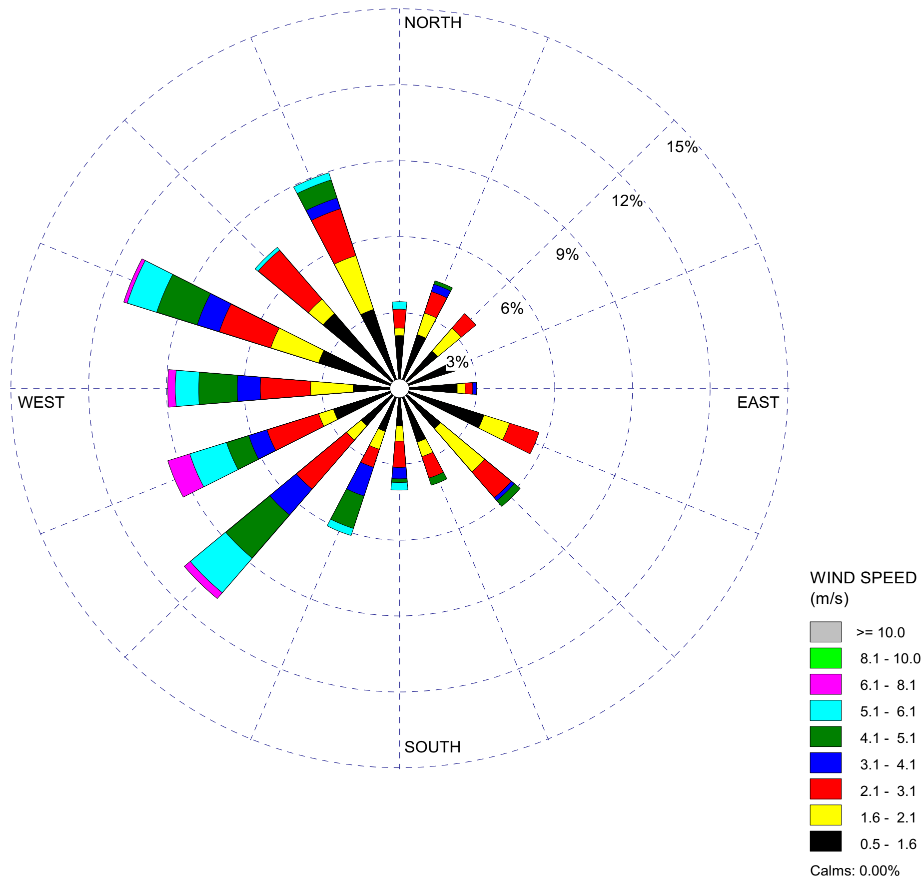


Figure 2.7-7. 10-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — February (Sheet 2 of 12)

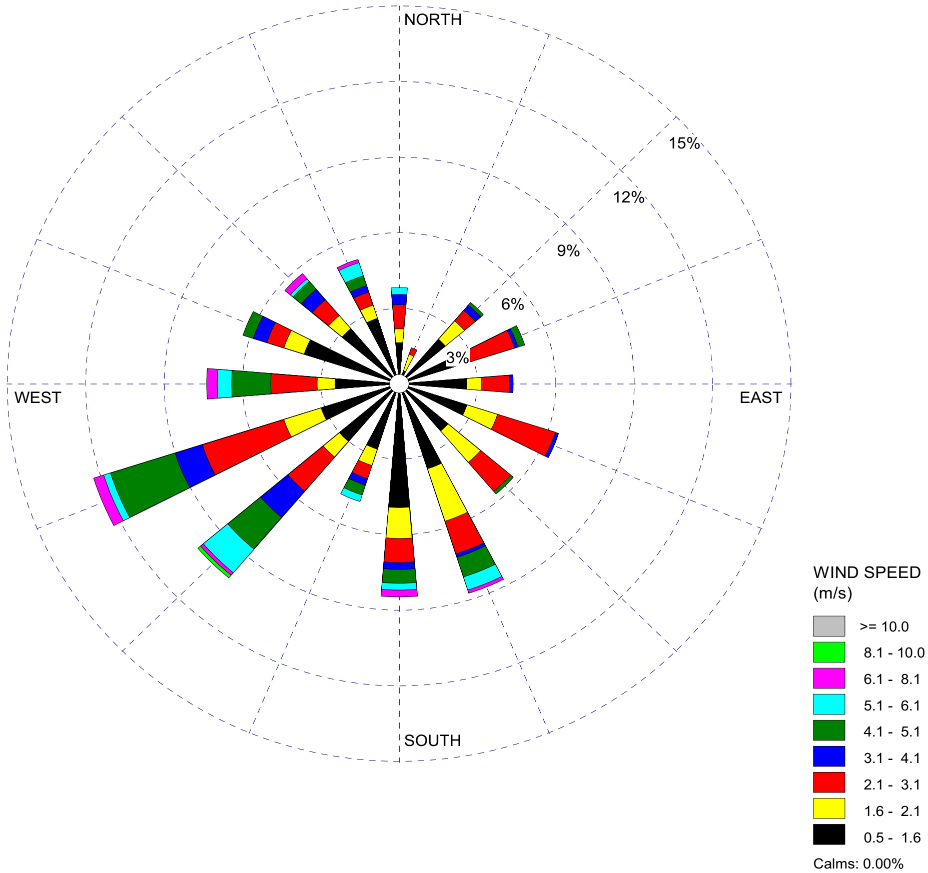


Figure 2.7-7. 10-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — March (Sheet 3 of 12)

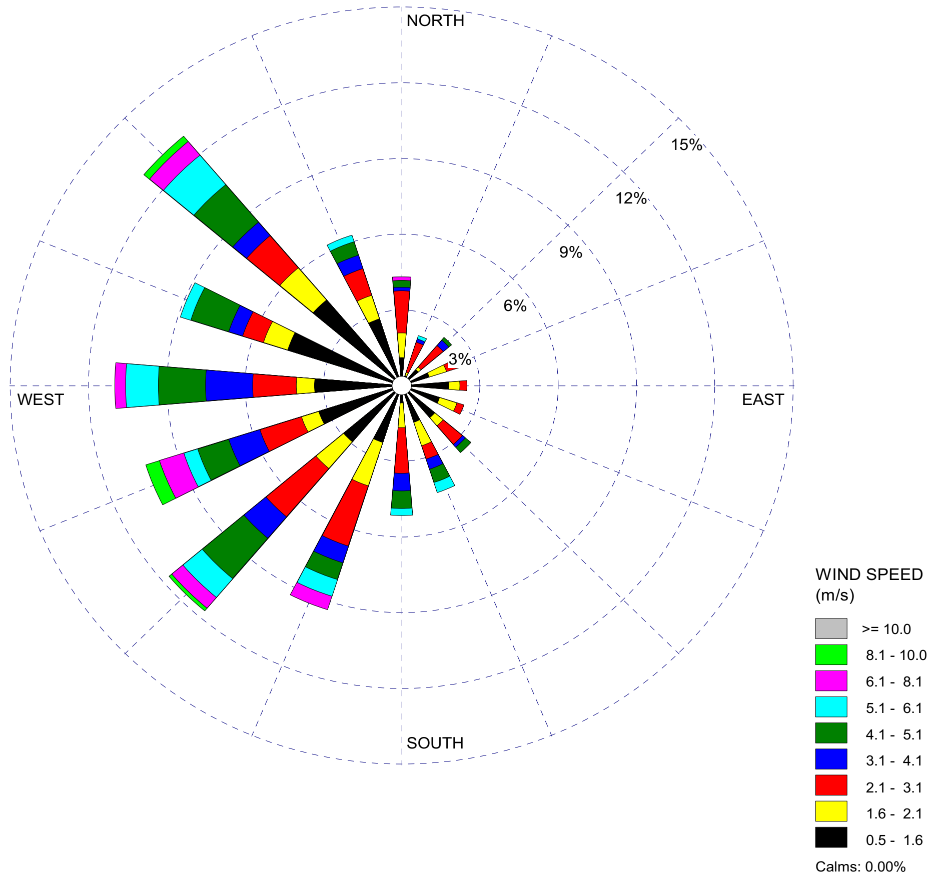


Figure 2.7-7. 10-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — April (Sheet 4 of 12)

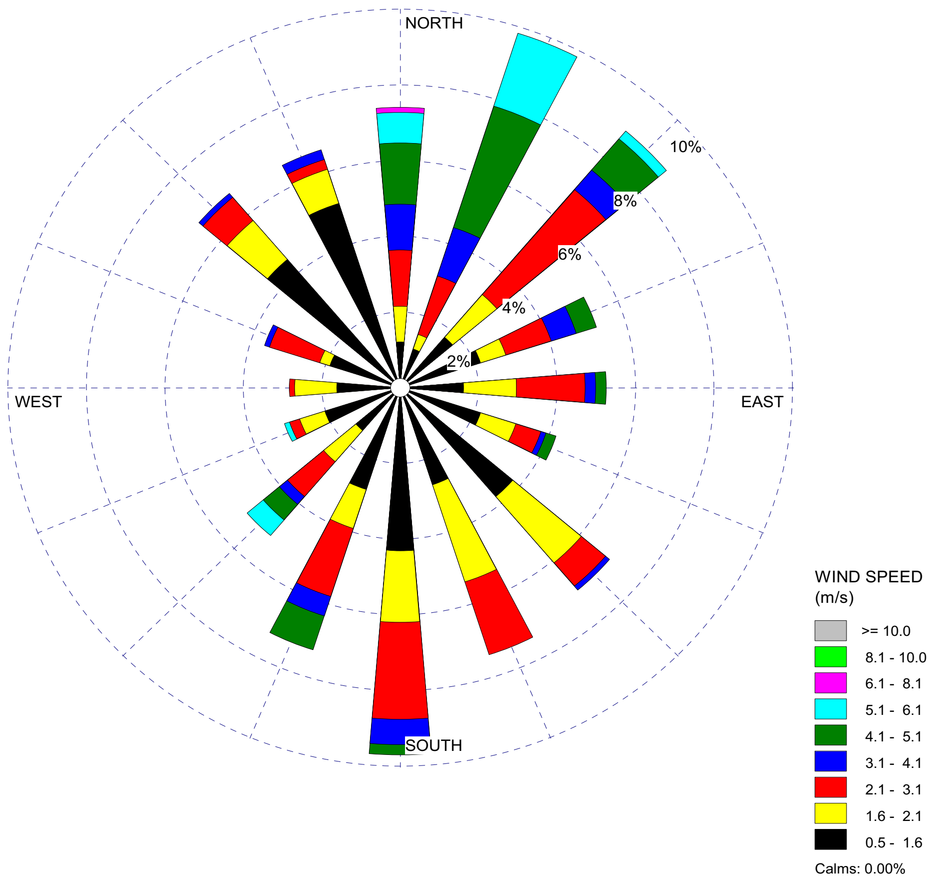


Figure 2.7-7. 10-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — May (Sheet 5 of 12)

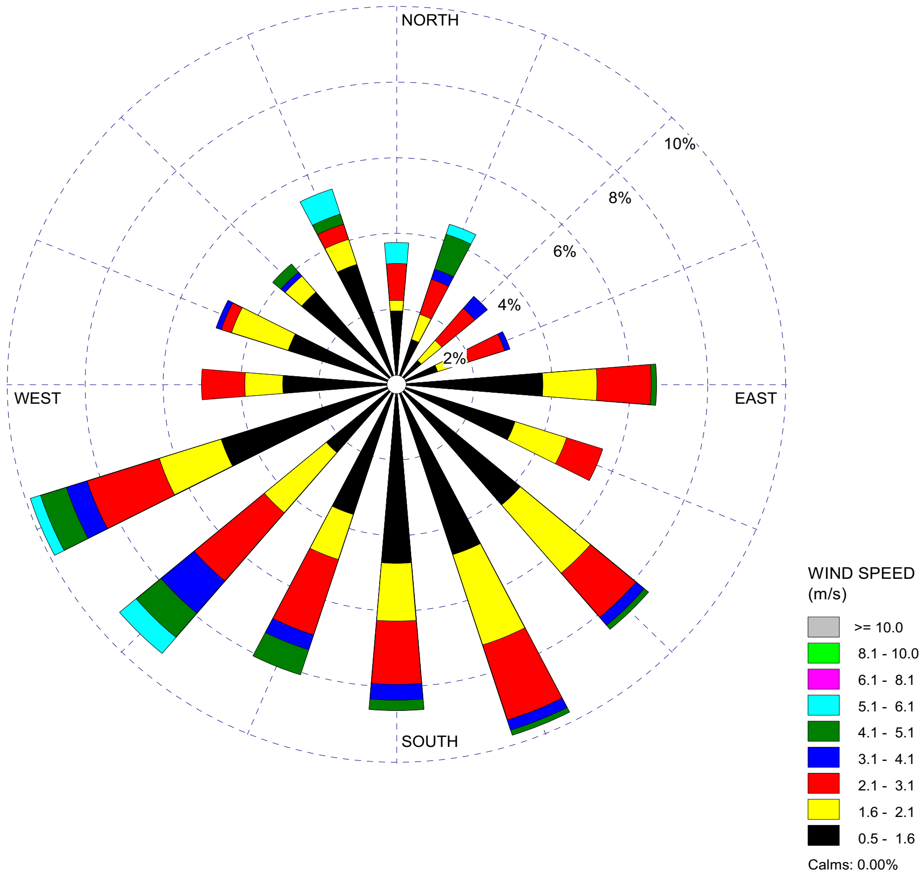


Figure 2.7-7. 10-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — June (Sheet 6 of 12)

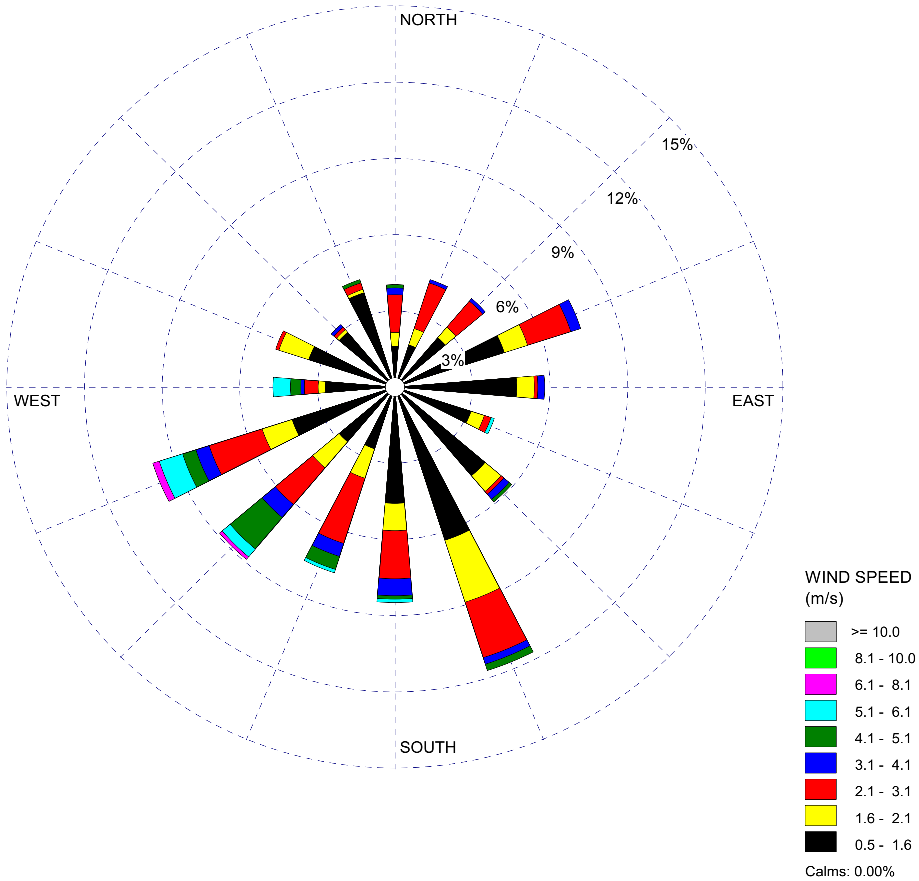


Figure 2.7-7. 10-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — July (Sheet 7 of 12)

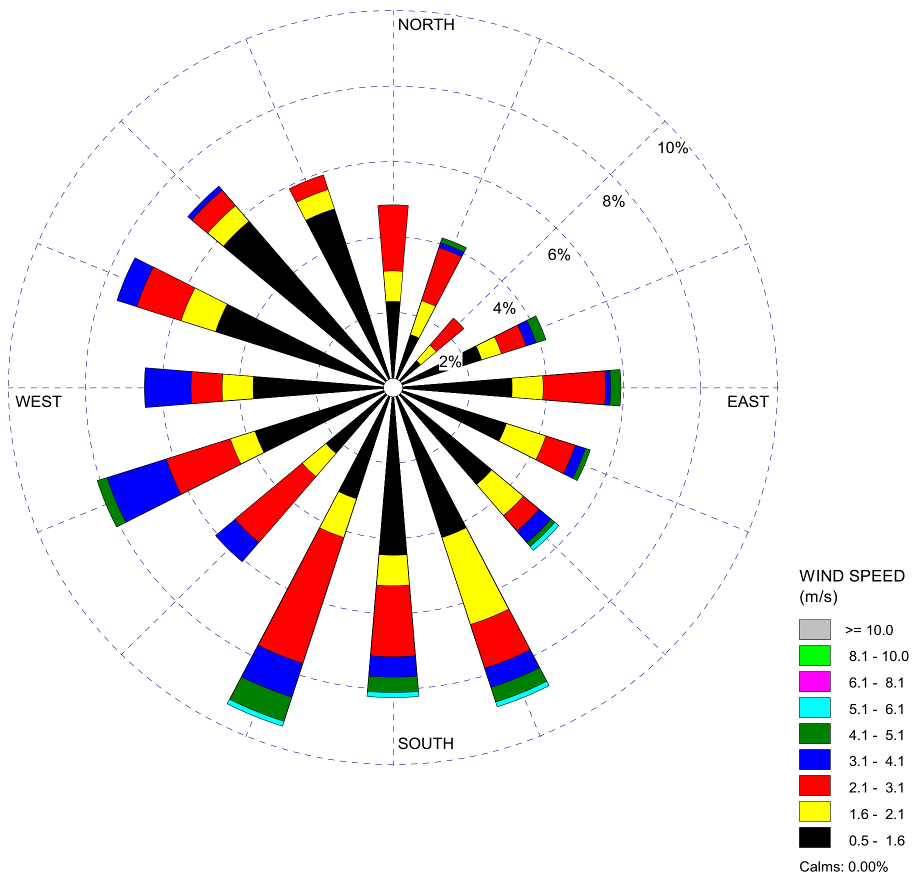


Figure 2.7-7. 10-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — August (Sheet 8 of 12)

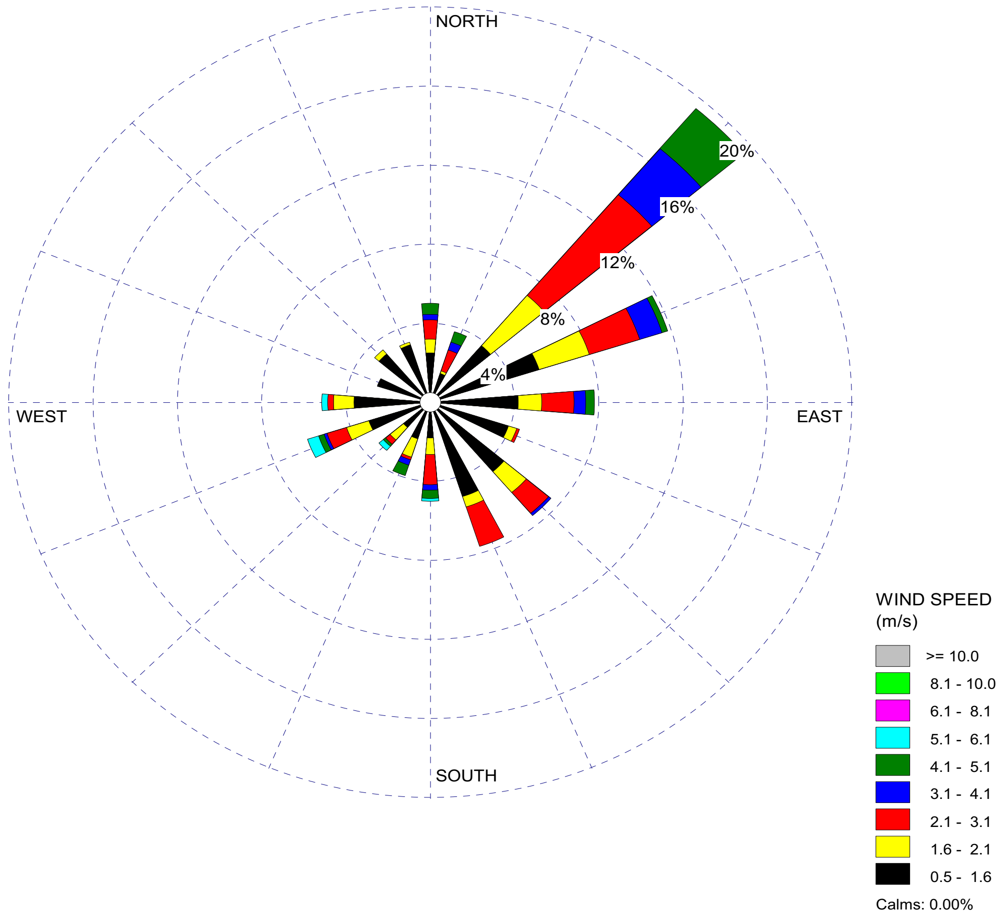


Figure 2.7-7. 10-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — September (Sheet 9 of 12)

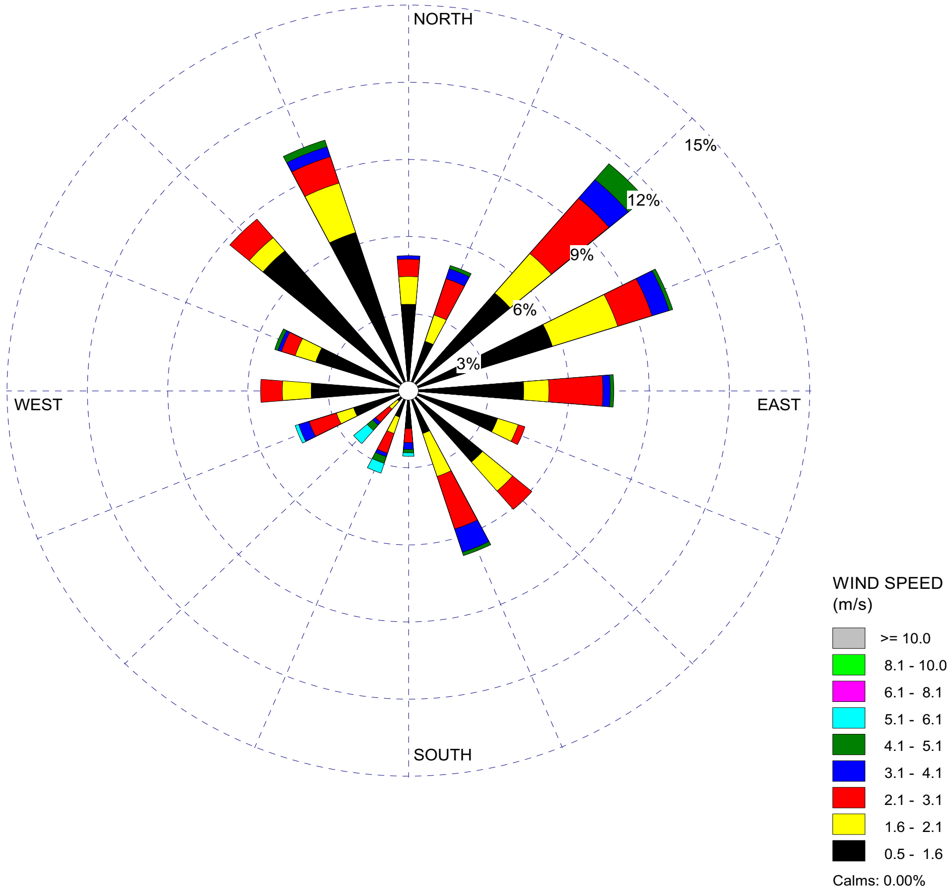


Figure 2.7-7. 10-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — October (Sheet 10 of 12)

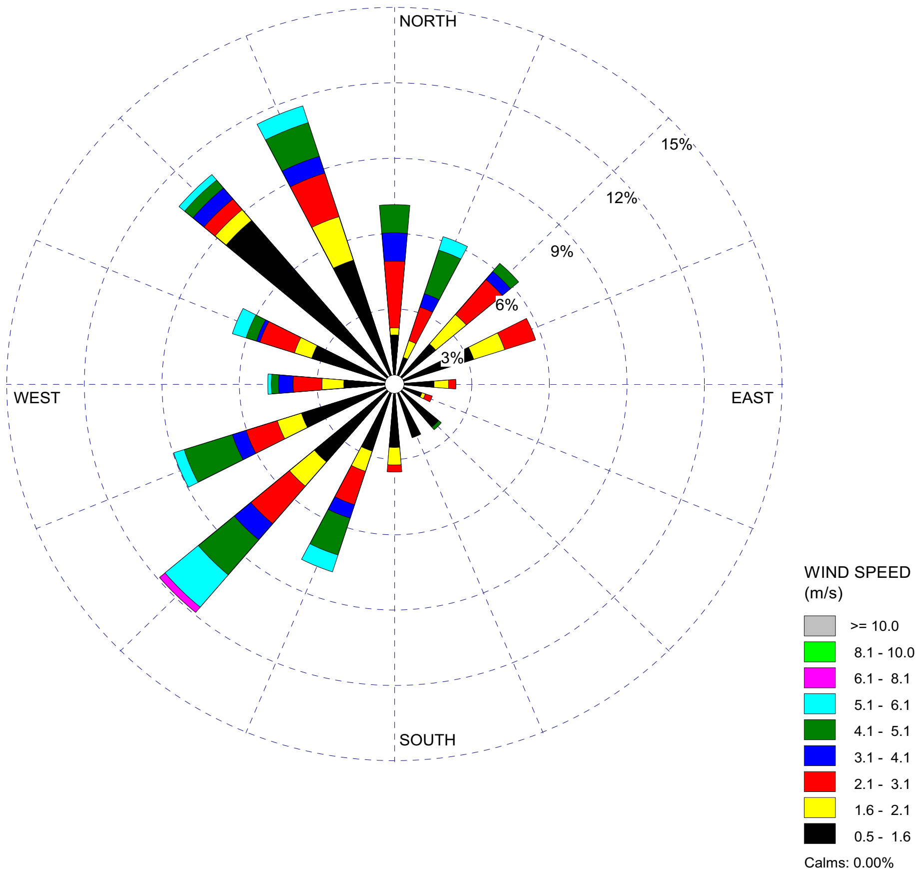


Figure 2.7-7. 10-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — November (Sheet 11 of 12)

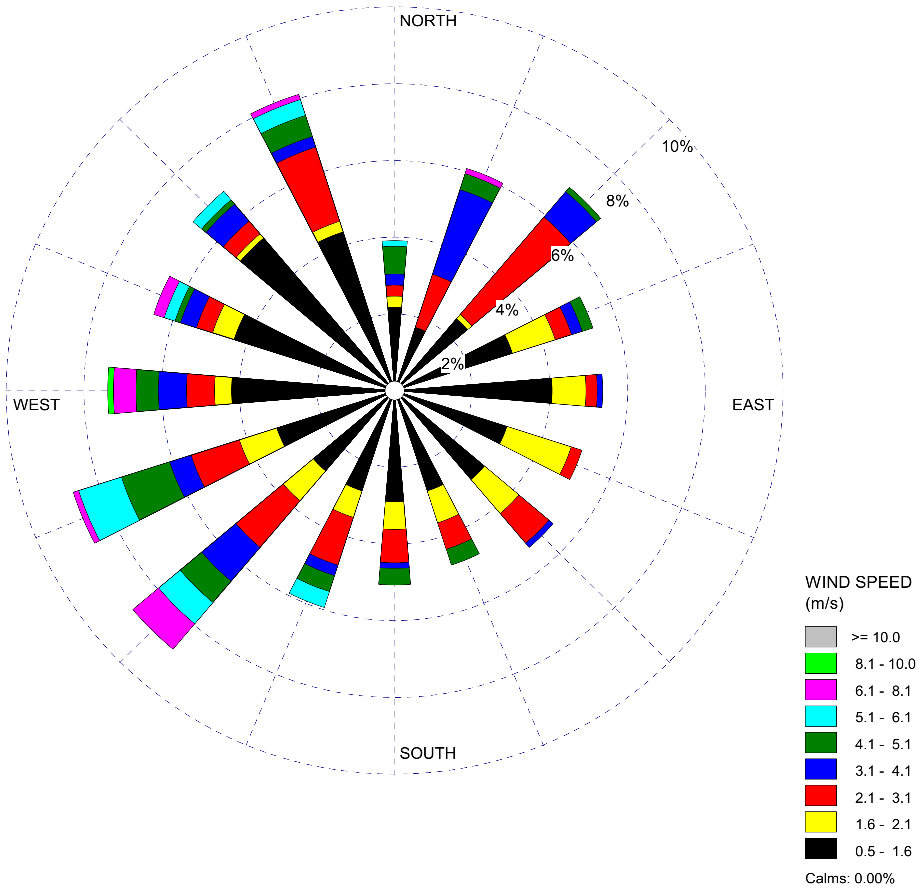


Figure 2.7-7. 10-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — December (Sheet 12 of 12)

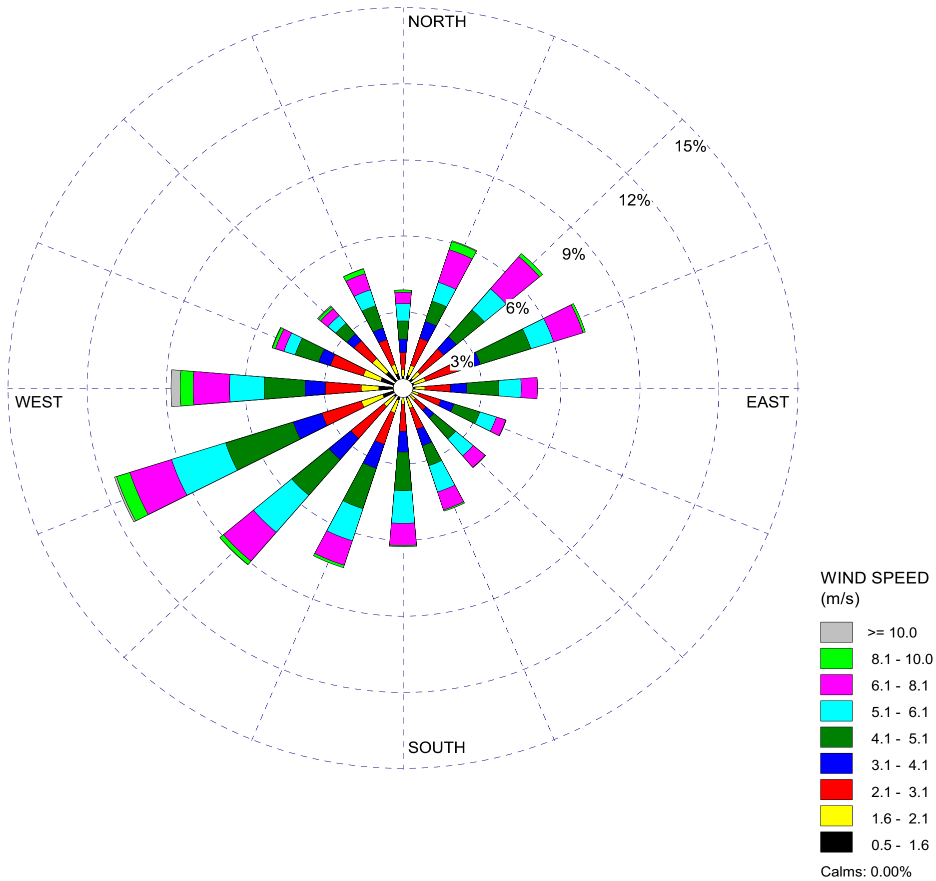


Figure 2.7-8. 60-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — Annual

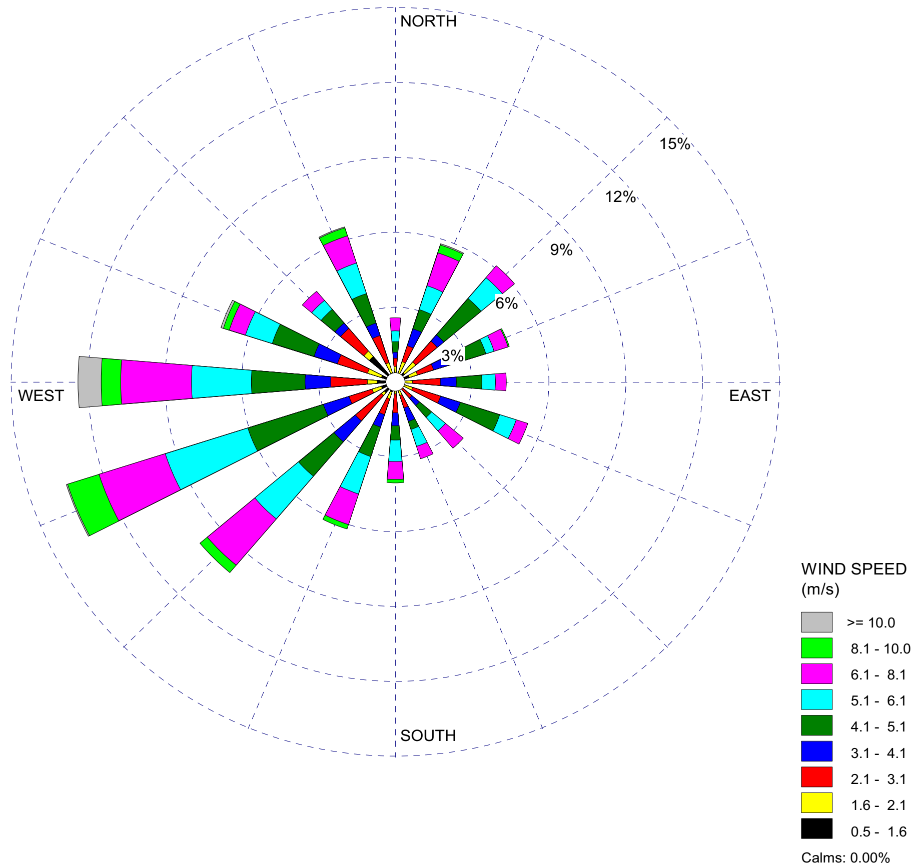


Figure 2.7-9. 60-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — Winter

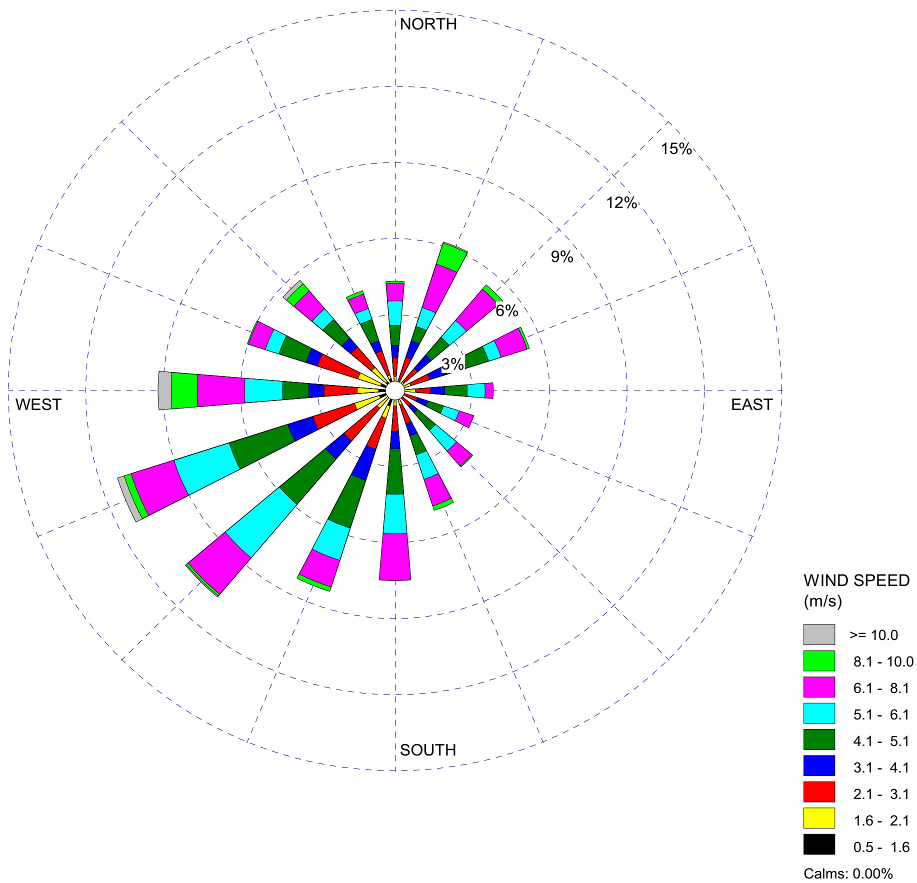


Figure 2.7-10. 60-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — Spring

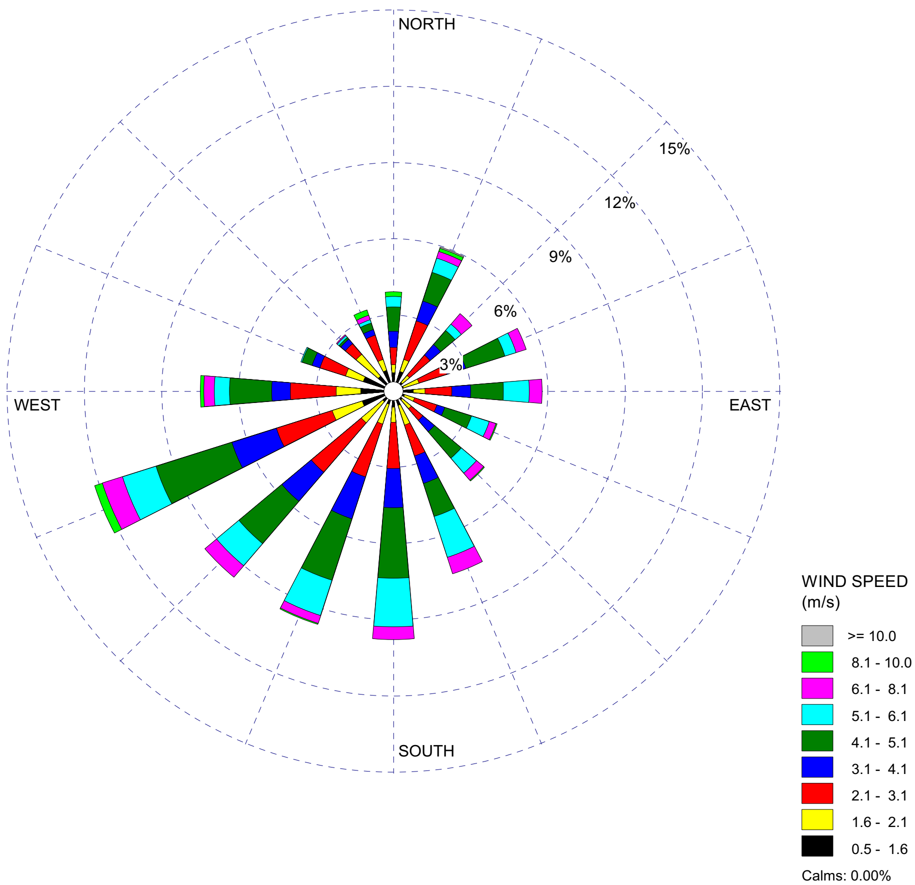


Figure 2.7-11. 60-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — Summer

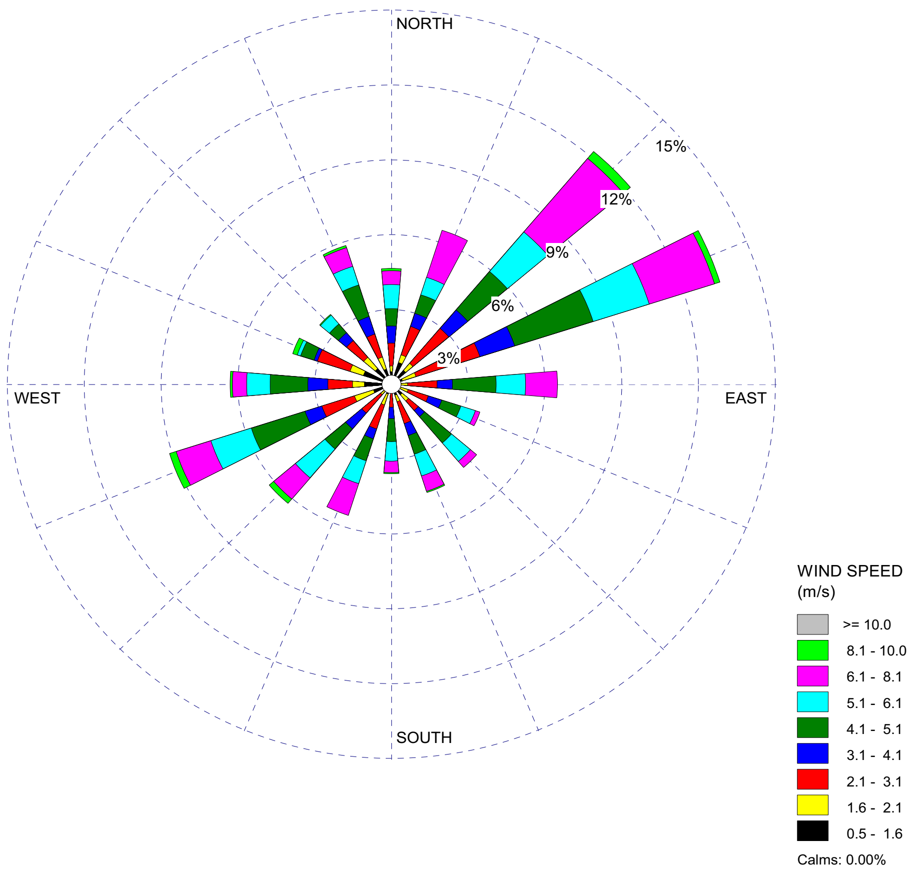


Figure 2.7-12. 60-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — Autumn

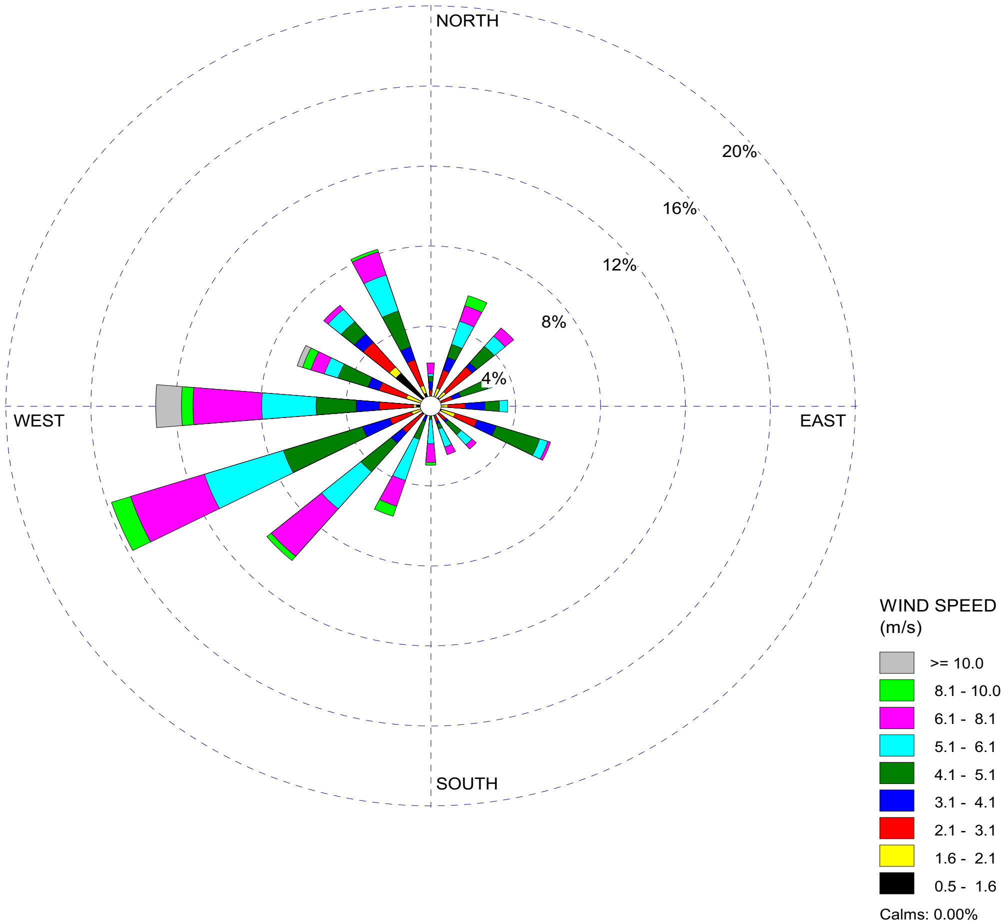


Figure 2.7-13. 60-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — January (Sheet 1 of 12)

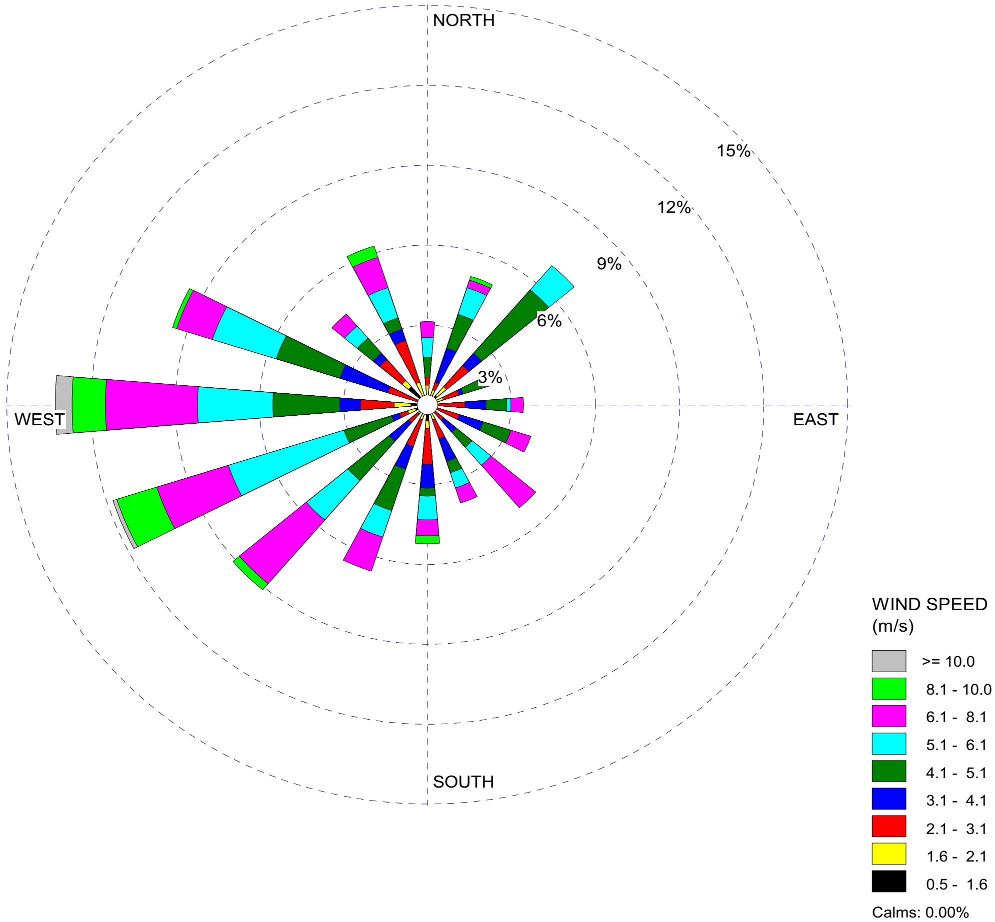


Figure 2.7-13. 60-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — February (Sheet 2 of 12)

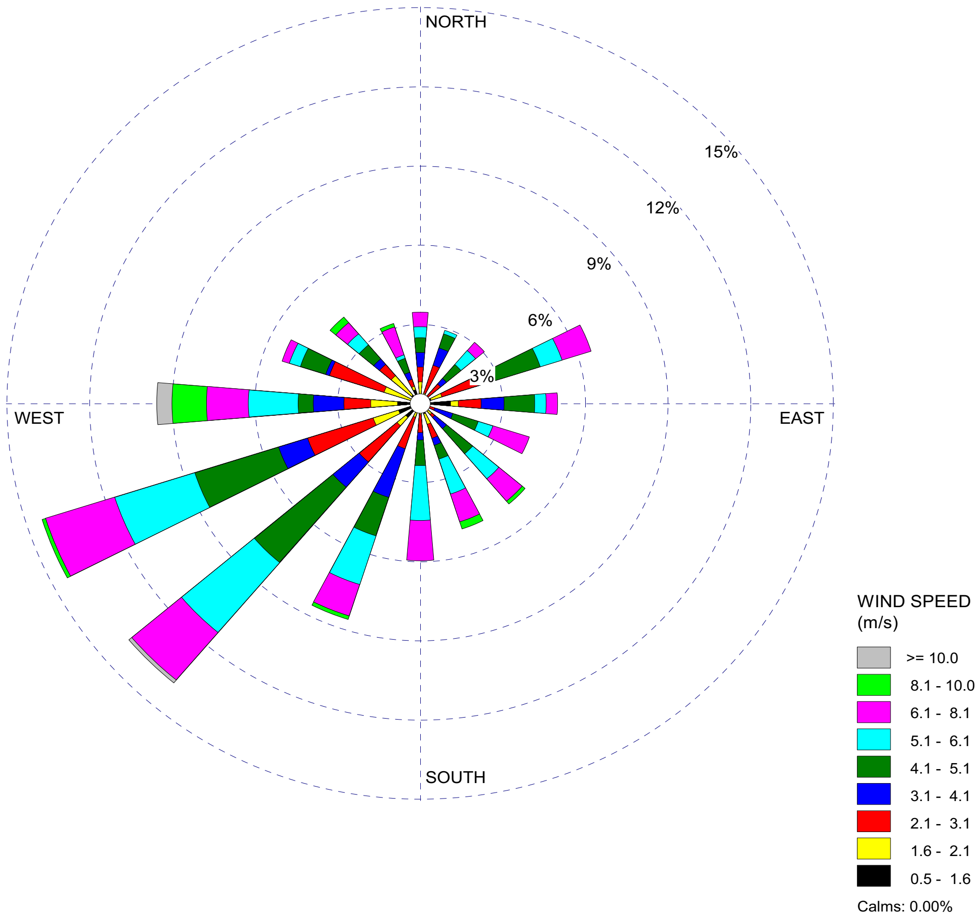


Figure 2.7-13. 60-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — March (Sheet 3 of 12)

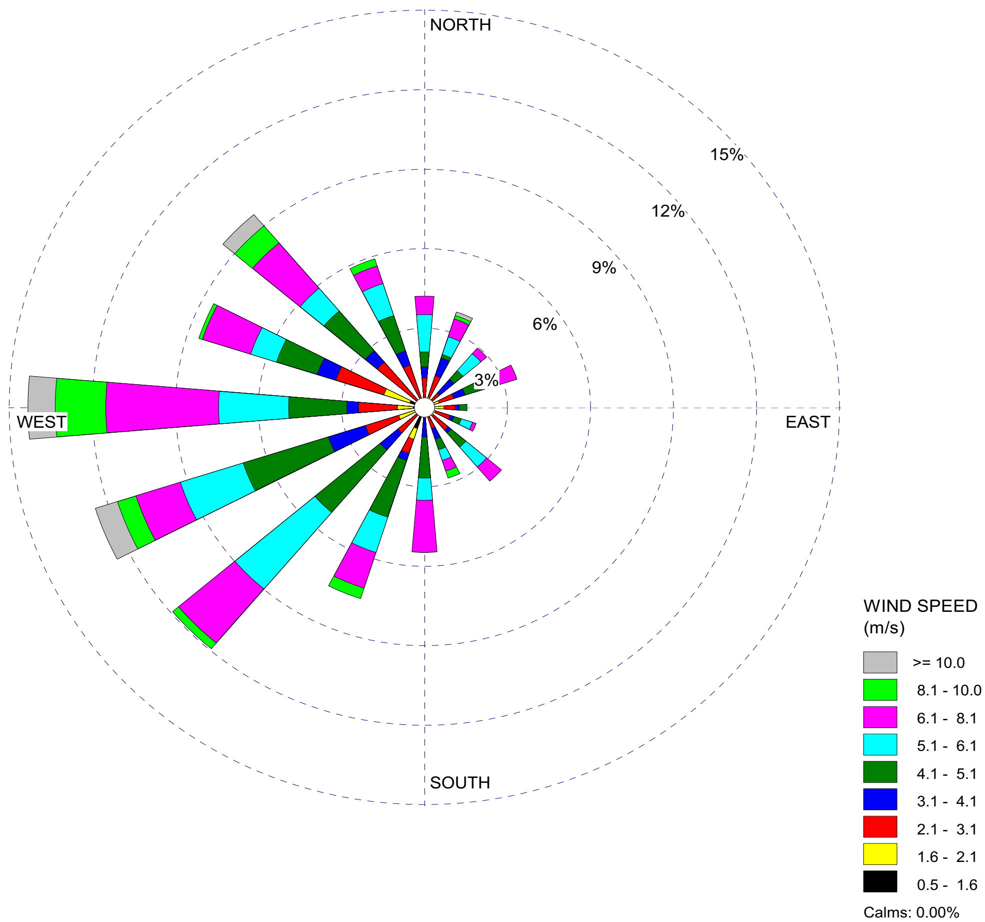


Figure 2.7-13. 60-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — April (Sheet 4 of 12)

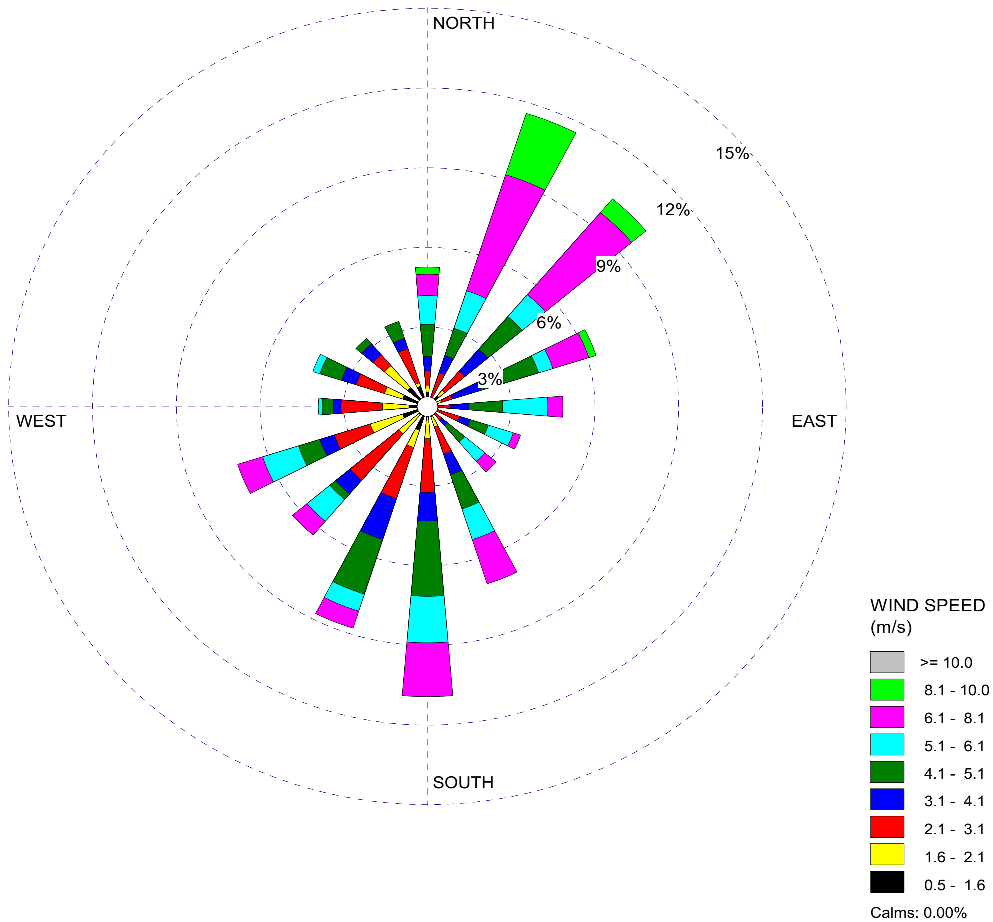


Figure 2.7-13. 60-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — May (Sheet 5 of 12)

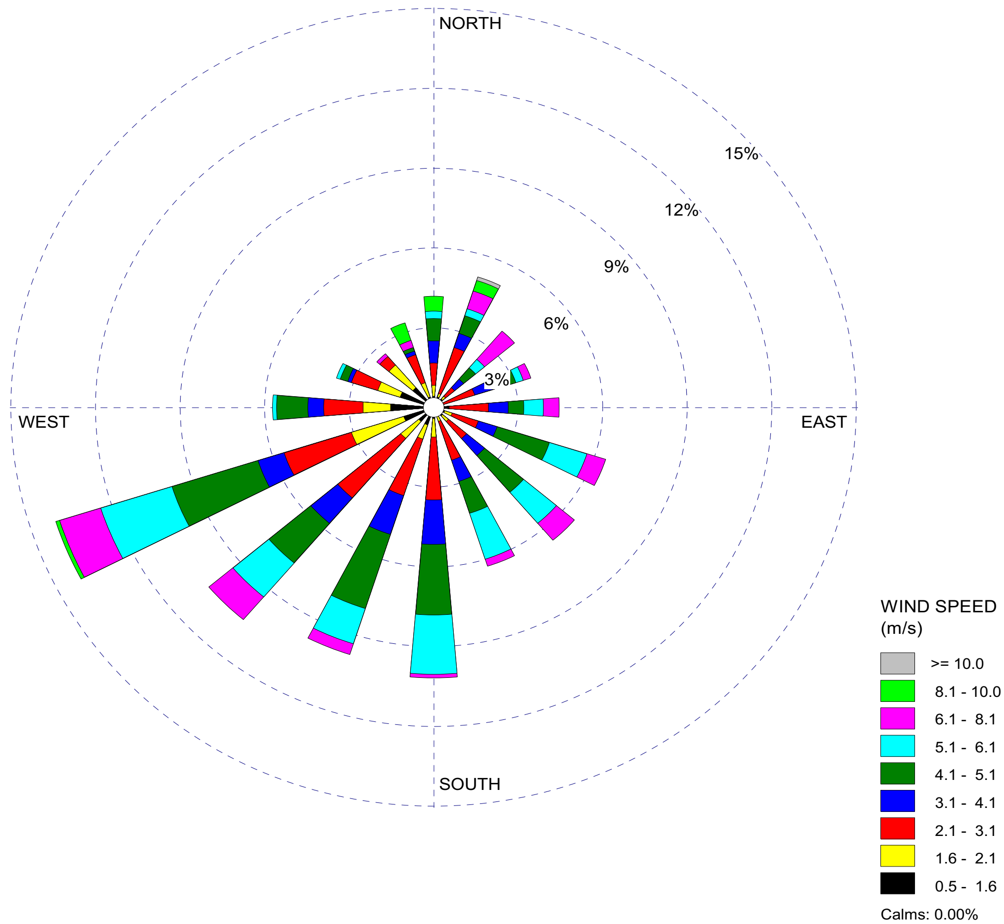


Figure 2.7-13. 60-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — June (Sheet 6 of 12)

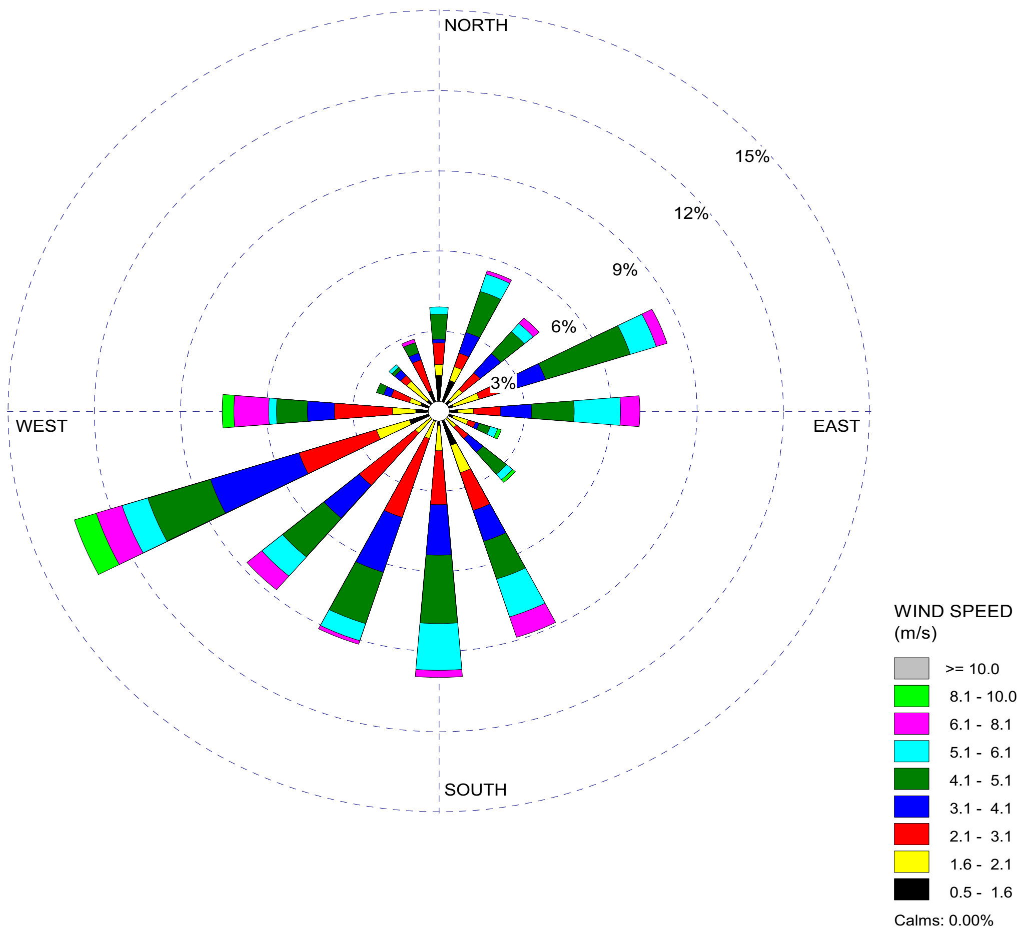


Figure 2.7-13. 60-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — July (Sheet 7 of 12)

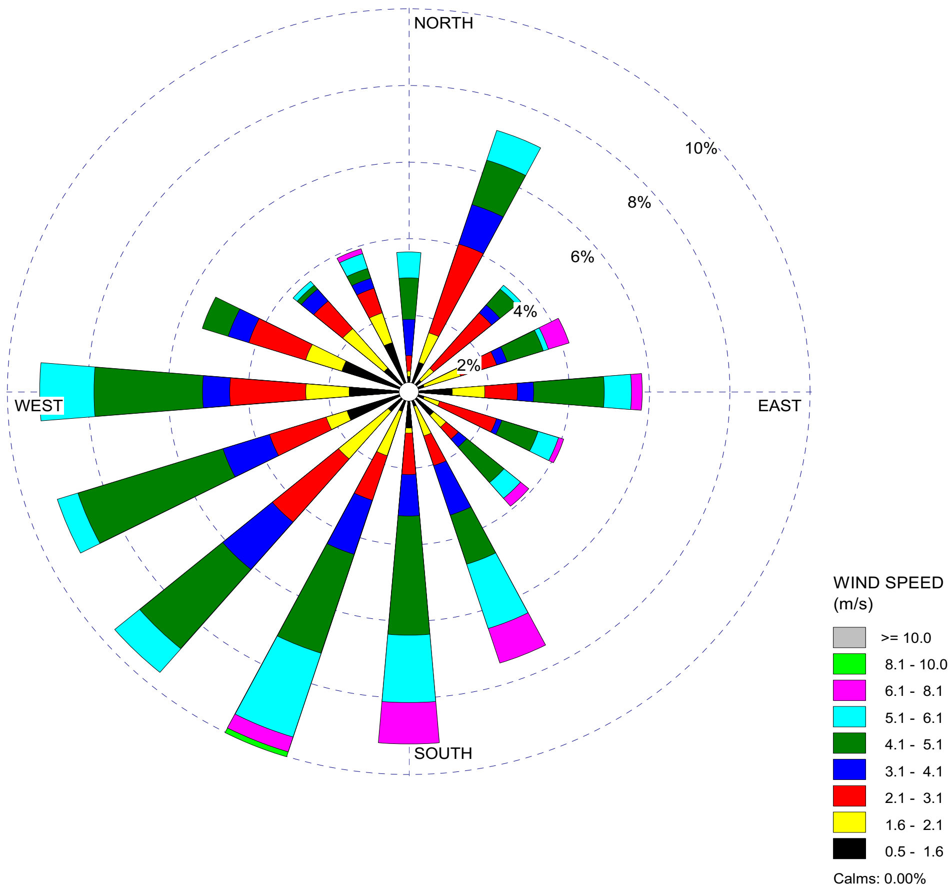


Figure 2.7-13. 60-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — August (Sheet 8 of 12)

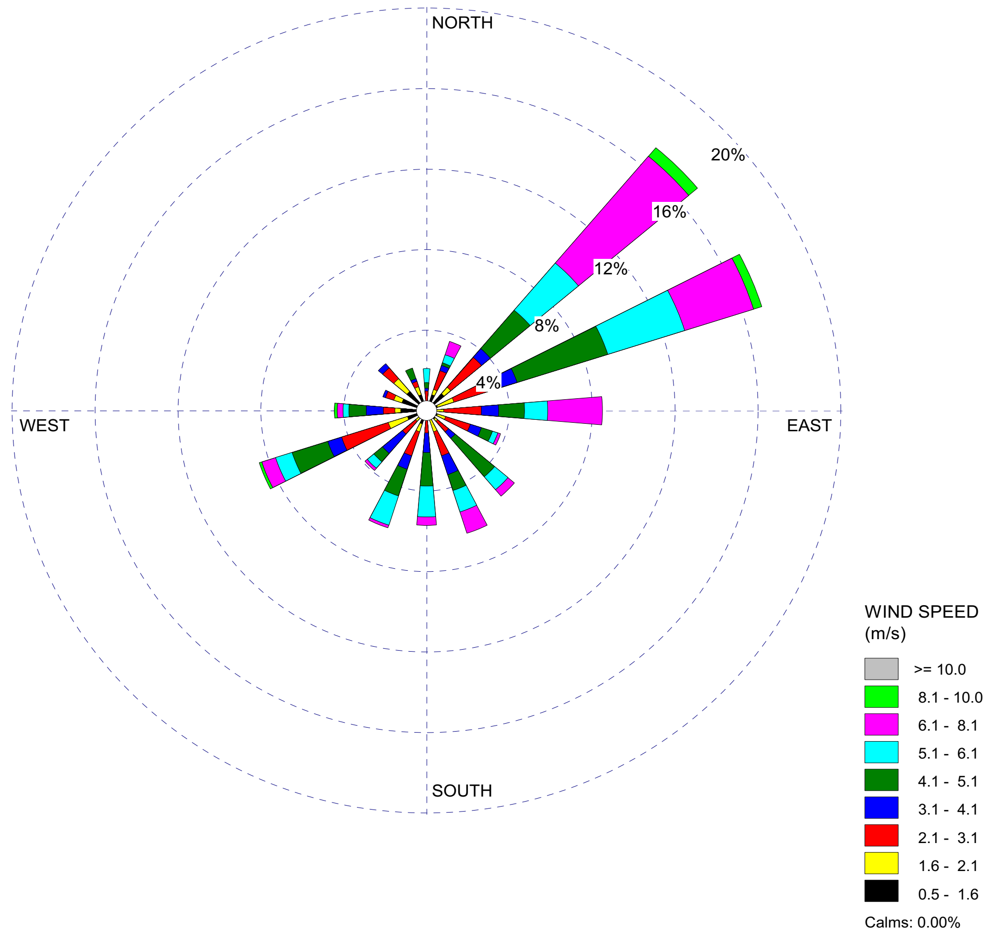


Figure 2.7-13. 60-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — September (Sheet 9 of 12)

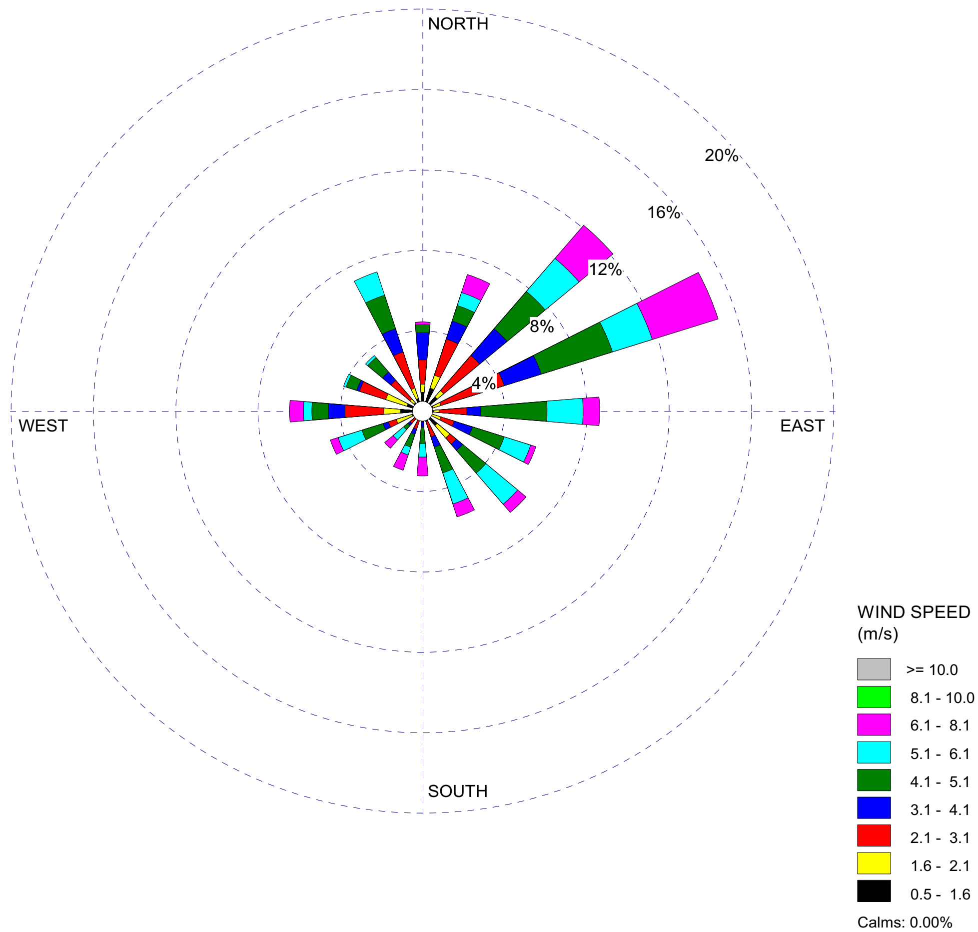


Figure 2.7-13. 60-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — October (Sheet 10 of 12)

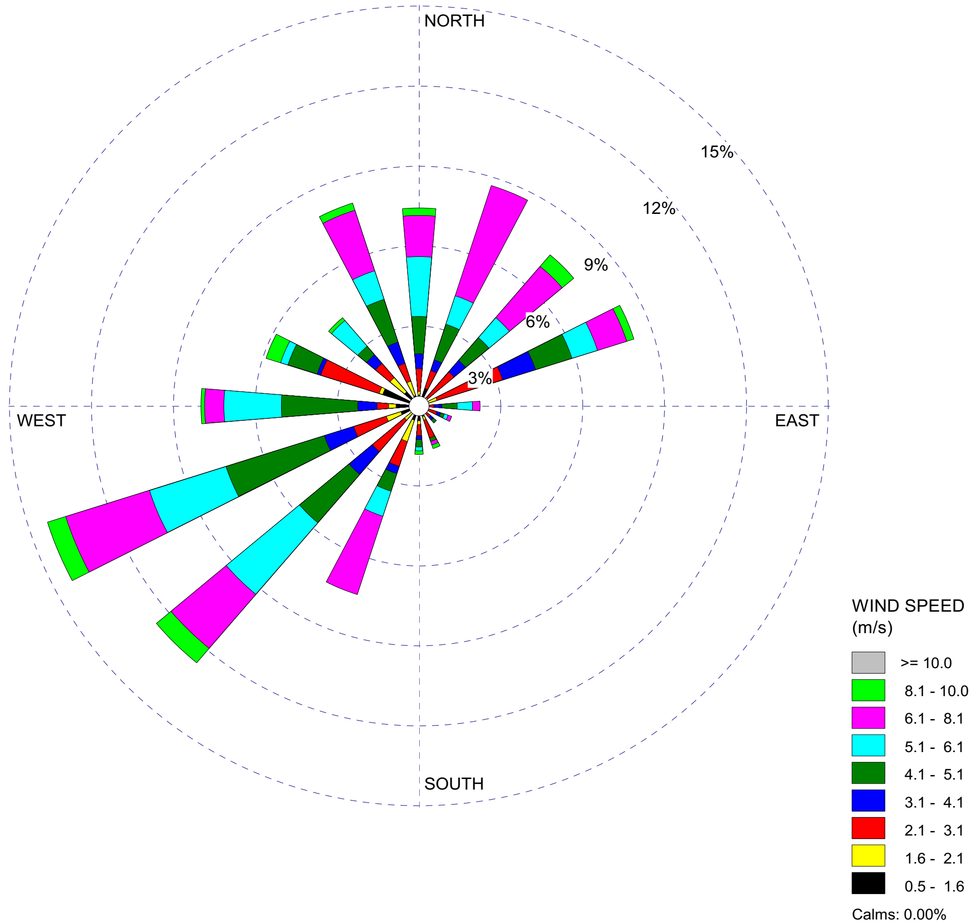


Figure 2.7-13. 60-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — November (Sheet 11 of 12)

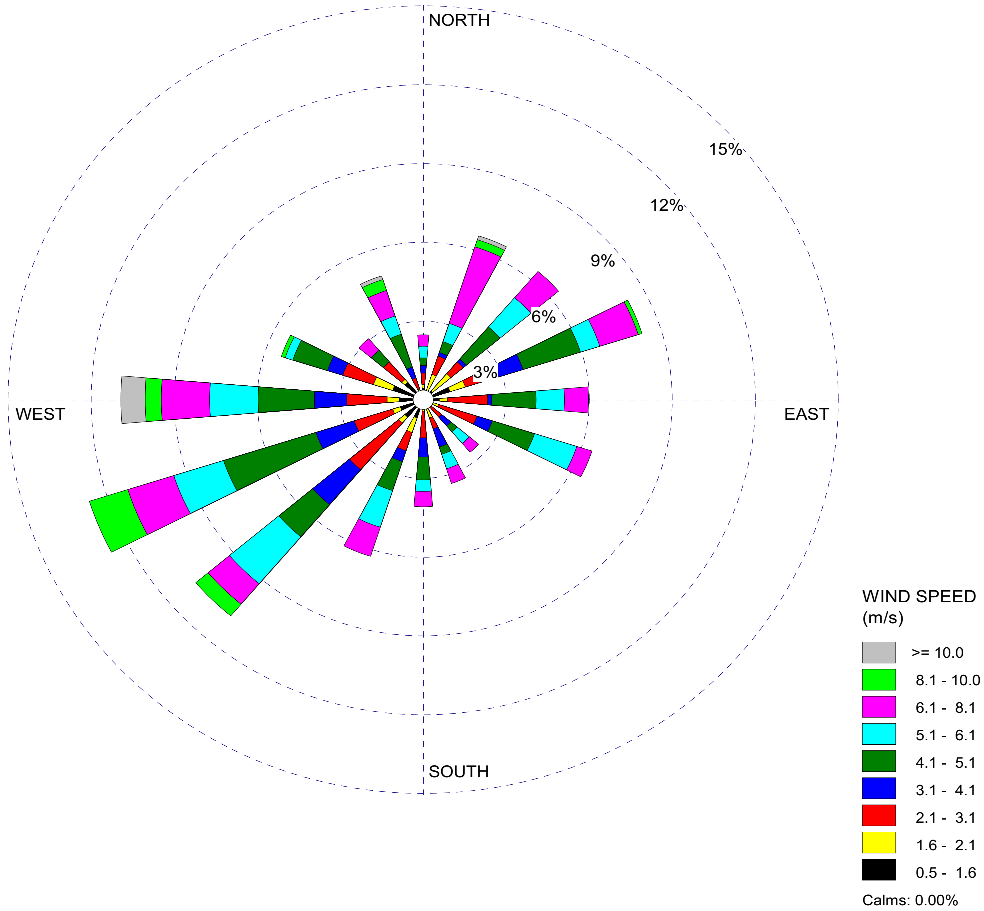


Figure 2.7-13. 60-Meter Level Composite Wind Rose for the Units 2 and 3 Monitoring Program (January 1, 2007–December 31, 2007) — December (Sheet 12 of 12)

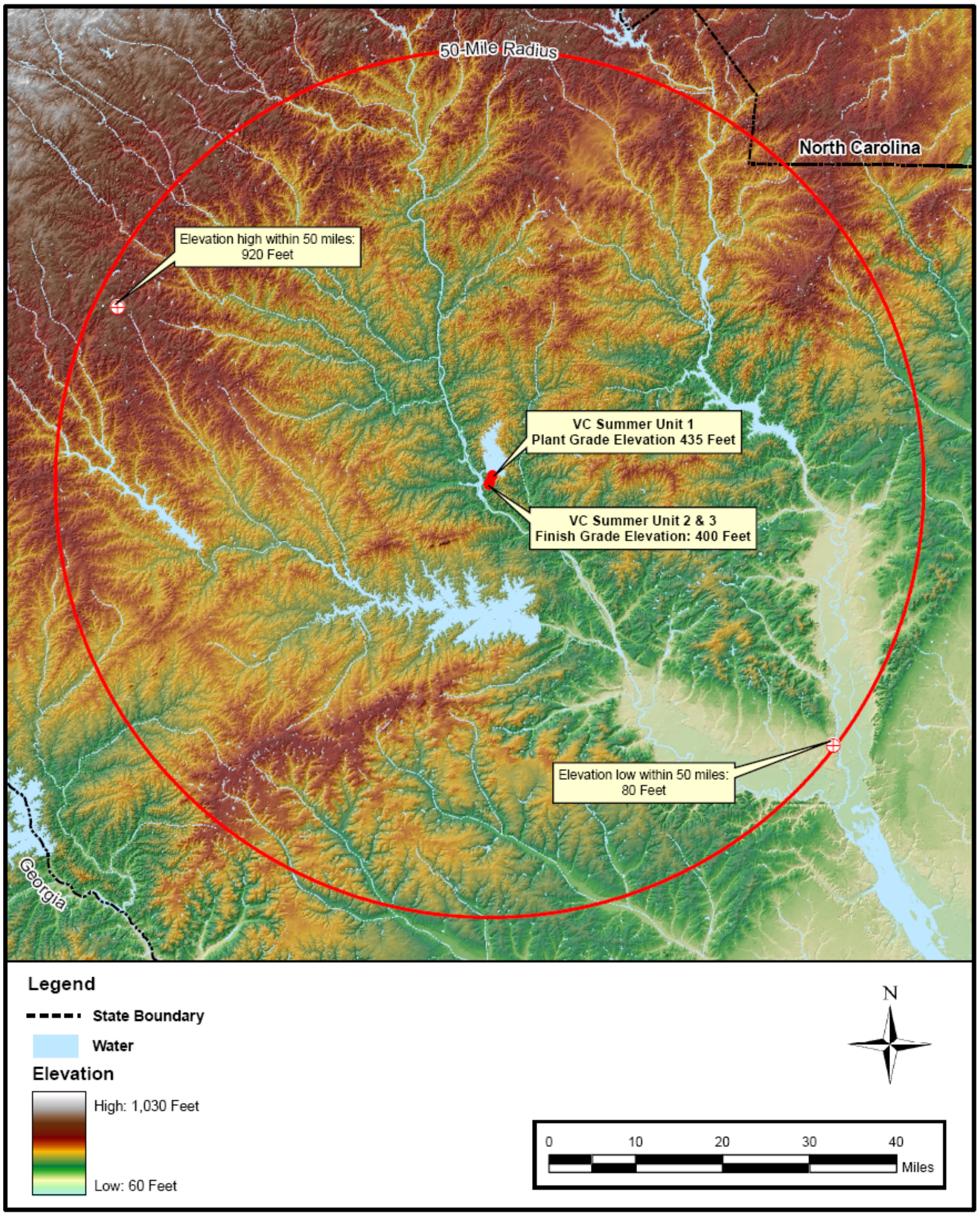
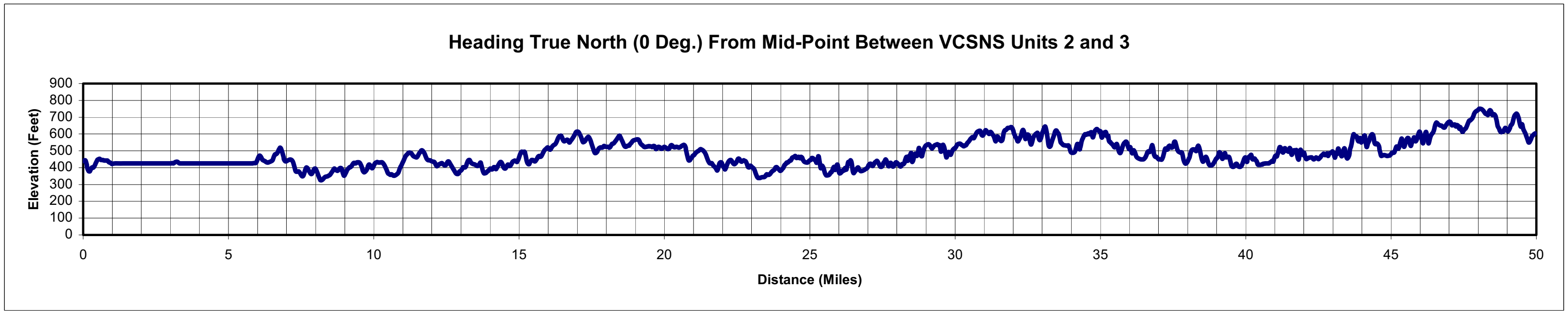
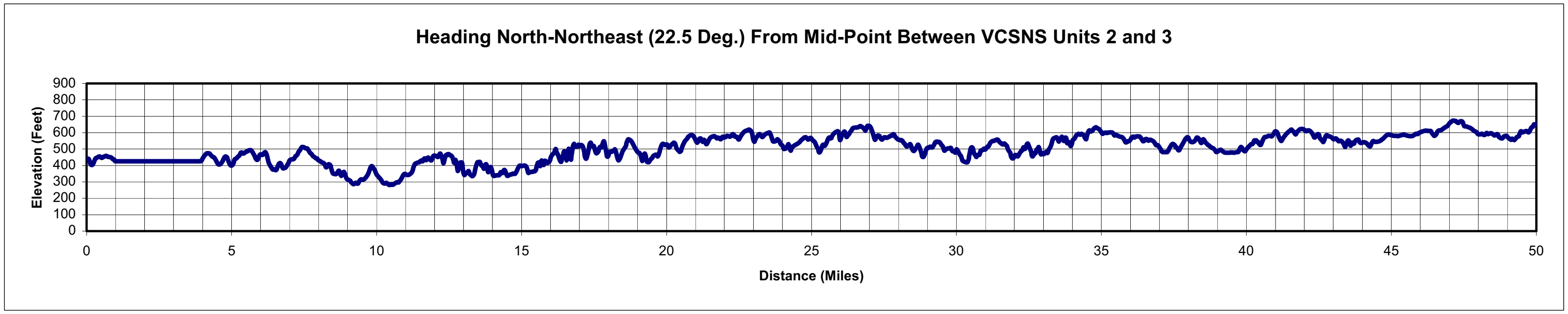
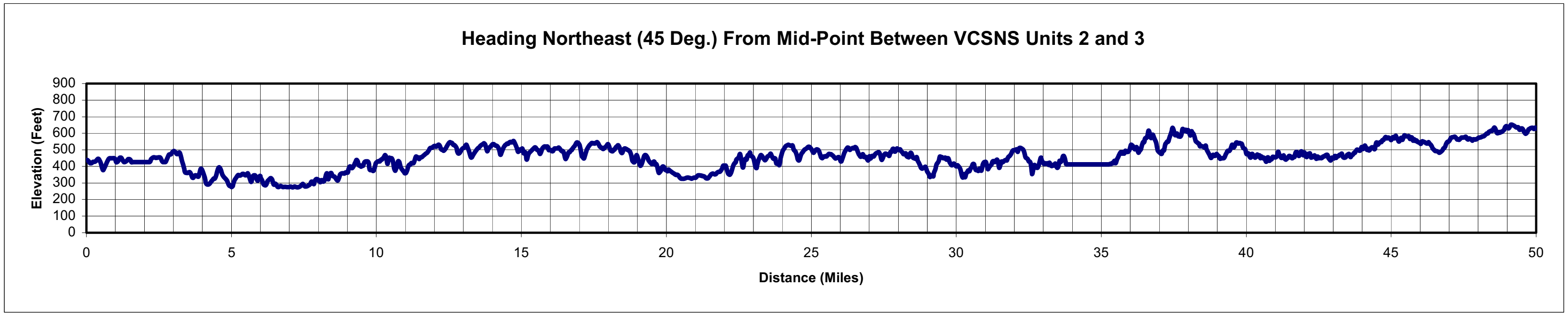


Figure 2.7-14. Site Area Map (50-Mile Radius)

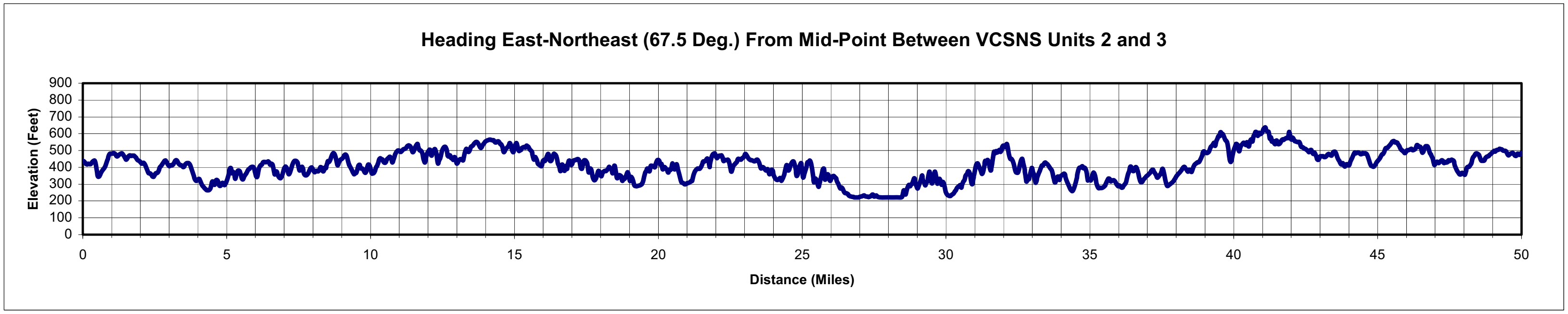


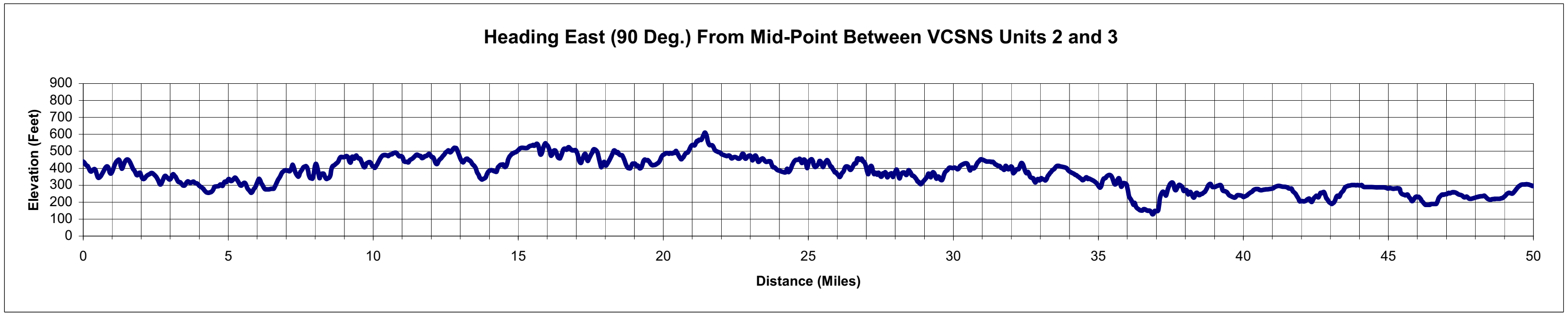


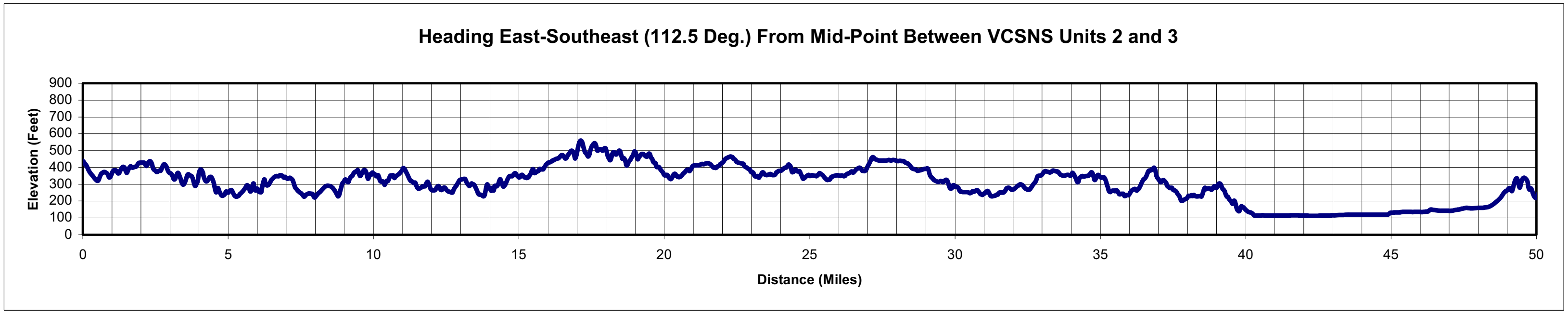


Nominal Plant Grade Elevation = 400 Feet

Figure 2.7-15. Terrain Elevation Profiles Within 50 Miles of the Site for Units 2 and 3 (Sheet 1 of 6)

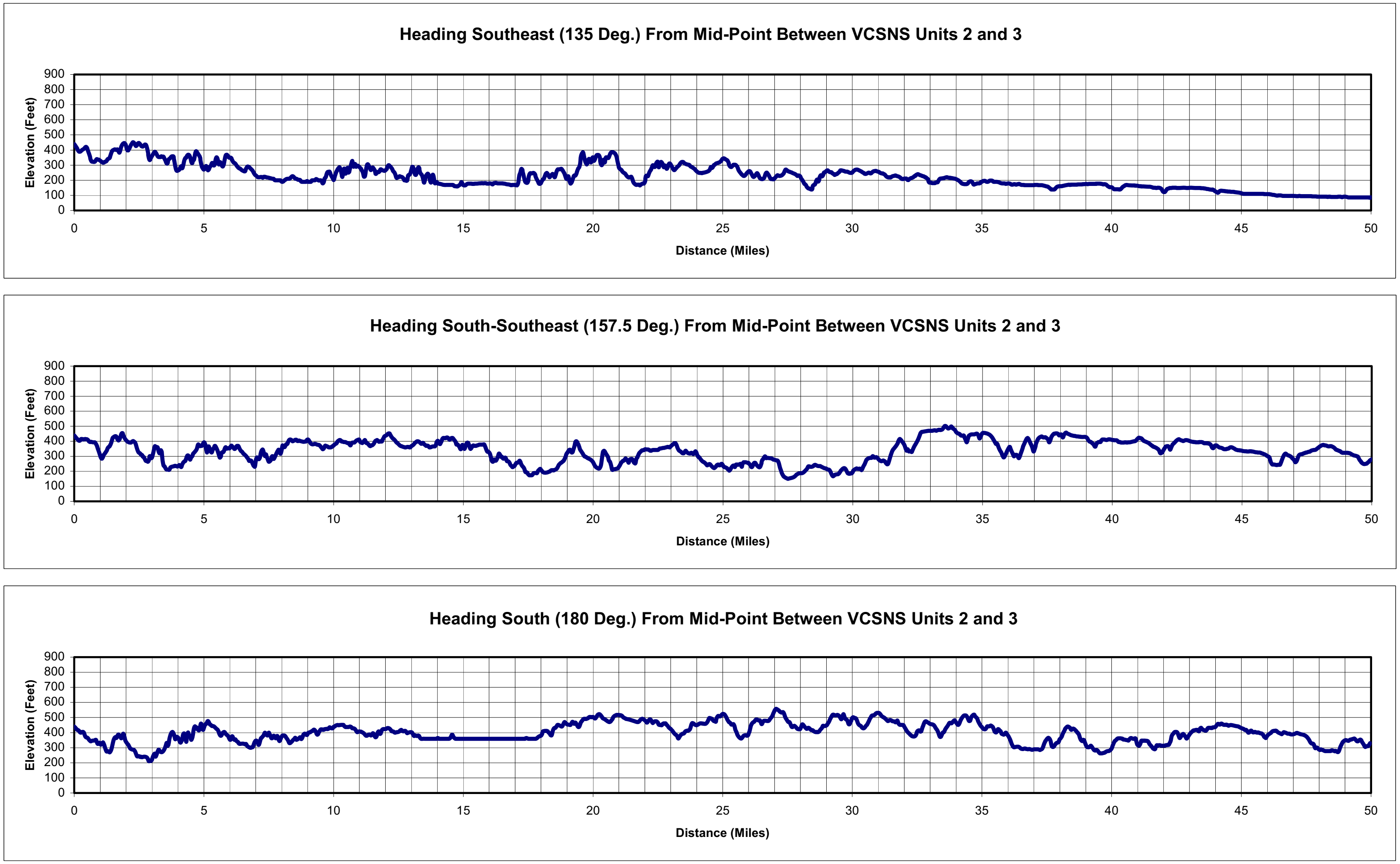






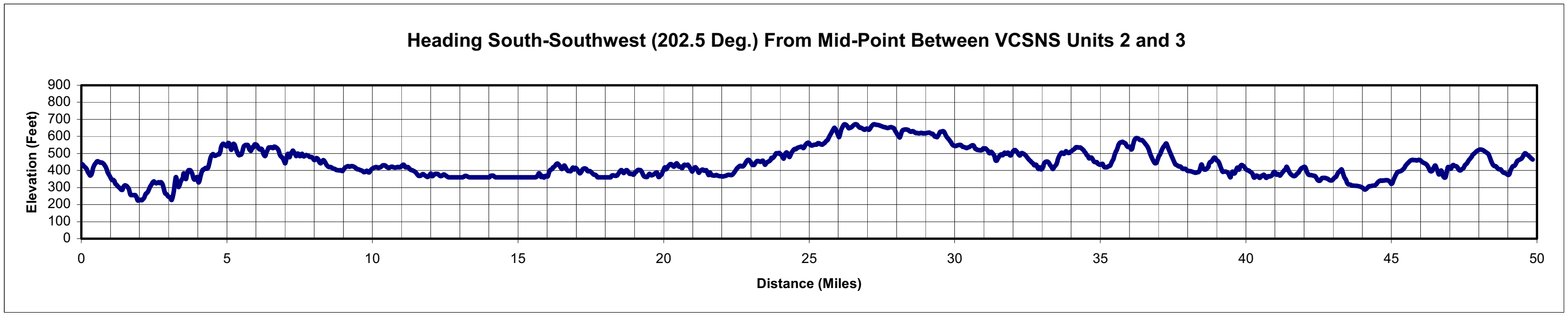
Nominal Plant Grade Elevation = 400 Feet

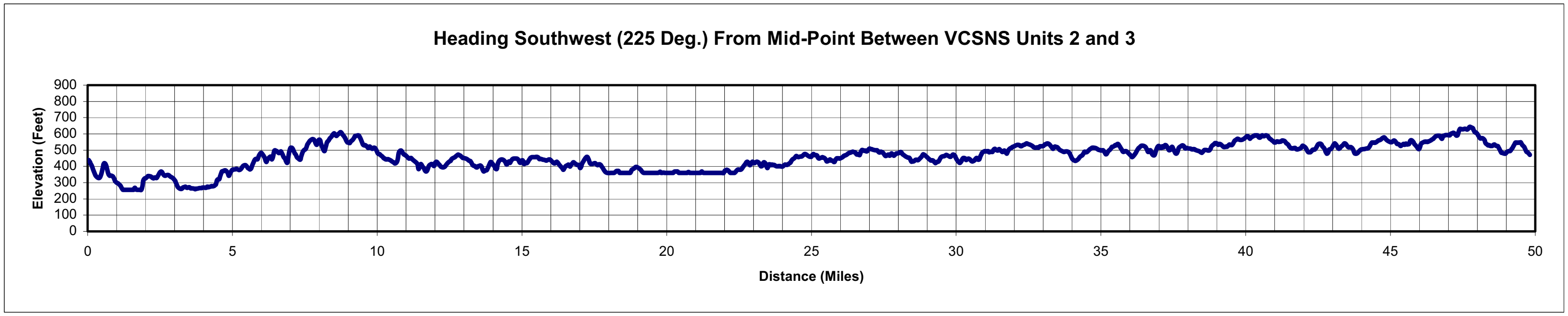
Figure 2.7-15. Terrain Elevation Profiles Within 50 Miles of the Site for Units 2 and 3 (Sheet 2 of 6)

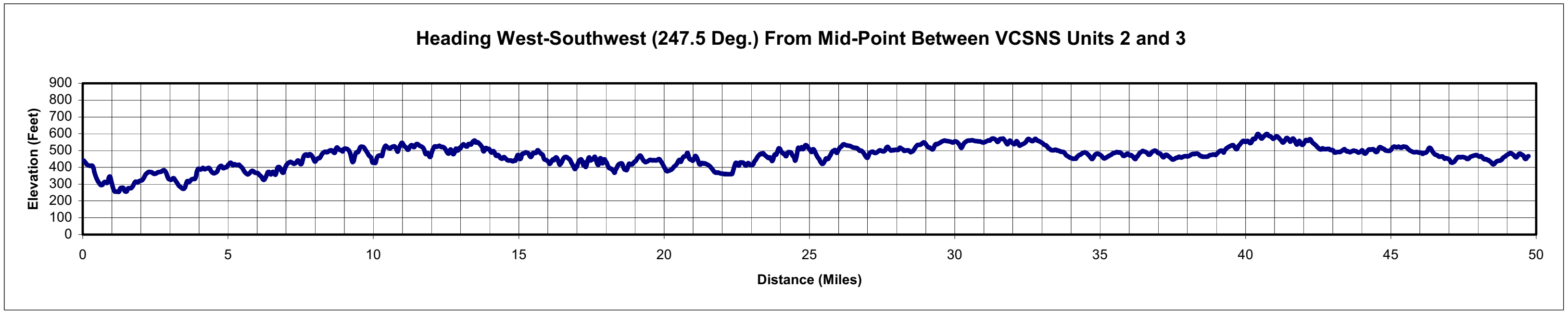


Nominal Plant Grade Elevation = 400 Feet

Figure 2.7-15. Terrain Elevation Profiles Within 50 Miles of the Site for Units 2 and 3 (Sheet 3 of 6)

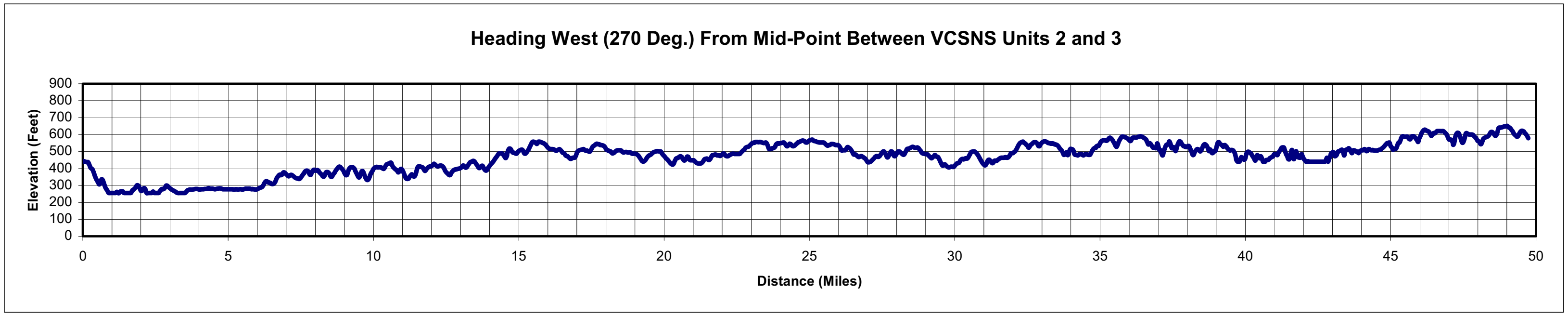


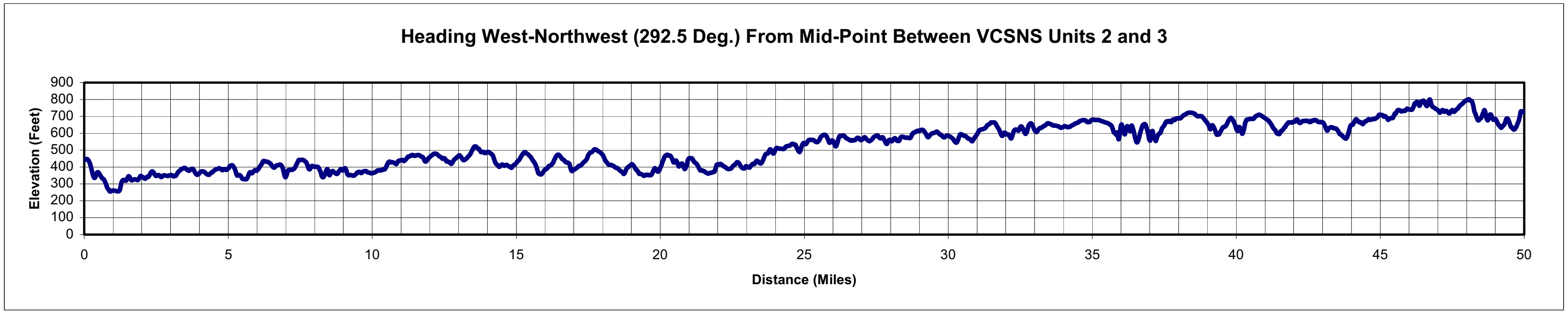


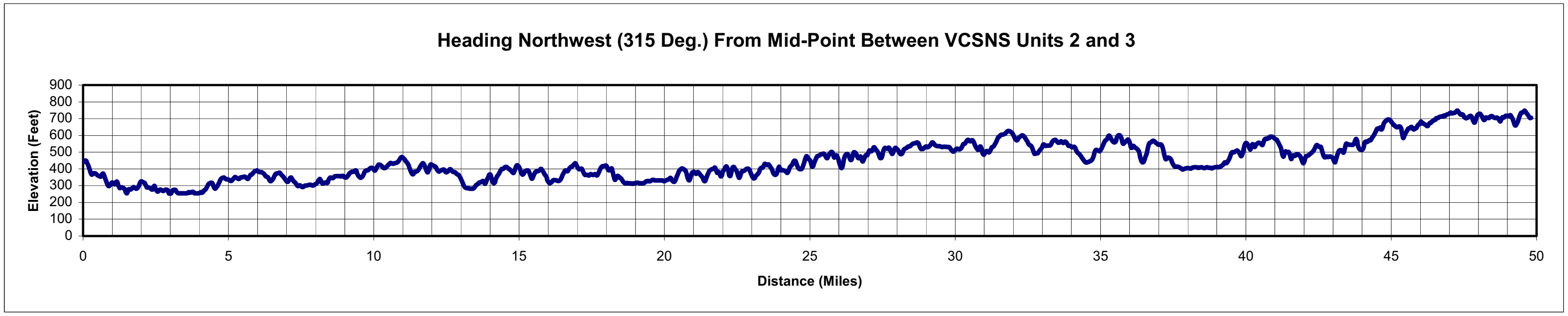


Nominal Plant Grade Elevation = 400 Feet

Figure 2.7-15. Terrain Elevation Profiles Within 50 Miles of the Site for Units 2 and 3 (Sheet 4 of 6)

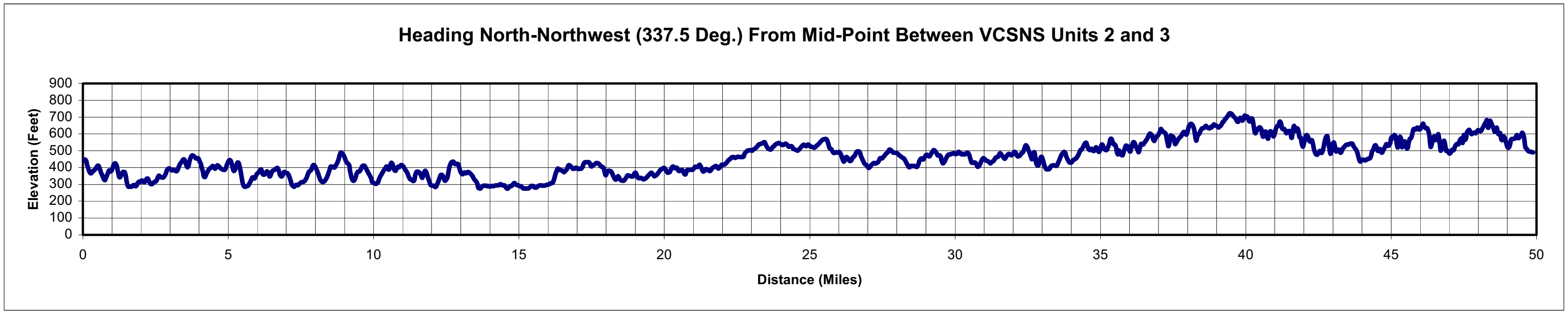






Nominal Plant Grade Elevation = 400 Feet

Figure 2.7-15. Terrain Elevation Profiles Within 50 Miles of the Site for Units 2 and 3 (Sheet 5 of 6)



Nominal Plant Grade Elevation = 400 Feet

Figure 2.7-15. Terrain Elevation Profiles Within 50 Miles of the Site for Units 2 and 3 (Sheet 6 of 6)

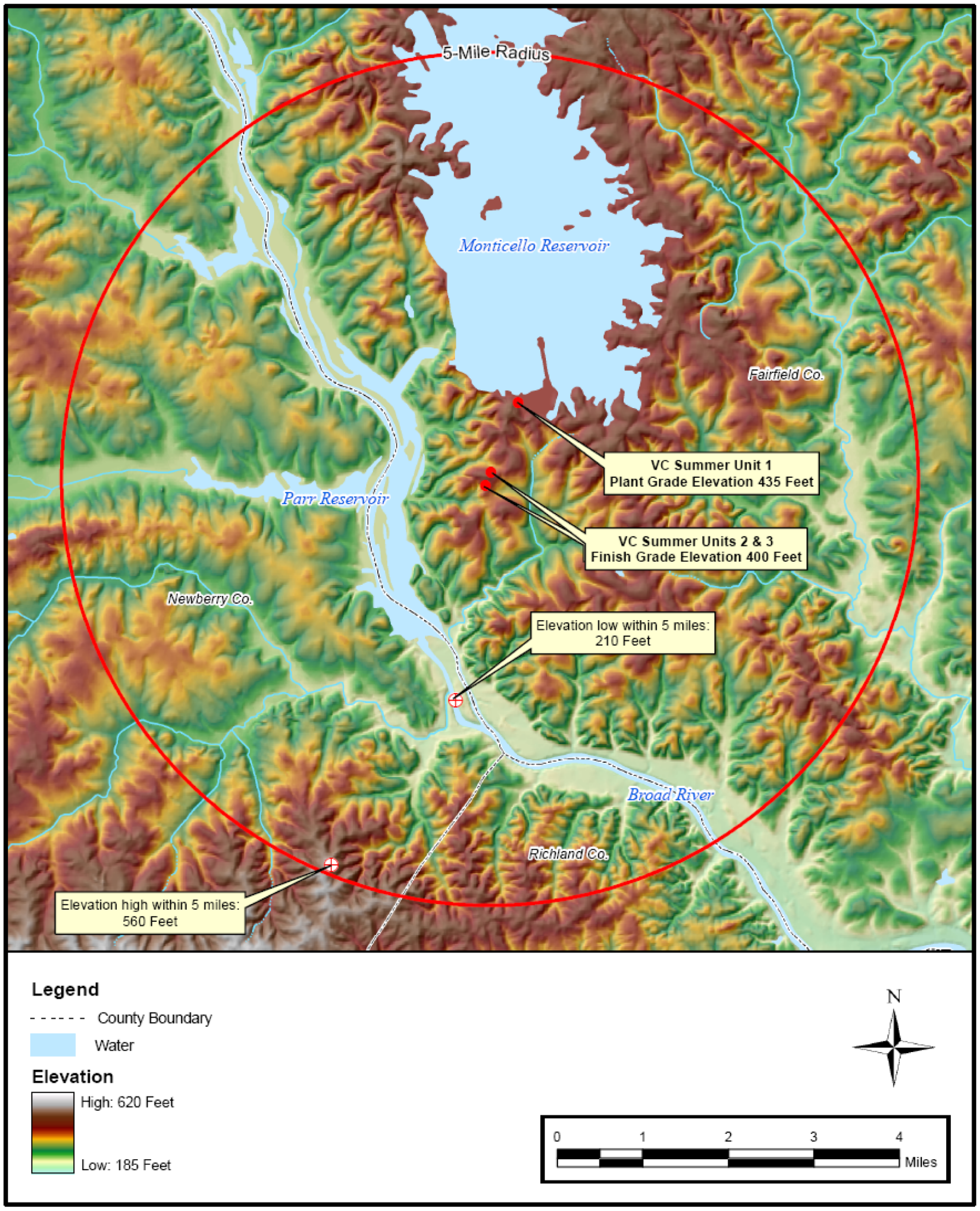


Figure 2.7-16. Site and Vicinity Map (5-Mile Radius)

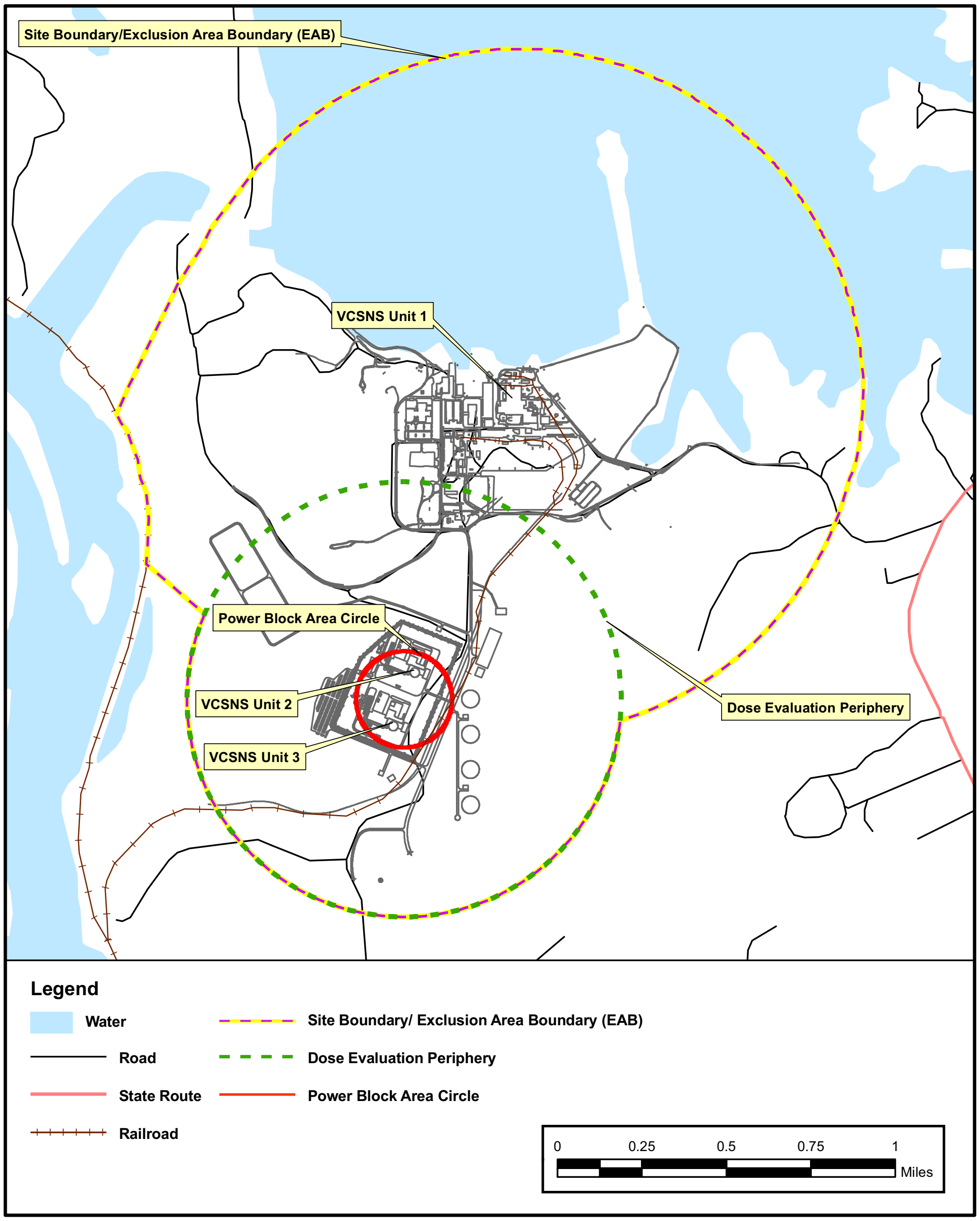


Figure 2.7-17. Site Boundary/Exclusion Area Boundary, Dose Evaluation Periphery, and PBA Circle