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U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: Duke Energy Carolinas, LLC
William States Lee III Nuclear Station - Docket Nos. 52-018 and 52-019
AP1000 Combined License Application for the
William States Lee III Nuclear Station Units 1 and 2
Response to Request for Additional Information
(RAI No. 3798 and 3799)
Ltr# WLG2010.04-02

Reference: Letter from Brian Hughes (NRC) to Peter Hastings (Duke Energy),
Request for Additional Information Letter No. 081 dated 11/1/2009
Related to SRP Section: 02.03.01, 02 – Regional Climatology

This letter provides the Duke Energy response to the Nuclear Regulatory Commission's request for additional information (RAI) included in the referenced letter.

The response to the NRC information request described in the referenced letter is addressed in a separate enclosure, which also identifies associated changes, when appropriate, that will be made in a future revision of the Final Safety Analysis Report for the Lee Nuclear Station.

If you have any questions or need any additional information, please contact Peter S. Hastings, Nuclear Plant Development Licensing Manager, at 980-373-7820.

Bryan J. Dolan
Vice President
Nuclear Plant Development

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NRO

Enclosures:

1) Duke Energy Response to Request for Additional Information Letter 081, RAI 02.03.01-011
2) Duke Energy Response to Request for Additional Information Letter 081, RAI 02.03.02-010

AFFIDAVIT OF BRYAN J. DOLAN

Bryan J. Dolan, being duly sworn, states that he is Vice President, Nuclear Plant Development, Duke Energy Carolinas, LLC, that he is authorized on the part of said Company to sign and file with the U. S. Nuclear Regulatory Commission this supplement to the combined license application for the William States Lee III Nuclear Station and that all the matter and facts set forth herein are true and correct to the best of his knowledge.

Bryan J. Dolan

Subscribed and sworn to me on April 14, 2010

Phoebe P. Elliott
Notary Public

My commission expires: June 26, 2011

SEAL

xc (w/o enclosures):

Loren Plisco, Deputy Regional Administrator, Region II
Jeffrey Cruz, Branch Chief, DNRL

xc (w/ enclosures):

Brian Hughes, Senior Project Manager, DNRL

Lee Nuclear Station Response to Request for Additional Information (RAI)

RAI Letter No. 081

NRC Technical Review Branch: **Siting and Accident Consequences Branch (RSAC)**

Reference NRC RAI Number(s): **RAI 02.03.01-011**

NRC RAI:

This is a follow-up to WLS RAI 2.3.1-10:

NUREG-0800, Section 2.3.1, states the applicability of data on severe weather phenomena to represent site conditions during the expected period of reactor operation should be substantiated.

The response to WLS 2.3.1-10 addressed the issue of severe weather phenomena to represent site conditions during the expected period of operation for the Lee nuclear plants, but this information was not included in the FSAR. Please update FSAR section 2.3.1 to include this information.

Duke Energy Response:

The information presented in the response to WLS RAI 02.03.01-010 will be added to FSAR Subsection 2.3.1.2 in a future revision, including an update that reflects a 45-year (1963-2007) time period for the design temperature analysis.

Associated Revision to the Lee Nuclear Station Final Safety Analysis Report:

FSAR Subsection 2.3.1.2

Attachment:

1) Revision to FSAR Subsection 2.3.1.2

Lee Nuclear Station Response to Request for Additional Information (RAI)

Attachment 1 to RAI 02.03.01-011

Revision to FSAR 2.3.1.2

COLA Part 2, FSAR Chapter 2, Subsection 2.3.1.2 is revised to add the following after the third paragraph:

General Design Criterion (GDC) 2 in Appendix A to 10 CFR Part 50 requires "consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding area, with sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated."

Extreme weather calculations for Lee Nuclear Station were conducted over the maximum data span available. Certified climatological data obtained from the U.S. National Climatic Data Center (NCDC) was used for the severe weather phenomena evaluations. This data selection supports accurate severe weather phenomena projections for the area in the vicinity of the Lee Nuclear Station site. This extensive historic data record provides the historical climatic trends and severe natural phenomena to be included in the site characterization.

Dry-bulb, coincident wet-bulb, and non-coincident wet-bulb temperatures represent significant site characteristics because this data is used in demonstrating that the AP1000 DCD site parameters are bounding (i.e., more conservative) than the Lee Nuclear Station site characteristics. The Lee Nuclear Station site characteristic temperatures were developed by considering both 100-year return temperatures and 0% exceedance temperatures. These values were calculated using all available hourly data from a 45-year (1963-2007) sequential meteorological data set for Greenville-Spartanburg Airport, Greer, South Carolina, Station No. 03870, National Weather Service (NWS) station. The difference between the Lee Nuclear Station site characteristics and the DCD design parameters, as provided in FSAR Table 2.0-201, provide additional margin to the selected Lee Nuclear Station site characteristic maximum safety temperatures. This margin accounts for any limitations to the accuracy, quantity, and period of time in which the historical data have been accumulated.

General predictions on global or U.S. climatic changes expected during the period of reactor operation are uncertain and are only applicable on a macroclimatic scale. Since the maximum data span available was used in the severe weather analysis, accurate severe weather phenomena have been provided based on best-available historic data. Projections of future severe weather conditions at the Lee Nuclear Station site are speculative at best, based on current understanding and modeling of global climate change.

Lee Nuclear Station Response to Request for Additional Information (RAI)

RAI Letter No. 081

NRC Technical Review Branch: Siting and Accident Consequences Branch (RSAC)

Reference NRC RAI Number(s): RAI 02.03.02-010

NRC RAI:

This is a follow-up to WLS RAI 2.3.2-09 regarding the SACTI cooling tower plume modeling:

The response to WLS RAI 2.3.2-09 included SACTI input files, and an elaborate justification (with sensitivity studies, plume extent, plume shadowing, fogging/icing) for using Charlotte (CLT) data as spatially representative for the Lee Site, but did not provide a revision to the FSAR. Update the FSAR accordingly.

FSAR (Rev. 1) Subsection 2.3.2.5.1 Cooling Tower Plumes addressed salt deposition on vegetation but not on plant equipment.

Provide in the FSAR a description of the potential impacts of the mechanical draft cooling towers on plant design and operation. In particular, address the effects of salt deposition on electrical transmission lines, electrical equipment (including transformers and switchyard), heating, ventilation, and air conditioning (HVAC) intakes. Also include justification for the use of CLT data as spatially representative considering the differing wind distributions.

Duke Energy Response:

The information provided in the response to WLS RAI 02.03.02-009 will be added in a future revision to the FSAR in a new Appendix 2DD. The new Appendix 2DD will provide comparisons of Lee Nuclear Station, Charlotte-Douglas Airport (CLT), and Greenville-Spartanburg Airport (GSP) meteorological data over consistent time periods to demonstrate similar climatology between the three locations similar to the justification provided in the response to WLS RAI 2.3.2-09.

The CLT (2001-2005) meteorological data was selected for use in the salt deposition assessment since it produced bounding results when compared to GSP (2001-2005) and Lee Nuclear Station (2007-2008) data. The maximum annual salt drift deposition amounts are over five times smaller for the GSP and Lee Nuclear Station meteorological databases than for CLT, with maximum annual concentrations of 0.16 kg/km^2/month (0.000016 mg/cm^2/month) for both GSP and Lee Nuclear Station and 0.82 kg/km^2/month (0.000082 mg/cm^2/month) for CLT.

<u>Effects of Salt Deposition on Electrical Equipment</u>

While salt deposition from evaporative cooling towers has the potential to build up on bushings of electrical equipment such as transformers, switchyard equipment, and transmission lines, IEEE C57.19.100-1995 "IEEE Guide for Application of Power Apparatus Bushings", Section 9 and Table 1, indicates that environments of less than 0.03 mg/cm^2 are below the typical measured equivalent salt deposition threshold to be designated the lowest level of contamination.

The salt deposition pattern shown in FSAR Table 2.3-280, which is based on 5 years of meteorological data from Charlotte (2001-2005), indicates that there will be negligible salt deposition on the Lee Nuclear Station site. The largest amount of deposition is approximately 1.2 kg/km^2/month (0.00012 mg/cm^2/month) occurring 200 m north of the towers in the summer. All other salt deposition amounts are below 1 kg/km^2/month (0.0001 mg/cm^2/month). On an annual basis, the largest amount of deposition is 0.82 kg/km^2/month (0.000082 mg/cm^2/month) occurring 200 m north of the towers.

Assuming the worst case potential salt deposition rate (0.00012 mg/cm^2/month) and no washing/cleaning from rain/wind at the Lee Nuclear Station site for an entire month, the result would be a monthly accumulation of only 0.4 percent (0.4%) of the 0.03 mg/cm^2 threshold amount for contamination designation by IEEE C57.19.100-1995. If it were assumed that no washing occurred over an entire year, the annual accumulation rate of 0.000082 mg/cm^2/month would result in only 3.3 percent (3.3%) of the threshold amount. Using the annual salt deposition rate of 0.000082 mg/cm^2/month and no washing/cleaning of electrical equipment and insulators from rain/wind, it would take 365 months (30+ years) before the buildup would equal the minimum buildup level classified as contaminated environment by IEEE C57.19.100-1995.

Due to natural wash off from local precipitation, total deposits are not expected to ever reach a level requiring attention. Therefore, none of the outdoor electrical equipment in the transformer yard or the switchyard requires special consideration for application in the environment at the Lee Nuclear Station site, and cooling tower plume generated salt deposits are not expected to adversely affect any electrical equipment at the Lee Nuclear Station site.

<u>Effects of Salt Deposition on Plant HVAC Intakes and Equipment</u>

Plant heating, ventilation and air conditioning (HVAC) intakes and equipment are located at distances ranging approximately 200 to 800 meters from the centerline of either group of Unit 1 or Unit 2 cooling towers. Due to the spatially distributed nature the cooling towers and plant equipment, cooling tower plumes from a wide range of plume directions could potentially impact plant equipment. Plume trajectories moving downwind from Unit 1 cooling towers toward sectors ranging from NE to ESE could potentially result in exposure of HVAC intakes and plant equipment to salt deposition from Unit 1 cooling tower plumes, while plume trajectories from Unit 2 cooling towers toward sectors ranging from WSW to NW could potentially result in salt deposition from Unit 2 cooling tower plumes. FSAR Table 2.3-280 shows that the maximum salt deposition rate anticipated at the distance range and directions where HVAC intakes and equipment are located is less than 0.00005 mg/cm^2/month. Based on guidance provided by IEEE C57.19.100-1995, it would take more than 600 months (50 years) of buildup without washing/cleaning from rain/wind before the threshold for low level contamination would be reached. Therefore, impacts from cooling tower plume salt deposition on HVAC intakes or equipment are negligible.

Associated Revision to the Lee Nuclear Station Final Safety Analysis Report:

1) New FSAR Chapter 2 Appendix 2DD
2) FSAR Subsection 2.3.2.5.1
3) FSAR Subsection 2.3.7

Attachments:

1) New FSAR Chapter 2 Appendix 2DD
2) Revision to FSAR Subsection 2.3.2.5.1
3) Revision to FSAR Subsection 2.3.7

Lee Nuclear Station Response to Request for Additional Information (RAI)

Attachment 1 to RAI 02.03.02-010

New FSAR Chapter 2 Appendix 2DD

Appendix 2DD

Cooling Tower Plume Analyses

This Appendix provides an evaluation of the meteorological data used in the cooling tower plume analyses.

APPENDIX 2DD

EVALUATION OF METEOROLOGICAL DATA USED IN COOLING TOWER PLUME ANALYSES

2DD.1 Purpose

The SACTI model requires hourly surface meteorological data in a format provided by the U.S. National Climatic Data Center (NCDC) in Asheville, NC or in Nuclear Regulatory Commission (NRC) format for on-site data. The William States Lee III Nuclear Station (Lee Nuclear Station) (WLS) on-site meteorological database is preferred for this analysis but less than five years of site data is available. Therefore, data from the National Weather Service (NWS) station at Charlotte, NC was selected for the analysis. A 5-year database (i.e., 2001 – 2005) containing the parameters needed by the SACTI model was used. Seasonal mixing height values for Greensboro, NC, the nearest upper air observation location to the site, were also used in the SACTI model. The acceptability of the Charlotte, NC data as a reasonable representation of the conditions expected at the Lee Nuclear Station site is evaluated in this Appendix.

2DD.2 Data Evaluation

The weather station at the Charlotte-Douglas Airport (CLT) is located approximately 35 miles northeast of the site. The ground elevation of the CLT airport is approximately 740 feet above mean sea level (msl). The weather station at the Greenville-Spartanburg Airport (Greer, GSP) is located approximately 40 miles southwest of the site. The ground elevation of the GSP airport is approximately 940 feet above mean sea level (msl). The plant elevation is approximately 600 feet msl with the circular mechanical draft cooling towers being located at a grade elevation of approximately 610 feet msl and the top of the towers at 701 feet msl. The onsite meteorological tower (i.e., Tower 2) is located at a base elevation of approximately 611 feet msl with instrumentation levels of 644 ft msl and 808 ft msl. Because the CLT weather station is in reasonable proximity to the site and is located at fairly similar elevations above sea level, the data from CLT are judged to be representative of the site. The following comparison of CLT and Lee Nuclear Station meteorological data supports this conclusion.

Table 2DD-201 gives a comparison of the meteorological data for the CLT and GSP weather stations and the Lee Nuclear Station site data (all data is from December 2005 through November 2006). The data comparison shows that the annual average wind speeds are very similar among the locations, with Charlotte and Lee Nuclear Station annual average wind speeds very similar and slightly lower than Greer.

The annual average humidity data (i.e., relative humidity and dew point) compared in Table 2DD-201, as well as Figure 2DD-202 and Figure 2DD-203 indicates that the Lee Nuclear Station site has higher humidity than the other two locations and that Charlotte humidity is closer than Greer to Lee Nuclear Station humidity for the period. The dry bulb temperatures are compared between the CLT, Lee Nuclear Station and GSP in Table 2DD-201 and Figure 2DD-204. The annual average temperature values are very similar among all three sites, with Charlotte being almost equal to the Lee Nuclear Station annual average temperature.

The stability class frequencies for the CLT weather station, the GSP weather station and Lee Nuclear Station site are compared in Table 2DD-201 and Figure 2DD-201. Stability class is determined at the NWS sites by the STAR method, which uses wind speed, cloud cover, and ceiling height data in the calculation. The two NWS sites (i.e., Charlotte and Greer) have similar frequency distributions with fewer occurrences of the extreme unstable and stable classes (i.e., A and G stability class) for Greenville and more occurrences of neutral stability (i.e., D stability class). The Lee Nuclear Station stability classes, based on the vertical temperature difference (Delta-T) method, exhibit much more frequently occurring G stability class and stable classes (i.e., E, F, and G) in general with approximately 54 percent occurrence of the stable classes versus 44 percent for Charlotte and 44 percent for Greer. Therefore, the Lee Nuclear Station onsite stability class distribution would tend to produce lower plume rises. The differences between stability class frequencies between the NWS sites and the Lee Nuclear Station site is attributable to the location of the Lee Nuclear Station site in a shallow river valley, as well as the different methods used to determine the stability classes.

Figure 2DD-205, Sheets 1 through 3, shows the wind rose for each of the three sites, providing a comparison between the wind speed and wind direction frequencies. The wind roses indicate that the Lee Nuclear Station site has a much higher frequency of NW winds due to the local terrain than the other two locations, although there is a secondary maximum in the Charlotte data from the NW direction. Thus, in this respect, it is closer to the prevailing wind direction at Lee Nuclear Station. The Greer data show strong prevailing southwest and northeast winds. The Charlotte data is more from the S – SSW. Also note that at higher wind speeds, the similarity of the Lee Nuclear Station winds to the SW - S and NE - N regional wind pattern improves. This is demonstrated by a comparison of the Lee Nuclear Station wind rose with low wind speeds (< 5 mph) removed (Figure 2DD-206) with the CLT wind rose given in Figure 2DD-205, (page 2 of 3).

Based on the above comparisons, it is concluded that use of the five-year meteorological dataset from the Charlotte (2001-2005) NWS weather station is reasonably representative of the conditions expected at the Lee Nuclear Station site. The CLT data is similar to Lee Nuclear Station in wind speeds, the occurrence of NW winds, and humidity. Since five years of onsite data was not available for SACTI modeling, five years of data from Charlotte NWS was used instead. Sensitivity studies were performed to address the differences in SACTI results for the three data sets.

Plume Length and Height

The SACTI visible plume results for the Charlotte-Douglas (CLT), Greenville-Spartanburg (GSP), and Lee Nuclear Station onsite meteorological data are summarized in Tables 2DD-202, 2DD-203, and 2DD-204, respectively. Table 2DD-205 provides a comparison of the frequency of occurrence of visible plume dimensions for the three meteorological databases. These tables provide a range of frequency of occurrence of visible plume dimensions (i.e., length, width, and height) in meters from the towers for each season of the year and for the annual period.

On an annual average basis, 40 percent of the plumes reach 400 m downwind for all three meteorological databases. Twenty percent of the plumes reach a length of 4600 m using the CLT database, 5400m using the GSP database and 800m using the Lee Nuclear Station data. This is the only case in which the plume length based on GSP data exceeds the length using the CLT data. On an annual average basis, 40 percent of the plumes reach a maximum of 170 m in height for the CLT database (160 m for GSP and 100 m for Lee Nuclear Station). The visible plumes predicted with the Lee Nuclear Station database are noticeably lower in height compared to the NWS databases. This could be due to higher wind speeds calculated by SACTI at plume height, which cause the plumes to bend over further, or a result of the greater frequency of G stability class in the Lee Nuclear Station meteorological dataset. Comparison of the plume length and height shows that CLT gives a reasonably conservative estimate of the plume extent offsite.

The largest visible plumes shown in Tables 2DD-202, 2DD-203, and 2DD-204 reach a distance of 9,900 m downwind of the towers and a height of approximately 1,700 m and occur approximately 1 percent of the time. The longer plumes occur a little less frequently with the Lee Nuclear Station database compared to the NWS databases, with the approximately 8000-meter visible plumes occurring less than 20 percent of the time. Note that the longest visible plumes occur during conditions of high ambient relative humidity that are conducive to natural fog formation and poor visibility conditions. Under these conditions, the atmosphere is either already at or near saturation. Therefore, the largest plumes may not be discernable from the ambient fogging conditions and present less of an aesthetic impact.

The SACTI results for three different meteorological databases (i.e., CLT, GSP, and Lee Nuclear Station) indicate that the majority (i.e., >50 percent) of the visible plumes extend less than 1,000 m downwind and 200 m in height. It also shows that the longest and largest visible plumes occur in the winter with smaller plumes occurring in the spring and fall seasons due to the cold air in winter causing condensation of the moist plumes more readily than in the warmer seasons (i.e., cold air has a much smaller capacity of holding water vapor). The summer visible plumes are noticeably smaller since warmer ambient air results in less condensation of the moist plumes, due to its ability to maintain higher water vapor concentrations.

Plume Shadowing

Consistent with the visible plume frequency results, the most plume shadowing occurs in the winter season with lesser amounts in the spring and fall and the least amounts in the summer. Plume shadowing effects reach 1,000 m downwind less than 2 percent of the time with the farthest impact reaching approximately 4,600 m in the winter for approximately 0.5% of the time (i.e., CLT meteorological database). The farthest extent of the winter plume shadowing effects is smaller for the GSP and Lee Nuclear Station meteorological databases with distances of 2,600 m and 2,400 m, respectively.

On an annual average basis, plume shadowing effects reach 1,000 m downwind 1 percent of the time with the effects reaching 3,200 m 0.5 percent of the time using the CLT meteorological database. The annual average shadowing effects are less extensive for the GSP and Lee Nuclear Station meteorological databases with 1 percent distances of 600 m and 800 m and 0.5 percent distances of 1,200 m and 1,400 m, respectively.

Ground-level Fogging/Icing

The SACTI output for the CLT and GSP data shows that there are virtually no occurrences of ground level fogging. Plume fogging occurred almost entirely in the Spring with the CLT meteorological data, with periods of fogging ranging from 0.5 to 2 hours in the south sector and a maximum of 2 hours at 500 m. Other sectors impacted were SSW (200 m) and SW (300-700 m) with 0.1 hour to 1.0 hour of fogging. Using GSP meteorological data, fogging occurred only in the Spring and Winter with 1.0 to 2.0 hours in the Spring in the SW downwind sector over a range of 300-700 m and 0.5 to 1.0 hour in the Winter in two downwind sectors (i.e., NNE and ENE).

The SACTI results for the Lee Nuclear Station data indicate that the maximum number of hours of ground level fogging is 362 hours over the 2-year 2006-2007 meteorological database (i.e., 2% of the time) for all directions occurring at a downwind distance of 400 m. However, many of those fogging occurrences are within the property boundary (i.e., onsite) leaving a maximum of 82 hours per 2-year period (i.e., 0.5% of the time) at a downwind distance of 500 m. The SACTI output for the CLT, GSP and Lee Nuclear Station meteorological data indicate no occurrences of ground level icing.

Salt Deposition

The SACTI output for CLT, GSP, and Lee Nuclear Station was also reviewed to determine whether or not a CLT salt deposition analysis was valid. The CLT data was determined valid for use in the Lee Nuclear Station salt deposition assessment since it produced bounding results when compared to GSP and Lee Nuclear Station data. The maximum annual salt drift deposition amounts are over five times smaller for the GSP and Lee Nuclear Station meteorological database than for CLT, whereby the maximum annual concentrations amounts are 0.16 kg/km^2/month (0.000016 mg/cm^2/month) for both GSP and Lee Nuclear Station and 0.82 kg/km^2/month (0.000082 mg/cm^2/month) for CLT. Maximum seasonal and annual salt deposition impacts occurred at distances of 200-300m using CLT and GSP datasets, and 600-700m using the WLS onsite meteorological dataset. Impacts were larger with the CLT meteorological data, thus CLT is appropriate to use for design purposes.

2DD.3 Conclusion

Based on the above comparisons, it is concluded that use of the five-year meteorological dataset from the Charlotte (2001-2005) NWS weather station is reasonably representative of the conditions expected at the Lee Nuclear Station site. The comparison of the meteorological variables between CLT and Lee Nuclear Station datasets, as well as the resulting SACTI outputs, support the use of a 5-year dataset from CLT as input to the SACTI modeling for the Lee Nuclear Station site.

TABLE 2DD-201
Meteorological Data Comparison
(Dec 2005 to Nov 2006)

Parameter	Lee Onsite Data	Charlotte Data	Greer Data
Annual Average Wind Speed (m/s)	2.45	2.67	2.97
Annual Average Temperature (˚C)	15.6	15.5	15.9
Annual Average Dew Point (˚C)	9.6	8.4	7.8
Annual Average RH (%)	70.9	65.7	62.4
Stability Class Frequency			
A	7.90%	3.60%	4.10%
B	6.10%	9.80%	9.90%
C	7.20%	11.60%	12.10%
D	25.60%	30.90%	29.70%
E	21.70%	18.00%	17.40%
F	11.90%	18.10%	17.50%
G	19.60%	8.00%	9.30%

TABLE 2DD-202
Visible Plume Frequency of Occurrence by Season Using
2001-2005 Charlotte Meteorological Data (All wind directions)

Percent Frequency of Occurrence

	100%	80%	60%	40%	20%	1%
Winter:						
length (m)	100	200	400	900	5,100	9,900
height (m)	40	120	160	370	1,400	1,400
radius (m)	25	45	60	85	520	1,400
Spring:						
length (m)	100	200	250	300	4,800	9,900
height (m)	40	110	120	160	1,400	1,400
radius (m)	25	35	45	60	470	650
Summer:						
length (m)	100	150	200	250	600	9,800
height (m)	40	110	120	130	330	1,400
radius (m)	25	35	40	45	75	650
Fall:						
length (m)	100	200	250	400	4,700	9,900
height (m)	40	110	125	160	1,400	1,400
radius (m)	25	35	45	60	435	1,400
Annual:						
length (m)	100	200	250	400	4,600	9,900
height (m)	40	110	120	170	1,400	1,400
radius (m)	25	35	40	65	435	1,400

TABLE 2DD-203
Visible Plume Frequency of Occurrence by Season Using
2001-2005 Greenville-Spartanburg Meteorological Data (All wind directions)

	Percent Frequency of Occurrence					
	100%	**80%**	**60%**	**40%**	**20%**	**1%**
Winter:						
length (m)	<100	250	400	700	9,700	9,900
height (m)	<10	80	160	290	1,400	1,700
radius (m)	<5	35	60	80	560	710
Spring:						
length (m)	100	200	250	300	5,300	9,800
height (m)	30	75	85	120	1,400	1,700
radius (m)	20	30	35	55	390	710
Summer:						
length (m)	100	200	250	300	600	9,800
height (m)	40	75	85	90	240	1,600
radius (m)	25	27	30	35	75	710
Fall:						
length (m)	100	200	250	400	5,400	9,800
height (m)	40	80	85	160	1,400	1,600
radius (m)	25	30	35	60	475	710
Annual:						
length (m)	100	200	250	400	5,400	9,800
height (m)	40	80	85	160	1,400	1,600
radius (m)	25	30	35	60	475	710

TABLE 2DD-204
Visible Plume Frequency of Occurrence by Season Using 2006-2007 Lee Onsite Meteorological Data (All wind directions)

Percent Frequency of Occurrence

	100%	80%	60%	40%	20%	1%
Winter:						
length (m)	100	300	400	500	8,000	9,900
height (m)	10	80	100	120	960	1,400
radius (m)	5	35	50	60	330	640
Spring:						
length (m)	100	200	250	300	450	9,900
height (m)	10	40	70	90	120	1,400
radius (m)	5	25	30	45	60	640
Summer:						
length (m)	100	150	250	300	500	9,900
height (m)	10	40	70	90	120	1,400
radius (m)	5	20	30	35	60	640
Fall:						
length (m)	100	200	300	400	700	9,900
height (m)	10	50	80	100	190	1,400
radius (m)	5	25	35	50	70	640
Annual:						
length (m)	100	200	300	400	800	9,900
height (m)	10	50	80	100	210	1,400
radius (m)	5	25	35	50	75	640

TABLE 2DD-205
Visible Plume Frequency of Occurrence by Season
Comparison of Meteorological Databases (All wind directions)

		Percent Frequency of Occurrence					
		100%	80%	60%	40%	20%	1%
Winter:							
length (m)	CLT	100	200	400	900	5,100	9,900
	GSP	<100	250	400	700	9,700	9,900
	WLS	100	300	400	500	8,000	9,900
height (m)	CLT	40	120	160	370	1,400	1,400
	GSP	<10	80	160	290	1,400	1,700
	WLS	10	80	100	120	960	1,400
radius (m)	CLT	25	45	60	85	520	1,400
	GSP	<5	35	60	80	560	710
	WLS	5	35	50	60	330	640
Spring:							
length (m)	CLT	100	200	250	300	4,800	9,900
	GSP	100	200	250	300	5,300	9,800
	WLS	100	200	250	300	450	9,900
height (m)	CLT	40	110	120	160	1,400	1,400
	GSP	30	75	85	120	1,400	1,700
	WLS	10	40	70	90	120	1,400
radius (m)	CLT	25	35	45	60	470	650
	GSP	20	30	35	55	390	710
	WLS	5	25	30	45	60	640
Summer:							
length (m)	CLT	100	150	200	250	600	9,800
	GSP	100	200	250	300	600	9,800
	WLS	100	150	250	300	500	9,900
height (m)	CLT	40	110	120	130	330	1,400
	GSP	40	75	85	90	240	1,600
	WLS	10	40	70	90	120	1,400
radius (m)	CLT	25	35	40	45	75	650
	GSP	25	27	30	35	75	710
	WLS	5	20	30	35	60	640
Fall:							
length (m)	CLT	100	200	250	400	4,700	9,900
	GSP	100	200	250	400	5,400	9,800
	WLS	100	200	300	400	700	9,900
height (m)	CLT	40	110	125	160	1,400	1,400
	GSP	40	80	85	160	1,400	1,600
	WLS	10	50	80	100	190	1,400
radius (m)	CLT	25	35	45	60	435	1,400
	GSP	25	30	35	60	475	710
	WLS	5	25	35	50	70	640
Annual:							
length (m)	CLT	100	200	250	400	4,600	9,900
	GSP	100	200	250	400	5,400	9,800
	WLS	100	200	300	400	800	9,900
height (m)	CLT	40	110	120	170	1,400	1,400
	GSP	40	80	85	160	1,400	1,600
	WLS	10	50	80	100	210	1,400
radius (m)	CLT	25	35	40	65	435	1,400
	GSP	25	30	35	60	475	710
	WLS	5	25	35	50	75	640

Figure 2DD-201
Stability Class Comparison
(Dec 2005 to Nov 2006)

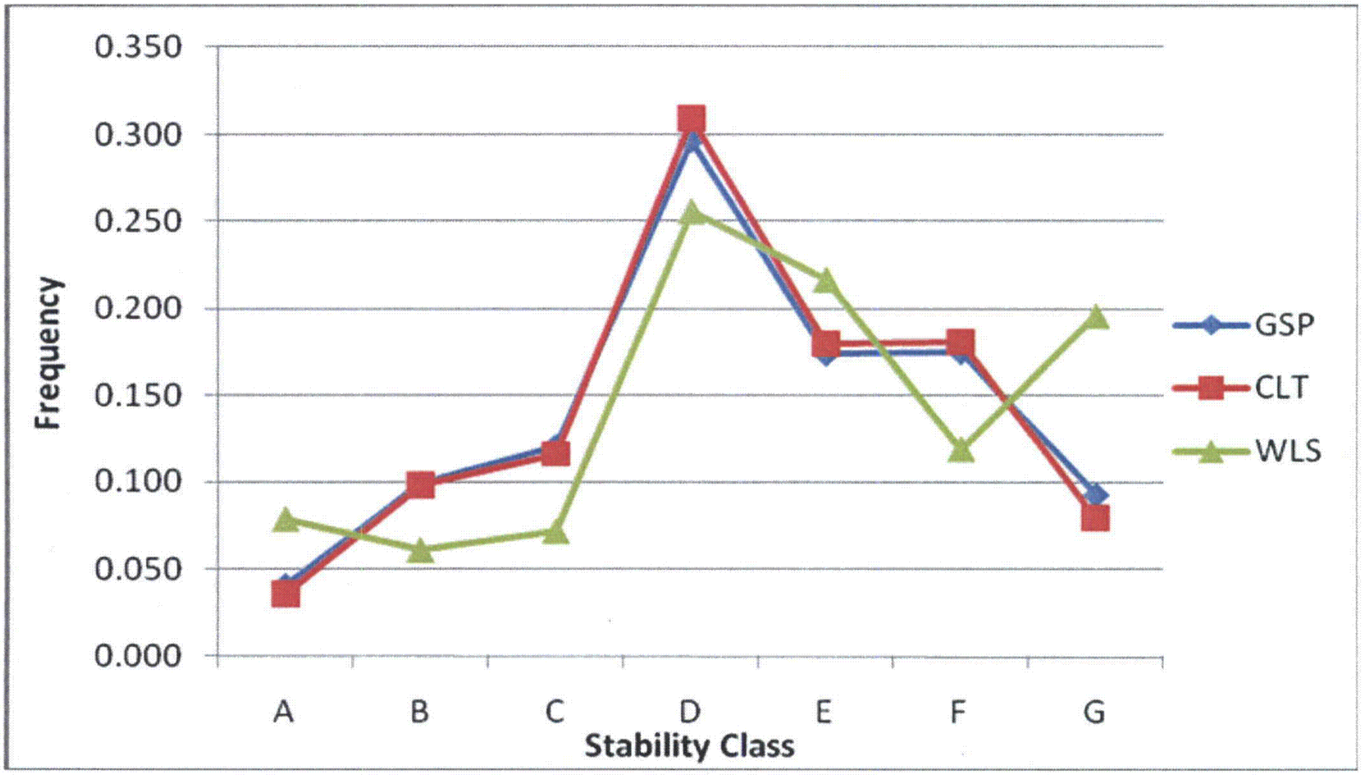


Figure 2DD-202
Relative Humidity Comparison
(Dec 2005 to Nov 2006)

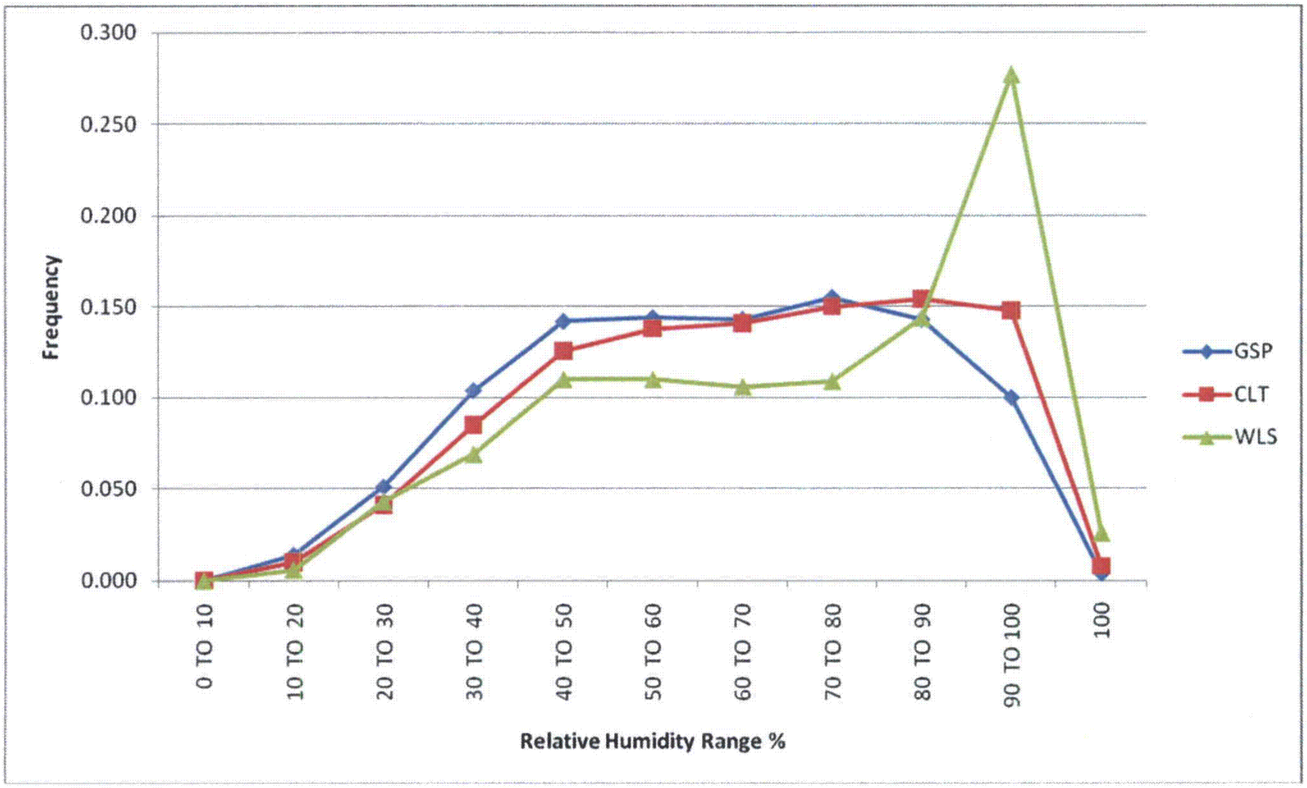


Figure 2DD-203
Dew Point Comparison
(Dec 2005 to Nov 2006)

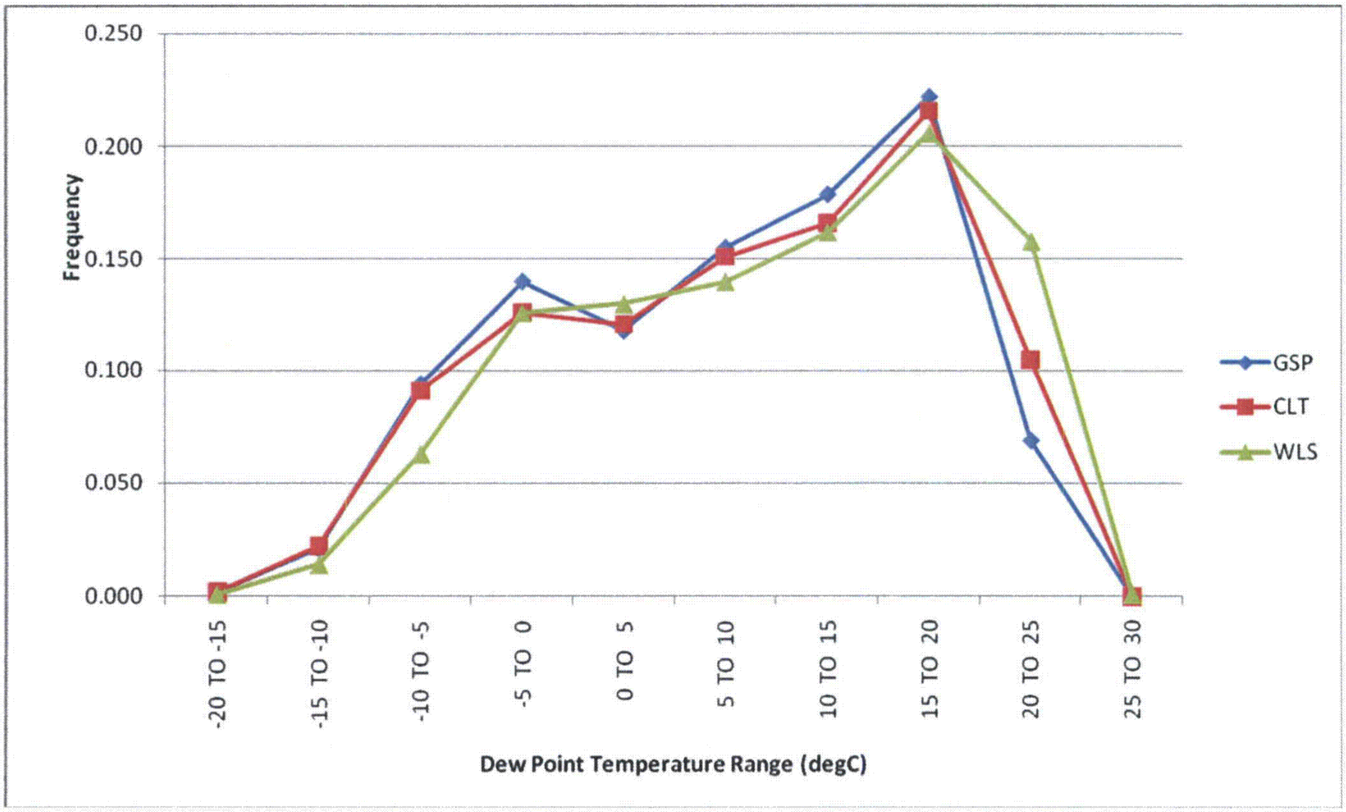


Figure 2DD-204
Dry Bulb Temperature Comparison
(Dec 2005 to Nov 2006)

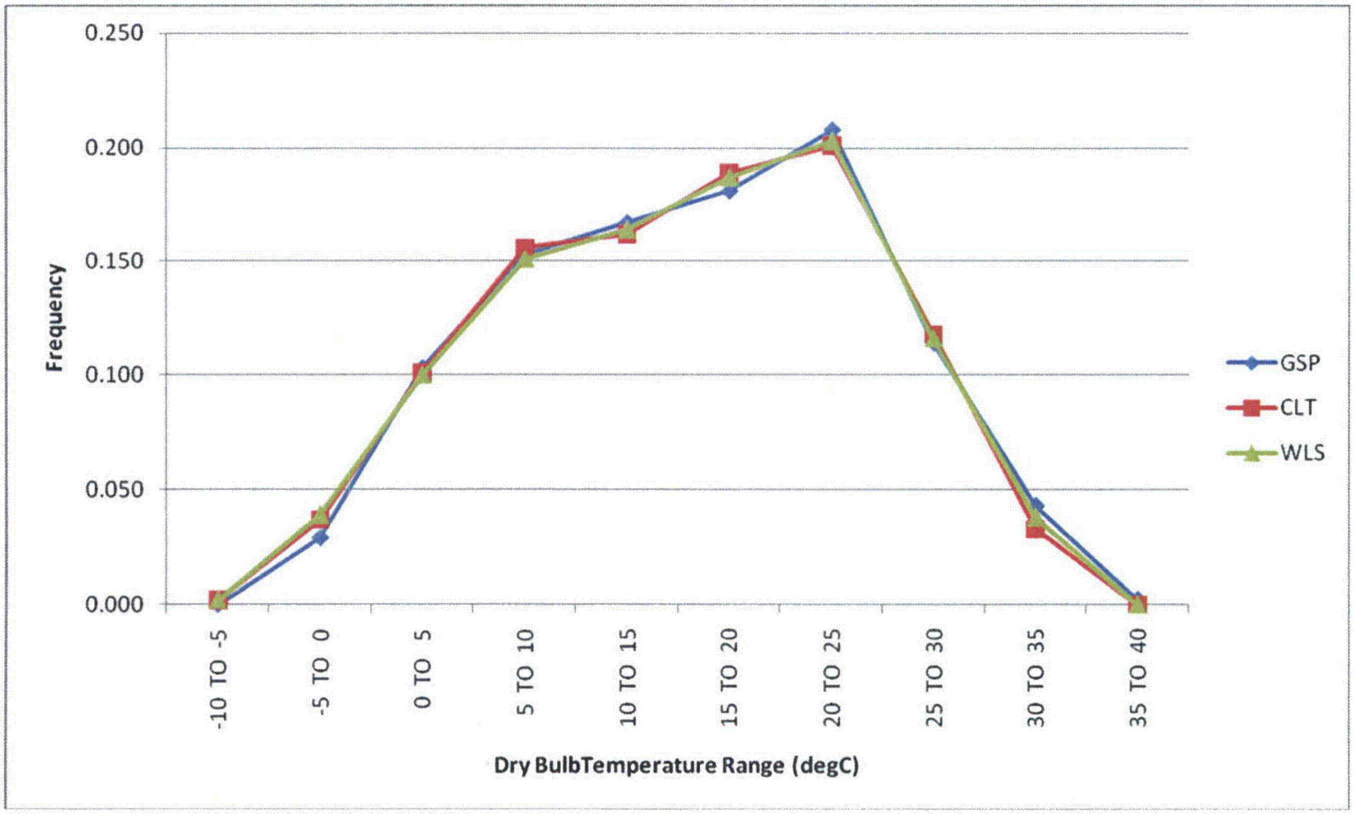


Figure 2DD-205
(page 1 of 3)
Wind Direction Frequency
WLS Data (Dec 2005 to Nov 2007)

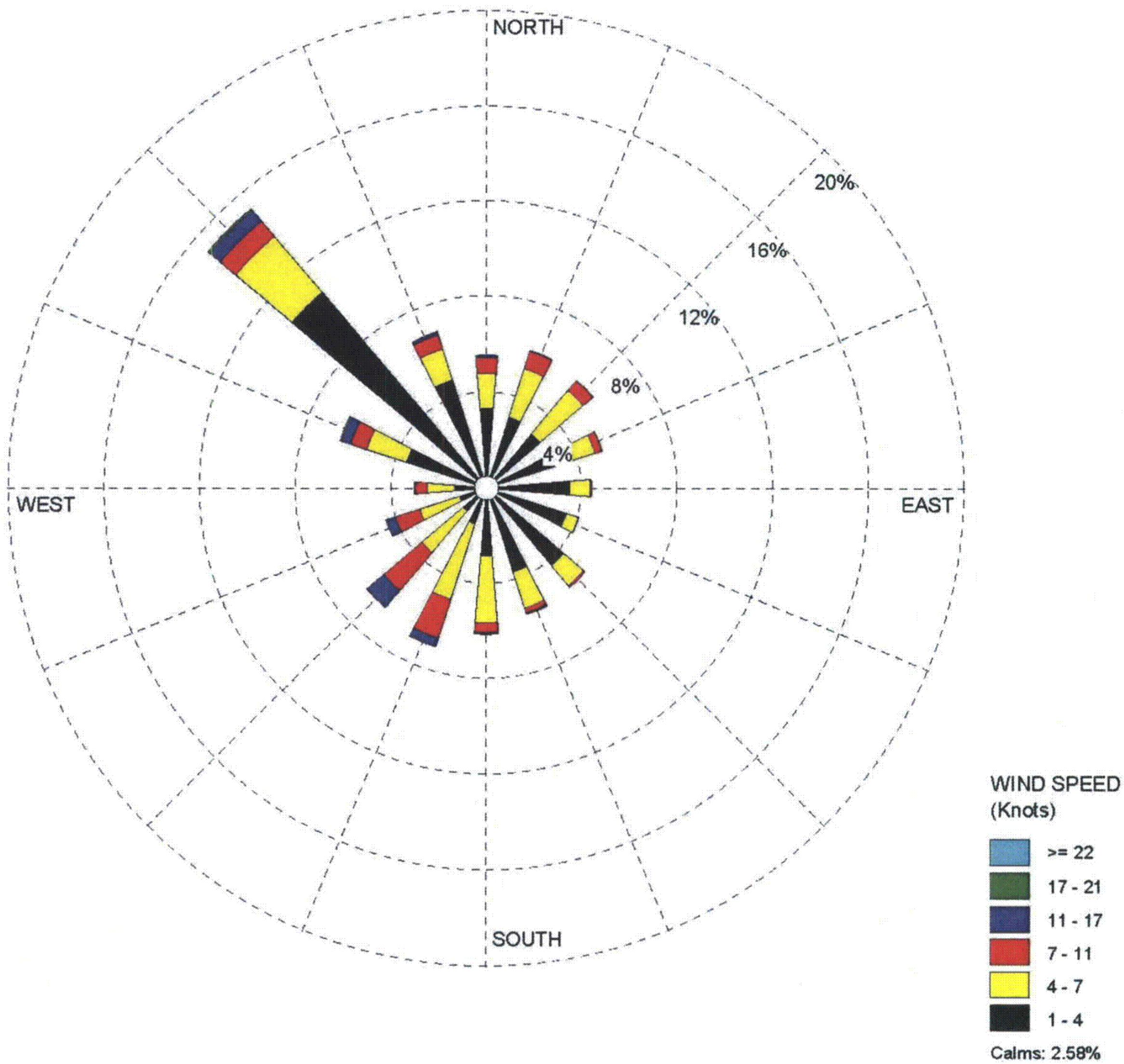


Figure 2DD-205
(page 2 of 3)
Wind Direction Frequency
CLT Data (Dec 2005 to Nov 2006)

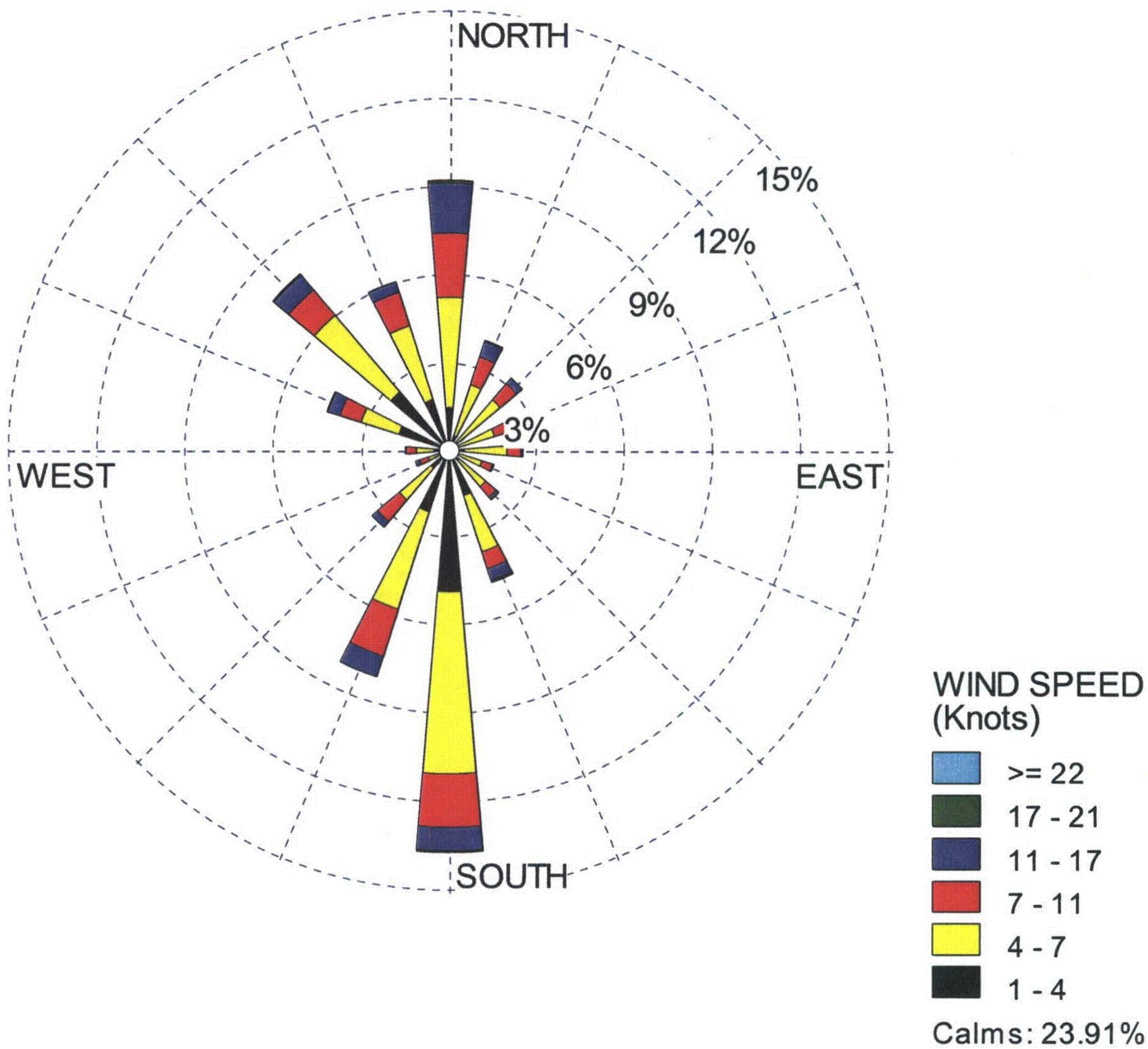


Figure 2DD-205
(page 3 of 3)
Wind Direction Frequency
GSP Data (Dec 2005 to Nov 2006)

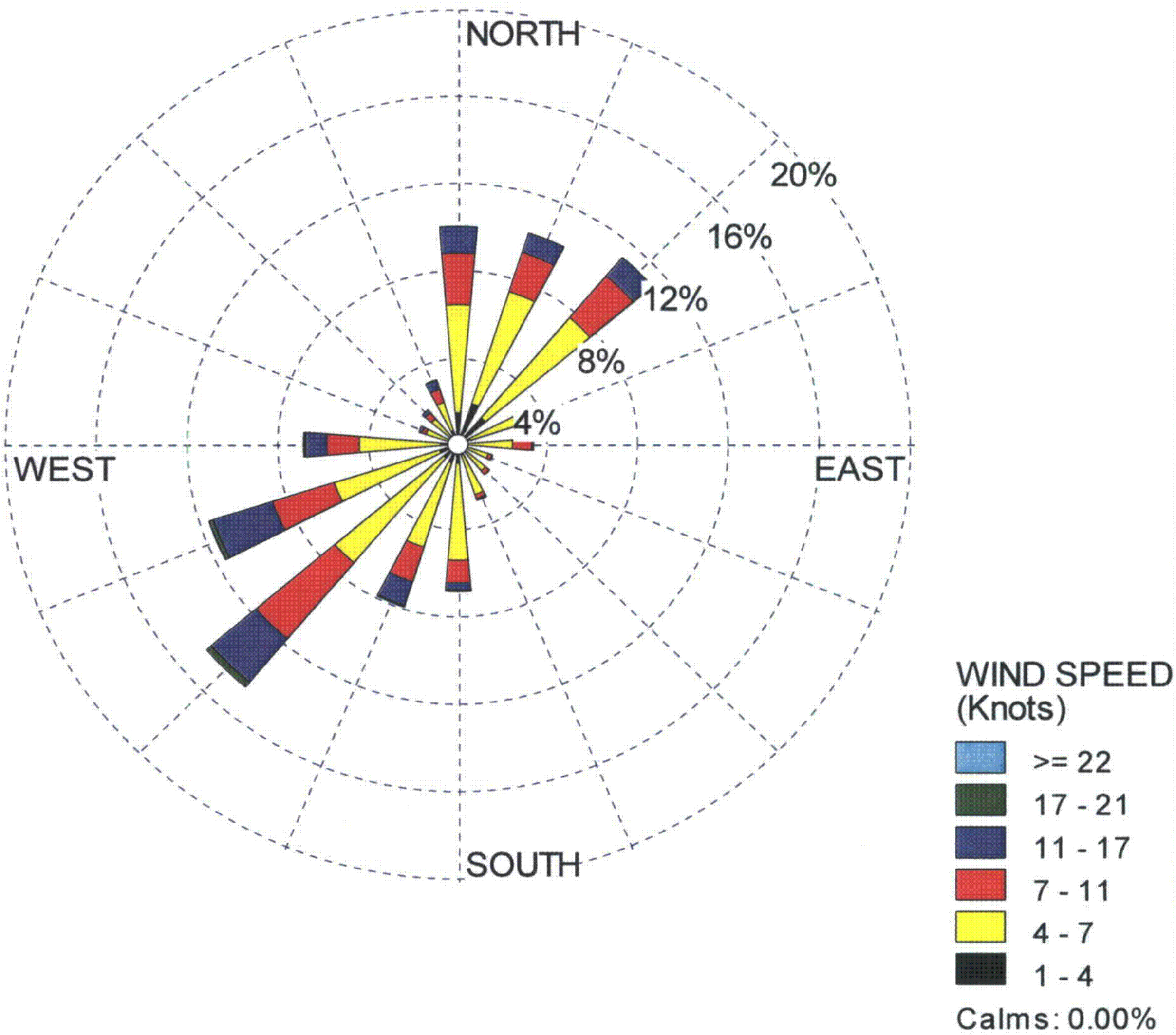
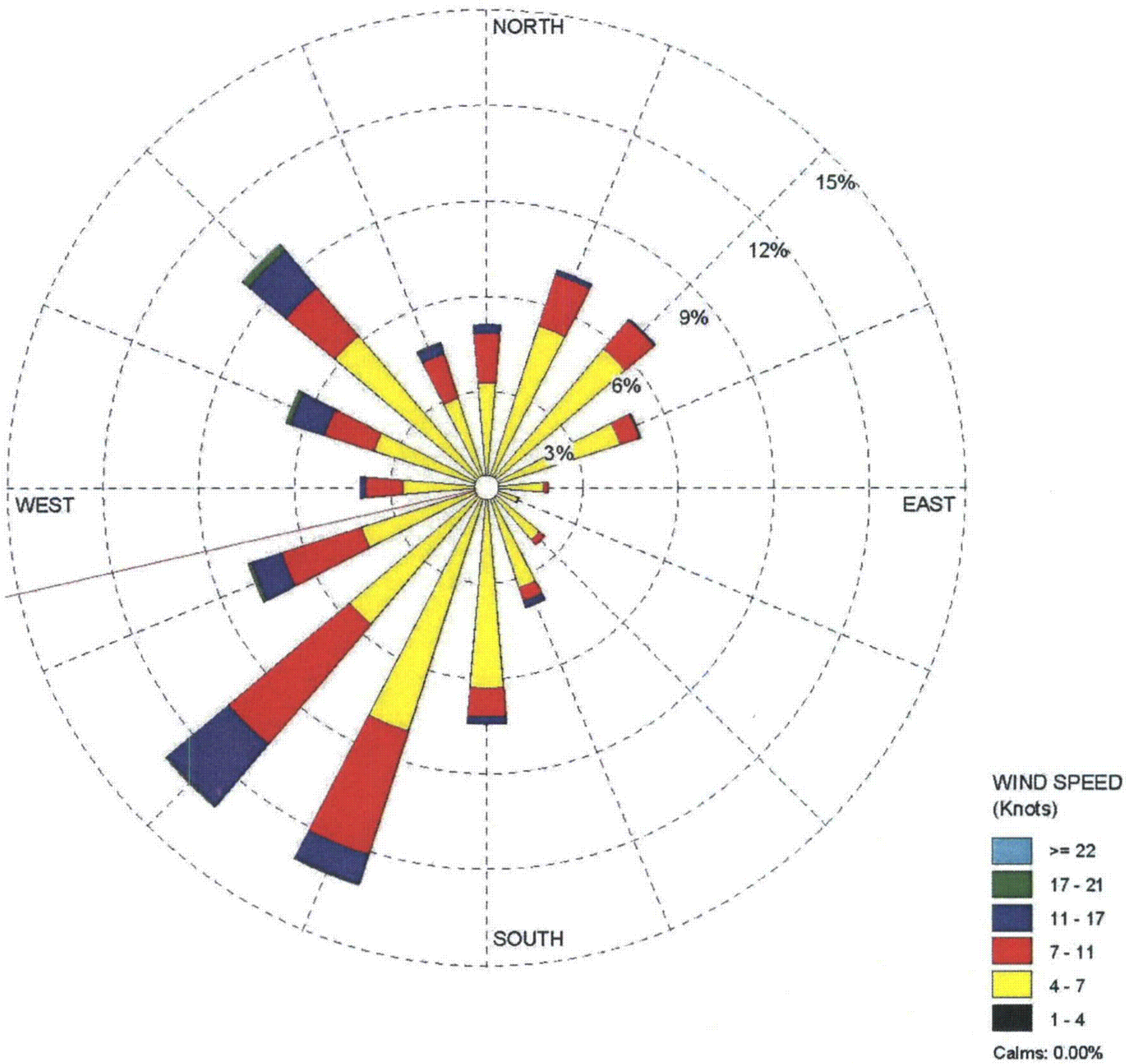


Figure 2DD-206
Wind Direction Frequency
WLS Data (Dec 2005 to Nov 2007)
[with low windspeeds (<5 mph or <4.3 knots) removed]



Lee Nuclear Station Response to Request for Additional Information (RAI)

Attachment 2 to RAI 02.03.02-010

Revision to FSAR Subsection 2.3.2.5.1

COLA Part 2, FSAR Chapter 2, Subsection 2.3.2.5.1 is revised to add the following after the seventh paragraph:

While salt deposition from evaporative cooling towers has the potential to build up on bushings of electrical equipment such as transformers, switchyard equipment, and transmission lines, IEEE C57.19.100-1995 "IEEE Guide for Application of Power Apparatus Bushings" (Reference 241), Section 9 and Table 1, indicates that environments of less than 0.03 mg/cm^2 are below the typical measured equivalent salt deposition threshold to be designated the lowest level of contamination.

Assuming the worst case seasonal potential salt deposition rate of 1.2 kg/km^2/month (0.00012 mg/cm^2/month), based on 5 years of CLT meteorological data and no washing/cleaning from rain/wind at the Lee Nuclear Station site for an entire month, the result would be a monthly accumulation of only 0.4 percent (0.4%) of the 0.03 mg/cm^2, or 300 kg/km^2 threshold amount for contamination designation by IEEE C57.19.100-1995. If it was assumed that no washing occurred over an entire year, the annual accumulation rate of 0.000082 mg/cm^2/month would result in only 3.3 percent (3.3%) of the threshold amount. Using the annual salt deposition rate of 0.000082 mg/cm^2/month and no washing/cleaning of electrical equipment and insulators from rain/wind, it would take 365 months (30+ years) before the buildup would equal the minimum buildup level classified as contaminated environment by IEEE C57.19.100-1995.

Due to natural wash off from local precipitation, total deposits are not expected to ever reach a level requiring attention. Therefore, none of the outdoor electrical equipment in the transformer yard or the switchyard requires special consideration for application in the environment at the Lee Nuclear Station site, and cooling tower plume generated salt deposits are not expected to adversely affect any electrical equipment at the Lee Nuclear Station site.

Plant heating, ventilation and air conditioning (HVAC) intakes and equipment are located at distances ranging approximately 200 to 800 meters from the centerline of either group of Unit 1 or Unit 2 cooling towers. Due to the spatially distributed nature of the cooling towers and plant equipment, cooling tower plumes from a wide range of plume directions could potentially impact plant equipment. Plume trajectories moving downwind from Unit 1 cooling towers toward sectors ranging from NE to ESE could potentially result in exposure of HVAC intakes and plant equipment to salt deposition from Unit 1 cooling tower plumes, while plume trajectories from Unit 2 cooling towers toward sectors ranging from WSW to NW could potentially result in salt deposition from Unit 2 cooling tower plumes. FSAR Table 2.3-280 shows that the maximum salt deposition rate anticipated at the distance range and directions where HVAC intakes and equipment are located is less than 0.00005 mg/cm^2/month. Based on guidance provided by IEEE C57.19.100-1995, it would take more than 600 months (50 years) of buildup without washing/cleaning from rain/wind before the threshold for low level contamination would be reached. Therefore, impacts from cooling tower plume salt deposition on HVAC intakes or equipment are negligible.

Lee Nuclear Station Response to Request for Additional Information (RAI)

Attachment 3 to RAI 02.03.02-010

Revision to FSAR Subsection 2.3.7

COLA Part 2, FSAR, Chapter 2, Subsection 2.3.7, is revised to add a new reference as follows:

241. IEEE Standard C57.19.100-1995, Guide for Application of Power Apparatus Bushings.