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September 26, 2008

Document Control Desk
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
Ltr# WLG2008.09-11

Reference: Letter from J.M. Muir (NRC) to B.J. Dolan (Duke Energy), Request for Additional Information Regarding the Environmental Review of the Combined License Application for William States Lee Nuclear Station Units 1 and 2, dated August 21, 2008

This letter provides the Duke Energy response to the Nuclear Regulatory Commission's (NRC) request for the following additional information (RAI) items listed in the reference letter.

RAI 2, Transportation
RAI 14, Hydrology
RAI 17, Hydrology
RAI 20, Hydrology
RAI 33, Socioeconomics
RAI 38, Radiological Health
RAI 43, Cultural Resources
RAI 46, Cultural Resources
RAI 49, Meteorology
RAI 50, Meteorology
RAI 51, Meteorology
RAI 70, Terrestrial Ecology
RAI 98, Accidents
RAI 100, Accidents
RAI 101, Accidents

A response to each NRC request is addressed in the enclosure which also identifies any associated changes that will be made in a future revision of the William States Lee III Nuclear Station application.

D079
NRO

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

Bryan J. Dolan
Vice President
Nuclear Plant Development

Enclosures:

1. Response to RAI 2, Transportation
2. Response to RAI 14, Hydrology
3. Response to RAI 17, Hydrology
4. Response to RAIs 20, 50, 51, 98, and 100, Hydrology, Meteorology, Accidents
5. Response to RAI 33, Socioeconomics
6. Response to RAI 38, Radiological Health
7. Response to RAIs 43 and 46, Cultural Resources
8. Response to RAI 49, Meteorology
9. Response to RAI 70, Terrestrial Ecology
10. Response to RAI 101, Accidents

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 September 26, 2008

Phoebe P. Elliott
Notary Public

My commission expires: June 26, 2011

SEAL

xc (wo/enclosures):

Michael Johnson, Director, Office of New Reactors
Gary Holahan, Deputy Director, Office of New Reactors
David Matthews, Director, Division of New Reactor Licensing
Scott Flanders, Director, Division of Site and Environmental Reviews
Glenn Tracy, Director, Division of Construction Inspection and Operational Programs
Luis Reyes, Regional Administrator, Region II
Loren Plisco, Deputy Regional Administrator, Region II
Thomas Bergman, Deputy Division Director, DNRL
Stephanie Coffin, Branch Chief, DNRL

xc (w/enclosures):

Linda Tello, Project Manager, DSER
Brian Hughes, Senior Project Manager, DNRL

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

RAI Letter Dated: August 21, 2008

Reference NRC RAI Number: ER RAI 2

NRC RAI:

Provide a full and detailed transportation analysis including RADTRAN and TRAGIS input and output files that supports Sections 3.8 and 7.4 of the ER.

Duke Energy Response:

Revised text for ER Sections 3.8 and 7.4 was provided to the NRC in a letter dated June 9, 2008.

Input and output files for the RADTRAN and TRAGIS models were provided to NRC in a letter dated August 18, 2008.

The transportation calculation package is available for NRC inspection at the Duke Energy Charlotte office or at our contractors' offices in Richland, WA and Bethesda, MD.

Associated Revisions to the Lee Nuclear Station Combined License Application:

No COLA revisions have been identified with this response.

Associated Attachments:

None

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

RAI Letter Dated: August 21, 2008

Reference NRC RAI Number: ER RAI 14

NRC RAI:

Submit a table showing the concentrations in four-cycle blowdown water to be discharged to the Broad River.

Duke Energy Response:

The water quality of the anticipated discharge from plant operations at Lee Nuclear Station, based on four-fold concentration of ambient waters of the Broad River, is provided in table format as an attachment below. This table highlights the three analytes, copper, iron and zinc, which occur naturally in this region and exceed the corresponding regulatory levels. Boron, cadmium, lead, mercury, selenium and silver were non-detected analytes listed in the table. Estimating concentrations of these analytes in the discharge is not possible.

Associated Revisions to the Lee Nuclear Station Combined License Application:

1. Revise COLA Part 3, ER Chapter 2, Subsection 2.3.3.1.2, by deleting the last paragraph, as follows:

   ~~Cadmium~~

   ~~Surface water results for samples collected from water bodies near the Lee Nuclear Site were below the reporting limit of 0.5 µg/L for cadmium. The 1970s study also reported no detection of cadmium in waters of the Broad River. However, because the CMC is lower than the reporting limit, cadmium concentrations could potentially exceed the CMC.~~

2. Revise COLA Part 3, ER Chapter 5, Subsection 5.2.3.2, paragraph 2, as follows:

   Details related to water quality of the Broad River are presented in Subsection 2.3.3. As previously noted in Subsection 2.3.3, most of the mean and maximum trace metals concentrations are below the SCDHEC criterion maximum concentration (CMCs) for fresh water aquatic life except for copper and iron; both naturally high in the region. Table 5.2-2 presents the water quality of the anticipated discharge from plant operations at Lee Nuclear Station, based on a four-fold concentration of the ambient waters of the Broad River. ~~Cadmium, e~~

   Based on the water quality data collected in 2006, copper, iron, and, occasionally zinc are ~~estimated~~ expected to exceed the SCDHEC CMCs for freshwater aquatic life ~~as a result~~ at the point of discharge of the 4-cycle concentration cooling tower ~~operation~~effluent. Zinc concentrations are expected to be reduced to concentrations less than the CMC~~s~~ upon mixing ~~when diluted bydischarged to~~ in the Broad River.~~during both the 7Q10 flow and the annual mean flow. Cadmium was only measured at thedetection limitand consequently is~~

~~conservatively estimated to exceed the CMC. Actual Cadmium concentration measured in the discharge will likely be below CMCs.~~ Iron and copper naturally occur at~~in~~ concentrations that ~~can~~ occasionally exceed South Carolina's CMCs for freshwater aquatic life in the Broad River. Iron and copper are expected to exceed their CMCs at the point of discharge during these periods. Based on average annual concentrations, these compounds should dilute to levels below their CMCs during both the 7Q10 flow and the annual mean flow. Boron, cadmium, lead, mercury, selenium and silver were measured in all samples below their laboratory detection limits, thus no estimate of the discharge concentrations was made for these analytes.

3. Revise COLA Part 3, ER Chapter 5, Section 5.2, by adding the attachment below.

Associated Attachment:

Table 5.2-2. Water Quality of Cooling Tower Blowdown

TABLE 5.2-2: WATER QUALITY OF COOLING TOWER BLOWDOWN

Category		Aluminum	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Silver	Sulfate	Zinc
		mg/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	mg/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L
(1) South Carolina PQLs		0.05	5	50	0.05	0.1	5	10	0.02	2	0.05	10	0.0005	10	5	5	5	10
(1) South Carolina CMCs for Freshwater Aquatic Life		-	340	-	-	0.53	-	3.8	1	14	-	-	1.6	150	-	0.37	-	37
(1) South Carolina MCLs		-	10	2000	-	5	100	-	-	-	-	-	2	-	50	-	-	-
Mean and Maximum values calculated from quarterly monitoring	Mean	0.163	0.36	19.2	<0.1	<0.5	0.827	1.31	0.855	<2	1.67	47.7	<0.087	0.128	<2	<0.5	6.26	5.44
	Max	0.268	2.18	22.4	<0.1	<0.5	1.68	4.97	1.11	<2	1.88	61.9	<0.1	2.95	<2	<0.5	9.77	12.6
(2) 4-cycle Concentration at Point of Discharge	Mean concentration	0.654	1.43	76.8	NA	NA	3.31	5.24	3.42	NA	6.68	191	NA	0.513	NA	NA	25.0	21.8
	Max concentration	1.07	8.72	89.4	NA	NA	6.72	19.9	4.42	NA	7.50	247	NA	11.8	NA	NA	39.1	50.2
(3) Diluted Effluent at River's 7Q10 Flow: 479 cfs (214,990 gpm)	Mean concentration	0.187	0.41	22.0	NA	NA	0.949	1.503	0.981	NA	1.92	54.7	NA	0.147	NA	NA	7.18	6.24
	Max concentration	0.307	2.50	25.7	NA	NA	1.93	5.70	1.27	NA	2.15	71.0	NA	3.38	NA	NA	11.2	14.4
(3) Diluted Effluent at River's Annual Mean Flow: 2538 cfs (1,139,134 gpm)	Mean concentration	0.168	0.37	19.8	NA	NA	0.851	1.348	0.879	NA	1.72	49.0	NA	0.132	NA	NA	6.44	5.60
	Max concentration	0.276	2.24	23.0	NA	NA	1.73	5.11	1.14	NA	1.93	63.6	NA	3.03	NA	NA	10.0	12.9

cfs = cubic feet per second
Operational Discharge Rate (DR) = 8216 gallons per minute (gpm)

MCL - Maximum Concentration Level
CMC - Criterion Maximum Concentration
mg/L - Milligrams Per Liter
ug/L - Micrograms Per Liter
meq/L - Milliequivalents Per Liter
PQL - Practical Quantitation Limit

Notes:

(1) South Carolina Department of Health (SCDHEC) Water Classifications and Standards Regulation 61-68 (June 25, 2004) established maximum concentrations for freshwater (CMCs) and drinking water (MCLs). SCDHEC Practical Quantitation Limits (PQLs) estalblish expected laboratory detection limits for NPDES monitoring (from SCDHEC Fact Sheet and Permit Rationale for New Industrial Facilities, July 2008).

(2) The Mean or Maximum analyte concentration is increased by a factor of 4.

(3) See ER Subsection 2.3.1.2.1.3 for discussion of the Broad River 7Q10 and Annual Mean Flows.

MEAN and MAX Concentrations - calculated from quarterly monitoring (Feb., May, Aug., Nov. of 2006) at Stations 101, 102, 105, 107, and 109 within the main channel of the Broad River (see Figure 2.3-21). No calculations were performed if all samples were below the laboratory detection limit (boron, cadmium, lead, mercury, selenium, silver).

Equation for Effluent Concentrations
Effluent Concentration = [(4-cycle Mean/Max concentration * DR)/(DR + River Flow)] + Mean/Max Concentration

NA - No effluent concentration calculations were conducted for non-detected compounds.

HIGHLIGHTED ANALYTES EXCEED THE CORRESPONDING REGULATORY LEVEL

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

RAI Letter Dated: August 21, 2008

Reference NRC RAI Number: ER RAI 17

NRC RAI:

Submit a summary statement regarding the construction aspects and impacts for causeway removal for both Make-Up Ponds A and B.

Duke Energy Response:

During the construction of the Cherokee Nuclear Station, temporary cofferdams were constructed in Make-Up Ponds A and B to divert stream flows while the permanent dams were constructed. Once the permanent dams were constructed the diversion conduits were closed and the ponds filled.

In Make-Up Pond A, there are two submerged cofferdams. The upstream cofferdam is approximately 400 ft. wide with a crest elevation at approximately 518 ft. above mean sea level (msl). A breach, approximately 60 ft. at the top and 20 ft. at the bottom, will be removed to elevation 510 ft. above msl. Approximately 500 cubic yards (cu.yd.) of material will be removed. A second cofferdam is approximately 450 ft. wide with a crest elevation at approximately 528 ft. above msl. This cofferdam will be breached with a cut approximately 92 ft. wide at the top and 20 ft. wide at the bottom, down to elevation 510 ft. above msl. Approximately 2500 cu.yd. of material will be removed.

In Make-Up Pond B, there is a single submerged cofferdam approximately 700 ft. wide with a crest elevation at 548 ft. above msl. This cofferdam will be breached to approximately 520 ft. above msl with a cut that is 160 ft. wide at the top and 20 ft. wide at the bottom. Approximately 9000 cu.yd. of material will be removed.

Breaching of the cofferdams will be accomplished using a crane and barge. The barge will be positioned over each cofferdam and the material removed with a clamshell and placed on the barge. The barge will move to shore where another crane and clamshell will remove the dredged material to trucks. Trucks will haul the material to the spoils area at the south end of the site (see ER Figure 3.1-1).

Associated Revisions to the Lee Nuclear Station Combined License Application:

No COLA revisions have been identified associated with this response.

Associated Attachments:

None

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

RAI Letter Dated: August 21, 2008

Reference NRC RAI Numbers: RAI 20, ER RAI 50, RAI 51, RAI 98, RAI 100

NRC RAIs:

ER RAI 20: Submit CORMIX input and output files for all CORMIX simulations from which results are extracted and shown in the application.

ER RAI 50: Provide the XOQDOQ input (including the associated meteorological data file) and output files.

ER RAI 51: Provide input (including the associated meteorological data file) and output files for the Seasonal/Annual Cooling Tower Impact Prediction Code (SACTI) computer code for analysis.

ER RAI 98: Provide in electronic format the input and output files for the PAVAN code used to calculate the X/Q values for the evaluation of DBAs in the Environmental Report. Include all files required to run the code, including the formatted meteorological data file.

ER RAI 100: Provide in electronic format the input and output files for the MACCS2 code used to evaluate the consequences of severe accidents in the Environmental Report. Include all files required to run the code, including the formatted meteorological data file.

Duke Energy Response:

Information responding to these RAIs was sent to NRC in a letter dated August 18, 2008.

Associates Revisions to the Lee Nuclear Station Combined License Application:

No COLA revisions have been identified associated with this response.

Associated Attachments:

None

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

RAI Letter Dated: August 21, 2008

Reference NRC RAI Number: ER RAI 33

NRC RAI:

Provide a summary of Duke Energy's outreach in the community.

Duke Energy Response:
Since the Lee Nuclear project site selection was announced in 2006, a total of four community newsletters have been mailed to local residents (two in 2006, one in 2007 and one to date in 2008) providing information on the project. The first newsletter was sent to households within a two-mile radius (approximately 2,000 residences). The subsequent newsletters were sent to a 10-mile radius (approximately 20,000 residences).

The first community newsletter included an invitation to a community picnic which was held on May 6, 2006. Approximately 800 neighbors attended the picnic, were provided project information by Duke Energy project employees, given the opportunity to ask questions and offered bus tours of the site. Another tour day was held on September 9, 2006 for Duke Energy employees, a number of whom live in the area of the proposed Lee Nuclear Station. Employees were encouraged to bring family/friends from the local community.

Duke Energy employees, including the chief nuclear officer and vice president of nuclear plant development, have met with community leaders in Cherokee County on three occasions to provide project updates and answer questions. These meetings were held at Limestone College and invitees included local and state elected officials, leaders from local government, the chamber of commerce, economic development group, local colleges/universities, large businesses, local school system, media, etc. In addition, Duke Energy employees have provided project updates at annual chamber of commerce planning retreats.

Lee Nuclear Project team members have met with local government officials, emergency management officials, secondary school leaders, community college/community technical school leaders and other individuals in the community to share information and look for partnership opportunities.

As part of the transmission siting related to the Lee Nuclear Project, Duke Energy completed four separate mailings to all property owners in an over 400 square mile study area. Prior to holding community workshops (two workshops in April 2007 and two in June 2007) to discuss the transmission siting process, letters were mailed to local leaders and property owners in the study area. The letters provided information on the siting study, included an input form to provide comments and invited recipients to the workshops where they could gather additional information, as well as ask questions. Another letter was mailed outlining alternate transmission corridors and the fourth letter was mailed to property owners impacted by the selected routes.

Duke Energy formed a traffic advisory group to evaluate the potential traffic impact of the station during construction and operations on McKowns Mountain Road, and to look at possible ways to mitigate these impacts. This group is being led by the county emergency manager, who is also a

McKowns Mountain Road neighbor and local fire chief. A kick off meeting was held with the advisory group on March 27, 2007 at the Fire Station on McKowns Mountain Road to discuss study purpose, study process, study area, intersections to be studied, data to be collected, traffic analysis, mitigation alternatives and alternatives assessment. Feedback was solicited from the group on the approach and mitigation alternatives to be considered.

A second meeting was held on April 21, 2008 at the Lee Nuclear Site trailer to discuss the status of the Traffic Study. Preliminary results were shared with the group but as a result of the potential increases in construction workforce, it was determined that the analysis may have to be revised. Duke committed to providing a status update to the advisory group, when the finalized workforce numbers are available, on whether the analysis would need to be revised and if so, the projected schedule for the results.

Duke Energy employees are also involved in the Broad Scenic River Advisory Group and have provided Lee Nuclear Station information at scheduled meetings. This included information on water use and transmission corridors.

Duke Energy has conducted two public opinion telephone surveys in the Lee Nuclear community. These are similar to surveys conducted by the Nuclear Energy Institute and Duke Energy (around its operating nuclear stations in the Carolinas).

Duke Energy employees have participated in two community service projects in the Gaffney area – a landscaping project at Draytonville Elementary School and a Habitat for Humanity building project. Employees have also worked with Draytonville Elementary School leaders to support additional projects for the school (kindergarten closets). Additionally, Duke has conducted nuclear generation presentations at Blacksburg High School and presentations for the Gaffney Rotary Club. Duke also provides support to local community activities, such as fundraisers.

Duke Energy maintains a new generation Web page (www.duke-energy.com/newgeneration) that is available for the public to obtain information about the Lee Nuclear Project.

Going forward, Duke Energy plans to continue its work in the Lee Nuclear community. We are currently evaluating the next community service project and newsletter mailing.

We will also schedule meetings with local leaders, as needed, to ensure they are updated on project status. Our business relations manager for Cherokee County routinely updates these leaders on Duke Energy activities, and the leaders' meetings are intended to supplement these regular updates. Additionally, we are planning to conduct future public opinion survey.

Associated Revisions to the Lee Nuclear Station Combined License Application:

No COLA revisions have been identified with this response.

Associated Attachments: None

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

RAI Letter Dated: August 21, 2008

Reference NRC RAI Number: ER RAI-38

NRC RAI:

Reconcile Figures 2.5-1 and 2.5-2 with Tables 2.5-1 and Table 2.5-2.

Duke Energy Response:

The figures were revised to display 2007 permanent population data as shown in the 2007 rows of the tables.

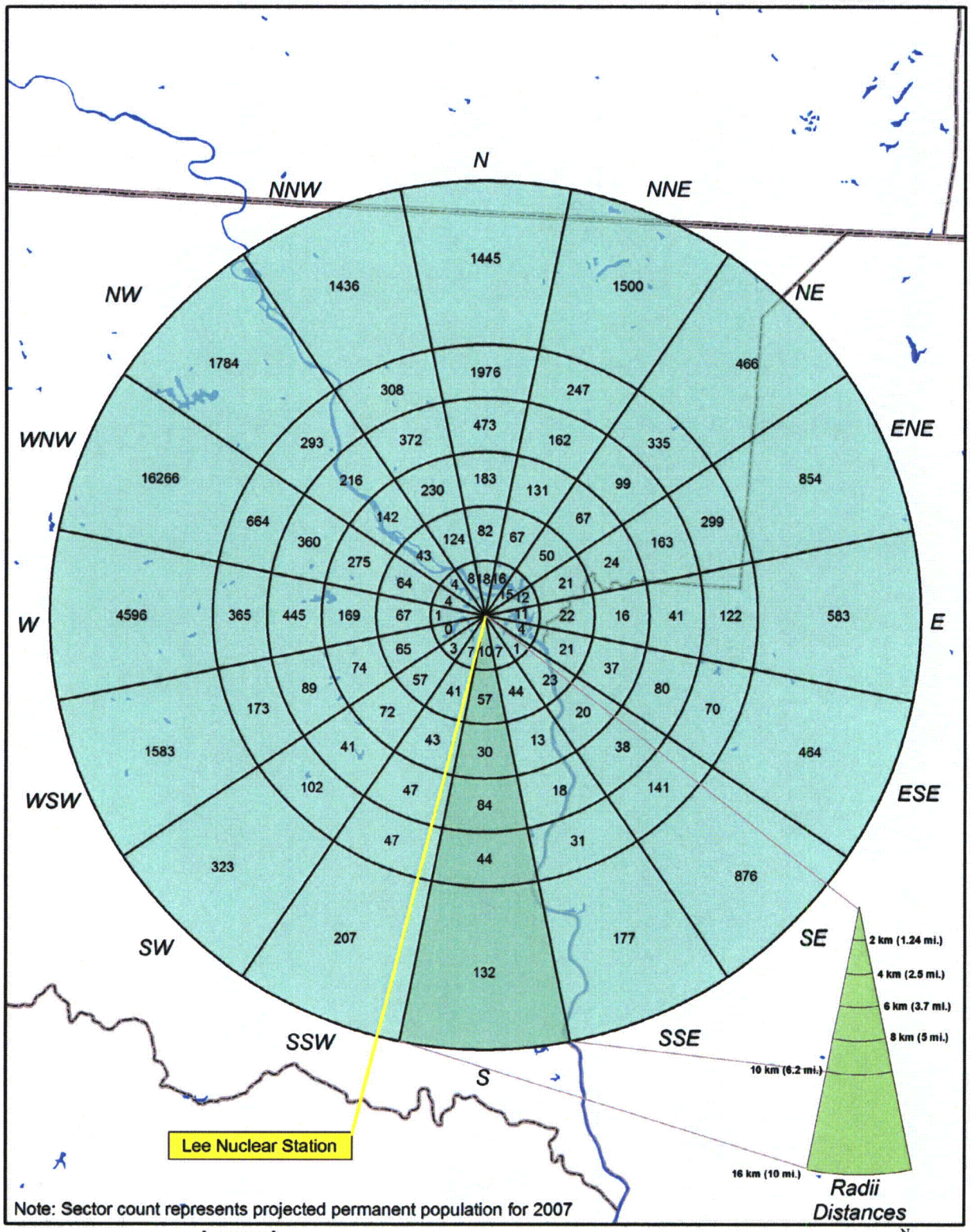
Associated Revisions to the Lee Nuclear Station Combined License Application

Replace COLA Part 3, ER Figures 2.5-1 and 2.5-2 with the attached figures.

Associated Attachments

The following figures are provided as Attachments:

ER Figure 2.5-1
ER Figure 2.5-2



Note: Sector count represents projected permanent population for 2007

Legend

- ☆ Lee Nuclear Station Center Point
- 0 – 16 km (10 mi.) Sectors
- Water Bodies
- County Boundary
- State Boundary

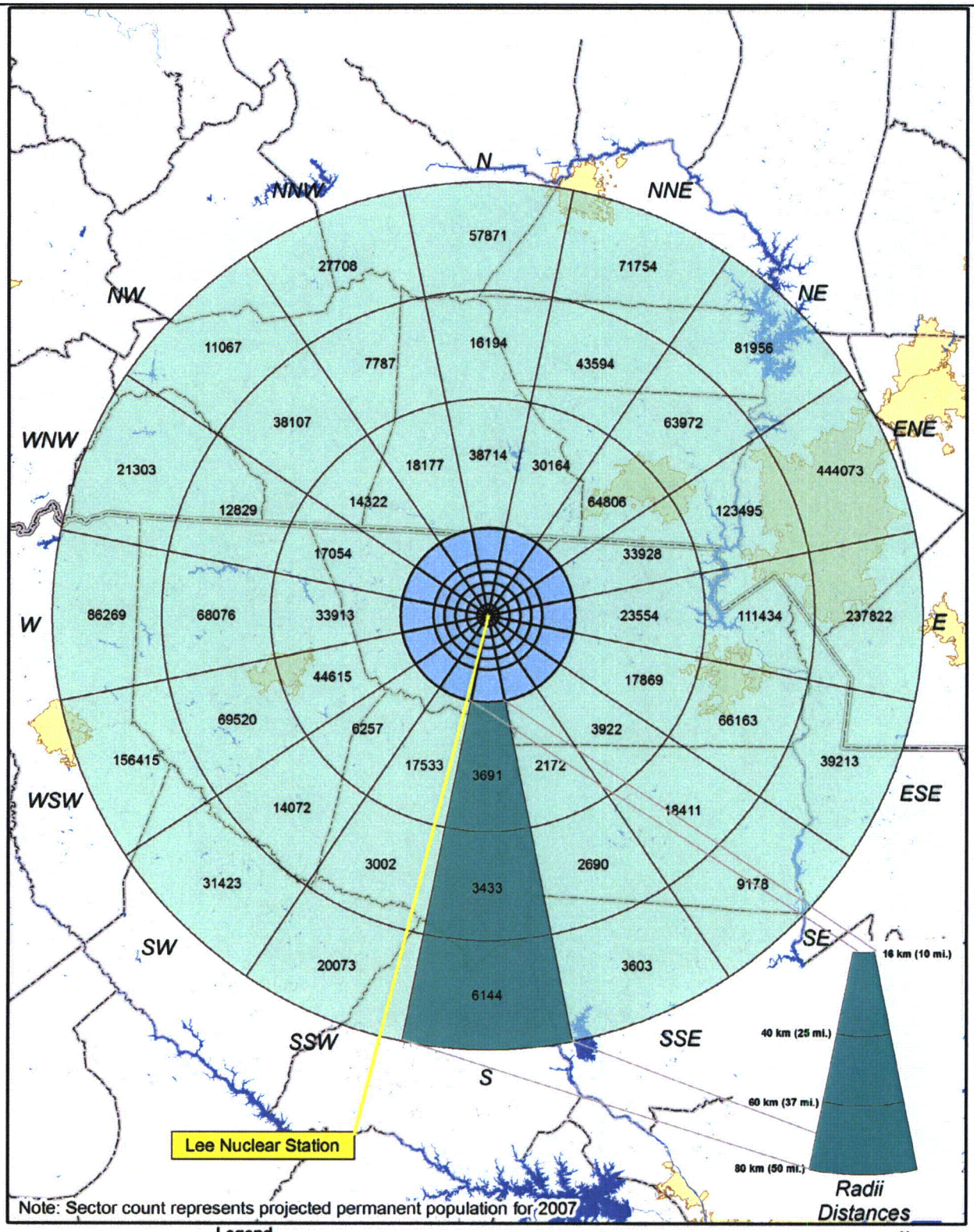
0 1.5 3 6
Miles

N W E S

WILLIAM STATES LEE III
NUCLEAR STATION UNITS 1 & 2

(0 to 16-km (10 mi.)
Population Sector Map

FIGURE 2.5-1 Rev 1



WILLIAM STATES LEE III
NUCLEAR STATION UNITS 1 & 2

16 km (10 mi.) - 80 km (50 mi.)
Population Sector Map

FIGURE 2.5-2 Rev 1

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

RAI Letter Dated: August 21, 2008

Reference NRC RAI Numbers: ER RAI 43, ER RAI 46

NRC RAIs:

ER RAI 43: What written procedure details the commitment to conduct cultural resource reviews for future APEs not yet analyzed (e.g. discharge structure and transmission lines)? Are there commitment/management practices for addressing cultural resources for future ground disturbing work associated with construction as well as future activities that may occur throughout the duration of the licensee?

ER RAI 46: What is Duke's analysis of cultural resources cumulative impacts and secondary impacts resulting from ongoing maintenance and from implementation of other protective measures identified for ecological resources?

Duke Energy Response:

Responses to these RAIs were provided to NRC in a letter from Duke Energy dated August 5, 2008.

As described in that letter, Duke Energy does not have written procedures governing future APEs not yet analyzed. Such protocols are generally included in the programmatic agreement between the State Historic Preservation Office (SHPO) and the Federal agency issuing the license (in this case NRC).

Also, described in the previous submittal, since the SC SHPO and Duke Energy concluded that impacts to cultural resources were small, in accordance with the definition in 10 CFR Part 51, and there are no other Federal actions in the vicinity of the project, we also concluded that, by definition, any cumulative impacts and secondary impacts would be small.

Associated Revisions to the Lee Nuclear Station Combined License Application:

No COLA revisions have been identified associated with this response.

Associated Attachments:

None

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

RAI Letter Dated: August 21, 2008

Reference NRC RAI Number: ER RAI 49

NRC RAI:

Are the differences in the predominant wind direction measured at the Lee Nuclear Station and Greenville-Spartanburg the result of local channeling of the flow, or a measurement error?

Duke Energy Response:

To evaluate this phenomenon, seven wind roses were developed for the first 12-month period of data from Lee Nuclear Station Meteorological Tower 2 (December 1, 2005 through November 30, 2006). In all wind rose figures, calms are defined as wind speeds below 0.5 m/sec. The following seven figures are attached:

Figure 1. Lee Nuclear Station Original Lower-Level (10-m) Data

Figure 2. Lee Nuclear Station Lower-Level (10-m) Data with Winds below 5 Mph Excluded

Figure 3. Lee Nuclear Station Original Upper-Level (60-m) Data

Figure 4. Lee Nuclear Station Upper-Level (60-m) Data with Winds below 5 Mph Excluded

Figure 5. Lee Nuclear Station Upper-Level (60-m) Data with Identical Hours Excluded (as in Figure 2)

Figure 6. Greer Original Data, Identical Time Period (12/1/2005 Through 11/30/2006) as Lee Nuclear Station Data

Figure 7. Greer Data with Winds below 5 Mph Excluded

Additional figures (discussed below) provide comparative and other information.

As shown in Figure 1, a strong NW component has been observed in the 10-m-level wind data at the Lee Nuclear Station. When wind speeds less than 5 mph are filtered out of the Lee Nuclear Station 10-m data, the NW sector is not as pronounced (Figure 2). Instead, the dominant wind directions become the SW and SSW sectors. By comparison, the 60-m winds, which are less likely to be influenced by surface geography, show predominant wind directions from the SSW, SW, and S sectors (Figure 3).

When hours of low wind speed are filtered out of the 10-m data, the dominant wind directions (SW and SSW) are in closer agreement with the 60-m-level wind directions. This indicates that the 10-m winds are being influenced by a localized wind flow under light wind conditions, typically attributable to surface boundary conditions. Because the NW sector remains one of the three most frequent wind directions at the lower (10-m) level, it also indicates that the geography affects some higher-level wind speeds. Therefore, the extent of this NW flow field could be more widespread in the vicinity of the Lee Nuclear Site.

When the 60-m-level winds are filtered to exclude wind speeds less than 5 mph (Figure 4), the predominant wind directions are from the SSW; SW; S and NNE; NE, as they were in the original data (Figure 3). When identical hours are excluded from the 60-m winds, matching the hours

excluded for 10-m winds below 5 mph, the NW quadrant winds (i.e., W through N sectors) are not as frequent (Figure 5). There is also a marked decrease in S winds, as well as some decrease in NNE and NE sector frequencies. The SW and SSW sectors remain dominant with increased wind direction frequencies. The comparison of the lower and upper wind direction frequencies with the lower wind speeds removed is consistent (Figure 8). However, the NW component at the lower level is still more pronounced.

To provide a comparison to regional conditions, hourly surface data were obtained from the National Climatic Data Center (NCDC) for the Greer (GSP) station covering the same time period (12/1/2005 through 11/30/2006) as the Lee Nuclear Station data. The wind rose for GSP (Figure 6) is shown to be similar to the 60-m Lee Nuclear Station wind rose in Figure 3. Prevailing winds at GSP are from the SW, SSW, and NE sectors. Prevailing 60-m winds measured at Lee Nuclear Station are also from the (SSW; SW; S) and (NNE; NE) sectors. The GSP site has fewer winds from the West and NW sectors (Figure 6), with predominantly SW and NE winds. There is no significant change in the GSP wind rose when excluding winds less than 5 mph (Figure 7).

A comparison of the original data from the Lee Nuclear Station and GSP is given in Figure 9. This figure shows the strong NE wind component at the Lee Nuclear Station. When wind speeds lower than 5 mph are removed from both data sets, the wind direction is in better agreement as shown in Figure 10. Wind speeds below 5 mph accounted for 60.7 percent of all data based on the original Lee Nuclear Station 10-m-level data, while wind speeds below 5 mph accounted for 30.1 percent of all data based on the original GSP data. This information indicates that the light wind speed regime is more significant at the Lee Nuclear Station because of terrain effects. Winds at the 60-m level at the Lee Nuclear Site occur 26.9 percent of the time, which agrees well with the GSP data.

To explain the dominant NW winds observed at the 10-m level at the Lee Nuclear Site versus GSP, it is noted that the main difference in the local terrain is the location of the Lee Nuclear Site along the shoreline of the Broad River. The river approaches the site from the NW and runs eastward along the northern edge of the site, then turns southward on the east side of the site. The GSP site is not located near any water body and is in relatively flat terrain. Lee ER Figure 2.7-45 shows the topography around the Lee Nuclear Site. The river valley profile is illustrated in Figure 11 by several elevation cross-sections, which depict a shallow river valley both upstream and at the Lee Nuclear Site. This figure shows profiles of the river valley for approximately 2 miles on either side of a line running NW along the Broad River channel from the Lee Nuclear Site. The topographic map of the area around GSP is provided in Figure 12, showing that the immediate area (within 2 miles) around GSP is relatively flat.

Thus, both GSP and Lee Nuclear Station winds are in general agreement, except for the locally-induced NW flow field observed within the valley of the Broad River, in the 10-m Lee Nuclear Station data. Both GSP and Lee Nuclear Station winds support a typical counter-clockwise turning (i.e. backing) of the winds with height, when compared to the Lee Nuclear Station 10-m-level winds.

Associated Revisions to the Lee Nuclear station Combined License Application:

No COLA revisions have been identified with this response.

Associated Attachments:

Figure 1.	Lee Nuclear Station Original Lower-Level (10-m) Data
Figure 2.	Lee Nuclear Station Lower-Level (10-m) Data with Winds below 5 Mph Excluded
Figure 3.	Lee Nuclear Station Original Upper-Level (60-m) Data
Figure 4.	Lee Nuclear Station Upper-Level (60-m) Data with Winds below 5 Mph Excluded
Figure 5.	Lee Nuclear Station Upper-Level (60-m) Data with Identical Hours Excluded (as in Figure 2)
Figure 6.	Greer Original Data, Identical Time Period (12/1/2005 Through 11/30/2006) as Lee Nuclear Station Data
Figure 7.	Greer Data with Winds below 5 Mph Excluded
Figure 8.	Comparison of Lee Nuclear Station Lower And Upper Wind Frequency with Low Wind Speeds (< 5 Mph) Removed
Figure 9.	Comparison of Original Data from Lee Nuclear Station Lower-Level and Greer Data
Figure 10.	Comparison of Data from Lee Nuclear Station Lower Level and Greer with Low Wind Speeds (< 5 Mph) Removed
Figure 11.	Profile of the Broad River Valley Upstream of the Lee Nuclear Site
Figure 12.	Topography around Greer

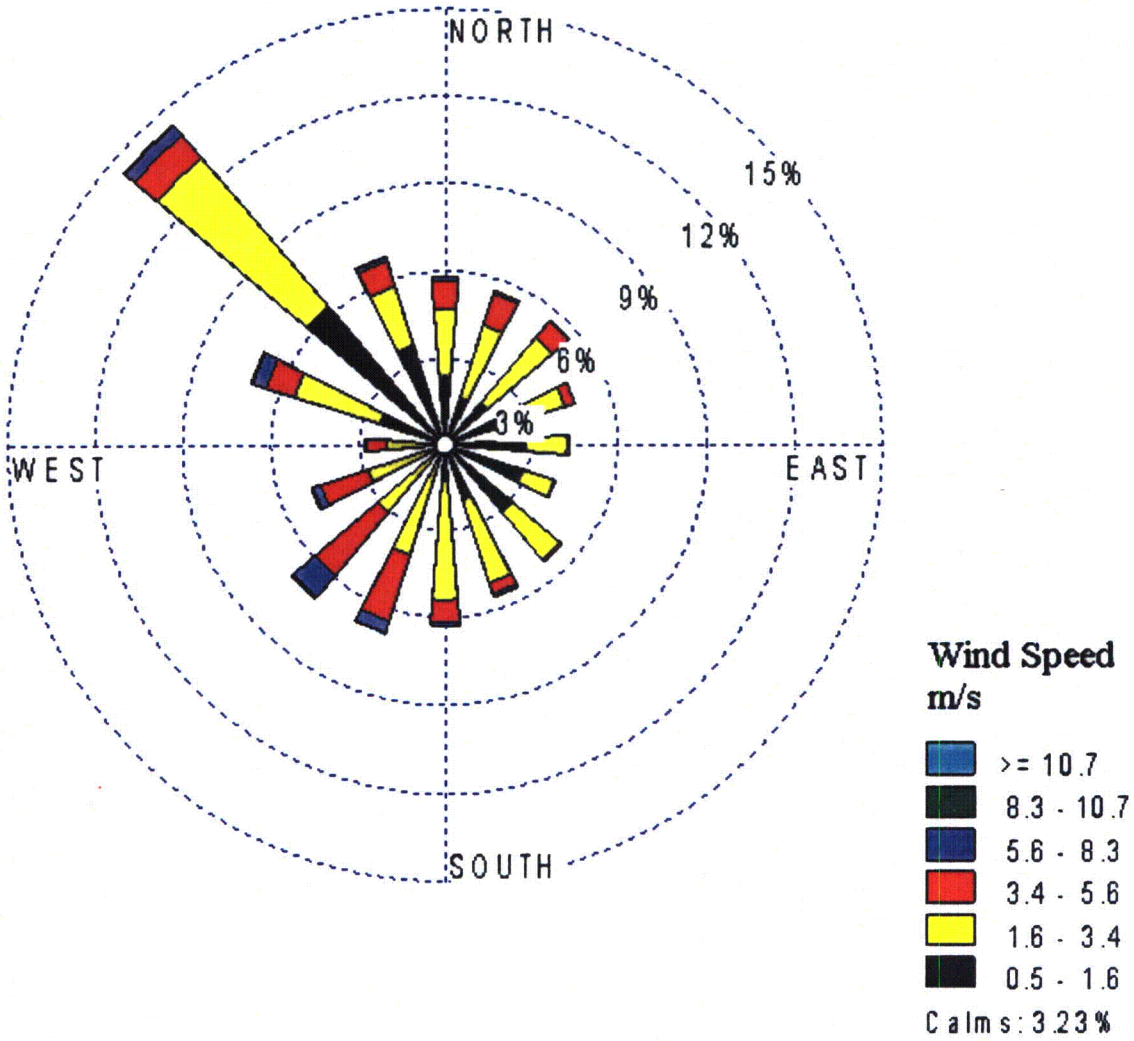


Figure 1

Lee Nuclear Station Original Lower-Level (10-m) Data

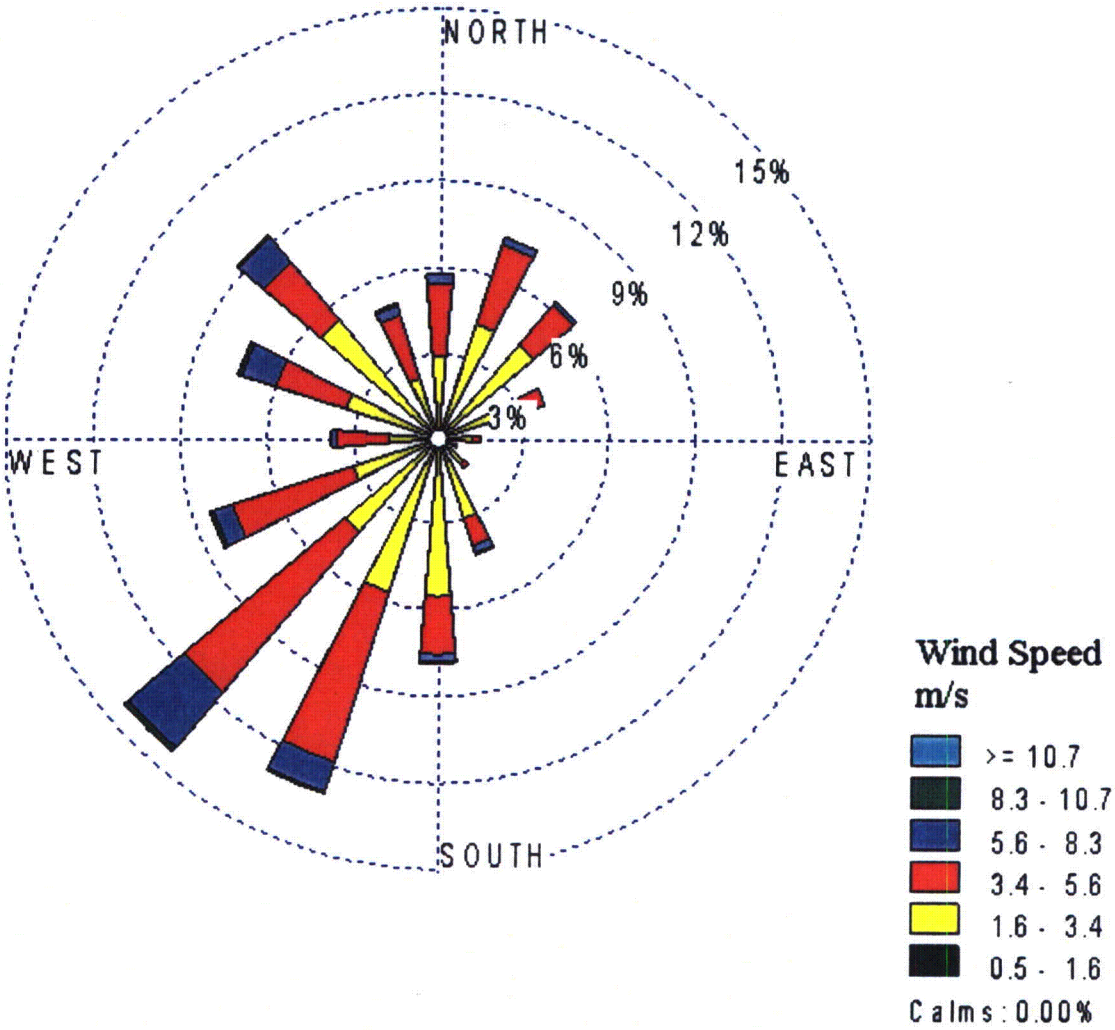


Figure 2

Lee Nuclear Station Lower-Level (10-m) Data with Winds below 5 Mph Excluded

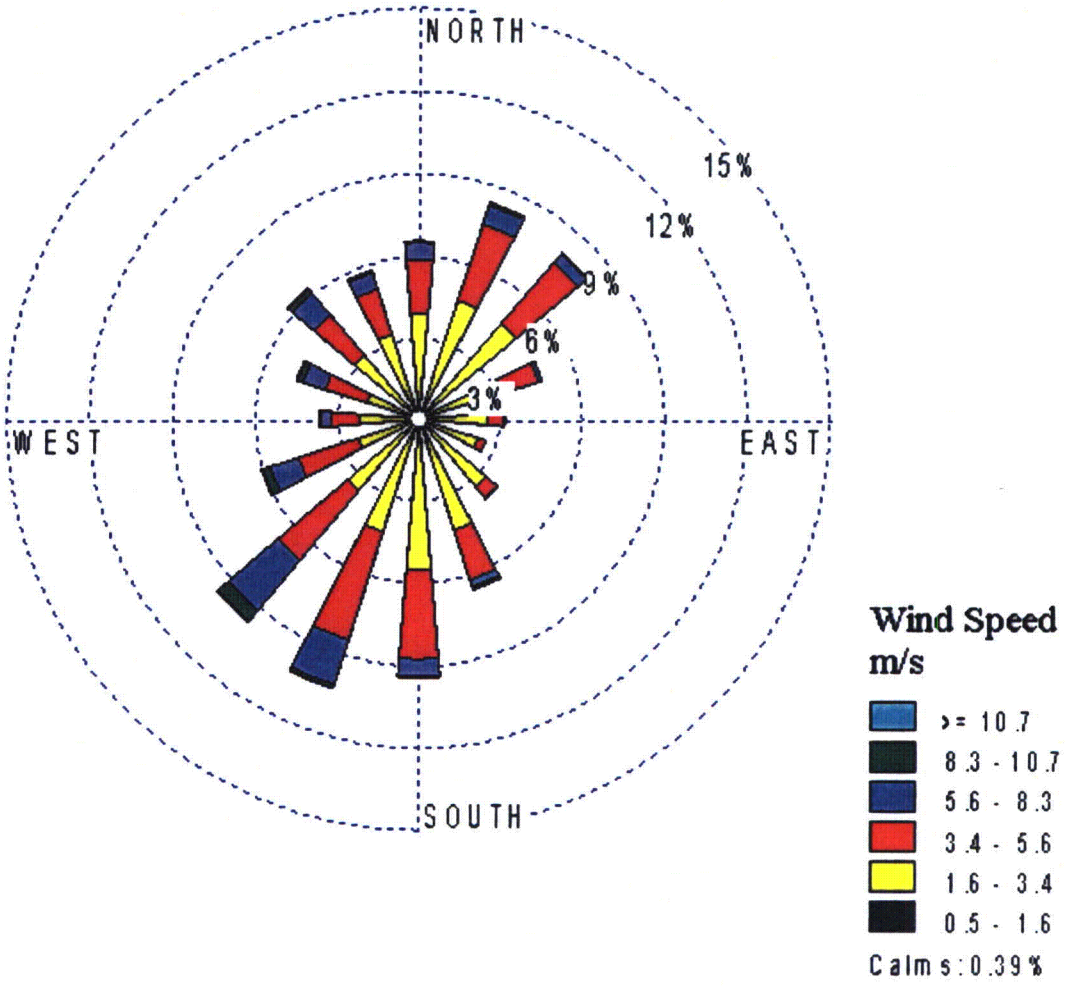


Figure 3

Lee Nuclear Station Original Upper-Level (60-m) Data

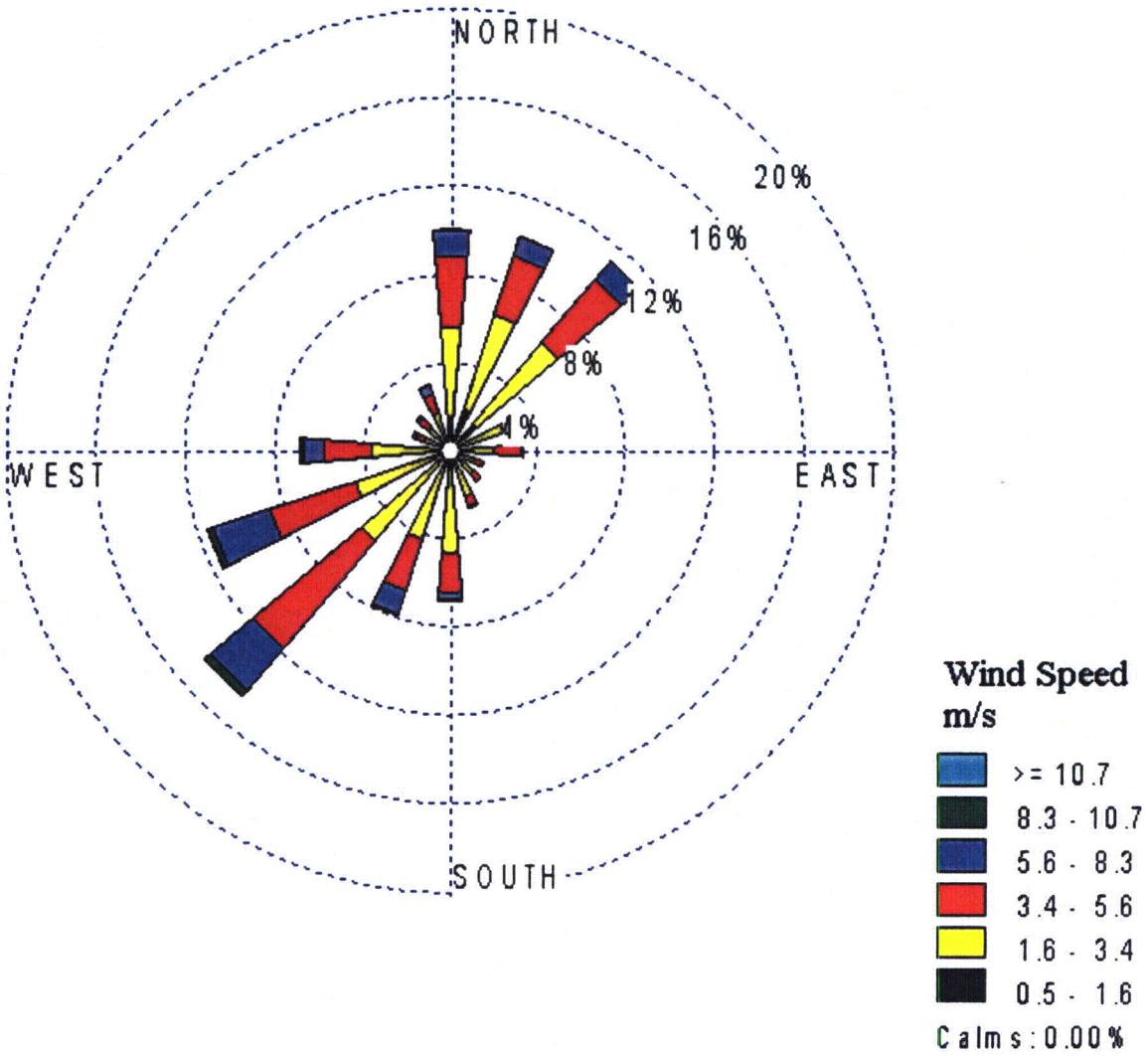


Figure 4

Lee Nuclear Station Upper-Level (60-m) Data with Winds below 5 Mph Excluded

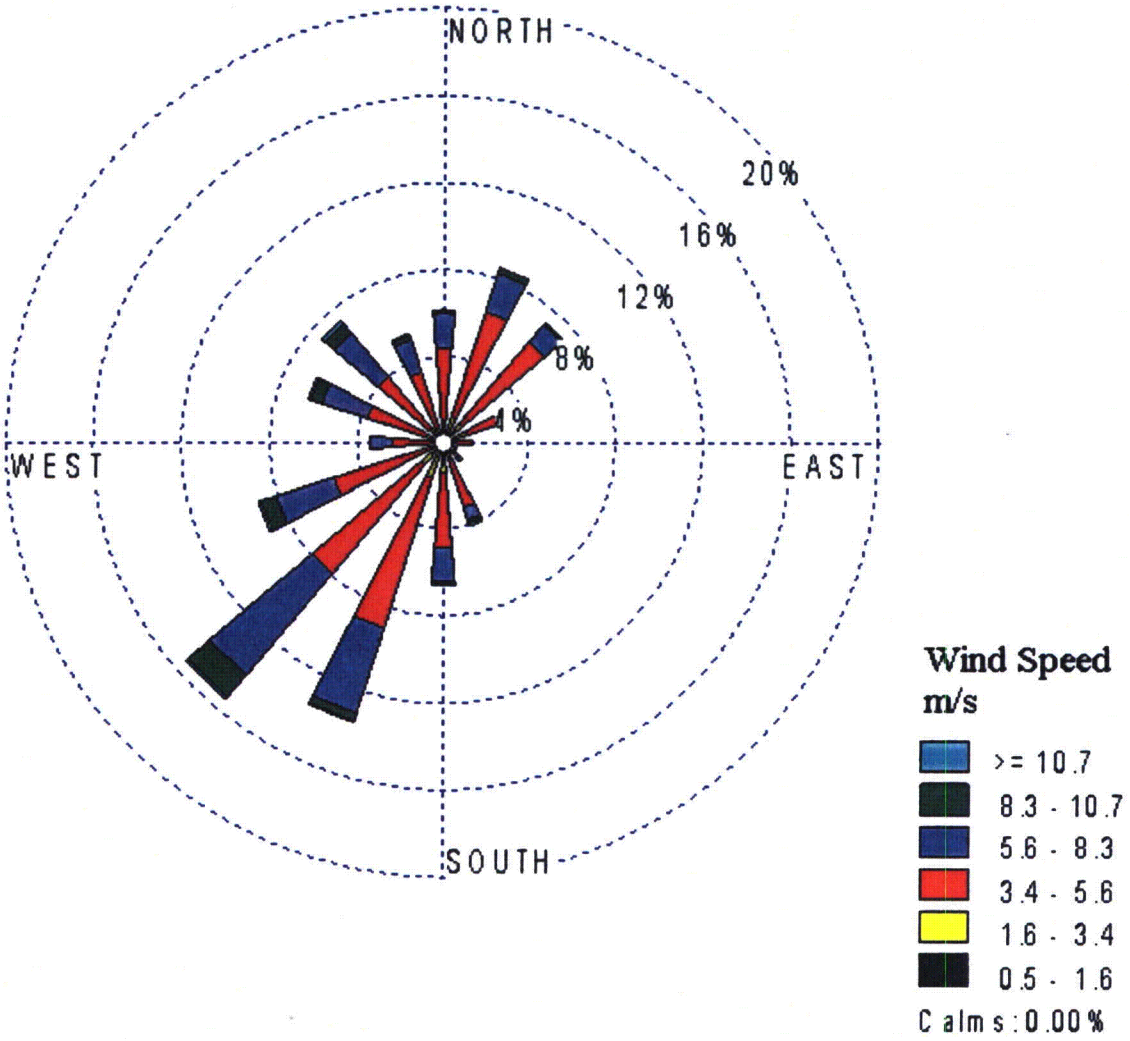


Figure 5

Lee Nuclear Station Upper-Level (60-m) Data with Identical Hours Excluded (as in Figure 2)

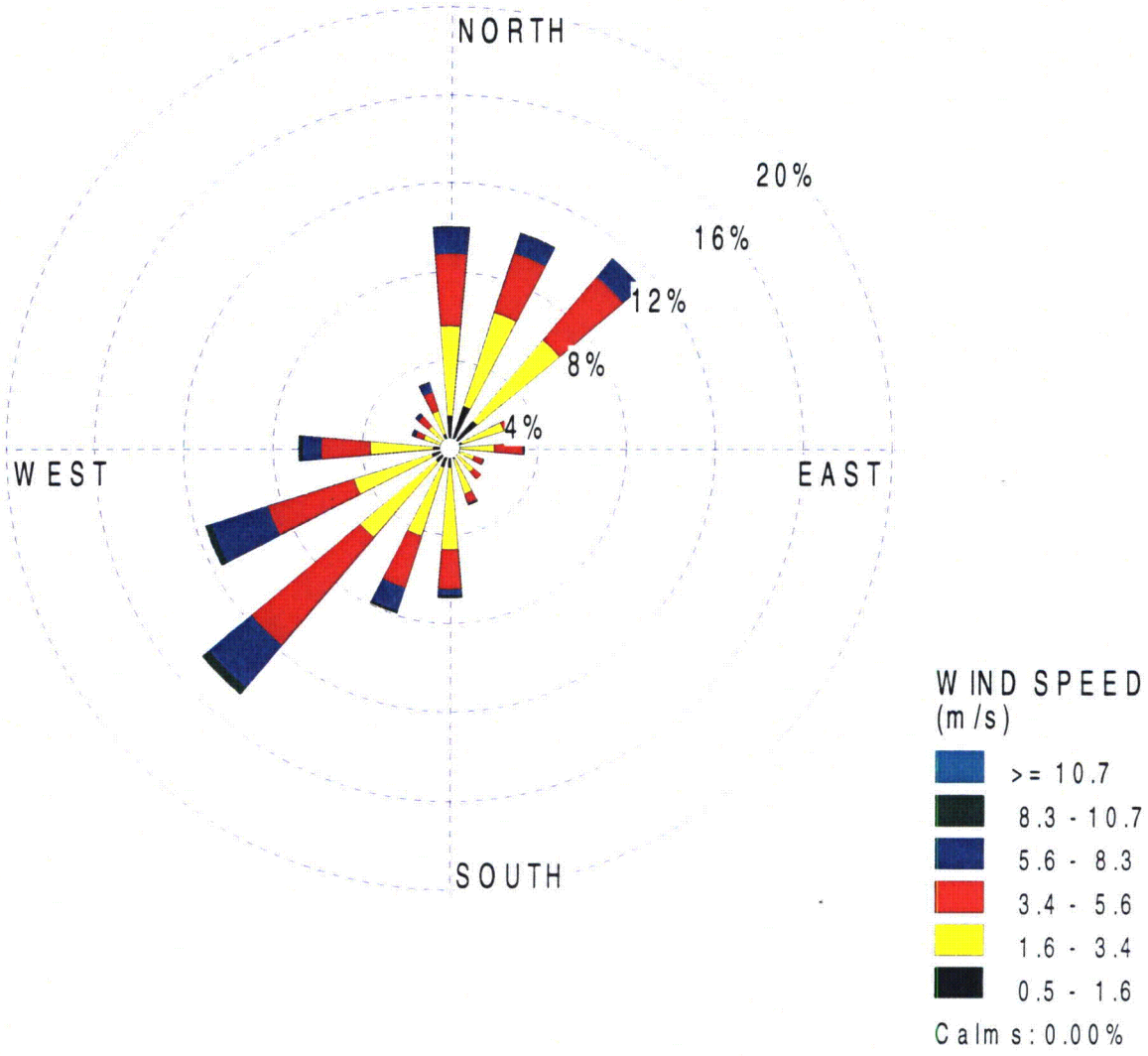


Figure 6

Greer Original Data

Identical Time Period (12/1/2005 Through 11/30/2006) as Lee Nuclear Station Data

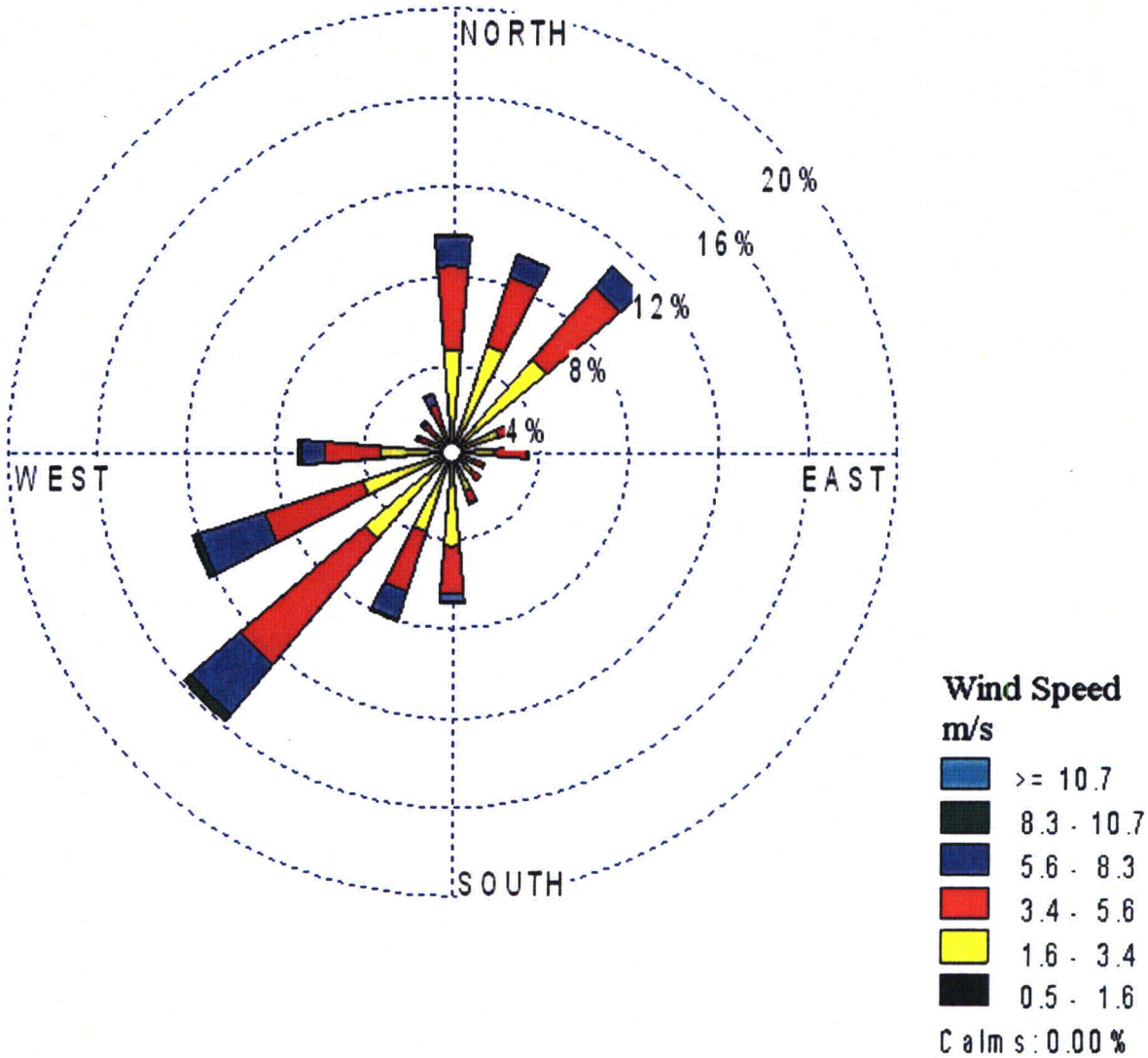


Figure 7

Greer Data with Winds below 5 Mph Excluded

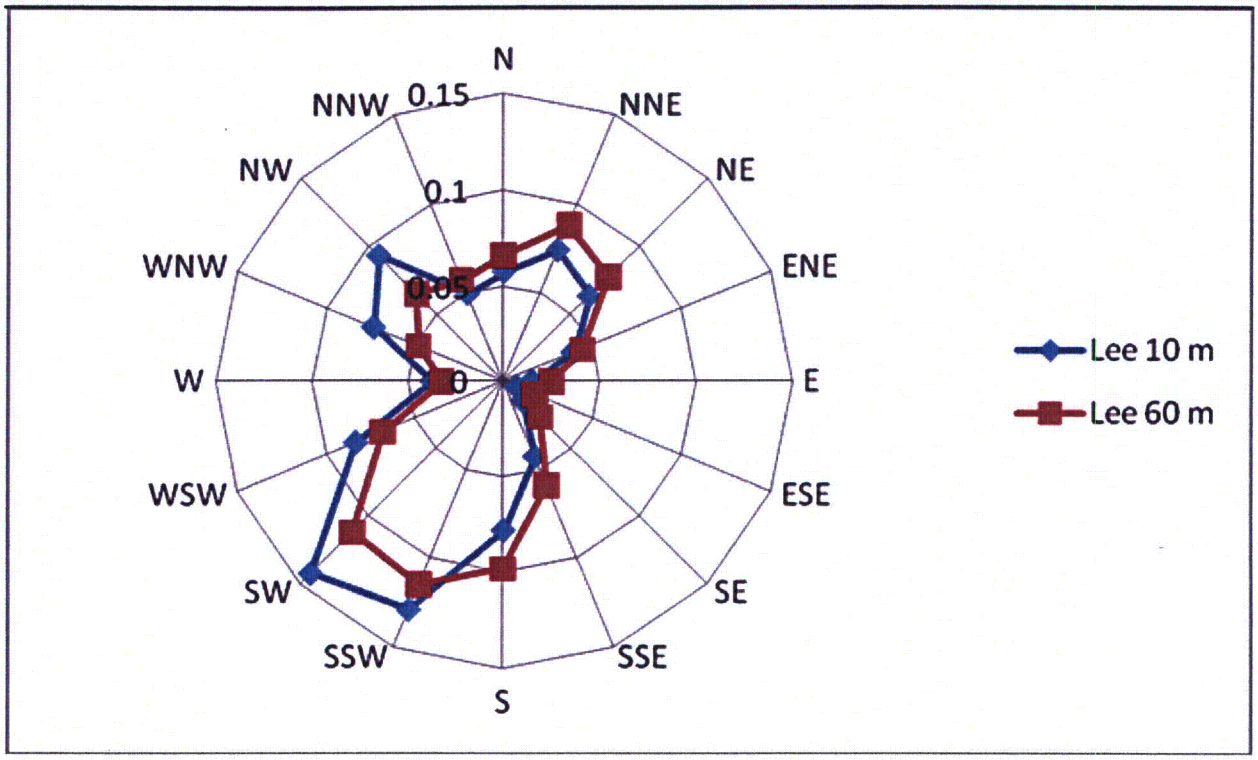


Figure 8

Comparison of Lee Nuclear Station Lower and Upper Wind Frequency with Low Wind Speeds (< 5 Mph) Removed

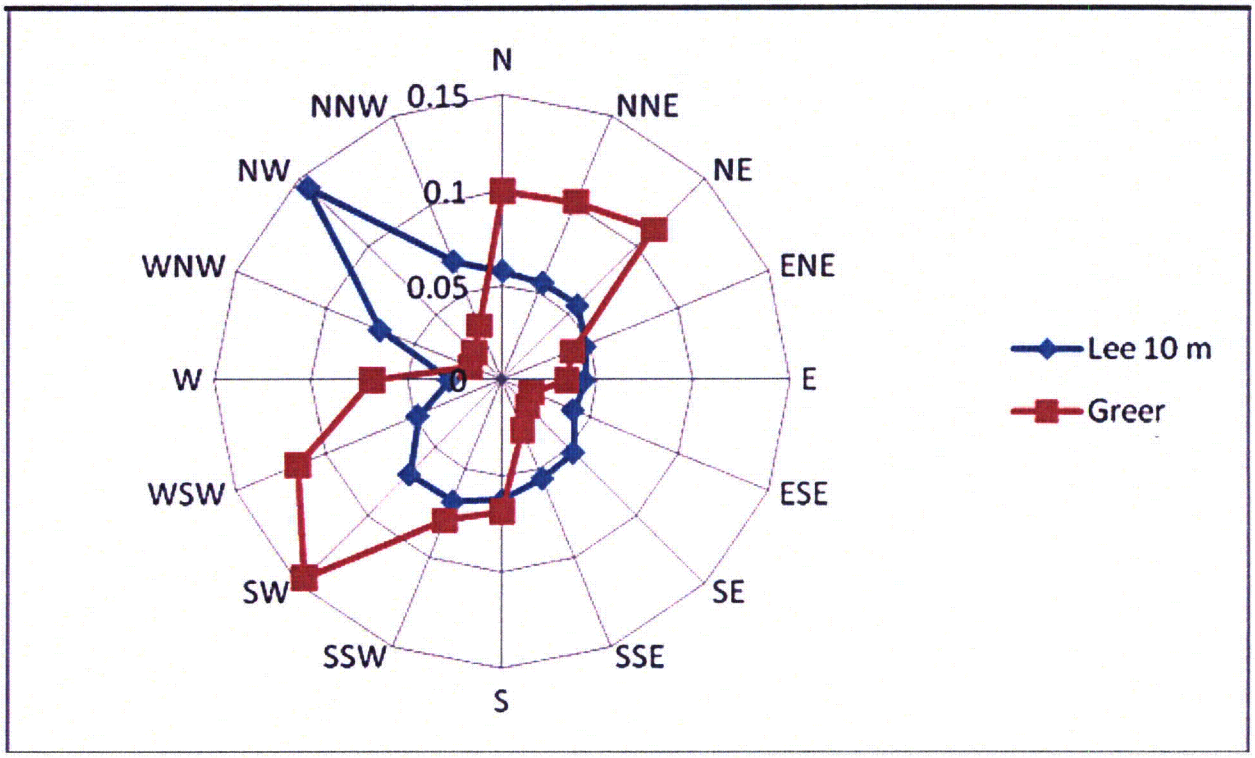


Figure 9

Comparison of Original Data from Lee Nuclear Station Lower-Level and Greer Data

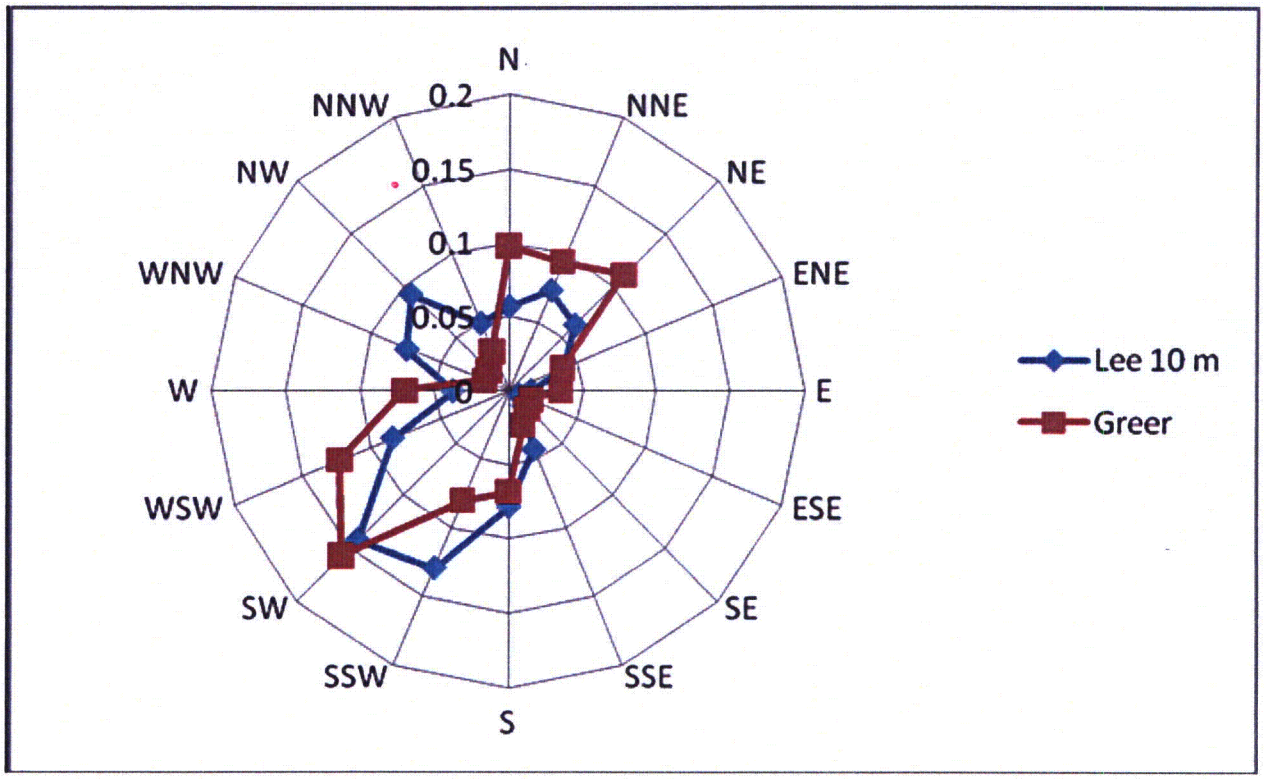


Figure 10

Comparison of Data from Lee Nuclear Station Lower Level and Greer with Low Wind Speeds (< 5 Mph) Removed

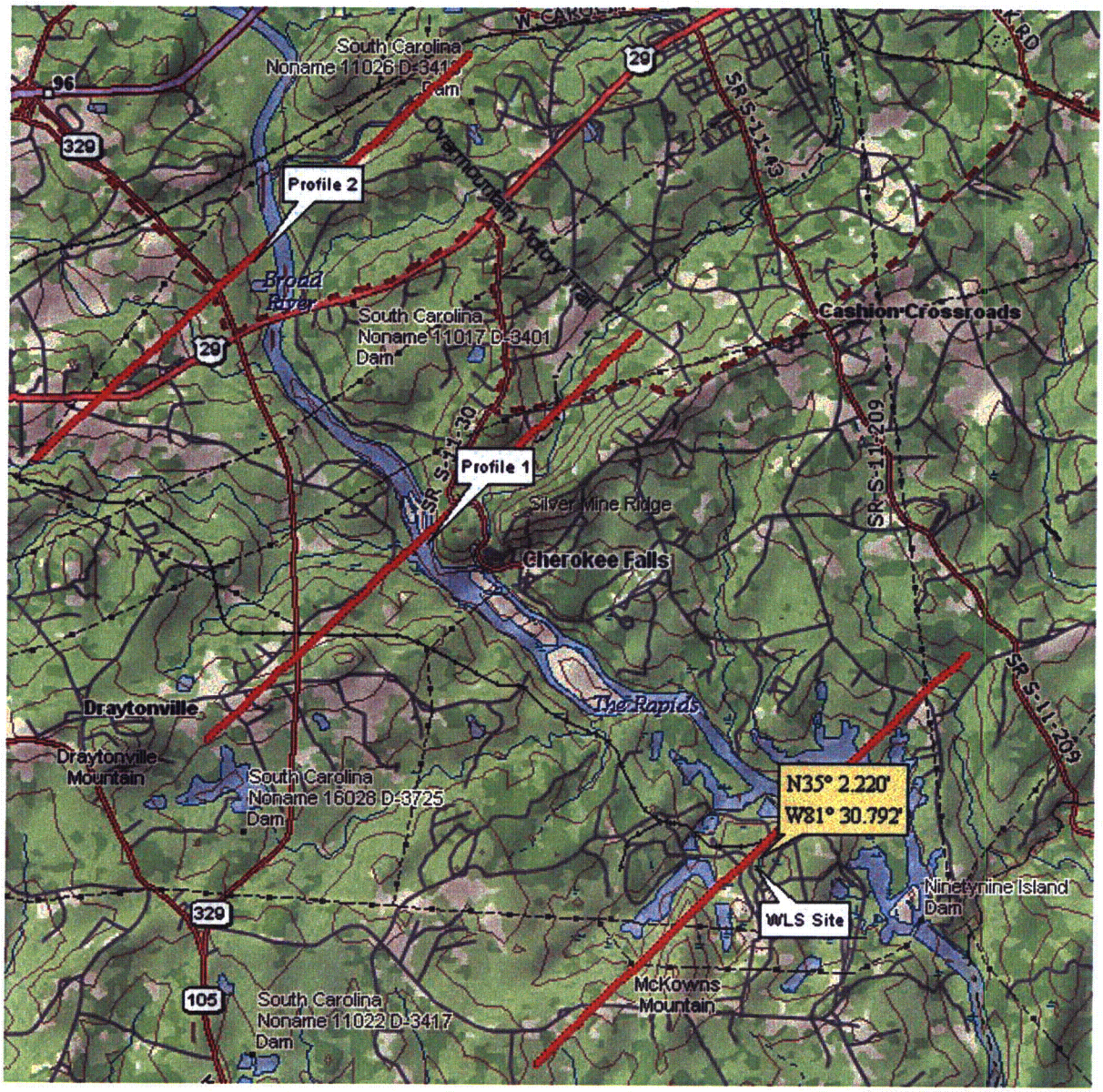
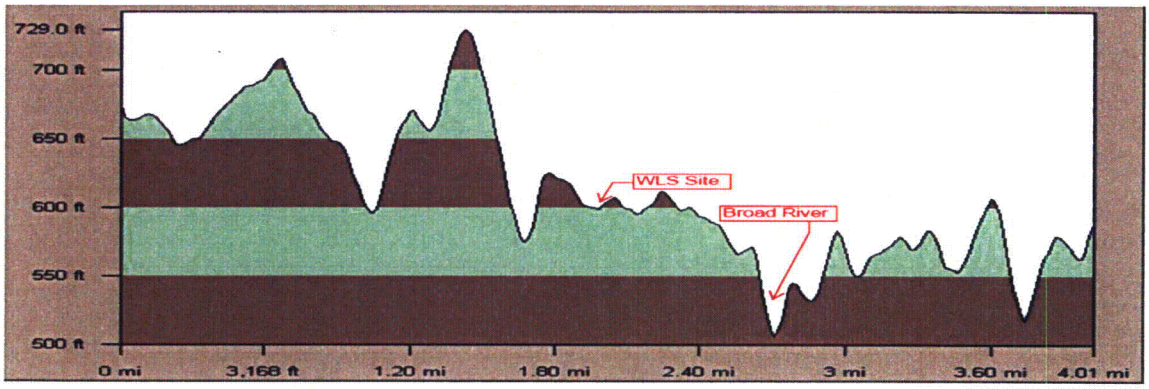


Figure 11

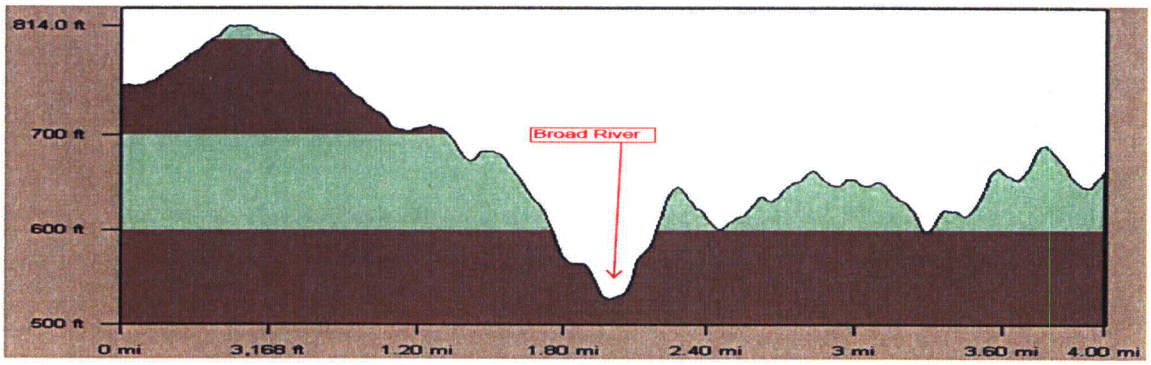
Profile of the Broad River Valley Upstream of the Lee Nuclear Site

Profiles Looking Upstream

WLS Site Profile



Profile 1



Profile 2

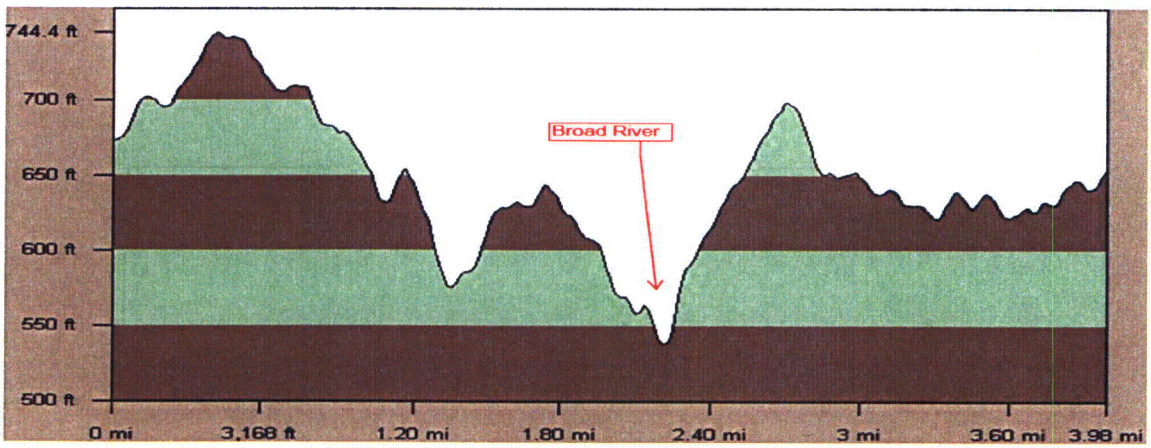
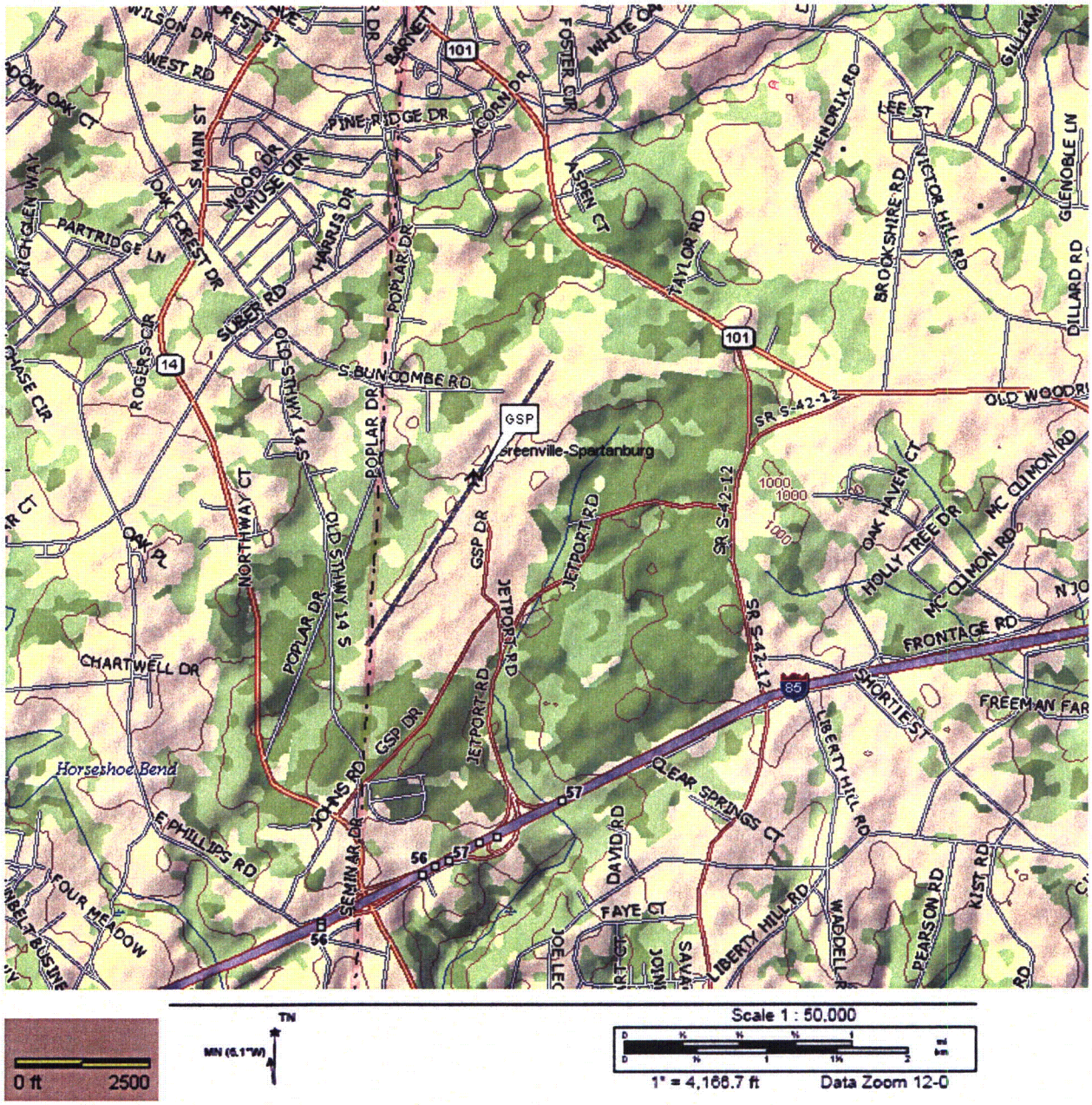


Figure 11

Profile of the Broad River Valley Upstream of the Lee Nuclear Site



GSP elevation is 971 feet.

Contour interval is 50 feet.

Figure 12

Topography around Greer

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

RAI Letter Dated: August 21, 2008

Reference NRC RAI Number: ER RAI 70

NRC RAI:

Provide GIS layers of all components of the construction footprint onsite.

Duke Energy Response:

Copies of the GIS layers for all figures in the ER including those requested in this RAI were transferred to the PNNL servers in May 2008.

Associated Revisions to the Lee Nuclear Station Combined License Application:

No COLA revisions have been identified with this response.

Associated Attachments:

None

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

RAI Letter Dated: August 21, 2008

Reference NRC RAI Number: ER RAI 101

NRC RAI:

Provide additional information and analysis to support the statement, "The liquid pathways dose is not expected to be significant" in the Section 7.2.2 of the Environmental Report.

Duke Energy Response:

The Lee Nuclear Station ER Section 7.2 discussion of water pathways is revised to include all surface water pathways and how the dose risk is derived. The MACCS2 analysis information is included for the liquid pathways dose.

Associated Revisions to the Lee Nuclear Station Combined License Application

1. Revise COLA Part 3, ER Chapter 7, Subsection 7.2.2, paragraph 18, as follows:

   The results of the dose and dollar risk assessments, including the water ingestion pathway, are provided in Table ~~7.2-5~~ 7.2-9. Risk is defined in these results as the product of release category frequency and the dose or cost associated with the release category. The total risk is assumed to be the sum of all scenarios.

2. Revise COLA Part 3, ER Chapter 7, Subsection 7.2.2, paragraph 19, as follows:

   The sum of the mean values for affected land areas for all release scenarios ~~are~~ is also shown in Table ~~7.2-5~~ 7.2-9. Each of these mean values has also been multiplied by their release category frequency.

3. Revise COLA Part 3, ER Chapter 7, Subsection 7.2.2, paragraphs 21 and 22, as follows:

   Due to the extremely low frequency of severe accidents in the AP1000 PRA results, the severe accident individual dose for the Lee Nuclear Site is also low. The weighted total dose risk is 5.27×10^{-2} person-rem/reactor years (RY). This dose risk is based on the calendar year 2016 projected population distribution. To obtain the average individual dose, this value is divided by the calendar year 2016 population of 2,715,444 people within 50 mi. of the Lee Nuclear Site. This total population is the sum of the populations given in Tables 2.5-1 for 0 to 10 mi. and Table 2.5-2 for 10 to 50 mi. The resulting dose risk is 1.94×10^{-8} rem/RY. This is much lower than the background radiation. Reference 8 indicates that the average individual dose caused by all other sources in the United States is 3.6×10^{-1} rem/year. ~~Since~~ Because the weighted total dose risk from severe accidents is much lower than the background radiation, it can also be concluded that the impact on the local biota will be negligible.

   ~~The liquid pathways dose is not expected to be significant. As discussed in Section 2.3.1.5.9, the groundwater at the Lee Nuclear site flows to the Broad River and does not communicate~~

~~with domestic water supply wells, so the groundwater dose is negligible. Furthermore, the travel of groundwater to the Broad River is not expected to result in high surface water doses because the minimum travel time to the Broad River is 6.7 years, which allows ample time for interdiction and other prevention activities. Therefore, the groundwater and surface water pathways are negligible.~~

Three dose pathways are considered: (1) the atmospheric pathway, in which radioactive material is released to the air, (2) the surface water pathway, in which airborne radioactive material falls out on open bodies of water, and (3) the groundwater pathway, in which groundwater is contaminated by a basemat melt-through with subsequent contamination of surface water by the groundwater.

Environmental consequences of some potential surface water pathways (e.g., swimming and fishing) are not evaluated by MACCS2. NUREG-1437 is used to address these pathways. Similarly, the MACCS2 code does not address the potential environmental consequences of the groundwater pathway. Alternate analyses are used to evaluate the potential consequences of releases to groundwater.

Air Pathway. The MACCS2 code directly estimates consequences associated with releases to the air pathway. The results of the MACCS2 runs are presented in Table 7.2-9.

Surface Water Pathways. Surface water pathways are an extension of the air pathway. These pathways cover the effects of radioactive material deposited on open bodies of water. The surface water pathways of interest include external radiation from submersion in water and activities near the water, ingestion of water, and ingestion of fish and other aquatic creatures. Of these pathways, the MACCS2 code evaluates only the ingestion of contaminated water. The risks associated with this surface water pathway calculated for the Lee Nuclear Site are included in the last column of Table 7.2-9. NUREG-1437 Table 5.17 indicates that, for a small river site such as the Lee Nuclear Site, drinking water is the dominant liquid pathway compared to seafood ingestion and shoreline exposure. Furthermore, the water ingestion dose risk of 1.50×10^{-3} person-rem/RY is small compared to the total dose risk of 5.27×10^{-2} person-rem/RY. Additionally, should a severe accident occur at the Lee Nuclear Site, it is likely that federal, state, and local officials would restrict access to the river below the site and in contaminated areas above the site. These actions would further reduce surface water pathway exposures.

Groundwater Pathway. In addition to surface water, groundwater must be considered in the liquid pathways dose. As discussed in Subsection 2.3.1.5.9, the groundwater at the Lee Nuclear Site flows to the Broad River and does not communicate with domestic water supply wells. Also, the travel of groundwater to the Broad River is not expected to result in high surface water doses because the minimum travel time to the Broad River is 6.7 years, which allows ample time for interdiction and other prevention activities. Therefore, the groundwater pathways dose is expected to be negligible.

4. Revise COLA Part 3, ER Chapter 7, Subsection 7.2.4, paragraph 3, as follows:

Additionally, the Commission's Safety Goal Policy Statement, issued in 1986, states that "the risk to an average individual in the vicinity of a nuclear power plant of prompt fatalities that might result from reactor accidents should not exceed one-tenth of one percent (0.1 percent) of the sum of prompt fatality risks resulting from other accidents to which members of the U.S. population are generally exposed" and that "the risk to the population in the area near a

nuclear power plant of cancer fatalities that might results from nuclear power plant operation should not exceed one-tenth of one percent (0.1 percent) of the sum of cancer fatality risks resulting from all other causes." (Reference 12) From the Centers for Disease Control and Prevention website, there were 2,398,343 deaths in the U.S. in the year 2004. Of these deaths, 550,270 resulted from cancer, while 108,694 resulted from accidents (Reference 3). This means that the cancer fatality risk from "all other causes" is 0.229 and the prompt fatality risk from "other accidents" is 0.045. One-tenth of one percent of each of these risks results in a value of 2.29×10^{-4} for cancer fatalities and 4.50×10^{-5} for prompt fatalities. As shown in Table ~~7.2-5~~ 7.2-9, the risk for latent fatalities is 3.44×10^{-5}, and the risk for early fatalities is 0, both of which are bounded by their respective criteria. Therefore, the early and latent fatality risks from a severe accident at the Lee Nuclear Site are found to be acceptable.

5. Revise ER Table 7.2-5 to include the water ingestion dose risk that is indicated in the attachment below.

Associated Attachment:

Table 7.2-5. Results Summary within 50 Mi. of the Lee Nuclear Site

TABLE 7.2-5
RESULTS SUMMARY WITHIN 50 MI. OF THE LEE NUCLEAR SITE

Dose Risk (person-rem/yr)	Dollar Risk ($/yr)	Affected Land (hectares)(a)	Early Fatalities (per year)	Latent Fatalities (per year)	Water Ingestion Dose Risk (person-rem/yr)
5.27E-2	1.55E+2	1.38E-3	0.00E+0	3.44E-5	1.50E-3

a) This value reflects the sum of affected land areas that have been multiplied by their release category frequency, whereas the affected land areas shown in the MACCS2 analysis are neither multiplied by release category frequency or summed. However, the same MACCS2 data are used as the basis for both values.