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April 6, 2010

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
(RAI No. 3726 and 3727)
Ltr# WLG2010.04-01

Reference: Letter from Brian Hughes (NRC) to Peter Hastings (Duke Energy),
Request for Additional Information Letter No. 080 dated 11/1/09
Related to SRP Section: 02.03.04, 05

This letter provides the Duke Energy response to the Nuclear Regulatory Commission's requests 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

D093
NRO

Enclosures:

1) Duke Energy Response to Request for Additional Information Letter 080, RAI 02.03.04-04
2) Duke Energy Response to Request for Additional Information Letter 080, RAI 02.03.04-05
3) Duke Energy Response to Request for Additional Information Letter 080, RAI 02.03.05-004

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.

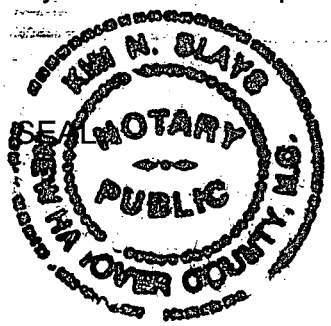
Bryan J. Dolan

Subscribed and sworn to me on April 6, 2010

Notary Public

My commission expires: April 19, 2010

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. 080

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

Reference NRC RAI Number(s): 02.03.04-004

NRC RAI:

The atmospheric dispersion factors (x/Q values) presented in FSAR Section 2.3.4 were generated using one year of onsite meteorological data. SRP 2.3.3 acceptance criteria 2.b states that if two years of onsite meteorological data are not available at the time a COL application is filed, the COL applicant should file a supplemental submittal when a complete 2-year data set is available and provide a reanalysis of the Section 2.3.4 atmospheric dispersion estimates based on the complete 2-year data set.

The design-basis accident x/Q values generated from 2 years of meteorological data provided in Appendix 2CC are generally more conservative/bounding than the 1-year x/Q values presented in FSAR Section 2.3.4. Further, the staff generated accident x/Qs using 2 years of meteorological data that were generally higher than the 2 year accident x/Qs presented in Appendix 2CC.

a. Please provide a copy of the input and output files for the PAVAN and ARCON model runs using the 2-year meteorological data set so that the staff may conduct a confirmatory analysis of the x/Q values presented in Appendix 2CC.

b. Please justify not identifying the more conservative 2-year accident x/Q values presented in Appendix 2 CC as site parameters in FSAR Table 2.0-201.

Duke Energy Response:

The input and output files for the PAVAN and ARCON96 model runs using the 2-year meteorological data set are attached.

The analyses used the 12-month period of December 2005 through November 2006 for the long-term analysis and the 24 –month period from December 1, 2005 to November 30, 2007 for the short-term analysis. FSAR Subsections 2.3.3.1 and 2.3.4 will be revised to reflect the two-year period of meteorological data used in the PAVAN and ARCON96 models. Additionally, the following tables will be revised with the two-year χ/Q values: FSAR Tables 2.0-201, 2.0-202, 2.3-283, and 2.3-285.

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

FSAR Subsection 2.3.3.1

FSAR Subsection 2.3.4

FSAR Table 2.0-201

FSAR Table 2.0-202

FSAR Table 2.3-283

FSAR Table 2.3-285

Attachments:

1) PAVAN and ARCON files on compact disk
2) Markup of FSAR Subsections 2.3.3.1 and 2.3.4, and FSAR Tables 2.0-201, 2.0-202, 2.3-283, and 2.3-285

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

Attachment 1 of RAI 02.03.04-004

PAVAN and ARCON files on compact disk

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

Attachment 2 of RAI 02.03.04-004

Markup of FSAR Subsections 2.3.3.1 and 2.3.4, and FSAR Tables 2.0-201, 2.0-202, 2.3-283, and 2.3-285

COLA Part 2, FSAR Chapter 2, Subsection 2.3.3.1, first paragraph will be revised as follows:

Two meteorological towers are currently at the site. The meteorological monitoring for the pre-construction phase utilized the primary meteorological tower (Tower 2), located east of the planned Nuclear Island. Either prior to or during the construction phase, Tower 2 is expected to be terminated. A separate tower is expected to be installed as the primary meteorological tower for the construction and operational phases.

Calculations to determine diffusion estimates for both short- and long-term conditions are provided in Subsection 2.3.4 and 2.3.5 respectively. These analyses were completed using data from the meteorological Tower 2 meteorological instrumentation ~~during the 12-month period of December 2005 through November 2006~~. The long-term X/Q modeling is based on the 12-month period of December 2005 through November 2006. The short-term X/Q modeling is based on the 24-month period from December 1, 2005 to November 30, 2007. ~~A separate tower is expected to be installed as the primary meteorological tower for the construction and operational phases.~~

COLA Part 2, FSAR Chapter 2, Subsection 2.3.4.1, fifth paragraph will be revised as follows:

Using joint frequency distributions of wind direction and wind speed by atmospheric stability, PAVAN provides the χ/Q values as functions of direction for various time periods at the EAB and the LPZ. The meteorological data needed for this calculation includes wind speed, wind direction, and atmospheric stability. The meteorological data used for this analysis was obtained from the onsite meteorological Tower 2 data from December 1, 2005 through November 30, ~~2006~~2007. The joint frequency distribution for this period is reported in Tables 2.3-235 through 2.3-241. Other plant specific data included tower height at which wind speed was measured (10.0 m) and distances to the EAB and LPZ. The Exclusion Area Boundary (EAB) for Lee Nuclear Station is shown in FSAR Figure 2.1-209. The minimum EAB distances are reported in Table 2.3-282. In this table, the distances are measured from a 550-foot radius effluent release boundary to the EAB. The low population zone (LPZ) is defined as a circle with a 2-mile radius centered on the midpoint between the Unit 1 and 2 containment buildings.

COLA Part 2, FSAR Chapter 2, Subsection 2.3.4.2, second and last paragraphs are revised as follows:

PAVAN requires the meteorological data in the form of joint frequency distributions of wind direction and wind speed by atmospheric stability class. These analyses were completed using data from the Tower 2 meteorological instrumentation during the ~~12~~-24-month period of December 2005 to November ~~2006~~2007.

Table 2.3-283 gives the direction-dependent sector and the direction independent χ/Q values at the EAB and LPZ along with the 5 percent maximum χ/Q values. As shown, the 0.5 percent direction dependent maximum sector relative dispersion exceeds the 5 percent direction independent overall site dispersion at the EAB. Since a higher relative dispersion coefficient is conservative, the 0.5 percent maximum sector (~~NNW~~SE at ~~668~~1339 m) relative dispersion is limiting for the EAB. For the LPZ, the comparison also resulted in the conclusion that the 0.5 percent direction dependent relative dispersion was limiting. A summary of these results is provided below.

Short Term Accident χ/Q VALUES (sec/m^3)
(Based on December 2005-November ~~2006~~2007 Meteorological Data)

	0–2 Hrs	0–8 Hrs	8–24 Hrs	24–96 Hrs	96–720 Hrs
EAB (~~668~~1339 m, ~~NNW~~SE sector)	3.~~52~~46E-04	N/A	N/A	N/A	N/A
LPZ (3219 m, SE sector)	N/A	~~7.16~~8.01E-05	~~4.92~~5.49E-05	2.~~18~~42E-05	~~6.80~~7.46E-06

The above Lee Nuclear Station site characteristics are compared to the AP1000 design criteria in Table 2.0-201.

TABLE 2.0-201 (Sheet 6 of 7)
COMPARISON OF AP1000 SITE PARAMETERS AND LEE NUCLEAR STATION UNITS 1 & 2 SITE CHARACTERISTICS

	AP 1000 DCD Site Parameters	WLS Site Characteristic	WLS FSAR Reference	WLS Within Site Parameter
Atmospheric Dispersion Values χ/Q [g]				
Site Boundary (0-2 hr)	$\leq 5.1 \times 10^{-4}$ sec/m^3	3.~~52~~46 x 10^{-4} sec/m^3	Table 2.3-283 Subsection ~~2.3.5.2~~2.3.4.2	Yes
Site Boundary (Annual Average)	$\leq 2.0 \times 10^{-5}$	5.~~7~~8 x 10^{-6} sec/m^3	Table 2.3-289 (Sheet 1 of 4) Subsection 2.3.5.2	Yes
Low population zone boundary				
0-8 hr	$\leq 2.2 \times 10^{-4}$ sec/m^3	~~7.16~~8.01 x 10^{-5} sec/m^3	Table 2.3-283	Yes
8-24 hr	$\leq 1.6 \times 10^{-4}$ sec/m^3	~~4.92~~5.49 x 10^{-5} sec/m^3	Table 2.3-283	Yes
24-96 hr	$\leq 1.0 \times 10^{-4}$ sec/m^3	2.~~18~~42 x 10^{-5} sec/m^3	Table 2.3-283	Yes
96-720 hr	$\leq 8.0 \times 10^{-5}$ sec/m^3	~~6.80~~7.46 x 10^{-5} sec/m^3	Table 2.3-283	Yes
Control Room	See Table 2.0-202	See Table 2.0-202	See Table 2.0-202	Yes

TABLE 2.0-202 (Sheet 1 of 4)
COMPARISON OF CONTROL ROOM ATMOSPHERIC DISPERSION FACTORS FOR ACCIDENT ANALYSIS FOR AP1000 DCD AND LEE NUCLEAR STATION UNITS 1 & 2 (REFERENCE TABLE 2.3-285)

	χ/Q (s/m^3) at HVAC Intake for the Identified Release Points [a]			χ/Q (s/m^3) at Annex Building Door for the Identified Release Points [b]		
	Plant Vent or PCS Air Diffuser[c]	Plant Vent	PCS Air Diffuser	Plant Vent or PCS Air Diffuser[c]	Plant Vent	PCS Air Diffuser
	DCD	FSAR	FSAR	DCD	FSAR	FSAR
0 – 2 hours	3.0E-03	2.01E-03	1.78E-03	1.0E-03	4.341E-04	4.83E-04
2 – 8 hours	2.5E-03	1.52E-03	1.45E-03	7.5E-04	3.47E-04	3.769E-04
8 – 24 hours	1.0E-04	5.984E-04	5.96.36E-04	3.5E-04	1.437E-04	1.61E-04
1 – 4 days	8.0E-04	4.576E-04	4.55.26E-04	2.8E-04	1.13E-04	1.32E-04
4 – 30 days	6.0E-04	3.256E-04	2.83.36E-04	2.5E-04	7.38.22E-05	7.89.13E-05

	χ/Q (s/m^3) at HVAC Intake for the Identified Release Points [a]				χ/Q (s/m^3) at Annex Building Door for the Identified Release Points[b]			
	Steam Line Break Releases	Steam Line Break Releases	Condenser Air Removal Stack[g]	Condenser Air Removal Stack	Steam Line Break Releases	Steam Line Break Releases	Condenser Air Removal Stack[g]	Condenser Air Removal Stack
	DCD	FSAR	DCD	FSAR	DCD	FSAR	DCD	FSAR
0 – 2 hours	2.4E-02	1.25E-02	6.0E-3	1.659E-03	4.0E-03	8.450E-04	2.0E-2	3.340E-03
2 – 8 hours	2.0E-02	6.57.22E-03	4.0E-3	1.327E-03	3.2E-03	6.044E-04	1.8E-2	2.791E-03
8 – 24 hours	7.5E-03	2.95E-03	2.0E-3	5.310E-04	1.2E-03	2.84E-04	7.0E-3	1.031E-03
1 – 4 days	5.5E-03	2.140E-03	1.5E-3	3.986E-04	1.0E-03	1.93E-04	5.0E-3	8.09.21E-04
4 – 30 days	5.0E-03	1.579E-03	1.0E-3	3.02.82E-04	8.0E-04	1.139E-04	4.5E-3	4.56.40E-04

TABLE 2.0-202 (Sheet 2 of 4)
COMPARISON OF CONTROL ROOM ATMOSPHERIC DISPERSION FACTORS FOR ACCIDENT ANALYSIS FOR AP1000 DCD AND LEE NUCLEAR STATION UNITS 1 & 2 (REFERENCE TABLE 2.3-285)

	χ/Q (s/m^3) at HVAC Intake for the Identified Release Points [a]		χ/Q (s/m^3) at Annex Building Door for the Identified Release Points [b]	
	Ground Level Containment Release Points[d][h]		Ground Level Containment Release Points[d]	
	DCD	FSAR	DCD	FSAR
0 – 2 hours	6.0E-03	2.70E-03	1.0E-03	4.95.01E-04
2 – 8 hours	3.6E-03	1.879E-03	7.5E-04	3.98E-04
8 – 24 hours	1.4E-03	7.039E-04	3.5E-04	1.659E-04
1 – 4 days	1.8E-03	6.290E-04	2.8E-04	1.236E-04
4 – 30 days	1.5E-03	4.375E-04	2.5E-04	8.59.76E-05

	χ/Q (s/m^3) at HVAC Intake for the Identified Release Points [a]		χ/Q (s/m^3) at Annex Building Door for the Identified Release Points [b]	
	PORV and Safety Valve Releases[e]		PORV and Safety Valve Releases[e]	
	DCD	FSAR	DCD	FSAR
0 – 2 hours	2.0E-02	1.108E-02	4.0E-03	8.671E-04
2 – 8 hours	1.8E-02	5.362E-03	3.2E-04	6.83E-04
8 – 24 hours	7.0E-03	2.328E-03	1.2E-03	2.96E-04
1 – 4 days	5.0E-03	1.789E-03	1.0E-03	1.92.05E-04
4 – 30 days	4.5E-03	1.347E-03	8.0E-04	1.146E-04

TABLE 2.0-202 (Sheet 3 of 4)
COMPARISON OF CONTROL ROOM ATMOSPHERIC DISPERSION FACTORS FOR ACCIDENT ANALYSIS FOR AP1000 DCD AND LEE NUCLEAR STATION UNITS 1 & 2 (REFERENCE TABLE 2.3-285)

	χ/Q (s/m^3) at HVAC Intake for the Identified Release Points [a]			χ/Q (s/m^3) at Annex Building Door for the Identified Release Points [b]		
	Fuel Handling Area[f]	Fuel Building Blowout Panel	Radwaste Building Truck Staging Area Door	Fuel Handling Area[f]	Fuel Building Blowout Panel	Radwaste Building Truck Staging Area Door
	DCD	FSAR	FSAR	DCD	FSAR	FSAR
0 – 2 hours	6.0E-03	1.64E-03	1.~~2~~17E-03	6.0E-03	3.64E-04	3.46E-04
2 – 8 hours	4.0E-03	1.20E-03	~~9.0~~8.98E-04	4.0E-03	2.65E-04	2.453E-04
8 – 24 hours	2.0E-03	4.25E-04	3.~~5~~30E-04	2.0E-03	1.01E-04	~~1.0~~9.78E-045
1 – 4 days	1.5E-03	4.~~1~~09E-04	~~3.0~~2.93E-04	1.5E-03	8.~~6~~87E-05	8.~~5~~71E-05
4 – 30 days	1.0E-03	3.~~1~~69E-04	2.~~3~~59E-04	1.0E-03	~~6.6~~7.37E-05	~~6.6~~7.57E-05

a) These dispersion factors are to be used 1) for the time period preceding the isolation of the main control room and actuation of the emergency habitability system, 2) for the time after 72 hours when the compressed air supply in the emergency habitability system would be exhausted and outside air would be drawn into the main control room, and 3) for the determination of control room doses when the non-safety ventilation system is assumed to remain operable such that the emergency habitability system is not actuated.

b) These dispersion factors are to be used when the emergency habitability system is in operation and the only path for outside air to enter the main control room is that due to ingress/egress.

c) These dispersion factors are used for analysis of the doses to a postulated small line break outside of containment. The plant vent and PCS air diffuser are potential release paths for other postulated events (loss-of-coolant accident, rod ejection accident, and fuel handling accident inside the containment); however, the values are bounded by the dispersion factors for ground level releases.

d) The listed values represent modeling the containment shell as a diffuse area source, and are used for evaluating the doses in the main control room for a loss-of-coolant accident, for the containment leakage of activity following a rod ejection accident, and for a fuel handling accident occurring inside the containment.

e) The listed values bound the dispersion factors for releases from the steam line safety and power-operated relief valves. These dispersion factors would be used for evaluating the doses in the main control room for a steam generator tube rupture, a main steam line break, a locked reactor coolant pump rotor, and for the secondary side release from a rod ejection accident.

TABLE 2.3-283 (Sheet 1 of 2)
LEE NUCLEAR STATION OFFSITE ATMOSPHERIC DISPERSION SHORT-TERM DIFFUSION ESTIMATES FOR ACCIDENTAL RELEASES

Exclusion Area Boundary χ/Q Values (sec/m^3) [(b)]

	~~Exclusion Area Boundary χ/Q (sec/m^3)~~		
	Direction Dependent χ/Q		Direction Independent χ/Q
Time Period	0.5% Max Sector χ/Q[(a)]	Sector/Distance	5% Overall Site Limit
0-2 Hrs	3.~~52~~46E-04	~~NNW / 668 m~~SE / 1339 m	~~2.86~~3.00E-04

Low Population Zone χ/Q Values (sec/m^3) [(b)]

	~~Low Population Zone χ/Q (sec/m^3)~~		
	Direction Dependent χ/Q		Direction Independent χ/Q
Time Period	0.5% Max χ/Q[(a)]	Sector	5% Site Limit
0-8 Hrs	~~7.16~~8.01E-05	SE	~~5.94~~6.26E-05
8-24 Hrs	~~4.92~~5.49E-05	SE	4.~~16~~40E-05
1-4 Days	2.~~18~~42E-05	SE	~~1.92~~2.04E-05
4-30 Days	~~6.80~~7.46E-06	SE	6.~~34~~79E-06

TABLE 2.3-283 (Sheet 2 of 2)

LEE NUCLEAR STATION OFFSITE ATMOSPHERIC DISPERSION SHORT-TERM DIFFUSION ESTIMATES FOR ACCIDENTAL RELEASES

Limiting Relative Dispersion Values [b]
Lee Nuclear 0.5% Maximum χ/Q Values (sec/m^3)

	0 – 2 Hrs	0 – 8 Hrs	8 – 24 Hrs	24 – 96 Hrs	96 – 720 Hrs
EAB (~~NNW, 668 m~~SE, 1339 m)[a]	3.~~52~~46E-04	N/A	N/A	N/A	N/A
LPZ (SE, 3219 m)[a]	N/A	~~7.16~~8.01E-05	~~4.92~~5.49E-05	2.~~18~~42E-05	~~6.80~~7.46E-06

~~AP1000 DCD χ/Q Values (sec/m^3)~~

	~~0 – 2 Hrs~~	~~0 – 8 Hrs~~	~~8 – 24 Hrs~~	~~24 – 96 Hrs~~	~~96 – 720 Hrs~~
~~EAB~~	~~1.0E-03~~				
~~LPZ~~		~~5.0E-04~~	~~3.0E-04~~	~~1.5E-04~~	~~8.0E-05~~

a) 0.5% χ/Q values represent the maximum for all sector-dependent values.
b) Based on Lee Nuclear Station meteorological data for December 2005 – November 200~~6~~7.

TABLE 2.3-285 (Sheet 1 of 2)

CONTROL ROOM ATMOSPHERIC DISPERSION FACTORS (χ/Q) FOR ACCIDENT DOSE ANALYSIS (S/M^3)

	Control Room χ/Q at HVAC Intake [a]			
Time Interval	Plant Vent	PCS Air Diffuser	Fuel Bldg. Blowout Panel	Radwaste Bldg. Truck Staging Area Door
0 -2 hours	2.01E-03	1.78E-03	1.64E-03	1.217E-03
2 – 8 hours	1.52E-03	1.45E-03	1.20E-03	9.08.98E-04
8 – 24 hours	5.984E-04	5.96.36E-04	4.25E-04	3.530E-04
1 – 4 days	4.576E-04	4.55.26E-04	4.109E-04	3.02.93E-04
4 – 30 days	3.256E-04	2.83.36E-04	3.169E-04	2.359E-04

	Steam Line Break Releases	PORV & Safety Valves	Condenser Air Removal Stack	Containment Shell
0 -2 hours	1.25E-02	1.108E-02	1.659E-03	2.70E-03
2 – 8 hours	6.57.22E-03	5.362E-03	1.327E-03	1.879E-03
8 – 24 hours	2.95E-03	2.328E-03	5.310E-04	7.039E-04
1 – 4 days	2.140E-03	1.789E-03	3.986E-04	6.290E-04
4 – 30 days	1.579E-03	1.347E-03	3.02.82E-04	4.375E-04

TABLE 2.3-285 (Sheet 2 of 2)

CONTROL ROOM ATMOSPHERIC DISPERSION FACTORS (χ/Q) FOR ACCIDENT DOSE ANALYSIS (S/M^3)

Control Room χ/Q at Annex Building Access Door [a]

Time Interval	Plant Vent	PCS Air Diffuser	Fuel Bldg. Blowout Panel	Radwaste Bldg. Truck Staging Area Door
0 -2 hours	4.~~3~~41E-04	4.83E-04	3.64E-04	3.46E-04
2 – 8 hours	3.47E-04	3.~~7~~69E-04	2.65E-04	2.453E-04
8 – 24 hours	1.437E-04	1.61E-04	1.01E-04	~~1.0E-0~~49.78E-05
1 – 4 days	1.13E-04	1.~~2~~32E-04	8.~~6~~87E-05	8.~~5~~71E-05
4 – 30 days	~~7.3~~8.22E-05	~~7.8~~9.13E-05	~~6.6~~7.37E-05	~~6.6~~7.57E-05

	Steam Line Break Releases	PORV & Safety Valves	Condenser Air Removal Stack	Containment Shell
0 -2 hours	8.450E-04	8.~~6~~71E-04	3.~~3~~40E-03	~~4.9~~5.01E-04
2 – 8 hours	6.~~0~~44E-04	6.83E-04	2.~~7~~91E-03	3.98E-04
8 – 24 hours	2.84E-04	2.96E-04	1.~~0~~31E-03	1.~~6~~59E-04
1 – 4 days	1.93E-04	~~1.9~~2.05E-04	~~8.0~~9.21E-04	1.~~2~~36E-04
4 – 30 days	1.~~1~~39E-04	1.~~1~~46E-04	~~4.5~~6.40E-04	~~8.5~~9.76E-05

a) Based on Lee Nuclear Station meteorological data for December 2005 – November 2007.

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

RAI Letter No. 080

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

Reference NRC RAI Number(s): 02.03.04-005

NRC RAI:

The applicant has taken a departure in FSAR Chapter 18, Human Factors Engineering, in that the Lee Technical Support Center (TSC) is not located in the control building as identified in the AP1000 DCD (Departure No. WLS DEP 18.8-1). Provide a description of the methodology, inputs, assumptions, and calculated atmospheric dispersion factors (x/Q values) for potential design-basis accident releases to the TSC. Information provided should be analogous to that provided for releases to the control room and include drawings to show relevant information graphically. Provide computer input and output files so that the staff may perform confirmatory analysis. Revise the Lee FSAR to include this information.

In accordance with SRP 15.0.3, SRP Acceptance Criteria 3, Technical Support Center Radiological Habitability, information regarding the TSC x/Q values is needed to verify that Lee meets Paragraph IV.E.8 of Appendix E to 10 CFR Part 50 concerning TSC habitability.

Duke Energy Response:

The ARCON96 computer code input and output files used to determine the TSC atmospheric dispersion factors are attached. The TSC is located in the Maintenance Support Building sited in the southern region of the protected area as shown in the Site Layout, FSAR Figure 1.1-202.

The FSAR will be revised to provide a description of the methodology, inputs, assumptions, and calculated atmospheric dispersion factors (χ/Q values) for potential design-basis accident releases to the TSC.

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

New FSAR Subsection 2.3.4.4

New FSAR Table 2.3-294

New FSAR Table 2.3-295

Attachment:

1) New FSAR Subsection 2.3.4.4 and New FSAR Tables 2.3-294 and 2.3-295
2) ARCON96 Input/Output Files (TSC) on compact disc

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

Attachment 1 to RAI 02.03.04-005

New FSAR Subsection 2.3.4.4 and New FSAR Tables 2.3-294 and 2.3-295

COLA Part 2, FSAR Chapter 2, Subsection 2.3.4 is revised to add a new subsection as follows:

2.3.4.4 Short-Term Atmospheric Dispersion Estimates for the Technical Support Center

The atmospheric dispersion estimates (χ/Qs) for the Lee Nuclear Technical Support Center (TSC) were calculated based on the guidance provided in Regulatory Guide 1.194. The TSC χ/Qs were calculated for the limiting design basis release point to the nearest point on the maintenance support building using the ARCON96 computer code (Reference 230). The nearest point on the maintenance support building was conservatively selected to bound the distance to the final TSC air intake location. The atmospheric dispersion calculation used hourly meteorological data from December 1, 2005 through November 30, 2007.

Because the limiting TSC radiological consequences are associated with the design basis LOCA and the containment shell is the most probable LOCA release location (see DCD Subsection 15.6.5.3.3, Release Pathways), a release from the containment shell was assumed. Intervening structures between the release point and the surrogate TSC air intake location were ignored for calculational simplicity, thereby underestimating the true distance from the release point to the surrogate TSC air intakes. This conservatism, in addition to using the conservative surrogate TSC air intake location, resulted in overestimating the TSC χ/Q values. A straight-line path from the source to receptor was conservatively assumed to minimize distances. Distances and directions were taken between the release point (center of the containment wall) to the closest point on the maintenance support building for each unit, as listed in Table 2.3-294. The surrogate TSC intake locations were assumed to be 1.5 m above grade.

Atmospheric stability was determined by the vertical temperature difference (ΔT), measured between the 60-meter and 10-meter instrumentation levels, and the stability classes given in Regulatory Guide 1.23. The containment shell was modeled as a diffuse area source with the elevation of the assumed release equal to the vertical center of the projected plane of the containment shell above the Auxiliary Building and below the conical roof (i.e., 35.4 m above grade). The building area used for building wake corrections is the above grade containment shell area which was conservatively calculated to be 2842 m^2. The initial diffusion estimates (i.e. sigma-y and sigma-z) were based on the Regulatory Guide 1.194 methodology, using a source width of 145 ft, and a source height 110.5 ft with the area of the conical roof and PCS air diffuser conservatively neglected. The χ/Q values that are not exceeded more than 5.0 percent of the total hours in the meteorological data set (e.g., 95-percentile χ/Q) were determined. The χ/Q values for Units 1 and 2 LOCA releases to the nearest corner of the Maintenance Support Building are shown in Table 2.3-295.

TABLE 2.3-294
LEE NUCLEAR STATION TSC HVAC DISTANCES AND DIRECTIONS

WLS COL 2.3-4

Release Point	Distance (m)	Direction to Source from receptor (°)
Unit 1 Containment Shell	196	330
Unit 2 Containment Shell	213	16

Notes:

1. Distances and directions based on the nearest point on the Maintenance Support Building from each unit's containment shell.
2. Directions are relative to true North.

TABLE 2.3-295

TSC ATMOSPHERIC DISPERSION FACTORS (χ/Q) FOR ACCIDENT DOSE ANALYSIS (S/M^3)

WLS COL 2.3-4

Time Interval	Unit 1 Containment Shell Release	Unit 2 Containment Shell Release
0 – 2 hours	1.51E-04	1.34E-04
2 – 8 hours	1.03E-04	1.13E-04
8 – 24 hours	3.93E-05	4.71E-05
1 – 4 days	2.90E-05	3.90E-05
4 – 30 days	2.15E-05	2.71E-05

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

Attachment 2 to RAI 02.03.04-005

ARCON96 Input/Output Files (TSC) on compact disc

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

RAI Letter No. 080

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

Reference NRC RAI Number(s): 02.03.05-004

NRC RAI:

The atmospheric dispersion factors (X/Q values) presented in FSAR Section 2.3.5 were generated using one year of onsite meteorological data. SRP 2.3.3 acceptance criteria 2.b states that if two years of onsite meteorological data are not available at the time a COL application is filed, the COL applicant should file a supplemental submittal when a complete 2-year data set is available and provide a reanalysis of the Section 2.3.5 atmospheric dispersion estimates based on the complete 2-year data set.

The routine release X/Q values generated from 2 years of meteorological data provided in Appendix 2CC are generally more conservative/bounding than the 1-year X/Q values presented in FSAR Section 2.3.5. Further, the staff generated X/Qs using 2 years of meteorological data that were generally higher than the 2 year X/Qs presented in Appendix 2CC.

a. Provide the input and output files for the 2-year XOQDOQ model runs so that the staff may conduct a confirmatory analysis of the X/Q values presented in the appendix.

b. Please justify not identifying the more conservative 2-year accident x/Q values presented in Appendix 2 CC as site parameters in FSAR Table 2.0-201.

c. The Staff also noted an apparent discrepancy between the WLS Site Characteristic, Site Boundary (Annual Average) X/Q value (5.7E-06) located in Table 2.0-201 and the No Decay/Undepleted EAB value (5.8E-06) located in FSAR Table 2.3-289. Following resolution of item b above, please evaluate these tables for consistency.

Duke Energy Response:

The input and output files for the XOQDOQ model runs using the 2-year meteorological data set are attached.

The Lee Nuclear Station FSAR Subsection 2.3.5.1 will be revised to include the statement that the meteorological data analyzed in Appendix 2CC for the period from December 2005 through November 2007 produces long-term atmospheric diffusion (χ/Q) values similar to the one year period from December 2005 through November 2006, thus the one year period meteorological data was retained. Meteorological characteristics are expected to vary year-to-year and the variation observed in the Lee site data is not unexpected. The variation in the observed Lee site data is not significant as evidenced by the minimal difference in max individual doses (doses calculated using χ/Q values and D/Q values based on two-year data minus doses calculated using χ/Q values and D/Q values based on one-year data). The doses are 5% of the corresponding 10 CFR 50 Appendix I limit, and the calculated doses remain below Appendix I dose criteria in all cases. The doses for the one-year data set and the two-year data set are compared with the Appendix I limits instead of with each other because the impact on margin is the important

consideration. The greatest decrease in margin is 1.6% for the maximum individual total body dose limit of 5 mrem/yr. The comparison of the population doses within 50 miles of the site is given in Table 2CC-221. These results show that the whole body and thyroid population doses increase by 3.8% and 2.5%, respectively. The maximum increase for any organ is 5.1% to the bone. None of these increases are considered significant.

Additionally, the favorable conclusions of the ALARA cost-benefit analyses would not be affected because the variation from year to year is not significant enough that radwaste system augments previously found to not be cost-beneficial would become cost-beneficial. This is demonstrated by the small difference (less than 10%) in population doses based on the two-year and one-year data sets.

Because the one-year and two-year data sets are consistent and representative of the long-term conditions, there is no benefit to updating the long-term atmospheric dispersion values currently provided in FSAR Section 2.3. During operations, year-to-year variability in meteorological conditions is addressed through annual effluent release reporting. Updating the site-specific long-term χ/Q and D/Q parameters (FSAR Tables 2.3-287 through 2.3-292) based on a two-year data set would require associated radiological dose calculations supporting FSAR Chapter 11 to be revised without any resulting benefit because the doses would not change significantly and the conclusions based on these doses would be the same.

After evaluation of the discrepancy between the WLS Site Characteristic, Site Boundary (Annual Average) χ/Q value and the No Decay/Undepleted EAB value, the No Decay/Undepleted EAB value of 5.8E-06 is correct. Table 2.0-201 and Subsection 2.3.5.2 of the FSAR will be updated to reflect this correction.

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

FSAR Subsection 2.3.5.1

FSAR Subsection 2.3.5.2

FSAR Table 2.0-201, as shown in Attachment 2 to Enclosure No. 1 of this letter, response to FSAR RAI 02.03.04-004.

Attachments:

1) XOQDOQ input and output files based on two years of data on compact disk
2) Revision to FSAR Subsections 2.3.5.1 and 2.3.5.2

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

Attachment 1 of RAI 02.03.05-004

XOQDOQ Input and Output files based on two years of data on compact disk

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

Attachment 2 of RAI 02.03.05-004

Revision to FSAR Subsections 2.3.5.1 and 2.3.5.2

COLA Part 2, FSAR Chapter 2, Subsection 2.3.5.1, second paragraph is revised as follows:

~~Meteorological data for the period from December 2005 through November 2006 was used in the analysis.~~ The meteorological data analyzed in Appendix 2CC for the period from December 2005 through November 2007 produces long-term atmospheric diffusion (χ/Q) values similar to the one-year period from December 2005 through November 2006, thus the one-year period meteorological data was retained. In addition to the gridded receptor locations, receptor locations were determined from the locations obtained from the current (2006) Land Use Census. Hourly meteorological data was used in the development of joint frequency distributions, in hours, of wind direction and wind speed by atmospheric stability class. The wind speed categories used were consistent with the Lee Nuclear short-term (accident) diffusion χ/Q calculation discussed above. Calms (wind speeds below the anemometer starting speed of 1 mph) were distributed into the first wind speed class with the same proportion and direction as the direction frequency of the 2nd wind-speed class.

COLA Part 2, FSAR Chapter 2, Subsection 2.3.5.2, second paragraph is revised as follows:

The results of the analysis, based on one year of data collected on site, are presented in Tables 2.3-287 through 2.3-292. The limiting atmospheric dispersion factor (χ/Q) at the EAB is in the SE direction at 1339 meters. The limiting atmospheric dispersion at the nearest residence is also in the SE direction at 1607 meters. Atmospheric dispersion factors for other receptors are given in Table 2.3-289. Long term atmospheric dispersion factors are not given in the AP1000 DCD except at the EAB. The DCD site boundary annual average χ/Q is 2.0×10^{-5} sec/m^3. This bounds the Lee Nuclear Station annual average routine release EAB χ/Q value of $5.8\sout{7} \times 10^{-6}$ sec/m^3. Table 2.0-201 provided a comparison of the Lee Nuclear Station site characteristics with the DCD design parameters.