Bryan J. Dolan
VP, Nuclear Plant Development

Duke Energy
EC09D/ 526 South Church Street
Charlotte, NC 28201-1006

Mailing Address:
P.O. Box 1006 – EC09D
Charlotte, NC 28201-1006

704-382-0605

bjdolan@duke-energy.com

March 18, 2009

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# WLG2009.03-14

Reference: Letter from L.M. Tello (NRC) to B.J. Dolan (Duke Energy), *Request for Additional Information Regarding the Environmental Review of Combined License Application for William States Lee Nuclear Station Units 1 and 2*, dated January 21, 2009

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

RAI 114, Alternative Energy

The response to this NRC request is addressed in a separate enclosure, which also identifies associated changes, when appropriate, that will be made in a future revision of the Williams States Lee III Nuclear Station application.

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

Enclosure:

1) Response to RAI 114, Alternative Energy

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.

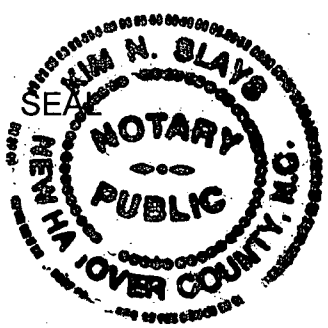
Bryan J. Dolan

Subscribed and sworn to me on March 18, 2009

Notary Public

My commission expires: April 19, 2010

SEAL



xc (w/o enclosure):

Loren Plisco, Deputy Regional Administrator, Region II
Stephanie Coffin, Branch Chief, DNRL
Robert Schaaf, Branch Chief, DSER

xc (w/ enclosure):

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

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

RAI Letter Dated: January 21, 2009

Reference NRC RAI Number: ER RAI-114

NRC RAI:

Provide calculations, references, and the selected control strategies for the natural gas fired emissions.

In the RAI-48 response, applicant provides emissions estimates for (5) natural gas fired combined cycle units in Table 9.2-4. Applicant then includes a reference to EPA AP-42 (5th Ed.) section 1.4 as a reference. It is unclear if the emissions are calculated from this reference; if they are, the applicant should use Section 3.1 for stationary gas turbines, and select the appropriate control strategies they would intend to deploy assuming 114,847,104 MMBtu input per year.

Duke Energy Response:

Emissions from an alternative natural gas fired combined cycle unit have been re-calculated using information from EPA AP-42, 5th Edition, section 3.1 for stationary gas turbines. A selective catalytic reduction (SCR) system is assumed in conjunction with water-steam injection for the purpose of reducing nitrogen oxide (NOx) and carbon monoxide (CO) emissions. Although an SCR system can operate alone, it is typically used in conjunction with water-steam injection systems or lean-premix system to reduce NO_X emissions to their lowest levels (less than 10 ppm at 15 percent oxygen for SCR and wet injection systems). The emission factors for NOx and CO are per Reference 15, Table 3.1-1. Emission factors for carbon dioxide (CO_2), sulfur dioxide (SO_2), and particulate matter (PM) are from EPA AP-42, 5th Edition, Table 3.1-2a.

The response to RAI-48 as transmitted in letter WLG2008.12-11 of 12/12/2008 is revised as follows:

Associated Revision to the Lee Nuclear Station Combined License Application:

1. ER Subsection 9.2.3.2.3 will be revised as follows:

   9.2.3.2.3 Air Quality

   Natural gas is a relatively clean-burning fuel. The combined-cycle operation is highly efficient (60 percent versus 33 percent for the coal-fired alternative) because the heat recovery steam generator does not receive supplemental fuel. The natural-gas-fired alternative would release similar types of emissions, but in lesser quantities than the coal-fired alternative, and in much larger quantities than the nuclear alternative.

   The largest environmental impact from this type of facility would result from the air emissions. The emissions resulting from burning natural gas only would be 195.2~~34.4~~ T. per year of SO_2, 7465~~517~~ T. per year of NO_x, 379~~287~~ T. per year of particulate matter (PM), and

1723~~482~~ T. per year of carbon monoxide (CO). A facility of this size would add 6,316,591~~6,755,712~~ T. per year of CO_2 to the environment. Assumptions and calculations for these emissions are provided in Table 9.2-5 and Table 9.2-4, respectively. ~~The $PM_{2.5}$ and regional haze rules would not be of concern with NGCC generation because these units have minimal SO_2 emissions.~~ The overall impacts are characterized as ~~SMALL to~~ MODERATE.

2. ER Table 9.2-3 will be revised as indicated in Attachment 1.

3. ER Table 9.2-4 will be replaced with Attachment 2.

4. ER Table 9.2-5 will be revised as indicated in Attachment 3.

5. ER Subsection 9.2.4 will be revised to correct Reference 15 with the following:

   15. U.S. Environmental Protection Agency (EPA), Section ~~1.4, "Natural Gas Combustion"~~3.1, "Stationary Gas Turbines," Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point Sources and Area Sources, EPA Report No. AP-42, Fifth ed., Washington, DC, September 1998, Website, http://www.epa.gov/ttn/chief/ap42/, accessed ~~September 19, 2008~~January 29, 2009.

Associated Attachments:

Attachment 1	Table 9.2-3 Comparison of the Environmental Impacts of the Coal-Fired and Natural Gas Alternatives to the Lee Nuclear Station
Attachment 2	Table 9.2-4 Air Emissions from Gas-Fired Alternative
Attachment 3	Table 9.2-5 Gas-Fired Alternative Characteristics

Attachment 114-1

Table 9.2-3

Comparison of the Environmental Impacts of the Coal-Fired and Natural Gas Alternatives to the Lee Nuclear Station

[Attachment Comprises 2 Pages, Including Cover Sheet]

TABLE 9.2-3
COMPARISON OF THE ENVIRONMENTAL IMPACTS OF THE COAL-FIRED AND NATURAL GAS ALTERNATIVES TO THE LEE NUCLEAR STATION

Attribute	Environmental Impacts		
	Lee Nuclear Station	Coal-Fired Alternative	Natural Gas Generation
Air Quality	SMALL	MODERATE	~~SMALL to~~MODERATE
Waste Management	SMALL	MODERATE	SMALL
Land	SMALL	SMALL	MODERATE
Ecology	SMALL	SMALL	SMALL to MODERATE
Water Use & Quality	SMALL	SMALL	SMALL
Human Health	SMALL	SMALL	SMALL
Socioeconomics	SMALL	SMALL	MODERATE
Aesthetics	SMALL	SMALL	SMALL to MODERATE
Cultural Resources	SMALL	SMALL	SMALL
Environmental Justice	SMALL	SMALL	SMALL

Attachment 114-2

Table 9.2-4
Air Emissions from Gas-Fired Alternative

[Table Replaced in its Entirety]

[Attachment Comprises 2 Pages, Including Cover Sheet]

TABLE 9.2-4
AIR EMISSIONS FROM GAS-FIRED ALTERNATIVE

Parameter	Result
Annual Gas Consumption	2,404,470 T. per year
Annual BTU Input	114,847,104 MMBtu per year
SO_2	195.2 T. SO_2 per year
NO_x	7465 T. NO_x per year
CO	1723 T. CO per year
PM	379 T. PM per year
PM_{10}	109 T. filterable PM_{10} per year
CO_2	6,316,591 T. CO_2 per year

Notes:

Btu	British thermal unit
CO	Carbon monoxide
CO_2	Carbon dioxide
kWh	Kilowatt hour
lb.	Pound
MW	Megawatt
NO_x	Oxides of Nitrogen
PM	Particulate Matter
PM_{10}	Particulates having diameter less than 10 microns
SO_2	Sulfur dioxide
T.	Ton
yr.	Year

Attachment 114-3

Table 9.2-5
Gas-Fired Alternative Characteristics

[Attachment Comprises 3 Pages, Including Cover Sheet]

TABLE 9.2-5
GAS-FIRED ALTERNATIVE CHARACTERISTICS
(Sheet 1 of 2)

Characteristic	Basis
Unit size = 482 MW IS0 rating net[a] Two 112 MW-combustion turbines 138 MW-heat recovery boiler	Standard size (Duke Energy experience)
Number of units = 5	Approximate capacity to replace 2400 MWe net
Fuel type = natural gas	Assumed
Fuel heating value = 23,882 Btu/lb (HHV)	Typical for natural gas used in NC (Duke Energy experience)
~~Fuel sulfur content~~SO_2 Emission Factor = 0.0034~~0006~~ lb/MMBtu	Used when sulfur content is not available
NOx control = selective catalytic reduction (SCR) with water injection	Best available for minimizing NOx emissions
Fuel NOx ~~content~~ Emission Factor = 0.13~~009~~ lb/MMBtu ~~(2.5 ppm)~~	~~Typical for large~~ SCR- control~~led combined cycle gas-fired units (EPA BACT Clearinghouse)~~ in conjunction with water-steam injection (Reference 15, Table 3.1-1)
Fuel CO_2 Emission Factor = 110 lb/MMBtu	Based on 99.5% conversion of fuel carbon to CO_2 (Reference 15, Table 3.1-2a)
Fuel CO ~~content~~ Emission Factor = 0.03~~0084~~ lb/MMBtu ~~(9 ppm)~~	~~T~~SCR-control in conjunction with water-steam injection (Reference 15, Table 3.1-1) ~~ypical for large SCR controlled gas fired units~~
Heat rate = 6800 Btu/kWh	Typical for combined cycle gas-fired turbines (@ ISO)
Capacity factor = 0.8	Typical for baseload units

TABLE 9.2-5
GAS-FIRED ALTERNATIVE CHARACTERISTICS
(Sheet 2 of 2)

Notes	
Net~~a.~~	The difference between "net" and "gross" is electricity consumed on-site.
Btu	British thermal unit
ISO Rating	International Standards Organization rating at standard atmospheric conditions of 59°F 60% relative humidity and 14.696 lb. of atmospheric pressure per sq. in.
kWh	Kilowatt hour
MM	Million
MW	Megawatts
MWe	Megawatts electric
NOx	Nitrogen oxides
HHV	High Heating Value