February 10, 2009

Mr. Bruce H. Hamilton
Vice President
McGuire Nuclear Station
Duke Energy Carolinas, LLC
12700 Hagers Ferry Road
Huntersville, NC 28078

SUBJECT: MCGUIRE NUCLEAR STATION, UNITS 1 AND 2, REQUEST FOR ADDITIONAL INFORMATION (RAI) REGARDING PROPOSED LICENSE AMENDMENT REQUEST FOR IMPLEMENTATION OF ALTERNATIVE SOURCE TERM (TAC NOS. MD8400 AND MD8401)

Dear Mr. Hamilton:

By letter dated March 20, 2008, Duke Energy Carolinas, LLC (Duke) requested an amendment to the McGuire Nuclear Station, Units 1 and 2 (McGuire 1 and 2) Facility Operating Licenses. The amendment request proposed to revise the McGuire 1 and 2 licensing basis by adopting the Alternative Source Term (AST) radiological analysis methodology for the loss-of-coolant accident. By electronic mail message dated October 3, 2008, the U.S. Nuclear Regulatory Commission (NRC) staff sent Duke a request for additional information (RAI) with respect to the subject license amendment application. By letter dated December 17, 2008, Duke responded to this RAI. Based on this response, the NRC staff has concluded that an additional RAI is needed in order to complete its review. Based on our telephone conversation of January 29, 2008, the NRC staff understands that you will respond to this RAI by February 13, 2009.

Sincerely,

/RA/

Jon Thompson, Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-369 and 50-370

Enclosure:
Request for Additional Information

cc w/encl: Distribution Via ListServ

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Vice President
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OFFICE	NRR/LPL2-1/PM	NRR/LP2-1/LA	NRR/AADB/BC	NRR/LPL2-1/BC
NAME	JThompson	MO'Brien	RTaylor*	MWong
DATE	2/5/2009	2/9/2009	1/30/2009	2/10/2009

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REQUEST FOR ADDITIONAL INFORMATION

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REGARDING PROPOSED LICENSE AMENDMENT REQUEST FOR

IMPLEMENTATION OF ALTERNATIVE SOURCE TERM

MCGUIRE NUCLEAR STATION, UNITS 1 AND 2

1. Section C.3.4 of Regulatory Guide (RG) 1.194, "Atmospheric Relative Concentrations for Control Room Radiological Habitability Assessments at Nuclear Power Plants," states that "If the distance to the receptor is less than about 10 meters, the ARCON96 code and the procedures in Regulatory Position 4 should not be used to assess χ/Q values. These situations will need to be addressed on a case-by-case basis." (Regulatory Positions 4.1 to 4.3 of RG 1.194 are based on Murphy-Campe and Standard Review Plan Chapter 6.4). With regard to the calculation of χ/Q values for releases from the main steam safety valves on the outboard doghouse (MSSVout), please provide a case-specific analysis that either recalculates the χ/Q values, or that quantitatively demonstrates that the magnitude of the MSSVout values listed in Table B-3 of Appendix D of your response sent by letter dated December 17, 2008, are bounded by dilution effects resulting from case-specific factors. Such an analysis need not be limited to meteorological factors. For example, it may consider applicable case-specific engineering influences such as high energy flow rates, thermal buoyancy, and effects of steam flashing to atmospheric conditions, but should account for temporal changes and resultant dilution effects throughout the accident.

2. Based on a January 15, 2009, telephone conference between Duke and NRC staff, it is the NRC staff's understanding that Duke no longer requests approval of χ/Q values associated with the reactor building surface. Please confirm that this is the case.

3. Some of the locations identified in Figure 1 of Appendix B of your response sent by letter dated December 17, 2008, appear to be at different distances and/or directions than those listed in Table B-2 of Appendix D of your response. Please provide one or more additional figures with higher resolution which clearly highlight all release and receptor locations and from which distance, height and direction inputs can be reasonably approximated. When both an arc direction and a straight-line direction could apply, please clarify whether calculations were made for both cases and the limiting resultant χ/Q values were listed in Table B-3 of Appendix D.

4. Question 6 of your response sent by letter dated December 17, 2008, discusses the control room air intake locations and auxiliary building roof elevation. Please clarify whether the heights of the control room air intakes are 3.6 meters above plant grade. Were all of the source and receptor values input into the ARCON96 computer code with respect to their height above plant grade? If the height of the auxiliary building roof was factored into the ARCON96 inputs, how was this done and to which release locations does it apply?

   Table B-2 of Appendix D of your response sent by letter dated December 17, 2008, lists non-zero initial sigma-y and sigma-z values for each of the following postulated release locations:

equipment hatch (EQ),
fuel building (FUEL),
inboard doghouse (NDOG),
inboard doghouse plus steam and feedwater line penetrations (VNDOG)
outboard doghouse (ODOG),
outboard doghouse plus steam and feedwater line penetrations (VODOG), and
reactor building surface (RX).

The NRC staff notes that the diffusion models incorporated in ARCON96 are Gaussian models that assume that the release is from a point source. When using ARCON96 for a point source, the initial sigma y and sigma z are both zero, which are the default values. Input of a non-zero initial sigma value identifies the release as a diffuse source. Since ARCON96 is not able to directly calculate atmospheric dispersion factors for non-point sources, it uses each non-zero initial sigma value to determine the distance from the center of the real source to a virtual point source upwind of the real source.

Regulatory Position 3.2.4.5 of RG 1.194, states that the height and width of the area source may be taken as the maximum vertical and horizontal dimensions perpendicular to the line of sight from the source center to the control room intake. These dimensions are used to calculate the initial sigma values which ARCON96 uses to calculate upwind virtual point sources. Regulatory Position 3.2.4.8, which discusses large louvered panels or large openings, states that application of the diffuse area source model would be appropriate when (1) the release rate from the building interior is essentially equally dispersed over the entire surface of the panel or opening and (2) assumptions of mixing, dilution, and transport within the building necessary to meet condition 1 are supported by the interior building arrangement.

Other than for the reactor building surface, please provide drawings showing the orientation of release with respect to the control room intake, describe the physical characteristics resulting in a diffuse release (e.g., louvered panel, array of vents) and further justify that it is appropriate to model each of the sources using the initial sigma-y and sigma-z values and distances and directions listed in Table B-2 of Appendix D of your response sent by letter dated December 17, 2008. Confirm that the other criteria discussed above have been met and that a release through another penetration (e.g., a single vent) would not result in more limiting χ/Q values than from the diffuse source.