March 19, 1998

Mr. Gary R. Peterson
Site Vice President
Catawba Nuclear Station
Duke Energy Corporation
4800 Concord Road
York, South Carolina 29745-9635

SUBJECT: CATAWBA NUCLEAR STATION - REQUEST FOR ADDITIONAL INFORMATION RELATED TO THE GENERIC LETTER 96-06 RESPONSE (TAC NOS. M96794 AND M96795)

Dear Mr. Peterson:

Generic Letter (GL) 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions," dated September 30, 1996, included a request for licensees to evaluate cooling water systems that serve containment air coolers to assure that they are not vulnerable to waterhammer and two-phase flow conditions.

Duke Energy Corporation provided its assessment for the Catawba Nuclear Plant in a letter dated January 28, 1997. We have reviewed your submittal and found that additional information is needed as set forth in the enclosure. Please provide this information by June 30, 1998. If you have any questions, please call me at 301-415-1451.

Sincerely,
ORIGINAL SIGNED BY:
Peter S. Tam, Senior Project Manager
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket Nos. 50-413 and 50-414

Enclosure: As stated

cc w/encl: See next page

Distribution	PTam	LBerry
Docket File	OGC	HBerkow
PUBLIC	J. Johnson, RII	
PDII-2 Reading	J. Tatum, O-8 D1	
J. Zwolinski	ACRS	
C. Ogle, RII	LPlisco, RII	

1/1 DF01

DOCUMENT NAME: G:\CATAWBA\CAT96794.RAI
To receive a copy of this document, indicate in the box: "**C**" = Copy without attachment/enclosure "**E**" = Copy with attachment/enclosure "**N**" = No copy

OFFICE	DRPE\PDII-2\PM	PDII-2\LA	N	PDII-2\D			
NAME	PTam:cn	LBerry		HBerkow			
DATE	03/18/98	3/18/98		3/18/98			

OFFICIAL RECORD COPY

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 19, 1998

Mr. Gary R. Peterson
Site Vice President
Catawba Nuclear Station
Duke Energy Corporation
4800 Concord Road
York, South Carolina 29745-9635

SUBJECT: CATAWBA NUCLEAR STATION - REQUEST FOR ADDITIONAL INFORMATION RELATED TO THE GENERIC LETTER 96-06 RESPONSE (TAC NOS. M96794 AND M96795)

Dear Mr. Peterson:

Generic Letter (GL) 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions," dated September 30, 1996, included a request for licensees to evaluate cooling water systems that serve containment air coolers to assure that they are not vulnerable to waterhammer and two-phase flow conditions.

Duke Energy Corporation provided its assessment for the Catawba Nuclear Plant in a letter dated January 28, 1997. We have reviewed your submittal and found that additional information is needed as set forth in the enclosure. Please provide this information by June 30, 1998. If you have any questions, please call me at 301-415-1451.

Sincerely,

Peter S. Tam

Peter S. Tam, Senior Project Manager
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket Nos. 50-413 and 50-414

Enclosure: As stated

cc w/encl: See next page

Catawba Nuclear Station

cc:
Mr. M. S. Kitlan
Regulatory Compliance Manager
Duke Energy Corporation
4800 Concord Road
York, South Carolina 29745

Mr. Paul R. Newton
Legal Department (PB05E)
Duke Energy Corporation
422 South Church Street
Charlotte, North Carolina 28242

J. Michael McGarry, III, Esquire
Winston and Strawn
1400 L Street, NW
Washington, DC 20005

North Carolina Municipal Power
Agency Number 1
1427 Meadowwood Boulevard
P. O. Box 29513
Raleigh, North Carolina 27626

Mr. Peter R. Harden, IV
Account Sales Manager
Westinghouse Electric Corporation
Power Systems Field Sales
P. O. Box 7288
Charlotte, North Carolina 28241

County Manager of York County
York County Courthouse
York, South Carolina 29745

Piedmont Municipal Power Agency
121 Village Drive
Greer, South Carolina 29651

North Carolina Electric Membership
Corporation
P. O. Box 27306
Raleigh, North Carolina 27611

Senior Resident Inspector
U.S. Nuclear Regulatory Commission
4830 Concord Road
York, South Carolina 29745

Regional Administrator, Region II
U. S. Nuclear Regulatory Commission
Atlanta Federal Center
61 Forsyth Street, S.W., Suite 23T85
Atlanta, Georgia 30303

Max Batavia, Chief
Bureau of Radiological Health
South Carolina Department of
Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

L. A. Keller
Manager - Nuclear Regulatory
Licensing
Duke Energy Corporation
526 South Church Street
Charlotte, North Carolina 28242-0001

Saluda River Electric
P. O. Box 929
Laurens, South Carolina 29360

Ms. Karen E. Long
Assistant Attorney General
North Carolina Department of Justice
P. O. Box 629
Raleigh, North Carolina 27602

Elaine Wathen, Lead REP Planner
Division of Emergency Management
116 West Jones Street
Raleigh, North Carolina 27603-1335

Catawba Nuclear Station

cc:
Mr. T. Richard Puryear
Owners Group (NCEMC)
Duke Energy Corporation
4800 Concord Road
York, South Carolina 29745

Richard M. Fry, Director
Division of Radiation Protection
North Carolina Department of
Environment, Health, and
Natural Resources
3825 Barrett Drive
Raleigh, North Carolina 27609-7721

REQUEST FOR ADDITIONAL INFORMATION FOR RESOLUTION OF GENERIC LETTER 96-06 ISSUES AT THE CATAWBA NUCLEAR STATION, UNIT NOS. 1 AND 2 (TAC NOS. M96794 AND M96795)

Generic Letter (GL) 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions," dated September 30, 1996, included a request for licensees to evaluate cooling water systems that serve containment air coolers to assure that they are not vulnerable to waterhammer and two-phase flow conditions. Duke Energy Corporation (the licensee) provided its assessment for the Catawba Nuclear Station in a letter dated January 28, 1997. In order for the staff to adequately assess the licensee's resolution of the waterhammer and two-phase flow issues, the following additional information is requested:

1. The licensee's response indicated that for certain scenarios, the containment penetrations for cooling water to the upper and lower containment headers isolate and the Emergency Operating Procedures (EOPs) do not direct the operators to restore cooling water to these headers for accident mitigation. However, during accident conditions, plant operators may elect to take actions to restore the containment cooling water headers to service if the situation calls for it. Describe any measures that exist or that have been taken to assure that these headers will not be restored as an option to mitigate accident conditions during these event scenarios.

The following questions are applicable to accident scenarios where the containment penetrations for cooling water are not isolated and the potential exists for waterhammer and/or two-phase flow to occur:

2. If a methodology other than that discussed in NUREG/CR-5220, "Diagnosis of Condensation-Induced Waterhammer," was used in evaluating the effects of waterhammer, describe this alternate methodology in detail. Also, explain why this methodology is applicable and gives conservative results for the Catawba units (typically accomplished through rigorous plant-specific modeling, testing, and analysis).

3. For both the waterhammer and two-phase flow analyses, provide the following information:

    a. Identify any computer codes that were used in the waterhammer and two-phase flow analyses and describe the methods used to benchmark the codes for the specific loading conditions involved (see Standard Review Plan Section 3.9.1).

    b. Describe and justify all assumptions and input parameters (including those used in any computer codes) such as amplifications due to fluid structure interaction, cushioning, speed of sound, force reductions, and mesh sizes, and explain why the values selected give conservative results. Also, provide justification for omitting any effects that may be relevant to the analysis (e.g., fluid structure interaction, flow induced vibration, erosion).

Enclosure

c. Provide a detailed description of the "worst-case" scenarios for waterhammer and two-phase flow, taking into consideration the complete range of event possibilities, system configurations, and parameters. For example, all waterhammer types and water slug scenarios should be considered, as well as temperatures, pressures, flow rates, load combinations, and potential component failures. Additional examples include:

- the consequences of steam formation, transport, and accumulation;
- cavitation, resonance, and fatigue effects; and
- erosion considerations.

d. Confirm that the analyses include a complete failure modes and effects analysis (FMEA) for all components (including electrical and pneumatic failures) that could impact performance of the cooling water system and confirm that the FMEA is documented and available for review, or explain why a complete and fully documented FMEA was not performed.

e. Explain and justify all uses of "engineering judgement."

4. Determine the uncertainty in the waterhammer and two-phase flow analyses, explain how the uncertainty was determined, and how it was accounted for in the analyses to assure conservative results for the Catawba units.

5. Confirm that the waterhammer and two-phase flow loading conditions do not exceed any design specifications or recommended service conditions for the piping system and components, including those stated by equipment vendors; and confirm that the system will continue to perform its design-basis functions as assumed in the safety analysis report for the facility.

6. Provide a simplified diagram of the system, showing major components, active components, relative elevations, lengths of piping runs, and the location of any orifices and flow restrictions.