January 10, 2002

LICENSEE : Duke Energy Corporation

FACILITIES: McGuire, Units 1 and 2, and Catawba, Units 1 and 2

SUBJECT: TELECOMMUNICATION WITH DUKE ENERGY CORPORATION TO DISCUSS INFORMATION IN THEIR LICENSE RENEWAL APPLICATION ON SECTION 4.6, CONTAINMENT LINER PLATE, METAL CONTAINMENTS, AND PENETRATION FATIGUE ANALYSIS

On November 20, 2001, after the staff reviewed information provided in Section 4.6 of the license renewal application (LRA), a conference call was conducted between the NRC and Duke Energy Corporation to clarify information presented in the application pertaining to the containment liner plate, metal containments, and penetration fatigue analysis. Participants in the November 20, 2001, conference call are provided in an attachment.

The questions asked by the staff, as well as the responses provided by the applicant, are as follows:

1. Provide detailed justification why a fatigue time-limited aging analysis (TLAA) was not required for the steel containment vessel, as stated in Section 4.6.2, for loadings resulting from operating transients, peak containment internal pressure resulting from the design basis loss of coolant accident (LOCA), design basis safe shutdown earthquake (SSE), and leakage rate testing, in addition to the loading resulting from the transient expansions of the bellows.

   The applicant indicated that there was no original fatigue analysis for the containment shell. The applicant further stated that peak containment internal pressure resulting from the design basis LOCA or a design basis SSE were one-time loads and not cyclic loads requiring a fatigue analysis. Penetration bellows (listed in aging management review results Table 3.5-1 on page 3.5-5) are provided to absorb the loads associated with thermal expansion during operational transients as well as loads induced during containment leak rate testing. The staff will consider this information but may request additional information to complete its review of this issue.

2. Sections 4.6.3.1 “McGuire Design and Time-Limited Aging Analysis Evaluation” and 4.6.3.2 “Catawba Design and Time-Limited Aging Analysis Evaluation,” refer to cracking as an aging effect which could result from cyclic fatigue, requiring fatigue management of the penetration bellows for the period of extended operation. “The Containment Leak Rate Testing Program,” discussed in Section B.3.8, has been identified as the program that manages cracking of the bellows. The element, “McGuire Operating Experience,” in Section B.3.8 states that several leaking penetration bellows were identified after twenty years of operation, and that some are currently cracked but the test leakages are within Technical Specification limits.

a. For the McGuire and the Catawba plants, provide the number of bellows where leaking cracks have been found, and the number of bellows that have been replaced, since the beginning of operation of these plants.

The applicant corrected the staff in its reference to cracked bellows and clarified that these bellows are characterized as leaking, as evidenced by their performance during leak rate testing. The applicant indicated that 20 bellows at McGure and 3 bellows at Catawba are designated as leaking bellows, and the applicant referred the staff to page B.3.8-3 of the LRA for a discussion of the replaced bellows in penetration 1M-441 at McGuire Unit 1.

b. For the McGuire and the Catawba plants, provide the number of Duke Class A and Class B bellows that are currently cracked.

The applicant indicated that there are no Class A bellows at Catawba or McGuire because there are no Class 1 pipe penetrations through the containment wall. As such, the aswer to Question 2.a applies to Class B penetrations. .

c. Table 3.5-1 “Aging Management Review Results,” indicates that the function of the bellows and mechanical penetrations is to provide a pressure boundary and/or fission product barrier. Provide justification for operating with cracked bellows during the period of current operation and the proposed period of extended operation.

The applicant responded that, again, the bellows could be characterized only as leaking. The applicant further stated that continued operation with leaking bellows was justified because the operability and surveillance requirements of technical specification 3.6.1, which governs containment leak rate testing, were met.

The staff will consider the information provided in response to a., b. and c., but may request additional information to complete its review of Section B.3.8, Containment Leak Rate Testing, of the LRA as it pertains to these issues.

3. Section 4.6.3.1 indicates that the vendors of the bellows performed cyclic life evaluations and stated that the life of the bellows is well beyond what the bellows would see during normal operation in 40 years of plant operation. Provide the root cause of bellows cracking as a result of fatigue failure within 20 years from the start of plant operation, well short of the bellows vendor test lives.

The applicant reiterated that the bellows have been characterized as leaking, not as cracked - and certainly not as cracked due to fatigue. The applicant further offered that the bellows that had been replaced at McGuire had cracked, and the root cause was attributed to trans-granular stress corrosion cracking from contact with chlorine. The applicant indicated that the other root causes of bellows leakage were attributed to either manufacturing process problems and defects or to improper installation. As such, these leaking bellows are being monitored within the sites’ corrective action programs. The staff will consider this information but may request additional information pertaining

to the range of root causes that may be attributed to leaking bellows to complete its review of this issue.

4. Section 4.6.3.2, "Catawba Design and Time-Limited Aging Analysis Evaluation," states that the design Code of Record for Catawba bellows assemblies is ASME Section III NC-3649, 1974. This code requires an evaluation of the cumulative effect of stress cycles for cyclic life of bellows.

   a. Explain why the fatigue design of penetration bellows is not a time-limited aging analysis (TLAA) for Catawba.

      The applicant indicated that the calculations and analyses for bellows were not considered relevant in making a safety determination and that an aging management program was proposed for this structural component.

   b. Provide the basis for the statement that Criterion (4) of §54.3 is not met, i.e., the determination that the penetration bellows fatigue analyses at the Catawba plants are not relevant in making any safety determination. Explain this statement since cracked bellows have been found at Catawba, and the function of the bellows is to act as a pressure and fission barrier.

      The applicant responded that the bellows were characterized as leaking, not cracked. The leaks have been attributed to manufacturing process problems, installation problems, and the one case of trans-granular stress corrosion cracking due to contact with chlorine. A cyclic analysis was performed for the bellows in the original design. The order of magnitude of the number of cycles was too large to base any safety judgment on the specific number. Therefore, the analysis is not a TLAA. Because the function of the bellows is within license renewal scope and leaks have been observed at both McGuire and Catawba, a program was proposed to address leaking.

   The staff will consider the information provided in response to a. and b. but may request additional information to provide the applicant an opportunity to explain that aging of bellows is addressed through an aging management program rather than a TLAA in their written response.

5. The acceptance criteria in Section B.3.8, "Containment Leak Rate Testing Program" state that the space between dual-ply bellows shall be subjected to a low pressure leak test, with no detectable leakage. Provide the minimum pressure requirement that makes this a meaningful test.

   The applicant indicated that, since a similar question related to the effectiveness of this aging management program was raised during the staff's review of LRA Section 3.5 (see October 30, 2001, conference call summary), that they would discuss the pressure requirements (three to five pounds per square inch gauge) in their official response to that question.

6. If the leakage is detectable, the acceptance criteria in Section B.3.8 also state that the assembly must be tested with the containment side of the bellows assembly pressurized

to P_a, and the acceptance criterion is based on the combined leakage rate for all reactor building bypass leakage paths to be less than or equal to 0.07 L_a. Provide the steps used to verify that the test leakage of any individual bellows assembly will be less than L_a over the extended life of the plant, or during a LOCA.

The applicant indicated that the acceptance criterion of 0.07 L_a was specified in technical specification surveillance requirement 3.6.3.8 as the maximum allowable combined (from all penetration bellows, isolation valves and electrical penetrations) leakage rate. As such, the test leakage of any individual bellows assembly will be less than L_a over the extended life of the plant during normal operations as well as during design basis events (e.g. LOCAs). The staff will consider the information provided in response to a., b. and c., but may request additional information to complete its review of Section B.3.8, Containment Leak Rate Testing, of the LRA as it pertains to these issues.

A draft of this telecommunication summary was provided to the applicant to allow them the opportunity to comment prior to the summary being issued.

/***RA***/

Rani L. Franovich, Project Manager
License Renewal and Environmental Impacts Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket Nos. 50-369, 50-370, 50-413, and 50-414

Attachment: As stated

cc w/attachment: See next page

6. If the leakage is detectable, the acceptance criteria in Section B.3.8 also state that the assembly must be tested with the containment side of the bellows assembly pressurized to P_a, and the acceptance criterion is based on the combined leakage rate for all reactor building bypass leakage paths to be less than or equal to 0.07 L_a. Provide the steps used to verify that the test leakage of any individual bellows assembly will be less than L_a over the extended life of the plant, or during a LOCA.

   The applicant indicated that the acceptance criterion of 0.07 L_a was specified in technical specification surveillance requirement 3.6.3.8 as the maximum allowable combined (from all penetration bellows, isolation valves and electrical penetrations) leakage rate. As such, the test leakage of any individual bellows assembly will be less than L_a over the extended life of the plant during normal operations as well as during design basis events (e.g. LOCAs). The staff will consider the information provided in response to a., b. and c., but may request additional information to complete its review of Section B.3.8, Containment Leak Rate Testing, of the LRA as it pertains to these issues.

A draft of this telecommunication summary was provided to the applicant to allow them the opportunity to comment prior to the summary being issued.

/***RA***/

Rani L. Franovich, Project Manager
License Renewal and Environmental Impacts Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket Nos. 50-369, 50-370, 50-413, and 50-414

Attachment: As stated

cc w/attachment: See next page

DISTRIBUTION:
See next page
*See previous concurrence
Document Name:C:\Program Files\Adobe\Acrobat 4.0\PDF Output\Conference Call Summary Nov~.wpd

OFFICE	LA:DRIP	ME:RLEP:DRIP	SC:RLEP:DRIP
NAME	E Hylton	R Franovich	P T Kuo
DATE	01/09/02*	01/10/02	01/10/02

OFFICIAL RECORD COPY

DISTRIBUTION:
HARD COPY
RLSB RF
E. Hylton

E-MAIL:
PUBLIC
J. Johnson
W. Borchardt
D. Matthews
C. Carpenter
C. Grimes
B. Zalcman
J. Strosnider (RidsNrrDe)
E. Imbro
G. Bagchi
K. Manoly
W. Bateman
J. Calvo
C. Holden
P. Shemanski
S. Rosenberg
G. Holahan
B. Boger
D. Thatcher
G. Galletti
B. Thomas
J. Moore
R. Weisman
M. Mayfield
A. Murphy
W. McDowell
S. Droggitis
N. Dudley
RLEP Staff

R. Martin
C. Patel
C. Julian (RII)
R. Haag (RII)
A. Fernandez (OGC)
J. Wilson
M. Khanna
R. Elliott
M. Hartzman

Mr. Gary Gilbert
Regulatory Compliance Manager
Duke Energy Corporation
4800 Concord Road
York, South Carolina 29745

Ms. Lisa F. Vaughn
Duke Energy Corporation
422 South Church Street
Charlotte, North Carolina 28201-1006

Anne Cottington, 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

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

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

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

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

Mr. Robert L. Gill, Jr.
Duke Energy Corporation
Mail Stop EC-12R
P. O. Box 1006
Charlotte, North Carolina 28201-1006

Mr. Alan Nelson
Nuclear Energy Institute
1776 I Street, N.W., Suite 400
Washington, DC 20006-3708

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

Mr. Virgil R. Autry, Director
Dept of Health and Envir Control
2600 Bull Street
Columbia, South Carolina 29201-1708

Mr. C. Jeffrey Thomas
Manager - Nuclear Regulatory Licensing
Duke Energy Corporation
526 South Church Street
Charlotte, North Carolina 28201-1006

Mr. L. A. Keller
Duke Energy Corporation
526 South Church Street
Charlotte, North Carolina 28201-1006

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

Mr. Peter R. Harden, IV
VP-Customer Relations and Sales
Westinghouse Electric Company
6000 Fairview Road - 12th Floor
Charlotte, North Carolina 28210

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

Mr. Richard M. Fry, Director
North Carolina Dept of Env, Health, and
Natural Resources
3825 Barrett Drive
Raleigh, North Carolina 27609-7721

County Manager of
Mecklenburg County
720 East Fourth Street
Charlotte, North Carolina 28202

Michael T. Cash
Regulatory Compliance Manager

Duke Energy Corporation
McGuire Nuclear Site
12700 Hagers Ferry Road
Huntersville, North Carolina 28078

Senior Resident Inspector
U.S. Nuclear Regulatory Commission
12700 Hagers Ferry Road
Huntersville, North Carolina 28078

Dr. John M. Barry
Mecklenburg County
Department of Environmental Protection
700 N. Tryon Street
Charlotte, North Carolina 28202

Mr. Gregory D. Robison
Duke Energy Corporation
Mail Stop EC-12R
526 S. Church Street
Charlotte, NC 28201-1006

TELECOMMUNICATION PARTICIPANTS
NOVEMBER 20, 2001

Staff Participants

Rani Franovich

Mark Hartzman

Hansraj Ashar

Duke Energy Corporation Participants

Greg Robison

Bob Gill

Debra Keiser

Attachment