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

OFFICE OF THE
GENERAL COUNSEL

March 20, 2002

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In the Matter of
DUKE ENERGY CORPORATION
(McGuire Nuclear Station, Units 1 and 2, and
Catawba Nuclear Station, Units 1 and 2)
Docket Nos. 50-369, 370, 413 and 414

Dear Administrative Judges:

Pursuant to the Commission's Order Referring Petitions for Intervention and Requests for Hearing to the Atomic Safety and Licensing Board Panel, CLI-01-20, (October 4, 2001), the NRC staff (Staff) is, by this letter, updating the case file in the above captioned matter. Enclosed you will find the following documents and an updated index of documents:

March 6, 2002, Note regarding telecommunication with Duke Energy Co. (Duke) regarding Requests for Addition Information, ADAMS accession no. ML020660073.

March 8, 2002, Letter from Duke to NRC, RE: Response to Request for Additional Information, ADAMS accession no. ML020780025.

March 14, 2002, Note regarding information provided by Duke regarding SAMAs, ADAMS accession no. ML020740179.

Attachment 2, Catawba Modified Case, ADAMS accession no. ML020770301
Attachment 3, McGuire Modified Case, ADAMS accession no. ML020770345

Undated, Timetable for Responses, ADAMS accession no. ML020530403

By copy of this letter, I am filing a copy of this update in the docket and with OCAA, and serving copies, by regular mail, upon David Repka, Esquire, attorney for the applicant, Duke

Power Corp., Mary Olson, Nuclear Information and Resource Service, and Janet Marsh Zeller, Blue Ridge Environmental Defense Fund. Copies of this letter and the updated index of the case file, are being served on the remainder of the service list.

Sincerely,

Susan L. Uttal
Counsel for NRC Staff

cc w/encls: as stated

cc w/o encls: Lisa F. Vaughn, Esq.
ASLB
Donald J. Moniak
Paul Gunter
Jesse Riley

DUKE ENERGY CORP. MCGUIRE/CATAWBA LICENSE RENEWAL CASE FILE DOCKET NOS. 50-369, 50-370, 50-413, 50-414			
DOCUMENT NUMBER	DESCRIPTION	I S S U E DATE	ADAMS ACCESSION #
	SAFETY REVIEW		
CD	License Renewal Application (LRA) and Appendices	06/13/2001	ML011660301
01	Transmittal Letters: LRA Highlighted Flow Diagrams LRA on CD	 06/13/2001 06/13/2001 06/28/2001	 ML011660138 ML011661068 ML011840032
02	Conference Call Summary - Mechanical ESF AMR	07/24/2001	ML012070063
03	Conference Call Summary - Structures	09/10/2001	ML012530283
04	Conference Call Summary - Aux Sys Scoping	10/10/2001	ML012830102
05	Conference Call Summary - Aux Sys Scoping	10/15/2001	ML012880370
06	Conference Call Summary - Aux Sys Scoping	11/02/2001	ML013060438
07	Conference Call Summary - ESF Scoping	11/14/2001	ML013190029
08	Conference Call Summary - Mechanical Aging Management Programs	11/23/2001	ML013310117
09	Conference Call Summary - Inservice Inspection	11/29/2001	ML013300361
10	Conference Call Summary - Structures	11/30/2001	ML013379544
11	Conference Call Summary - Reactor Coolant System and Engineered Safety Features Scoping	12/05/2002	ML013400357
12	Conference Call Summary - Structures	12/11/2001	ML013460154
13	Conference Call Summary - Mechanical AMPs	12/11/2001	ML013460269
14	Conference Call Summary - Mechanical AMP	12/12/2001	ML013460417
15	Conference Call Summary - Mechanical AMPs	12/13/2001	ML013470364
16	Conference Call Summary - Chemistry Control Program	12/14/2001	ML013520129

DUKE ENERGY CORP. MCGUIRE/CATAWBA LICENSE RENEWAL CASE FILE DOCKET NOS. 50-369, 50-370, 50-413, 50-414			
DOCUMENT NUMBER	DESCRIPTION	I S S U E DATE	ADAMS ACCESSION #
17	Conference Call Summary - Electrical	12/27/2001	ML013650428
18	Conference Call Summary - Structures	01/10/2002	ML020110099
19	Conference Call Summary - Ventilation Systems	01/15/2002	ML020170132
20	Conference Call Summary - Aux Sys Scoping	01/15/2002	ML020160418
21	Request for Additional Information (RAI) - Scoping Methodology Audit	01/17/2002	ML020220034
22	RAI - Electrical	01/17/2002	ML020180061
23	RAI -Scoping Results	01/23/2002	ML020290102
24	RAI - Mechanical - ESF Scoping	01/23/2002	ML020240249
25	RAI - Mechanical - Auxilliary Systems AMR	01/24/2002	ML020240265
26	RAI - Mechanical - AMP	01/28/2002	ML020310200
27	RAI - Mechanical - Aux Sys Scoping	01/28/2002	ML020320212
28	RAI - Mechanical - ESF AMR	01/28/2002	ML020320010
29	RAI - Reactor Coolant System	01/28/2002	ML020310255
30	RAI -Structures	01/28/2002	ML0203201652'1
31	RAI - Reactor Coolant System II	01/30/2002	ML020350542
32	Notice of Meeting to Discuss Schedules	05/08/2001	ML011290008
33	Notice of Meeting to Discuss Schedules	06/05/2001	ML011560744
34	Summary of Meeting to Discuss Schedules	06/06/2001	ML011590263
35	Teleconference Summary - Inspection Schedules	06/07/2001	ML011590499
36	Summary of Meeting to Discuss Schedules	07/10/2001	ML011930405

DUKE ENERGY CORP. MCGUIRE/CATAWBA LICENSE RENEWAL CASE FILE DOCKET NOS. 50-369, 50-370, 50-413, 50-414			
DOCUMENT NUMBER	DESCRIPTION	I S S U E DATE	ADAMS ACCESSION #
37	Meeting Summary - LRA Orientation	07/26/2001	ML012080051
38	Editorial Changes to LRA		ML011980527
39	NEI/Management Meeting Notice	08/31/2001	ML012430275
40	Meeting Notice - Scoping Methodology Audit Exit	10/03/2001	ML012770008
41	NEI/Management Meeting Summary	10/21/2001	ML012840369
42	Meeting Summary - Scoping Methodology Audit Exit	11/15/2001	ML013190507
43	Notice of Meeting to discuss LR Emerging Issues	11/30/2001	ML013370001
44	e-mail re: minor questions on Aux Sys AMR	12/10/2001 12/13/2001	ML020040015
45	e-mail re: minor questions on Aux Sys Scoping	12/13/2001	ML020170427
46	NEI/Management Meeting Notice	12/14/2001	ML013510294
47	Notice of Meeting to discuss Station Black Out Scoping	12/18/2001	ML013600335
48	Summary of Meeting on LR Emerging Issues	01/17/2002	ML020300004
	ENVIRONMENTAL REVIEW		
49	Letter re: maintenance of documents - McGuire	06/12/2001	ML011640049
50	Memorandum: Acceptance Review Results - McGuire	07/10/2001	ML011920220
51	Determination of Acceptability and Sufficiency - McGuire	07/15/2001	ML012270107
52	Notice of Intent - McGuire	08/16/2001	ML012280471

DUKE ENERGY CORP. MCGUIRE/CATAWBA LICENSE RENEWAL CASE FILE DOCKET NOS. 50-369, 50-370, 50-413, 50-414			
DOCUMENT NUMBER	DESCRIPTION	I S S U E DATE	ADAMS ACCESSION #
53	Notice of Public Meeting, Environmental Scoping - McGuire	09/07/2001	ML012500389
54	Meeting Summary - Environmental scoping; transcript -McGuire	10/12/2001	ML012850194
55	RAI - SAMAs -McGuire	11/19/2001	ML013250535
56	RAI - Environmental Report - McGuire	11/19/2001	ML013300544
57	Telecommunication RE: RAIs - McGuire	12/06/2001	ML013420001
58	Response to RAIs	01/17/2002	ML020440709
59	Response to RAIs	01/31/2002	ML020450466
60	Letter re: maintenance of documents - Catawba	06/11/2001	ML011620533
61	Memorandum: Acceptance Review Results - Catawba	07/10/2001	ML011920167
62	Determination of Acceptability and Sufficiency - Catawba	08/15/2001	ML012270107
63	Notice of Intent - Catawba	09/14/2001	ML012570124
64	Notice of Public Meeting, Environmental Scoping - Catawba	10/03/2001	ML012760475
65	Summary of Site Audit - Catawba	11/13/2001	ML013170360
66	Meeting Summary - Environmental scoping; transcript - Catawba	11/29/2001	ML013330257
67	RAI - SAMAs - Catawba	12/10/2001	ML013460491
68	RAI - Environmental Report - Catawba	12/12/2001	ML013470594
69	Response to RAIs	02/01/2002	ML020450479
70		02/08/2002	ML020450547

DUKE ENERGY CORP. MCGUIRE/CATAWBA LICENSE RENEWAL CASE FILE DOCKET NOS. 50-369, 50-370, 50-413, 50-414			
DOCUMENT NUMBER	DESCRIPTION	I S S U E DATE	ADAMS ACCESSION #
71	Note regarding telecommunication with Duke Energy Co. (Duke) regarding Requests for Addition Information	03/06/2002	ML020660073
72	Response to Request for Additional Information,	03/08/2002	ML020780025
73	Note regarding information provided to NRC by Duke regarding SAMAs	03/14/2002	ML02074017
73a	Attachment 2, Catawba Modified Case	03/14/2002	ML020770301
73b	Attachment 3, McGuire Modified Case	03/14/2002	ML020770345
74	Timetable for Responses	undated	ML020530403

DOCUMENT NO. 71

March 6, 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 REQUESTS FOR ADDITIONAL INFORMATION PERTAINING TO THE NRC STAFF'S REVIEW OF SECTION 2.4.2 OF THE LICENSE RENEWAL APPLICATION

On January 28, 2002, the NRC staff (hereafter referred to as "the staff") issued a request for additional information (RAI) pertaining to structures. On February 21, 2002, a conference call was conducted between the NRC and Duke Energy Corporation to discuss information that was being requested by the NRC to complete its review of Section 2.4.2 of the license renewal application (LRA). Participants of the conference call are provided in Attachment 1, and a list of revised RAIs is provided in Attachment 2.

The applicant requested the staff to clarify the following RAIs:

2.4.2-1 Section 2.4.2 of the LRA for both McGuire and Catawba describes the "other structures," which include auxiliary buildings, condenser cooling water intake structure, nuclear service water structures, standby nuclear service water pond dam, standby shutdown facility, turbine building (including service building), unit vent stack, and yard structures. However, the applicant provides only the systems drawings for the LRA but does not provide any structural drawings. The staff reviewed Catawba Updated Final Safety Analysis Report (UFSAR) Figure 1-20 and McGuire UFSAR Figure 2-4; however, the UFSAR figures were either of poor resolution or provided security fence boundaries, which are not useful to the staff in performing license renewal scoping results reviews. Therefore, the staff requests that the applicant provide general structural drawings [i.e., location plans and elevations and/or structural details, such as the Nuclear Steam Supply System (NSSS) supports] for the other structures at Catawba and McGuire.

The applicant provided general arrangement plot plans for Catawba and McGuire to the staff to determine if these drawings would enable the staff to complete its review of Section 2.4.2. The staff determined that the drawings were helpful and should be referenced in the applicant's response to the RAI. Since the drawings contain sensitive information relating to the location of risk-important structures, they will not be attached to the RAI response. The applicant also asked the staff to clarify if location plans and elevations and/or structural details for the other structures at Catawba and McGuire were still needed. The staff responded that the general arrangement plot plans were

ML020660073

sufficient. The applicant asked why drawings of the NSSS supports were requested in RAI 2.4.2-1 and RAI 2.4.2-12. The staff responded that the information pertaining to these structural supports could be provided once in response to RAI 2.4.2-12. As such, RAI 2.4.2-1 is being revised as follows:

Section 2.4.2 of the LRA for both McGuire and Catawba describes the "other structures," which include auxiliary buildings, condenser cooling water intake structure, nuclear service water structures, standby nuclear service water pond dam, standby shutdown facility, turbine building (including service building), unit vent stack, and yard structures. However, the applicant provides only the systems drawings for the LRA but does not provide any structural drawings. Therefore, the staff requests that the applicant provide general arrangement drawings for the other structures at Catawba and McGuire.

2.4.2-12 Section 2.4.3 of the LRA states that the component supports also include the Class I NSSS supports. The NSSS supports within the scope of license renewal are the reactor coolant system piping supports; pressurizer upper and lower supports; reactor vessel support; control rod drive seismic structure supports; steam generator vertical, lower lateral, and upper supports; and reactor coolant pump lateral and vertical support assemblies. However, the LRA does not provide any information on the support structures, and there is insufficient information in the UFSAR to support the staff's review. Since each of the NSSS support assemblies are designed entirely different, the staff is unable to verify the components that require an aging management review (AMR). Describe the structures of the NSSS support assemblies that are within the scope of license renewal and subject to an AMR.

The applicant indicated that figures 5-25 through 5-35 (roughly) in the Catawba and McGuire UFSARs provide illustrations of the NSSS supports and requested the staff to review those figures and indicate if they are sufficient to resolve this RAI. The staff has reviewed the UFSAR figures and has determined that they are helpful and that drawings of these supports do not need to be submitted in response to the original RAI 2.4.2-1. However, the staff requests that the applicant provide a narrative description of the license renewal evaluation boundaries for the NSSS supports. As such, RAI 2.4.2-12 is being revised as follows:

Section 2.4.3 of the LRA states that the component supports also include the Class I nuclear steam supply system (NSSS) supports. The NSSS supports within the scope of license renewal are the reactor coolant system piping supports; pressurizer upper and lower supports; reactor vessel support; control rod drive seismic structure supports; steam generator vertical, lower lateral, and upper supports; and reactor coolant pump lateral and vertical support assemblies. However, the LRA does not reflect the evaluation boundaries for NSSS supports, and there is insufficient information in the UFSAR to support the staff's review. Since each of the NSSS support assemblies are designed entirely differently, the staff is unable to verify the components for which an AMR is required. Please describe the structures of the NSSS support assemblies as

well as the license renewal evaluation boundaries for these assemblies. Provide applicable LRA or UFSAR references for this information.

2.4.2-7 Section 2.4.2.3 of the LRA states that the nuclear service water structures at the Catawba plant include several structures. It is not clear that the structures described in the section are the structures within the boundary of the nuclear service water structures for license renewal. Provide a drawing that highlight all the structures that are subject to an AMR and identify which of the components (other than the components specified) listed in Table 3.5-2 of both the LRAs that are applicable to the nuclear service water structures.

The applicant referred the staff to Tables 2.2-1, -2, -3 and -4 in the LRA, which lists those mechanical systems and structures that are excluded from or within the scope of license renewal for both stations. According to Table 2.2-2, all of the structures described in Section 2.4.2.3 of the LRA are within the scope of license renewal. The applicant also explained that the components listed in Table 3.5-2 apply to all the Catawba structures listed as within the scope of license renewal in Table 2.2-2 (and Table 2.2-1 for McGuire) unless otherwise noted. The staff concluded that drawings are not needed to complete the review of this issue. However, a narrative discussion of Tables 2.2-1 through 2.2-4 and an explanation of how the staff should interpret information contained in Section 3.5-2 of the LRA will suffice in the applicant response to this RAI. As such, RAI 2.4.2-7 is being revised as follows:

Section 2.4.2.3 of the LRA states that the nuclear service water structures at the Catawba plant include several structures. It is not clear that the structures described in the section are the structures within the boundary of the nuclear service water structures for license renewal. Please indicate which structures (including the nuclear service water structures) are within the scope of license renewal and subject to an AMR; provide applicable LRA references for this information. Also, please confirm that the components listed in Table 3.5-2 of the LRA are applicable to all structures (including nuclear service water structures) that are within the scope of license renewal unless otherwise noted in the table.

2.4.2-11 In Section 2.4.2.8 of the LRA, the applicant describes the yard structures, trenches, and drainage systems for McGuire and Catawba. However, there is no supporting information or document that can be used to verify the content of this section. Provide a drawing for each plant that shows the location of the yard structures and highlight the components that are within the scope of license renewal.

The applicant indicated that the yard structures, trenches and drainage structures are listed in Tables 3.5-2 and 3.5-3 and suggested that a narrative response to this question would be more useful to the staff than drawings. As such,
RAI 2.4.2-11 is being revised as follows:

In Section 2.4.2.8 of the LRA, the applicant describes the yard structures, trenches, and drainage structures for McGuire and Catawba. However, there is no supporting information or document that can be used to verify the content of this section. Please describe, for each plant, the yard structures, trenches and drainage structures that are within the scope of license renewal; provide applicable LRA references for this information.

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

Attachments: As stated

cc w/attachments: See next page

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TELECOMMUNICATION PARTICIPANTS
FEBRUARY 21, 2002

Staff Participants

Rani Franovich

Jin-Sien Guo

Duke Energy Corporation Participants

Bob Gill

Debra Keiser

Attachment 1

List of Revised RAIs

RAI 2.4.2-1 is being revised as follows:

Section 2.4.2 of the license renewal application (LRA) for both McGuire and Catawba describes the "other structures," which include auxiliary buildings, condenser cooling water intake structure, nuclear service water structures, standby nuclear service water pond dam, standby shutdown facility, turbine building (including service building), unit vent stack, and yard structures. However, the applicant provides only the systems drawings for the LRA but does not provide any structural drawings. Therefore, the staff requests that the applicant provide general arrangement drawings for the other structures at Catawba and McGuire.

RAI 2.4.2-7 is being revised as follows:

Section 2.4.2.3 of the LRA states that the nuclear service water structures at the Catawba plant include several structures. It is not clear that the structures described in the section are the structures within the boundary of the nuclear service water structures for license renewal. Please indicate which structures (including the nuclear service water structures) are within the scope of license renewal and subject to an aging management review (AMR); provide applicable LRA references for this information. Also, please confirm that the components listed in Table 3.5-2 of the LRA are applicable to all structures (including nuclear service water structures) that are within the scope of license renewal unless otherwise noted in the table.

RAI 2.4.2-11 is being revised as follows:

In Section 2.4.2.8 of the LRA, the applicant describes the yard structures, trenches, and drainage structures for McGuire and Catawba. However, there is no supporting information or document that can be used to verify the content of this section. Please describe, for each plant, the yard structures, trenches and drainage structures that are within the scope of license renewal; provide applicable LRA references for this information.

RAI 2.4.2-12 is being revised as follows:

Section 2.4.3 of the LRA states that the component supports also include the Class I nuclear steam supply system (NSSS) supports. The NSSS supports within the scope of license renewal are the reactor coolant system piping supports; pressurizer upper and lower supports; reactor vessel support; control rod drive seismic structure supports; steam generator vertical, lower lateral, and upper supports; and reactor coolant pump lateral and vertical support assemblies. However, the LRA does not reflect the evaluation boundaries for NSSS supports, and there is insufficient information in the Update Final Safety Analysis Report (UFSAR) to support the staff's review. Since each of the NSSS support assemblies are designed entirely differently, the staff is unable to verify the components for which an AMR is required. Please describe the structures of the NSSS support assemblies as well as the license renewal evaluation boundaries for these assemblies. Provide applicable LRA or UFSAR references for this information.

DOCUMENT NO. 72

Hearing File

ML020740025

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A Duke Energy Company

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M. S. Tuckman
Executive Vice President
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March 8, 2002

U.S. Nuclear Regulatory Commission
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Washington, DC 20555

Subject: Response to Requests for Additional Information in Support of the Staff Review of the Application to Renew the Facility Operating Licenses of McGuire Nuclear Station, Units 1 & 2 and Catawba Nuclear Station, Units 1 & 2

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

Dear Sir:
By letter dated June 13, 2001, Duke Energy Corporation (Duke) submitted an Application to Renew the Facility Operating Licenses of McGuire Nuclear Station and Catawba Nuclear Station (Application). The staff is reviewing the information provided in the Application and has identified areas where additional information is needed to complete its review.

In a letter dated January 17, 2002, the staff requested additional information concerning Sections 2.5, 3.6, and Appendix B, Section B.3.19 of the Application. These sections contain information related to the electrical elements of the license renewal review. Attachment 1 provides the Duke response to this letter. Some of these responses contain commitments. The commitments are restated in Attachment 2 to facilitate tracking and management.

If there are any questions, please contact Bob Gill at (704) 382-3339.

Very truly yours,

M. S. Tuckman

M. S. Tuckman

Attachments:

A085

Affidavit

M. S. Tuckman, being duly sworn, states that he is Executive Vice President, Nuclear Generation Department, Duke Energy Corporation; that he is authorized on the part of said Corporation to sign and file with the U. S. Nuclear Regulatory Commission the attached responses to staff requests for additional information relative to its review of the Application to Renew the Facility Operating Licenses of McGuire Nuclear Station and Catawba Nuclear Station, Docket Nos. 50-369, 50-370, 50-413 and 50-414 dated June 13, 2001, and that all the statements and matters set forth herein are true and correct to the best of his knowledge and belief. To the extent that these statements are not based on his personal knowledge, they are based on information provided by Duke employees and/or consultants. Such information has been reviewed in accordance with Duke Energy Corporation practice and is believed to be reliable.

M. S. Tuckman

M. S. Tuckman, Executive Vice President
Duke Energy Corporation

Subscribed and sworn to before me this 8TH day of MARCH 2002.

Mary P. Nelms
Notary Public

My Commission Expires:

JAN 22, 2006

xc: (w/ Attachment)

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Attachment 1
Application to Renew the Operating Licenses of
McGuire Nuclear Station and Catawba Nuclear Station
Responses to NRC Requests for Additional Information
NRC Letter dated January 17, 2002

2.5 Scoping and Screening Results: Electrical and Instrumentation and Controls

Note: RAI 2.5-1 and RAI 2.5-2 are related topics and a common response is provided.

RAI 2.5-1

Section 2.5 of the LRA indicates that the switchyard systems (i.e., switchyard bus, transmission conductors, and high-voltage insulators) do not meet any of the scoping criteria of §54.4(a). §54.4(a)(3) requires all systems, structures, and components to be included in the scope of license renewal that are relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for station blackout (§50.63). §50.63(a)(1) requires that the nuclear power plant be able to recover from a station blackout. Clarify why switchyard systems are not relied on in safety analyses or plant evaluations to perform a function in the recovery from a station blackout. Also clarify why these offsite system components do not meet the scoping criteria of §54.4(a)(1), §54.4(a)(2) or §54.4(a)(3).

RAI 2.5-2

Section 2.5 of the LRA indicates that the Unit Main Power System and Nonsegregated-Phase bus in the 6.9 kV Normal Auxiliary Power System were found not to meet any of the scoping criteria of §54.4(a). Clarify why the Unit Main Power System and the Nonsegregated-Phase bus in the 6.9 kV Normal Auxiliary Power System are not relied on in safety analyses or plant evaluations to perform a function in the recovery from a station blackout. Also clarify why these offsite system components do not meet the scoping criteria of §54.4(a)(1), §54.4(a)(2) or §54.4(a)(3).

Response to RAI 2.5-1 and RAI 2.5-2

Duke performed an initial review of the McGuire and Catawba station blackout (SBO) safety analyses and plan evaluations prior to submittal of the Application. Based on RAI 2.5-1 and RAI 2.5-2, along with the recent industry discussions, Duke re-reviewed the plant documents with emphasis on equipment related to the recovery of offsite power.

Based on the results of this recent review, Duke has decided that the McGuire and Catawba components that are part of the power path for offsite power from the switchyard are within the scope of license renewal in accordance with the SBO scoping criterion, §54.4(a)(3). This power path includes portions of the power path from the unit power circuit breakers (PCBs) in the respective switchyards to the safety-related buses in each plant. The power path includes portions of (1) the switchyard systems, (2) the Unit Main Power System, and (3) the Nonsegregated-Phase bus in the 6.9 kV Normal Auxiliary Power System of each station.

An aging management will be performed on the passive, long-lived structures and components associated with this offsite power path. The results of this aging management review will be submitted on or before June 30, 2002.

RAI 2.5-3
Section 2.5 of the LRA indicates that non-insulated ground conductors were found not to meet any of the scoping criteria of §54.4(a). Non-insulated ground conductors provide safety-related electrical systems with the capability to withstand transient conditions (e.g., electrical faults). Clarify why this function does not meet the scoping criteria of §54.4(a)(1) and §54.4(a)(2).

Response to RAI 2.5-3
Background
Uninsulated ground conductors are electrical conductors (e.g., copper cable, copper bar, steel bar) that are uninsulated (i.e., bare conductors). Uninsulated ground conductors are connected to electrical equipment housings, enclosures and cabinets as well as metal structural features such as the cable tray system, building structural steel and concrete reinforcing steel.

Uninsulated ground conductors do not include instrument grounding conductors or computer grounding conductors since these grounding conductors are insulated. Being insulated, instrument and computer grounding conductors are included in the aging management review of the general population of non-EQ insulated cables and connections.

Other than the Turkey Point and St. Lucie plants, no other plants undergoing license renewal have found uninsulated ground conductors to be within the scope of license renewal. At Turkey Point and St. Lucie uninsulated ground conductors are specifically identified in their Fire Protection commitments and are in scope only for the Fire Protection scoping criterion. McGuire and Catawba have no such commitments.

Scoping
Uninsulated ground conductors at McGuire and Catawba do not perform a safety-related function per §54.4(a)(1). They are also not relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with any §54.4(a)(3) regulated event. Not being within license renewal scope per the criteria of §54.4(a)(1) and §54.4(a)(3), the remaining scoping criterion to evaluate is the nonsafety-related criterion of §54.4(a)(2).

Uninsulated ground conductors perform a nonsafety-related function at both McGuire and Catawba. Per the nonsafety-related criterion of §54.4(a)(2), all nonsafety-related electrical systems and components whose failure could prevent satisfactory accomplishment of any of the functions identified in §54.4(a)(1)(i), (ii) or (iii) are in scope.

The nonsafety-related scoping criterion of §54.4(a)(2) is not a function-based criterion but a failure-based criterion. To further understand this scoping criterion and how a nonsafety-related

system or component could be within scope, the language of this criterion is expanded in Chapter 6 of the *License Renewal Electrical Handbook*, EPRI 1003057, (page 6-6) as follows:

> ***License Renewal Electrical Handbook***
> "A nonsafety-related system or component is not in scope (per §54.4(a)(2)) unless its failure would:
> - cause a loss of the integrity of the reactor coolant pressure boundary,
> - cause a loss of the capability to shut down the reactor or the capability to maintain it in a safe shutdown condition, or
> - cause a loss of the capability to prevent or mitigate the consequences of accidents that could result in the potential offsite exposure specified in §54.4(a)(1)(iii)."

This nonsafety-related failure is a single failure as discussed in licensing and station design documents. Single failures are considered as part of the current licensing basis for both McGuire and Catawba. McGuire and Catawba are in conformance with licensing commitments concerning single failure as contained in Section 3.1, "Conformance with General Design Criteria" of their respective UFSARs. Criterion 17 – Electrical Power Systems is excerpted below:

> **UFSAR Section 3.1, Conformance with General Design Criteria**
> **Criterion 17 – Electrical Power Systems**
> "...The onsite electrical power supplies...and the onsite electric distribution system, shall have sufficient independence, redundancy, and testability to perform their safety functions assuming a single failure...."

Based on conformance with single failure criteria as outlined in both the McGuire and Catawba UFSARs, no uninsulated ground conductor failure would prevent satisfactory accomplishment of any of the safety-related functions identified in §54.4(a)(1)(i), (ii) or (iii). Uninsulated ground conductors do not meet the nonsafety-related scoping criterion of §54.4(a)(2).

Uninsulated ground conductors are not within the scope of license renewal, because the scoping criteria of §54.4(a)(1), §54.4(a)(2) or §54.4(a)(3) are not met.

3.6 Aging Management of Electrical and Instrumentation and Controls

RAI 3.6.1-1

Exposure of electrical cables to localized environments caused by heat or radiation can result in reduced insulation resistance (IR). Reduced IR causes an increase in leakage currents between conductors and from individual conductors to ground. A reduction in IR is a concern for circuits with sensitive, low-level signals such as radiation monitoring and nuclear instrumentation since it may contribute to inaccuracies in instrument loop. The applicant states that the Non-EQ Insulated Cables and Connections Aging Management Program includes non-EQ cables used in low-level signal application that are sensitive to reduction in insulation resistance such as radiation monitoring and nuclear instrumentation. Further, the applicant states that the accessible non-EQ insulated cables installed in Reactor Buildings, Auxiliary Buildings and Turbine Building are visually inspected for cables jacket surface anomalies such as embrittlement, discoloration, cracking or surface contamination. Visual inspection may not be sufficient to detect aging degradation from heat and radiation in the instrumentation circuits with sensitive, low-level signal. Because low level signal instrumentation circuits may operate with signals that are normally in the milliamp range or less, they can be affected by extremely low levels of leakage current. These low levels of leakage current may affect instrument loop accuracy before the adverse localized environment that caused them produces changes that are visually detectable. Routine calibration test performed as part of the plant surveillance test program can be used to identify the potential existence of this aging degradation. Provide a description of your plant calibration test program that will be relied upon as the aging management activity used to detect this aging degradation in sensitive, low level signal circuits, or provide the technical basis for excluding it.

Response to RAI 3.6.1-1

Duke understands the basis of RAI 3.6.1-1 as concerning the adequate aging management of non-EQ electrical cables used in low-level signal applications that are sensitive to reduction in insulation resistance (IR), such as radiation monitoring and nuclear instrumentation. As stated in Section B.3.23 of the Application, the McGuire and Catawba *Non-EQ Insulated Cables and Connections Aging Management Program* includes these cables within the total population of cables and connections included in this visual inspection program. Having performed extensive, plant-wide visual inspections as part of the license renewal preparatory work at Oconee, Duke has a very high confidence that the visual inspections outlined in this program will detect early aging degradation of insulation of all types of cables and connections—including those that are the subject of RAI 3.6.1-1. The McGuire and Catawba *Non-EQ Insulated Cables and Connections Aging Management Program* is consistent with Gall Report program XI.E1. For these reasons, Duke does not credit a plant calibration test program for aging management.

Additional Information for Response to RAI 3.6.1-1 Regarding Visual Inspections and Detection of Aging Degradation

Two statements are made in RAI 3.6.1-1 regarding visual inspections that are inaccurate and unsupported. This additional information section examines these statements to assist the reviewer in recognizing the strength of visual inspections.

RAI 3.6.1-1 makes the following statement: "Visual inspection may not be sufficient to detect aging degradation from heat and radiation in the instrumentation circuits with sensitive, low-level signal."

This RAI statement is in disagreement with GALL Report Table VI.A (page VI A-3). Item A.1-a of Table VI.A pertains to all non-EQ cables and connections (including those that are the subject of RAI 3.6.1-1). Item A.1-a of Table VI.A identifies program XI.E1 (visual inspection program) as providing aging management for aging effects that include "*reduced insulation resistance*" and indicates that "*No*" further evaluation is recommended. The statement in the RAI that "*Visual inspection may not be sufficient to detect aging degradation...*" is in contradiction to the GALL Report.

For low-voltage cables, embrittlement and significant cracking (through cracks) of the cable jacket and conductor insulation would have to occur before the introduction of moisture around the cable could be an issue. As stated in the Program Description for GALL Report program XI.E1, "*the electrical cables and connections covered by this aging management program are either not exposed to harsh accident conditions or are not required to remain functional during or following an accident to which they are exposed.*" GALL Report Table VI.A (Item A.1-a, page VI A-3) indicates that visual inspection program XI.E1 manages "*moisture intrusion*" and indicates that "*No*" further evaluation is recommended.

RAI 3.6.1-1 makes the following statement: "These low levels of leakage current may affect instrument loop accuracy before the adverse localized environment that caused them produces changes that are visually detectable."

This RAI statement contradicts statements made in Department of Energy report SAND96-0344, *Aging Management Guideline for Commercial Nuclear Power Plants - Electrical Cable and Terminations*. SAND96-0344 is cited as a reference in both NUREG-1800 (SRP for license renewal applications) and NUREG-1801 (GALL Report). SAND96-0344 provides a comprehensive compilation and evaluation of information on the topic of aging and aging management for cables and their associated connections. SAND96-0344 Section 5.2.2, Measurement of Component or Circuit Properties, states the following (underline added for emphasis):

SAND96-0344, Section 5.2.2
"Diagnostic techniques to assist in assessment of the functionality and condition of power plant cables and terminations are described in this section....

"Significant changes in mechanical and physical properties (such as elongation-at-break and density) occur as a result of thermal- and radiation-induced aging. For low-voltage cables, these changes precede changes to the electrical performance of the dielectric. Essentially, the mechanical properties must change to the point of embrittlement and cracking before significant electrical changes are observed...."

"Embrittlement and cracking" are signs of extensive aging that are easily detectable by visual inspection. Signs of less extensive aging, such as discoloration, are also easily detectable by visual inspection. Visual inspections can detect aging degradation early in the aging process before significant aging degradation has occurred. SAND96-0344 Section 5.2.2.1.2, Insulation Resistance (IR)-Advantages/Disadvantages, provides further information on insulation resistance as an electrical property related to aging of cables as follows:

SAND96-0344, Section 5.2.2.1.2
"IR may give some indication of the aging of connections; however, it is generally considered of little use in predicting the aging of a cable. IR properties of dielectrics may change little until severe degradation of mechanical properties occurs. These measurements display some gradual changes with aging, but are generally nowhere near as sensitive to aging as techniques based on mechanical properties.... Conversely, even gross insulation damage may not be evidenced by changes in IR; for example, an insulation cut-through surrounded by dry air may not significantly affect IR readings.... Testing is usually conducted as a pass/fail...."

Performing visual inspections is supported as a promising condition monitoring technique. As described in Section 5.2.2.4 of SAND96-0344:

SAND96-0344, Section 5.2.2.4
"In mid-1993 the U.S. NRC Office of Nuclear Reactor Regulation (NRR) initiated an EQ task action plan (EQ TAP) which sets forth specific activities of the Office of Nuclear Regulatory Research (RES) and NRR relating to the qualification of electrical components. Potential safety issues addressed by the EQ TAP include...condition monitoring methods. One of the primary focal points of this effort relates to low-voltage cables."

An array of condition monitoring techniques were evaluated in the EQ TAP in order to identify those that are "*Promising*". Calibration testing was not included among the array of condition monitoring techniques evaluated as part of the EQ TAP. Visual inspection was evaluated as part of the EQ TAP and was identified as a "*Promising*" condition monitoring technique.

Visual inspections are also discussed in the *License Renewal Electrical Handbook* (EPRI 1003057, page 14-3) as follows:

> **License Renewal Electrical Handbook**
> "Research continues to be performed on condition monitoring methods that run the full spectrum from very unsophisticated to ultrasophisticated. To date, out of all that research, no sophisticated approach has been found workable for the full range of plant cables, cable installations and environments at the U.S. nuclear power plants. The only universal technique that was found to provide reasonable indication that could be related to cable degradation was visual inspections.... At present, visual inspection techniques are the only practical and universal type of condition monitoring program and are adequate for the cables and connections covered by this [XI.E1] GALL Report program."

SAND96-0344 (Chapter 5) also provides a comprehensive review of maintenance, surveillance and condition monitoring techniques for evaluation of electrical cable and terminations. SAND96-0344 Table 5-1 identifies Inspection Techniques Applicable to Various Degradation Mechanisms and "*Visual inspection*" is identified in the table as an applicable technique for each mechanism. Tables 5-2, 5-3, 5-4 and 5-5 list Destructive, Nondestructive and Essentially Nondestructive Condition Monitoring Techniques and calibration testing is not identified in any of these tables as a condition monitoring technique. In addition, a word search concluded that neither calibration nor calibration testing is identified in any part of SAND96-0344.

The additional information above provides a basis for the strength of visual inspections as a condition monitoring technique that is recognized by both the industry and the NRC. Duke intends that this additional information aid the reviewer in recognizing the strength of the McGuire and Catawba *Non-EQ Insulated Cables and Connections Aging Management Program*, which is based on visual inspections.

B.3.19 Inaccessible Non-EQ Medium-Voltage Cables Aging Management Program
Note: RAI B.3.19-1 and RAI B.3.19-2 are related topics and a common response is provided.

B.3.19-1
Periodic actions are taken to prevent cable from being exposed to significant moisture, such as inspecting for water collection in cable manholes and conduit, and draining water. These actions are considered as preventive actions. Section B.3.19 of the LRA under topic heading "Preventive Actions" indicates no preventive actions are required as part of the Inaccessible Non-EQ Medium-Voltage Cables Aging Management Program (AMP). Explain why no preventive actions are required as part of the AMP.

B.3.19-2
Section B.3.19 of the LRA under topic heading "Scope" defines significant moisture as exposure to long-term (over a long period such as a few years), continuous standing water. Similar words are used in Section 3.6.2 of the LRA. The Oconee LRA defined significant moisture as exposure to moisture that lasts more than a few days. Explain why exposure to moisture over more than a few days, and up to a few years, is not significant.

Response to RAI B.3.19-1 and RAI B.3.19-2
The response to these two RAIs is in preparation and will be provided on or before April 15, 2002.

Attachment 2
Application to Renew the Operating Licenses of
McGuire Nuclear Station and Catawba Nuclear Station
Responses to NRC Requests for Additional Information
NRC Letter dated January 17, 2002

LIST OF COMMITMENTS

LIST OF COMMITMENTS

1. The results of the aging management review for the structures and components within the systems identified in the response to RAI 2.5-1 and RAI 2.5-2 will be submitted on or before June 30, 2002.

2. The response to RAI B.3.19-1 and RAI B.3.19-2 is in preparation and will be provided on or before April 15, 2002.

DOCUMENT NO. 73

March 14, 2002

NOTE TO: File

FROM: James H. Wilson, Senior **/s/JHWilson**
Environmental Project Manager
License Renewal and Environmental Impacts Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation.

SUBJECT: INFORMATION PROVIDED BY DUKE ENERGY CORPORATION RELATED TO SEVERE ACCIDENT MITIGATION ALTERNATIVES IN ITS LICENSE RENEWAL APPLICATION FOR THE CATAWBA NUCLEAR STATION, UNITS 1 AND 2 (TAC NOS. MB2031 AND MB2032)

As followup to the NRC request for additional information dated December 10, 2001, related to the staff's environmental review for Catawba license renewal and the Duke Energy Corporation (Duke) response dated February 1, 2002, the staff held two telephone conferences with Duke.

In a telephone conference call held on February 7, 2002, Duke provided additional information to supplement its Catawba Nuclear Station Severe Accident Mitigation Alternatives (SAMA) Analysis Final Report, submitted in the environmental report (ER) for Catawba license renewal. Attachment 1 summarizes the questions asked by the staff, as well as Duke's responses. Duke is currently using Revision 2b to the Catawba PRA, but has not submitted this information to the NRC elsewhere. Attachment 2 is the printout of 2 data files containing the Catawba release category matrices (RCMs) used in the PRA analyses and the modified RCMs assuming the NUREG/CR-6427 weighted early containment failure probabilities.

Another telephone conference call was held on February 25, 2002, to further supplement information in the Catawba ER and the material provided after the February 7, 2002, telephone conference. Attachment 3 summarizes the questions asked by the staff, as well as Duke's responses.

The Duke Energy Corporation (Duke) provided the information in the designated attachments to the NRC staff via e-mails dated February 13 and March 14, 2002. Because the staff may rely on some of this information in its environmental review of Duke's application for renewal of the Catawba Nuclear Station, Units 1 and 2, licenses, this information is being docketed and made publicly available.

Docket Nos. 50-413 and 50-414

Attachments: As stated

ML 020740179

Documentation of Information Provided in Teleconference held on February 7, 2002

1. Provide the release category matrix for the baseline risk study and for the sensitivity case used to develop the response to RAI 4.

   RESPONSE: In determining the risk impact based on the NUREG/CR-6427 weighted value of 34% for early containment failure probability, the Catawba PRA Revision 2b release category matrix (RCM) is modified by reallocating only the release category frequencies for those PDSs identified as SBOs in the RCM such that the early containment failure probability is 34%. From the Catawba PRA Revision 2b analysis the fast station blackout PDSs are 8PI, 8PS, 14PI, 14PS and 20PI, and the slow station blackout PDSs are 4PI, 4PS, 7PI, 7PS, 15PI and 15PS (note that small containment isolation failures are included since some of these PDSs end up in early containment failures) - a description of the PDSs can be found in the section 6.1 of the Catawba IPE report. The early containment failure frequencies in the RCM (RC501 and RC502) were increased proportionally.

   Attached (Attachment 2) is a data file containing the Catawba release category matrices (RCMs) used in the PRA analyses and the modified RCMs assuming the NUREG/CR-6427 weighted early containment failure probabilities.

2. Provide an approximate estimate of the costs associated with implementing the following 2 SAMAs at the Duke plants, broken down by general cost categories, such as engineering, materials, labor, administrative, or equivalent. It is our expectation that: (1) all equipment/hardware would be non-safety related, (2) procedures and any related training would be developed and maintained in accordance with existing plant practices applicable to the severe accident management guidelines, (3) no licensee submittals or changes to the FSAR or technical specifications would be involved.

   RESPONSE:

   Option 1 - (a severe accident management procedure to power a subset of the igniters [e.g., one train] from a portable generator or equivalent ac-independent power source. This change would not address backup power to air return fans. [The generator need not be dedicated or pre-staged if there is sufficient time to locate, position, and connect it prior to the onset of core damage, e.g., several hours in the frequency-dominant SBO.])

   This potential modification would require a 50.59 review which may result in changes to the design and additional costs not contained in the present estimate. This option does not provide for tornado protection of the generating source and is not seismically designed. Seismic and tornado are significant contributors to the overall SBO CDF. Including such features to the design would significantly increase the cost of the option.

Engineering	$5,000
Materials	$50,000
Installation Labor	$110,000
Maint and Operations	$40,000
TOTAL	$205,000

Option 2 - (a severe accident management procedure to power a subset of the igniters plus one air return fan from an ac-independent power source)

This potential modification would require a 50.59 review which may result in changes to the design and additional costs not contained in the present estimate.This option does not provide for tornado protection of the generating source and is not seismically designed. Seismic and tornado are significant contributors to the overall SBO CDF. Including such features to the design would significantly increase the cost of the option.

Engineering	$50,000
Materials	$210,000
Installation Labor	$240,000
Maint and Operations	$40,000
TOTAL	$540,000

3. Provide the basis for the cost estimates provided for the following 2 SAMAs, and a specific dollar value or range of dollar values (in lieu of the general statement ">1$M"): (1) Install automatic swap-over to high pressure recirculation, and (2) Install automatic swap to RV cooling/other unit RN system upon loss of RN.

RESPONSE:

From Page 7-8 of the Watts Bar SAMA report (reference NUREG-0498, Supp. 1), an alternative considered in the cost benefit analysis was:

> "Category I - Improve Availability of ECCS Recirculation -- Install automatic high-pressure recirculation (I.4) : automate the alignment of ECCS recirculation to the high-pressure charging and safety injection pumps. This would reduce the potential for related human errors made during manual realignment."

On Page 7-9 of the above mentioned report, Table 7.4 (Summary of Value/Impact Study Results) provides the cost estimate for this alternative to be on the order of $2.1 million. This cost estimate applies to both SAMAs (1) and (2).

Documentation of Information Provided in Teleconference held on February 25, 2002

1. Provide a description of the assumptions on which the risk reduction for the 3rd diesel was based (i.e.., diverse but not seismic), and the types of sequences/failures that would not be addressed by the 3rd (non-seismic) diesel.

   RESPONSE: Section 4.3 of the SAMA submittal (see Attachment H of the Environmental Report) provides a discussion of how the seismic and non-seismic initiators were treated separately in the SAMA analysis. The reason for separating out the seismic from non-seismic initiators in the SAMA analysis is that for the seismic initiator extensive plant damage is expected to occur resulting in failures of multiple pieces of equipment/components. Therefore, to mitigate such an event would require substantial upgrades to the plant systems seismic ruggedness. The CDF reductions reported in the SAMA submittal are for the non-seismic initiating events.

   The intent of our estimation of the risk reduction associated with the installation of a third diesel was to maximize the potential benefit by assuming that the third diesel was perfectly reliable, no random failure modes and no common cause connections to the essential diesels. This was to be accomplished by setting the existing diesel generator failure modes to 0 in the cutset file thus eliminating all blackout sequences. In practice, we did this by identifying and setting to 0 the dominant failure modes of the diesel generators, as described in Attachment H of the Environmental Report. Some residual CDF related to diesel failures did remain in the solution. The SAMA analysis estimated the change in CDF from installation of a third diesel to be 1.6E-05. This change comes from the reduction in the CDF contributions from the non-seismic initiators (turbine building flood, LOOP, all consuming turbine building fire, tornado initiators, etc.). Remember that the seismic considerations were addressed independently. This reduction is approximately 89% of the estimated benefit (~1.8E-05) if every single diesel generator failure event had been set to 0 rather than simply addressing the dominant contributors. The change in CDF provided in the SAMA submittal provides a reasonable estimate of the reduction expected by a highly reliable and diverse alternate ac power source.

   The intent was to present a change in CDF consistent with the complete elimination of all diesel generator failure modes, perfect reliability and diversity.

2. Provide a description of the additional risk reduction that would be achieved by making the 3rd diesel seismic, and the types of sequences/failures that not be addressed by the 3rd (seismic) diesel.

   RESPONSE: A sensitivity study has been conducted to evaluate the impact that a third diesel could have on the seismic results. No cost estimate has been developed for providing a seismically qualified diesel. As was done for the non-seismic analysis, the random failure modes of the diesels were removed form the model. The resulting

change in CDF is approximately 4E-07. The seismic results are dominated by seismic failures in the 4 kV power system for which improving diesel generator availability provides no benefit.

3. Provide the expected risk reduction for the dedicated power line from the nearby hydro station (i.e., equivalent to adding a 3rd (seismic?) diesel), and the supporting rationale (i.e., that the HCLPF for hydro stations would typically be less than for a seismic diesel).

   RESPONSE: A dedicated and tornado protected line from the Wylie hydro-electric station could provide a CDF reduction similar to the estimate provided for the third diesel in the SAMA analysis. However, the result does not address potential common cause failure of the hydro-electric station as a result of the same tornado that causes the loss of offsite power to occur. The seismic fragilities of the hydro-electric plant would be expected to be lower than most of the essential systems at Catawba.

4. Provide a brief description of the SAMA on which the $205K and $540K estimates were based. This information is needed in order to put the various cost elements (engineering, materials, installation labor, and maintenance) in perspective. The response should clarify whether the SAMA/cost estimates: assume the generator is dedicated? pre-staged? would be located inside or outdoors?; include the cost of a pad or enclosure building? power cables (and their approximate length)? installing disconnects? routine surveillance and maintenance costs for remaining plant life?

   RESPONSE: The design requires an installed dedicated diesel because powering of the igniters needs to occur prior to the onset of core damage. The diesel is located outdoors for ventilation and exhaust considerations. Initiation and operation of the diesel will occur prior to the onset of core damage and thus will be covered by the emergency operating procedures rather than the severe accident management guidelines which are entered after core damage occurs.

   The cost estimates provided assumed one new dedicated diesel generator set, prestaged and located outside on a concrete pad for each station. No enclosure was included in the estimate. Approximately 900 feet of cable and nine circuit breakers would need to be installed and are included in the cost estimate. Initial procedure development costs were included in the cost estimate. However, ongoing routine surveillance and maintenance costs were not included. Also, this cost estimate does not include tornado protection of the diesel generator set nor does it include any seismic design .

5. Based on information provided in response to RAI 6c and RAI 8 (Table 8-3), it appears that installation of a watertight wall, if it achieves the same risk reduction as "manning the SSF 24 hours a day", may be cost beneficial. In this regard, please:

   a. Provide the estimated risk reduction (CDF and person-rem) and averted risk benefit for the alternative SAMA involving installation of a watertight wall. Describe which sequences/failure modes are eliminated by the SAMA, and which ones would remain.

RESPONSE: To estimate the maximum benefit associated with installing a watertight wall around the 6900/4160V transformers the same methodology implemented in the SAMA submittal is used here. This alternative has the potential to significantly reduce the risk associated with severe accident sequences involving turbine building flood initiators. Therefore, it is assumed that the installation of this watertight wall would completely eliminate the turbine building flood initiator severe accident sequences from the cut set file. To determine the maximum risk reduction possible for this alternative the turbine building flood initiator was set to 0 in the cut set file. The maximum estimated CDF reduction is 1.4E-05 per yr with a person Rem risk reduction of 12.4 person-Rem.

Based on these risk reduction values, over the 46-year current and license renewal period the maximum estimated benefit is approximately $1.1 million (averted public exposure = $3.4E+05, averted onsite cleanup cost = $2.1E+05, averted onsite exposure cost = $6.8E+03, averted offsite property damage cost = $7.0E+04, and averted power replacement cost = $4.5E+05).

The estimate of the benefit provided above is based, as is the SAMA submittal, on Revision 2b of the Catawba PRA. Catawba has recently installed reactor coolant pump seals that use o-ring materials that perform better at high temperature. This plant modification is expected to reduce the probability of a reactor coolant pump seal LOCA following a loss of seal cooling. Since a large fraction of the core damage sequences initiated by the turbine building flood involve seal LOCAs, the modification will reduce the CDF contribution form the flood and consequently reduce the change in CDF associated with the construction of a watertight wall. A sensitivity study has been performed to estimate the impact of the new seals on the benefit calculation. Considering the performance of the new seals, the change in CDF associated with the construction of the wall is estimated to be 1E-05. The estimated benefit is less than $870,000 with a person Rem risk reduction of 15.1 person-Rem.

b. Provide a description and breakdown of the major costs that contribute to the estimated cost of $500K to install a watertight wall.

RESPONSE: The estimated cost to install this modification in one Catawba unit is $250K. The estimated cost breakdown is $75K for engineering, $25K for materials, $150K for installation labor. Ongoing costs (i.e., maintenance of a sump pump) have not been included in this estimate. These cost estimates are for scoping purposes only and are subject to change.

6. Provide a breakdown of the Catawba SBO CDF in terms of internal events, seismic, fire, flood, tornado, etc.

RESPONSE:

INTERNAL		
INITIATOR		Core Damage Freq. (per yr)
T1	Reactor Trip	1.6E-08
T2	Loss of Load	1.0E-09
T3	LOOP	1.6E-06
T4	Loss of Main Feedwater	1.1E-09
T9	Loss of RN	9.3E-09
T11	Loss Of 4160 V Essential Bus	9.6E-08
FTB	Turbine Building Flood	1.3E-05

EXTERNAL		
INITIATOR		Core Damage Freq. (per yr)
FACTB	All Consuming TB Fire	1.7E-07
FCBLR	Cable Room Fire Causes A Loss Of CCW	1.8E-08
FETB	ETB Fire Initiating Event	1.5E-09
FCR	Control Room Fire Causes A Loss Of KC	1.0E-08
SEISMIC	Seismic	8.4E-06
TORNF4	Plant Struck By F4 Or F5 Tornado	4.4E-07
TORNSW	Tornado Causes LOOP	1.5E-06

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	RC101	RC102	RC103	RC104	RC201	RC202	RC203	RC204	RC301
10CI	0	0	0	0	0	0	0	0	0
14AI	0.0107	1.07E-06	0.000103	1.03E-08	0	0	0	0	0
14AS	0.0106	0.0000203	0.000103	1.96E-07	0	0	0	0	0
14DI	0.0106	0.000107	0.000102	1.03E-06	0	0	0	0	0
14PI	0	0.00107	0	0.0000103	0	0	0	0	0
14PL	0	0.0107	0	0.000103	0	0	0	0	0
14PS	0.00882	0.000981	0.0000851	9.46E-06	0	0	0	0	0
15AI	0.0107	1.07E-06	0.000103	1.03E-08	0	0	0	0	0
15DI	0.0107	0.0000116	0.000103	1.12E-07	0	0	0	0	0
15DS	0.0106	0.000107	0.000102	1.03E-06	0	0	0	0	0
15PI	0	0.000981	0	9.46E-06	0	0	0	0	0
15PS	0.00882	0.000981	0.0000851	9.46E-06	0	0	0	0	0
19DI	0	0	0	0	0	0	0	0	0
19DS	0	0	0	0	0	0	0	0	0
1AI	0	0	0	0	0	0	0	0	0
1AS	0	0	0	0	0	0	0	0	0
1DI	0	0	0	0	0	0	0	0	0
1PI	0	0	0	0	0	0	0	0	0
1PL	0	0	0	0	0	0	0	0	0
20AI	0.00107	1.07E-07	0.0000108	1.08E-09	0	0	0	0	0
20AS	0.00107	1.07E-06	0.0000108	1.08E-08	0	0	0	0	0
20DI	0.00095	0.000116	9.59E-06	1.17E-06	0	0	0	0	0
20DS	0.00105	0.0000203	0.0000106	2.05E-07	0	0	0	0	0
20PI	0	0	0	0	0	0	0	0	0
21AI	0.00107	1.16E-06	0.0000108	1.17E-08	0	0	0	0	0
21AS	0.00106	2.03E-06	0.0000107	2.05E-08	0	0	0	0	0
21DI	0.00101	0.0000587	0.0000102	5.93E-07	0	0	0	0	0
21DS	0.00105	0.0000203	0.0000106	2.05E-07	0	0	0	0	0
22AI	0	0	0	0	0	0	0	0	0
22AS	0	0	0	0	0	0	0	0	0
22CI	0	0	0	0	0	0	0	0	0
22CS	0	0	0	0	0	0	0	0	0
23AI	0	0	0	0	0	0	0	0	0
24AI	0	0	0	0	0	0	0	0	0
24CI	0	0	0	0	0	0	0	0	0
24CS	0.000942	0.0000182	0.000115	2.23E-06	0	0	0	0	0
25AI	0.000533	5.82E-07	0.000543	5.92E-07	0	0	0	0	0
25DI	0.00095	0.000116	0.0000096	1.17E-06	0	0	0	0	0
26DI	0.000981	0.000109	0.899	0.0999	0	0	0	0	0
27DI	0	0	0	0	0	0.00099	0	0.999	0
2AI	0	0	0	0	0	0	0	0	0
2CI	0	0	0	0	0	0	0	0	0
2DI	0	0	0	0	0	0	0	0	0
3AI	0	0	0	0	0	0	0	0	0
4DI	0	0	0	0	0	0	0	0	0
4DS	0	0	0	0	0	0	0	0	0
4PI	0	0	0	0	0	0	0	0	0
4PS	0	0	0	0	0	0	0	0	0
5AI	0	0	0	0	0	0	0	0	0
5CI	0	0	0	0	0	0	0	0	0
5CS	0	0	0	0	0	0	0	0	0
6AI	0	0	0	0	0	0	0	0	0
7DI	0	0	0	0	0	0	0	0	0
7DS	0	0	0	0	0	0	0	0	0
7PI	0	0	0	0	0	0	0	0	0
7PS	0	0	0	0	0	0	0	0	0
8PI	0	0.0000909	0	8.11E-06	0	0	0	0	0
8PL	0	0.00982	0	0.000077	0	0	0	0	0
8PS	0.00818	0.000909	0.00073	0.0000811	0	0	0	0	0

	RC302	RC303	RC304	RC305	RC306	RC401	RC402	RC403	RC404
10CI	0	0	0	0	0	0	0	0	0
14AI	0	0	0	0	0	0	0	0	0
14AS	0	0	0	0	0	0.952	0.00181	0.00941	0.0000179
14DI	0	0	0	0	0	0	0	0	0
14PI	0	0	0	0	0	0	0	0	0
14PL	0	0	0	0.98	0.00945	0	0	0	0
14PS	0	0	0	0	0	0.55926	0.0796	0.00709	0.000787
15AI	0	0	0	0	0	0	0	0	0
15DI	0	0	0	0	0	0	0	0	0
15DS	0	0	0	0	0	0.945	0.00954	0.00933	0.0000942
15PI	0	0	0	0	0	0	0	0	0
15PS	0	0	0	0	0	0.55926	0.0796	0.00709	0.000787
19DI	0	0	0	0	0	0	0	0	0
19DS	0	0	0	0	0	0.935	0.0544	0.00944	0.00055
1AI	0	0	0	0	0	0	0	0	0
1AS	0	0	0	0	0	0.00098	0.0000099	0.989	0.00999
1DI	0	0	0	0	0	0	0	0	0
1PI	0	0	0	0	0	0	0	0	0
1PL	0	0	0	0.99	0.01	0	0	0	0
20AI	0	0	0	0	0	0	0	0	0
20AS	0	0	0	0	0	0.988	0.000989	0.00997	9.98E-06
20DI	0	0	0	0	0	0	0	0	0
20DS	0	0	0	0	0	0.97	0.0188	0.00979	0.00019
20PI	0	0	0	0	0	0	0	0	0
21AI	0	0	0	0	0	0	0	0	0
21AS	0	0	0	0	0	0.987	0.00188	0.00997	0.000019
21DI	0	0	0	0	0	0	0	0	0
21DS	0	0	0	0	0	0.97	0.0188	0.00979	0.00019
22AI	0	0	0	0	0	0	0	0	0
22AS	0	0	0	0	0	0.00103	0.0000104	0.988	0.00998
22CI	0	0	0	0	0	0	0	0	0
22CS	0	0	0	0	0	0.842	0.049	0.103	0.00599
23AI	0	0	0	0	0	0	0	0	0
24AI	0	0	0	0	0	0	0	0	0
24CI	0	0	0	0	0	0	0	0	0
24CS	0	0	0	0	0	0.873	0.0169	0.107	0.00207
25AI	0	0	0	0	0	0	0	0	0
25DI	0	0	0	0	0	0	0	0	0
26DI	0	0	0	0	0	0	0	0	0
27DI	0	0	0	0	0	0	0	0	0
2AI	0	0	0	0	0	0	0	0	0
2CI	0	0	0	0	0	0	0	0	0
2DI	0	0	0	0	0	0	0	0	0
3AI	0	0	0	0	0	0	0	0	0
4DI	0	0	0	0	0	0	0	0	0
4DS	0	0	0	0	0	0.971	0.0188	0.00981	0.00019
4PI	0	0	0	0	0	0	0	0	0
4PS	0	0	0	0	0	0.56175	0.0832	0.00752	0.000836
5AI	0	0	0	0	0	0	0	0	0
5CI	0	0	0	0	0	0	0	0	0
5CS	0	0	0	0	0	0.891	0.099	0.009	0.001
6AI	0	0	0	0	0	0	0	0	0
7DI	0	0	0	0	0	0	0	0	0
7DS	0	0	0	0	0	0.923	0.0179	0.00928	0.00018
7PI	0	0	0	0	0	0	0	0	0
7PS	0	0	0	0	0	0.49691	0.0699	0.0799	0.00888
8PI	0	0	0	0	0	0	0	0	0
8PL	0	0	0	0.982	0.0077	0	0	0	0
8PS	0	0	0	0	0	0.516	0.0574	0.0663	0.00737

	RC405	RC406	RC407	RC408	RC501	RC502	RC601	RC602	RC603
10CI	0	0	0	0	0.0283	0.0201	0.0102	0.0104	0.000969
14AI	0	0	0	0	0.0257	0.0000282	0	0	0
14AS	0	0	0	0	0.0257	0.0000282	0	0	0
14DI	0	0	0	0	0.0257	0.0000282	0.446	0.00451	0.404
14PI	0	0	0	0	0.337272	0.003128	0	0.2292	0
14PL	0	0	0	0	0	0	0	0	0
14PS	0	0	0	0	0.3401626	0.0031674	0	0	0
15AI	0	0	0	0	0.0257	0.0000282	0	0	0
15DI	0	0	0	0	0.0257	0.0000282	0.0446	0.000451	0.0404
15DS	0	0	0	0	0.0257	0.0000282	0	0	0
15PI	0	0	0	0	0.3372819	0.0031281	0	0.26019	0
15PS	0	0	0	0	0.3401626	0.0031674	0	0	0
19DI	0	0	0	0	0.000493	4.51E-06	0.437	0.445	0.00426
19DS	0	0	0	0	0.000493	4.51E-06	0	0	0
1AI	0	0	0	0	4.95E-08	5E-10	0	0	0
1AS	0	0	0	0	4.95E-08	5E-10	0	0	0
1DI	0	0	0	0	9.9E-08	1E-09	0.000787	0.0000962	7.07E-06
1PI	0	0	0	0	0.0010172	0.3424295	0	0	0
1PL	0	0	0	0	0	0	0	0	0
20AI	0	0	0	0	0.000259	2.85E-07	0	0	0
20AS	0	0	0	0	0.000259	2.85E-07	0	0	0
20DI	0	0	0	0	0.000259	2.85E-07	0.719	0.088	0.0736
20DS	0	0	0	0	0.000259	2.85E-07	0	0	0
20PI	0	0	0	0	0.3386948	0.0034652	0	0.49348	0
21AI	0	0	0	0	0.000259	2.85E-07	0	0	0
21AS	0	0	0	0	0.000259	2.85E-07	0	0	0
21DI	0	0	0	0	0.000259	2.85E-07	0.36	0.044	0.0368
21DS	0	0	0	0	0.000259	2.85E-07	0	0	0
22AI	0	0	0	0	0.000542	5.47E-06	0	0	0
22AS	0	0	0	0	0.0000522	0.000945	0	0	0
22CI	0	0	0	0	0.000449	0.0000486	0.0393	0.0401	0.000383
22CS	0	0	0	0	0.000449	0.0000486	0	0	0
23AI	0	0	0	0	0.000458	0.0000497	0.393	0.401	0.00383
24AI	0	0	0	0	0.000283	1.69E-06	0	0	0
24CI	0	0	0	0	0.000268	0.0000016	0.0648	0.00793	0.00664
24CS	0	0	0	0	0.000268	0.0000016	0	0	0
25AI	0	0	0	0	0.000259	2.85E-07	0	0	0
25DI	0	0	0	0	0.000532	4.18E-06	0	0.0807	0
26DI	0	0	0	0	0	0	0	0	0
27DI	0	0	0	0	0	0	0	0	0
2AI	0	0	0	0	4.95E-08	5E-10	0	0	0
2CI	0	0	0	0	9.99E-06	1.01E-07	0.787	0.0963	0.00707
2DI	0	0	0	0	0.0000495	0.0000005	0.787	0.0962	0.00707
3AI	0	0	0	0	0.000495	0.000005	0	0	0
4DI	0	0	0	0	9.9E-08	1E-09	0.402	0.00406	0.0393
4DS	0	0	0	0	9.9E-08	1E-09	0	0	0
4PI	0	0	0	0	0.3402986	0.0034814	0	0.49786	0
4PS	0	0	0	0	0.3433775	0.0035125	0	0	0
5AI	0	0	0	0	0.000136	1.38E-06	0	0	0
5CI	0	0	0	0	0.000273	2.75E-06	0	0.0883	0
5CS	0	0	0	0	0.000273	2.75E-06	0	0	0
6AI	0	0	0	0	0.000495	0.000005	0	0	0
7DI	0	0	0	0	0.0493	0.000451	0.0764	0.000772	0.00739
7DS	0	0	0	0	0.0493	0.000451	0	0	0
7PI	0	0	0	0	0.328224	0.013566	0	0.46369	0
7PS	0	0	0	0	0.3308064	0.0136736	0	0	0
8PI	0	0	0	0	0.3356834	0.0055866	0	0.29422	0
8PL	0	0	0	0	0	0	0	0	0
8PS	0	0	0	0	0.335	0.00746	0	0	0

	RC604	RC605	RC606	RC607	RC608	RC701	RC702	RC703	RC704
10CI	0.000989	0.0983	0.1	0.00467	0.00477	0.00124	0.00127	0.0114	0.0117
14AI	0	0	0	0	0	0	0	0	0
14AS	0	0	0	0	0	0	0	0	0
14DI	0.00408	0.00448	0.0000453	0.00391	0.0000395	0.0945	0.000954	0.000933	9.42E-06
14PI	0.341	0	0.00382	0	0.00333	0	0.0803	0	0.000794
14PL	0	0	0	0	0	0	0	0	0
14PS	0	0	0	0	0	0	0	0	0
15AI	0	0	0	0	0	0	0	0	0
15DI	0.000408	0.000448	4.53E-06	0.000391	3.95E-06	0.00945	0.0000954	0.0000933	9.42E-07
15DS	0	0	0	0	0	0	0	0	0
15PI	0.31	0	0.00412	0	0.00303	0	0.0803	0	0.000794
15PS	0	0	0	0	0	0	0	0	0
19DI	0.00435	0.00441	0.0045	0.000043	0.0000439	0.049	0.05	0.000495	0.000505
19DS	0	0	0	0	0	0	0	0	0
1AI	0	0	0	0	0	0	0	0	0
1AS	0	0	0	0	0	0	0	0	0
1DI	8.65E-07	0.0794	0.00971	0.000714	0.0000873	0.0000882	0.0000108	0.0089	0.00109
1PI	0	0	0.48636	0	0.0755	0	0.0000832	0	0.0942
1PL	0	0	0	0	0	0	0	0	0
20AI	0	0	0	0	0	0	0	0	0
20AS	0	0	0	0	0	0	0	0	0
20DI	0.00901	0.00726	0.000889	0.000742	0.0000908	0.0881	0.0108	0.00089	0.000109
20DS	0	0	0	0	0	0	0	0	0
20PI	0.0722	0	0.00679	0	0.000723	0	0.0832	0	0.000835
21AI	0	0	0	0	0	0	0	0	0
21AS	0	0	0	0	0	0	0	0	0
21DI	0.0045	0.00363	0.000444	0.000371	0.0000454	0.044	0.00539	0.000445	0.0000544
21DS	0	0	0	0	0	0	0	0	0
22AI	0	0	0	0	0	0	0	0	0
22AS	0	0	0	0	0	0	0	0	0
22CI	0.000391	0.0048	0.0049	0.0000468	0.0000478	0.00441	0.0045	0.000539	0.00055
22CS	0	0	0	0	0	0	0	0	0
23AI	0.00391	0.048	0.049	0.000468	0.000478	0.0441	0.045	0.00539	0.0055
24AI	0	0	0	0	0	0	0	0	0
24CI	0.000812	0.00792	0.000969	0.000809	0.000099	0.00794	0.000971	0.00097	0.000119
24CS	0	0	0	0	0	0	0	0	0
25AI	0	0	0	0	0	0	0	0	0
25DI	0.00826	0	0.000815	0	0.0000834	0	0.00988	0	0.0000998
26DI	0	0	0	0	0	0	0	0	0
27DI	0	0	0	0	0	0	0	0	0
2AI	0	0	0	0	0	0	0	0	0
2CI	0.000865	0.00795	0.000972	0.0000714	8.74E-06	0.0882	0.0108	0.000891	0.000109
2DI	0.000865	0.00795	0.000972	0.0000714	8.74E-06	0.0882	0.0108	0.000891	0.000109
3AI	0	0	0	0	0	0	0	0	0
4DI	0.000397	0.00406	0.000041	0.000397	4.01E-06	0.049	0.000495	0.000495	0.000005
4DS	0	0	0	0	0	0	0	0	0
4PI	0.0667	0	0.00685	0	0.00067	0	0.0832	0	0.000836
4PS	0	0	0	0	0	0	0	0	0
5AI	0	0	0	0	0	0	0	0	0
5CI	0.000794	0	0.000892	0	8.02E-06	0	0.0099	0	0.0001
5CS	0	0	0	0	0	0	0	0	0
6AI	0	0	0	0	0	0	0	0	0
7DI	0.0000747	0.000769	7.76E-06	0.0000743	7.51E-07	0.00931	0.0000941	0.0000937	9.46E-07
7DS	0	0	0	0	0	0	0	0	0
7PI	0.0504	0	0.0658	0	0.00636	0	0.0635	0	0.00802
7PS	0	0	0	0	0	0	0	0	0
8PI	0.233	0	0.041	0	0.0224	0	0.0607	0	0.00704
8PL	0	0	0	0	0	0	0	0	0
8PS	0	0	0	0	0	0	0	0	0

	RC801	RC802	RC901	RC902	RC903	RC904
10CI	0.00195	0.693	0	0	0	0
14AI	0.0848	0.00942	0.869	0.0000869	0	0
14AS	0	0	0	0	0	0
14DI	0	0	0	0	0	0
14PI	0	0	0	0	0	0
14PL	0	0	0	0	0	0
14PS	0	0	0	0	0	0
15AI	0.0848	0.00942	0.869	0.0000869	0	0
15DI	0.0763	0.00848	0.782	0.0000782	0	0
15DS	0	0	0	0	0	0
15PI	0	0	0	0	0	0
15PS	0	0	0	0	0	0
19DI	0	0	0	0	0	0
19DS	0	0	0	0	0	0
1AI	0.00009	0.0999	0.000899	9.81E-07	0.898	0.00098
1AS	0	0	0	0	0	0
1DI	0	0.899	0	0	0	0
1PI	0	0	0	0	0	0
1PL	0	0	0	0	0	0
20AI	0.0899	0.00998	0.899	0.0000899	0	0
20AS	0	0	0	0	0	0
20DI	0	0	0	0	0	0
20DS	0	0	0	0	0	0
20PI	0	0	0	0	0	0
21AI	0.0899	0.00998	0.898	0.00098	0	0
21AS	0	0	0	0	0	0
21DI	0.0449	0.00499	0.449	0.00049	0	0
21DS	0	0	0	0	0	0
22AI	0.09	0.00999	0.891	0.009	0	0
22AS	0	0	0	0	0	0
22CI	0.0729	0.0171	0.725	0.00368	0.0805	0.000408
22CS	0	0	0	0	0	0
23AI	0	0	0	0	0	0
24AI	0.09	0.01	0.9	0.00009	0	0
24CI	0.0729	0.0171	0.728	0.000795	0.0808	0.0000882
24CS	0	0	0	0	0	0
25AI	0.045	0.0549	0.449	0.00049	0.448	0.000489
25DI	0.0809	0.00898	0.801	0.00809	0	0
26DI	0	0	0	0	0	0
27DI	0	0	0	0	0	0
2AI	0.09	0.01	0.899	0.000981	0	0
2CI	0	0	0	0	0	0
2DI	0	0	0	0	0	0
3AI	0.09	0.01	0.891	0.009	0	0
4DI	0.045	0.005	0.45	0.000045	0	0
4DS	0	0	0	0	0	0
4PI	0	0	0	0	0	0
4PS	0	0	0	0	0	0
5AI	0.09	0.01	0.891	0.009	0	0
5CI	0.081	0.009	0.802	0.0081	0	0
5CS	0	0	0	0	0	0
6AI	0.09	0.01	0.891	0.009	0	0
7DI	0.0766	0.00851	0.77	0.000077	0	0
7DS	0	0	0	0	0	0
7PI	0.0338	0.0049	0	0.0297	0	0.00369
7PS	0	0	0	0	0	0
8PI	0.0298	0.00431	0	0.0262	0	0.00324
8PL	0	0	0	0	0	0
8PS	0	0	0	0	0	0

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	RC101	RC102	RC103	RC104	RC201	RC202	RC203	RC204	RC301
14AI	0.0102	1.02E-06	9.88E-05	9.88E-09	0	0	0	0	0
14DI	0.0107	1.16E-05	0.000103	1.12E-07	0	0	0	0	0
14PI	0.000922	5.83E-05	8.9E-06	5.63E-07	0	0	0	0	0
14PL	0.00882	0.000981	8.51E-05	9.46E-06	0	0	0	0	0.883
15AI	0.00107	1.07E-07	1.07E-05	1.07E-09	0	0	0	0	0
15PI	0.000874	0.000107	8.43E-06	1.03E-06	0	0	0	0	0
15PL	0.00882	0.000981	8.51E-05	9.46E-06	0	0	0	0	0.883
19DI	0	0	0	0	0	0	0	0	0
19DL	0	0	0	0	0	0	0	0	0.891
19DS	0	0	0	0	0	0	0	0	0
1AI	0	0	0	0	0	0	0	0	0
1AL	0	0	0	0	0	0	0	0	0.000891
20DI	0.00106	5.39E-06	1.07E-05	5.44E-08	0	0	0	0	0
21DI	0.00106	5.39E-06	1.07E-05	5.44E-08	0	0	0	0	0
22AI	0	0	0	0	0	0	0	0	0
22CI	0	0	0	0	0	0	0	0	0
22CL	0	0	0	0	0	0	0	0	0.891
22CS	0	0	0	0	0	0	0	0	0
23AI	0.000534	5.34E-08	0.000543	5.43E-08	0	0	0	0	0
23CI	0.00107	1.16E-06	1.08E-05	1.17E-08	0	0	0	0	0
26DI	0.000981	0.000109	0.899	0.0999	0	0	0	0	0
27DI	0	0	0	0	0	0.00099	0	0.999	0
2AI	0	0	0	0	0	0	0	0	0
4AI	0	0	0	0	0	0	0	0	0
4DI	0	0	0	0	0	0	0	0	0
4PI	0	0	0	0	0	0	0	0	0
4PL	0	0	0	0	0	0	0	0	0.891
5AI	0	0	0	0	0	0	0	0	0
5CI	0	0	0	0	0	0	0	0	0
5CL	0	0	0	0	0	0	0	0	0.891
7DI	0	0	0	0	0	0	0	0	0
7DL	0	0	0	0	0	0	0	0	0
7LI	0	0	0	0	0	0	0	0	0
7PI	0	0	0	0	0	0	0	0	0
7PL	0	0	0	0	0	0	0	0	0.892
7PS	0	0	0	0	0	0	0	0	0
8PI	0.000081	9.91E-06	7.23E-06	8.84E-07	0	0	0	0	0
8PL	0.00884	0.000982	6.93E-05	7.7E-06	0	0	0	0	0.884

	RC302	RC303	RC304	RC305	RC306	RC401	RC402	RC403	RC404
14AI	0	0	0	0	0	0	0	0	0
14DI	0	0	0	0	0	0	0	0	0
14PI	0	0	0	0	0	0	0	0	0
14PL	0.0981	0.00851	0.000946	0	0	0	0	0	0
15AI	0	0	0	0	0	0	0	0	0
15PI	0	0	0	0	0	0	0	0	0
15PL	0.0981	0.00851	0.000946	0	0	0	0	0	0
19DI	0	0	0	0	0	0	0	0	0
19DL	0.099	0.009	0.001	0	0	0	0	0	0
19DS	0	0	0	0	0	0.891	0.099	0.009	0.000999
1AI	0	0	0	0	0	0	0	0	0
1AL	0.000099	0.899	0.0999	0	0	0	0	0	0
20DI	0	0	0	0	0	0	0	0	0
21DI	0	0	0	0	0	0	0	0	0
22AI	0	0	0	0	0	0	0	0	0
22CI	0	0	0	0	0	0	0	0	0
22CL	0.099	0.009	0.001	0	0	0	0	0	0
22CS	0	0	0	0	0	0.891	0.0989	0.00899	0.000999
23AI	0	0	0	0	0	0	0	0	0
23CI	0	0	0	0	0	0	0	0	0
26DI	0	0	0	0	0	0	0	0	0
27DI	0	0	0	0	0	0	0	0	0
2AI	0	0	0	0	0	0	0	0	0
4AI	0	0	0	0	0	0	0	0	0
4DI	0	0	0	0	0	0	0	0	0
4PI	0	0	0	0	0	0	0	0	0
4PL	0.099	0.009	0.001	0	0	0	0	0	0
5AI	0	0	0	0	0	0	0	0	0
5CI	0	0	0	0	0	0	0	0	0
5CL	0.099	0.009	0.001	0	0	0	0	0	0
7DI	0	0	0	0	0	0	0	0	0
7DL	0.99	0	0.01	0	0	0	0	0	0
7LI	0	0	0	0	0	0	0	0	0
7PI	0	0	0	0	0	0	0	0	0
7PL	0.0991	0.00813	0.000903	0	0	0	0	0	0
7PS	0	0	0	0	0	0	0.764	0	0.0902
8PI	0	0	0	0	0	0	0	0	0
8PL	0.0982	0.00693	0.00077	0	0	0	0	0	0

	RC405	RC406	RC407	RC408	RC501	RC502	RC601	RC602	RC603
14AI	0	0	0	0	0.0257	2.82E-05	0	0	0
14DI	0	0	0	0	0.0257	2.82E-05	0.0446	0.000451	0.0404
14PI	0	0	0	0	0.24	0.00217	0.111	0.0202	0.00541
14PL	0	0	0	0	0	0	0	0	0
15AI	0	0	0	0	0.00259	2.84E-06	0	0	0
15PI	0	0	0	0	0.186	0.0016	0.221	0.0404	0.0108
15PL	0	0	0	0	0	0	0	0	0
19DI	0	0	0	0	0.000493	4.51E-06	0.218	0.223	0.00213
19DL	0	0	0	0	0	0	0	0	0
19DS	0	0	0	0	0.000493	4.51E-06	0	0	0
1AI	0	0	0	0	4.95E-08	5E-10	0	0	0
1AL	0	0	0	0	0	0	0	0	0
20DI	0	0	0	0	0.000259	2.85E-07	0.4	0.00404	0.0409
21DI	0	0	0	0	0.000259	2.85E-07	0.4	0.00404	0.0409
22AI	0	0	0	0	0.000493	4.51E-06	0	0	0
22CI	0	0	0	0	0.000542	5.24E-06	0.0873	0.000882	0.000852
22CL	0	0	0	0	0	0	0	0	0
22CS	0	0	0	0	0.000542	5.24E-06	0	0	0
23AI	0	0	0	0	0.000259	2.85E-07	0	0	0
23CI	0	0	0	0	0.000259	2.85E-07	0.0799	0.000807	0.00818
26DI	0	0	0	0	0	0	0	0	0
27DI	0	0	0	0	0	0	0	0	0
2AI	0	0	0	0	4.95E-08	5E-10	0	0	0
4AI	0	0	0	0	4.95E-08	5E-10	0	0	0
4DI	0	0	0	0	9.9E-08	1E-09	0.803	0.00812	0.0786
4PI	0	0	0	0	0.158	0.00164	0.242	0.0707	0.00217
4PL	0	0	0	0	0	0	0	0	0
5AI	0	0	0	0	4.99E-06	5.05E-08	0	0	0
5CI	0	0	0	0	9.99E-06	1.01E-07	0.0874	0.000883	0.000786
5CL	0	0	0	0	0	0	0	0	0
7DI	0	0	0	0	0.000493	4.51E-06	0.873	0.00882	0.00852
7DL	0	0	0	0	0	0	0	0	0
7LI	0	0	0	0	0.0794	0.000301	0	0.748	0
7PI	0	0	0	0	0.139	0.00697	0.102	0.315	0.00991
7PL	0	0	0	0	0	0	0	0	0
7PS	0	0	0	0	0.139	0.00697	0	0	0
8PI	0	0	0	0	0.255	0.00394	0.188	0.0365	0.00784
8PL	0	0	0	0	0	0	0	0	0

	RC604	RC605	RC606	RC607	RC608	RC701	RC702	RC703	RC704
14AI	0	0	0	0	0	0	0	0	0
14DI	0.000408	0.000448	4.53E-06	0.000391	3.95E-06	0.00945	9.54E-05	9.33E-05	9.42E-07
14PI	0.0171	0.00111	0.000202	5.43E-05	0.000167	0.0129	0.00415	0.00013	0.000041
14PL	0	0	0	0	0	0	0	0	0
15AI	0	0	0	0	0	0	0	0	0
15PI	0.0342	0.00223	0.000405	0.000109	0.000334	0.0258	0.00829	0.00026	8.21E-05
15PL	0	0	0	0	0	0	0	0	0
19DI	0.00217	0.0022	0.00225	2.15E-05	2.19E-05	0.0245	0.025	0.000247	0.000252
19DL	0	0	0	0	0	0	0	0	0
19DS	0	0	0	0	0	0	0	0	0
1AI	0	0	0	0	0	0	0	0	0
1AL	0	0	0	0	0	0	0	0	0
20DI	0.000413	0.00404	4.08E-05	0.000412	4.16E-06	0.0489	0.000494	0.000494	4.99E-06
21DI	0.000413	0.00404	4.08E-05	0.000412	4.16E-06	0.0489	0.000494	0.000494	4.99E-06
22AI	0	0	0	0	0	0	0	0	0
22CI	8.61E-06	0.000882	8.91E-06	8.6E-06	8.69E-08	0.0098	9.89E-05	9.89E-05	9.99E-07
22CL	0	0	0	0	0	0	0	0	0
22CS	0	0	0	0	0	0	0	0	0
23AI	0	0	0	0	0	0	0	0	0
23CI	8.26E-05	0.000807	8.15E-06	8.25E-05	8.33E-07	0.00979	9.89E-05	9.88E-05	9.98E-07
26DI	0	0	0	0	0	0	0	0	0
27DI	0	0	0	0	0	0	0	0	0
2AI	0	0	0	0	0	0	0	0	0
4AI	0	0	0	0	0	0	0	0	0
4DI	0.000794	0.00812	0.000082	0.000794	8.02E-06	0.098	0.00099	0.00099	0.00001
4PI	0.0067	0.00244	0.00071	2.19E-05	6.72E-05	0.0271	0.0086	0.000274	8.63E-05
4PL	0	0	0	0	0	0	0	0	0
5AI	0	0	0	0	0	0	0	0	0
5CI	7.94E-06	0.000883	8.92E-06	7.94E-06	8.02E-08	0.0098	0.000099	0.000099	0.000001
5CL	0	0	0	0	0	0	0	0	0
7DI	8.61E-05	0.00882	8.91E-05	0.000086	8.69E-07	0.098	0.00099	0.000989	9.99E-06
7DL	0	0	0	0	0	0	0	0	0
7LI	0.0724	0	0.00716	0	0.000693	0	0.0912	0	0.000873
7PI	0.0304	0.0021	0.037	0.000204	0.00358	0.0125	0.0383	0.000256	0.00451
7PL	0	0	0	0	0	0	0	0	0
7PS	0	0	0	0	0	0	0	0	0
8PI	0.0252	0.00367	0.00457	0.000136	0.00249	0.0217	0.00685	0.000423	0.000784
8PL	0	0	0	0	0	0	0	0	0

	RC801	RC802	RC901	RC902	RC903	RC904
14AI	0.0849	0.00943	0.87	0.000087	0	0
14DI	0.0763	0.00848	0.782	7.82E-05	0	0
14PI	0.051	0.00567	0.523	0.00528	0	0
14PL	0	0	0	0	0	0
15AI	0.0895	0.00994	0.897	8.97E-05	0	0
15PI	0.0407	0.00453	0.418	0.00422	0	0
15PL	0	0	0	0	0	0
19DI	0.045	0.005	0.448	0.00227	0	0
19DL	0	0	0	0	0	0
19DS	0	0	0	0	0	0
1AI	0.00009	0.0999	0.0009	9E-08	0.899	8.99E-05
1AL	0	0	0	0	0	0
20DI	0.0449	0.00499	0.449	4.49E-05	0	0
21DI	0.0449	0.00499	0.449	4.49E-05	0	0
22AI	0.09	0.00999	0.899	0.00009	0	0
22CI	0.081	0.00899	0.809	0.000081	0	0
22CL	0	0	0	0	0	0
22CS	0	0	0	0	0	0
23AI	0.045	0.0549	0.45	0.000045	0.449	4.49E-05
23CI	0.0809	0.00899	0.809	8.09E-05	0	0
26DI	0	0	0	0	0	0
27DI	0	0	0	0	0	0
2AI	0.00009	0.0999	0.0009	9E-08	0.899	8.99E-05
4AI	0.045	0.055	0.45	0.000045	0.45	0.000045
4DI	0	0	0	0	0	0
4PI	0.0428	0.00476	0.428	0.00433	0	0
4PL	0	0	0	0	0	0
5AI	0.09	0.01	0.9	0.00009	0	0
5CI	0.081	0.009	0.81	0.000081	0	0
5CL	0	0	0	0	0	0
7DI	0	0	0	0	0	0
7DL	0	0	0	0	0	0
7LI	0	0	0	0	0	0
7PI	0.022	0.00645	0.232	0.00234	0.0357	0.00036
7PL	0	0	0	0	0	0
7PS	0	0	0	0	0	0
8PI	0.0296	0.00956	0.344	0.00348	0.0558	0.000564
8PL	0	0	0	0	0	0

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#	Review Area	NRC Letter Date	Response Due[1]
1.	Electrical	01/17/2002	03/15/2002
2.	General TLAA	NONE	COMPLETE
3.	ISI Program	NONE	COMPLETE
4.	Mechanical AMP	01/28/2002	03/15/2002
5.	Mechanical AUX Sys AMR	01/23/2002	03/15/2002
6.	Mechanical AUX Sys Scoping	01/28/2002	04/15/2002
7.	Mechanical ESF Sys AMR	01/28/2002	03/15/2002
8.	Mechanical ESF Sys Scoping	01/23/2002	04/15/2002
9.	Mechanical SPCS AMR	NONE	COMPLETE
10.	Mechanical SPCS Scoping	NONE	COMPLETE
11.	RCS	01/28/2002 01/30/2002	04/15/2002 04/15/2002
12.	Scoping Methodology	01/17/2002	04/15/2002
13.	Scoping Results	01/23/2002	04/15/2002
14.	Structural	01/28/2002	03/15/2002

[1] All responses must be submitted by 04/15/2002. Dates in this column represent the date by which Duke will provide responses to the NRC RAI letters.