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Docket No.: 50-269

Mr. H. B. Tucker
Vice President
Nuclear Production Department
Duke Power Company
422 S. Church Street
Charlotte, North Carolina 28242

Dear Mr. Tucker:

As you know, we are in the midst of conducting a research program to assess the safety implications of control systems, and have selected the Oconee-1 plant as one of the specific plants in this effort. Although we have substantial as-built design and operation information on Oconee-1, we do not have all the information we will need, particularly on the Integrated Control System, associated support systems, and plant process system parameters.

While our discussions regarding your full participation in this effort have not come to a final conclusion, we have decided that in order to complete this work in a timely manner, we must continue it on the basis of the best information available to us. We have, therefore, decided to proceed, using the information that we have, and where information is missing, using what we believe is representative of Oconee-1.

To date, we have had to make several assumptions and estimates as described in the attached list. These estimates were made by our contractor, Oak Ridge National Laboratory, based on existing information on Babcock and Wilcox reactors, and from information received in conjunction with efforts to resolve Unresolved Safety Issue A-49. This information is provided to you in advance to allow you opportunity for comment. We will keep you advised as our program proceeds, and, in particular, as we find it necessary to make further assumptions and estimates.

Sincerely,

Original signed by
Darrell G. Eisenhut

Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation

Enclosure:
List of Assumptions and
Estimates

*SEE PREVIOUS ORC FOR CONCURRENCES.

OFFICE	DL:LB#1	PR:PM*	DL:ORB#4*	DL:AD/L	DST:DIR	RES	DL:DIR
SURNAME	SChesnut/lg	PWagner	JStolz	TMNovak	SHanauer	KRGoller	DGEisenhut
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Docket No.: 50-269

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Vice President
Nuclear Production Department
Duke Power Company
422 S. Church Street
Charlotte, NC 28242

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To date, we have had to make several assumptions and estimates as described in the attached list. These estimates were made by our contractor, Oak Ridge National Laboratory, based on existing information on Babcock and Wilcox reactors, and from information received in conjunction with efforts to resolve USI, A-49. This information is provided to you in advance to allow you opportunity for comment. We will keep you advised as our program proceeds, and, in particular, as we find it necessary to make further assumptions and estimates.

Sincerely,

Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation

Enclosure:
List of Assumptions and
Estimates

*See previous yellow.

OFFICE	DL:LB#1	PR:PM*		DL:AD/L			DL:DIR
SURNAME	SChesnut/yt	PWagner	JStolz	TMNovak	SHanauer	KRGoller	DEisenhut
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DEisenhut

Docket No.: 50-269

Mr. William O. Parker, Jr.
Vice President
Steam Production
Duke Power Company
422 S. Church Street
Charlotte, NC 28242

Dear Mr. Parker:

As you know, we are in the midst of conducting a research program to assess the safety implications of control systems, and have slected the Oconee-1 plant as one of the specific plants in this effort. Although we have substantial as-built design and operation information on Oconne-1, we do not have all the information we will need, particularly on the Integrated Control System, associated support systems, and plant process system parameters.

While our discussions regarding your full participation in this effort have not come to a final conclusion, we have decided that in order to complete this work in a timely manner, we must continue it on the basis of the best information available to us. We have, therefore, decided to proceed, using the information that we have, and where information is missing, using what we believe is representative of Oconee-1.

To date, we have had to make several assumptions and estimates as described in the attached list. We will keep you advised as our program proceeds, and, in particular, as we find it necessary to make further assumptions and estimates.

Sincerely,

Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Regulatory Reactor

Enclosure:
List of Assumptions and
Estimates

OFFICE	DL:LB#1	OR:PM		DL:AD/L			DL:DIR
SURNAME	SChesnut/yt	PWagner	JStolz	TMNovak	SHanauer	KRGoller	DEisenhut
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bcc: R. Minogue
D. Ross
K. Goller
W. Morrison
E. Wenzinger
D. Basdekas

Mr. William O. Parker, Jr., Vice President
Steam Production
Duke Power Company
422 S. Church Street
Charlotte, NC 28242

Dear Mr. Parker:

As you know, we are in the midst of conducting a research program to assess the safety implications of control systems, and that we want to use the Oconee-1 plant as one of the specific plants in this effort. Although we have substantial as-built design and operation information on Oconee-1, we do not have all the information we will need, particularly on the Integrated Control System, associated support systems, and plant process system parameters.

While our discussions regarding your full participation in this effort have not come to a final conclusion, we have decided that in order to complete this work in a timely manner, we must continue this work on the basis of the best information available to us. We have, therefore, decided to proceed, using the information that we have, and, where information is missing, what we believe is "representative" of Oconee-1.

To date, we have had to make the attached list of assumptions and estimates. We would like to request that you review this list and let us know if they are correct for Oconee-1. If not, would you please provide us with the correct information on Oconee-1, so that our analyses and conclusions will more accurately reflect reality for Oconee-1.

Your assistance in this matter is appreciated.

Sincerely,

Karl R. Goller, Director
Division of Facility Operations
Office of Nuclear Regulatory Research

Enclosure: List of Assumptions
and Estimates

OFFICE	ICB:DFO:RES	ICB:DFO:RES	DD:DFO:RES	D:DFO:RES		
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Duke Power Company

cc w/enclosure(s):

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Walhalla, South Carolina 29691

Honorable James M. Phinney
County Supervisor of Oconee County
Walhalla, South Carolina 29621

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ESTIMATES/ASSUMPTIONS FOR
PARAMETERS USED IN ORNL MODEL OF OCONEE UNIT 1

Core and Vessel

Avg. flow area per pin	.1774 in^2
Hydraulic diam of flow area	.2388 in
Hydraulic diam of downcomer	1 ft
Hydraulic diam of lower plenum	1 ft
Hydraulic diam of upper plenum	4 ft

Pressure losses (drag and form)

Vessel	20 psi
Steam generator	40 psi
Total primary loop	80 psi

Main feedwater pump

Moment of inertia	60 $lb\text{-}ft^2$
Rated head	2260 ft
Rated torque	7350 lb-ft
Rated density	62.3 lb/ft^3

Control system

BTU limit:

The BTU limit is determined by a weighted sum of reactor outlet

temperature (TH), feedwater temperature (TF), and steam generator pressure (PSG) times normalized reactor coolant flow (WRC) as shown by,

$$\text{BTU limit} = (\text{THL} + \text{TFL} + \text{PSGL} - 200)\,(\text{WRCL}/100)$$

where,

$$\text{THL} \cong 3.44(\text{TH} - 575°\text{F}),$$

$$\text{TFL} \sim (\text{TF} - 100°\text{F})/9 + 60,$$

$$\text{PSGL} = \begin{cases} 105 & \text{PSG} \leq 1000 \text{ psi}, \\ 105 - 11(\text{PSG}-1000)/25; & 1000 < \text{PSG} \leq 1125 \text{ psi}, \\ 50 \quad ; & \text{PSG} > 1125 \text{ psi}, \end{cases}$$

and

$$\text{WRCL} = 105\ \text{WRC}\ .$$

Feedwater demand:

The feedwater demand (WD) is altered by the value of feedwater temperature in order to reduce effects on plant state by changing water temperature. The following relations are used to obtain a correction factor (FC) for the feedwater demand based on feedwater temperature (TF):

$$\text{TIC} = f(\text{WD})$$

$$\Delta T = \text{TF} - \text{TIC}$$

$$\text{FC} = 1 + \Delta T/1000.$$

Where the desired feedwater temperature TIC is determined by the following conditional equation,

$$f(\text{WD}) \sim \begin{cases} 200 + 53 \times 10^{-6}\ (\text{WD}) & 0 \leq \text{WD} \leq 1.83 \times 10^{6} \text{ lbs/hr} \\ 297 + 32.7 \times 10^{-6}\ (\text{WD} - 1.83 \times 10^{6}): & 1.83 \times 10^{6} < \text{WD} \leq 2.92 \times 10^{6} \\ 326 + 17.1 \times 10^{-6}\ (\text{WD} - 2.92 \times 10^{6}): & 2.92 \times 10^{6} < \text{WD} \leq 5.14 \times 10^{6} \\ 400 + 9.78 \times 10^{-6}\ (\text{WD} - 5.14 \times 10^{6}): & 5.14 \times 10^{6} < \text{WD} \end{cases}$$