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

MAR 10 1980

Docket Nos. 50-369
and 50-370

Mr. William O. Parker, Jr.
Vice President, Steam Production
Duke Power Company
P. O. Box 2178
422 South Church Street
Charlotte, North Carolina 28242

Dear Mr. Parker:

SUBJECT: REVIEW OF NUCLEAR PLANTS STRUCTURAL DESIGN
(McGuire Nuclear Station, Units 1 and 2)

On November 15, 1979, Dr. Sai Chan, NRC Staf and representatives of our consultant, Ames Laboratory, visited the McGuire Station to observe and discuss the McGuire containment structure and design. As a result of this visit and discussion, our consultant has prepared an estimate of the statistical parameters for the McGuire containment design variables. These are presented in the enclosed February 12, 1980 letter to us from our consultant. It is requested that you review and comment on our consultants estimates. In addition, we need some additional details on the penetration for the containment vessel, in particular, reinforcement thickness and size and penetrating shell thicknesses for the equipment and personnel penetrations. These matters were discussed with your staff on February 28, 1980.

Although this review is being performed on a generic basis outside of our review of your application for an operating license, we would appreciate a prompt response in letter form.

Your continued cooperation in this matter is appreciated.

Sincerely,

Robert L. Baer

Robert L. Baer, Chief
Light Water Reactors Branch No. 2
Division of Project Management

Enclosure:
Letter From Ames Laboratory
Dated February 12, 1980

ccs w/enclosure:
See next pages

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February 12, 1980

Dr. Sai Chan
Structural Engineering Branch
Division of System Safety
Office of Nuclear Reactor Regulation
Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: AMES LABORATORY TECHNICAL ASSISTANCE TO THE DIVISION OF SYSTEMS SAFETY, NRR -- "A REVIEW OF NUCLEAR PLANTS STRUCTURAL DESIGN" (FIN NO. A-4131). STATISTICAL PARAMETERS OF DESIGN VARIABLES

Dear Dr. Chan:

Enclosed please find our estimates of the statistical parameters for the design variables for the Sequoyah and McGuire Nuclear Power Plants. Unless there is an objection, we intend to use these values in our best estimate and uncertainty analysis of the two plants. Please review these. Also, please send them to the appropriate officials of the two plants for their review and comment.

Please ask Duke Power personnel for more details on the penetrations for the McGuire containment vessel. In particular, we need reinforcement thickness and size and penetrating shell thickness for the equipment and personnel penetrations.

Please send me copies of letters you send to TVA and Duke. If you have any questions, please contact me.

Sincerely,

Lowell Greimann

Lowell Greimann
Project Engineer

Enclosures

cc: Delwyn Bluhm, Head, Project Engineering
F. P. Schauer, Chief, Structural Engineering Branch

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Under Contract With The United States Department Of Energy

STATISTICAL PARAMETERS FOR DESIGN VARIABLES
McGUIRE NUCLEAR PLANT

Design Variable	Nominal	Mean	Tolerance	Standard Deviation	Reference
Plate Thickness	3/4"	0.768	-0.010" +0.045	0.0092	1,2
	11/16	0.703	-0.010 +0.041	0.0085	
	1/2	0.513	-0.010 +0.035	0.0075	
Ring Plate Length and Width	ℓ,b	ℓ,b	$\pm$ 1/4"	0.083"	3
Containment Plate Length	ℓ	ℓ	$\pm$ 1/8"	0.042"	4
Containment Plate Width	b	b - 1/8	- 1/4 + 0	0.042"	4
Containment Radius	690"	690"	$\pm$ 1.5"	0.5"	4
Material Yield	32 ksi	35.2 ksi	-0 ksi	3.8 ksi	5
Material Ultimate	60 ksi	66.0 ksi	-0 +20 ksi	7.2 ksi	6

References:

(1) ASTM Standards, 1979, Specification A20, "Standard Specification for General Requirements for Steel Plates for Pressure Vessels", Table 1.

(2) Telephone Conversation with Product Specialist - Plate Sales, Bethlehem Steel, stated plate overweights ranged from 3 to 5 percent, on average.

(3) Same as Reference (1), Table 6.

(4) Drawings and information supplied by Duke Power.

(5) Galambos, T. V. and Ravindra, M. K., "Properties of Steel for Use in LRFD". Journal of the Structural Division, ASCE, v. 104, No. ST9, Sept. 1978, pp 1459-1468.

(6) Ravindra, M. K. and Galambos, T. V., "Load and Resistance Factor Design of Steel". Journal of the Structural Division, ASCE, v. 104, No. ST9, Sept. 1978, pp 1337-1353.

STATISTICAL PARAMETER FOR DESIGN VARIABLES
SEQUOYAH NUCLEAR PLANT

Design Variable	Nominal	Mean	Tolerance	Standard Deviation	Reference
Plate Thickness	1¼"	1.277"	-0.010" +0.063"	0.012"	1,2
	1 3/16	1.212	-0.010 +0.059	0.012	
	1 1/16	1.084	-0.01 +0.053	0.011	
	1	1.02	-0.010 +0.050	0.01	
	3/4	0.768	-0.010 +0.045	0.0092	
	11/16	0.703	-0.010 +0.041	0.0085	
	5/8	0.639	-0.010 +0.038	0.008	
	1/2	0.513	-0.010 +0.035	0.0075	
Plate length & width	ℓ, b	ℓ, b	± 1/4"	0.083"	3
Containment Diameter	1380"	1380"	± 6.9"	2.3"	4
Material Yield	32 ksi	35.2 ksi	-0 ksi	3.8 ksi	5
Material Ultimate	60 ksi	66.0 ksi	-0 ksi +20	7.2 ksi	6

References:

(1) ASTM Standards, 1979, Specification A20, "Standard Specification for General Requirements for Steel Plates for Pressure Vessels", Table I.

(2) Telephone Conversation with Product Specialist - Plate Sales, Bethlehem Steel, stated plate overweights ranged from 3 to 5 percent, on average.

(3) Same as Reference (1), Table 6.

(4) Drawings supplied by TVA.

(5) Galambos, T. V. and Ravinda. M. K., "Properties of Steel for Use in LRFD". Journal of the Structural Division, ASCE, v. 104, No. ST9, Sept. 1978, pp 1459-1468.

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