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DENTON,H.R. Office of Nuclear Reactor Regulation, Director
STOLZ,J.F. Operating Reactors Branch 4

SUBJECT: Forwards test results of Units 1 & 2 control room pressurization test & response to NRC position on operator protection re NUREG-0737,Item III.D.3.4, "Control Room Habitability," per NRC 850415 request.

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June 24, 1985

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. J. F. Stolz, Chief
Operating Reactors Branch No. 4

Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287

Dear Sir:

By letter dated April 15, 1985, the NRC provided to Duke the Staff position with respect to operator protection concerning NUREG-0737 Item III.D.3.4, "Control Room Habitability" for Oconee Nuclear Station. Further, the April 15, 1985 letter requested that Duke submit the test results of the Unit 1 and 2 Control Room Pressurization test that was to be performed shortly after the completion of the Unit 2 Refueling Outage and, in addition, provide a response to the Staff position.

By letter dated May 1, 1985, Duke committed to submit the results of the test for the Staff's evaluation by June 14, 1985. The data from the test is provided for the Staff's review (Attachment 1). Briefly, the best pressurization results was found when the control room pressure was compared to pressure in the North Lobby adjacent to the Control Room. The worst pressurization was found when the control room pressure was compared to pressure in the turbine building.

Attachment 2 provides Duke's response to the NRC Staff's position.

Very truly yours,

H.B. Tucker 1/1

Hal B. Tucker

PFG:slb

Attachments

cc: Dr. J. Nelson Grace, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
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A003
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cc: Mr. J. C. Bryant
NRC Resident Inspector
Oconee Nuclear Station

Ms. Helen Nicolaras
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attachment 1
Duke Power Company
Oconee Nuclear Station
Control Room Habitability
Test Data

Differential Pressure Between Control Room and	OPERATING MODES		
	Booster Fan Single Failure (Min. Value)	Both Booster Fans Operating	Damper Single Failure (Min. Value)
North Lobby (Inches of Water)	+0.09	+0.14	+0.08
South Lobby (Inches of Water)	+0.045	+0.09	+0.07
Turbine Building (Inches of Water)	+0.03	+0.08	+0.05
Cable Room (Inches of Water)	+0.04	+0.09	+0.065

NOTE: One main air handling unit running continuously.

Attachment 2
Duke Power Company
Oconee Nuclear Station
Control Room Habitability
Response to Staff Positions

1.a) Staff Position:

Continue to increase the "leak tightness" of the control room by performing appropriate testing to determine the sources of leakage and sealing them following the planned installation of the proposed "leak tight" dampers. Tightening of the control room should progress with the objective of achieving a pressurization capability of 1/8 inch W.G. with the currently installed "booster system;"

Duke's Response:

The modifications to the Oconee Control Room HVAC system have been completed. These modifications were to correct the inability to pressurize and isolate the Control Room.

Testing of the Unit 1 and Unit 2 Control Room has been performed following the completion of the modifications. The test has shown that the Control Room can be pressurized. The test was conducted with all components of the Control Room HVAC System, including components added as part of the modifications operating as designed. The test was initially performed with both filter trains and booster fans running and all isolation dampers closed.

1.b) Staff Position:

Perform a single failure modes and effects analysis demonstrating the effects of single failures on the aiblity to maintain the positive pressure that would be achieved with no such failures and both booster fans in operation;

Duke's Response:

Testing of the Control Room HVAC System was also performed to determine what affect failure of single components would have on the ability to pressurize the Control Room.

Part of the test was performed with only one of the filter trains and booster fans operating and all other components operating correctly. The Control Room pressure was still positive with respect to the adjacent spaces.

Secondly, a single isolation damper was failed, i.e., locked open but with both filter trains and booster fans operating. The Control Room was still pressurized.

Comparing the single failure testing, it appears the worst case single failure would be the loss of one of the filter trains and booster fans.

1.c) Staff Position:

Perform dose calculations using the leakage characteristics corresponding to a worst case single failure determined in item a) above. The calculation should follow the guidelines established by Standard Review Plan (SRP) Section 6.4 and additional unfiltered infiltration should be assumed in the calculation if the control room cannot be maintained at a pressure greater than or equal to 1.8 inch W.G. with single failure. With respect to damper failure, repair could be credited by using the criteria for valve or damper repair alternative in Section 6.4, Appendix A; and

Duke's Response

The following model was discussed with the NRC Staff prior to submittal.

- Maximum Hypothetical Accident (MHA) - Control Room Operator Dose Model

  The initial post accident containment airborne activity consists of 100 percent core inventory noble gases. Containment source term depletion includes radiological decay and containment leakage. Sources of activity released to the environment are containment bypass leakage and Penetration Room Ventilation Systems' discharges. Assumptions and data are divided into the areas in which they are used.

- Containment Building

  1. Initial source term - 100% noble gases dispersed into containment atmosphere Refs. 1, 7

  2. Containment leak rate - .25% volume per day; 0-1 days
     .125% volume per day; 1-30 days
     Refs. 2, 3

  3. Fraction of containment leak rate which bypasses the Penetration Room and is, therefore, released directly to the environment - .5 Ref. 4

  4. Penetration Room air discharge rate to maintain negative pressure - 1000 cfm Ref. 5

  5. Penetration Room net free volume - 3.16E5 $ft.^3$.

- Dispersion Factor - X/Q

Methods employed in the calculations of the X/Q follow recommendations in "Nuclear Power Plant Control Room Ventilation System Design for Meeting General Criterion 10", 13th AEC Air Cleaning Conference by K. G. Murphy and Dr. K. M. Campe. The applicable equation is found in Section V.B.1.b for a diffuse source - point receptor,

where: $X/Q = [U(\pi G_y G_z + \frac{a}{K+2})]^{-1}$

$k = \frac{3}{(s/2)}^{1.4}$

s = distance between containment surface receptor locations = 7 meters

d = containment diameter = 38 m

a = containment building surface area = 2300 m^2

Specific X/Q values for the various averaging times were determined using meteorlogical data at Oconee for the period March 15, 1970 - March 14, 1972.

Time following MHA	X/Q (sec/m^3)
0-8 hours	8.5E-03
8-24 hours	6.0E-03
1-4 days	4.1E-03
4-30 days	2.15E-03

- Control Room

1. Control Room occupancy factor following a MHA - 0-30 days is 50% (12 hour shifts) Ref. 6

2. Breathing rates are per Regulatory Guide 1.4

3. Credit for beta radiation shielding by special protective clothing and eye protection is assumed. The calculated unprotected skin dose does not exceed the 75 Rem value specified in Standard Review Plan 6.4

4. Control Room net free volume - 8.01E4 $ft.^3$.

The following conservative 30-day Control Room operator dose calculation results are below GDC 19 values:

Whole Body	Skin
3.14 Rem	59.5 Rem

- References

1. NRC conference call from Ted Quay and Helen Nicolaras (NRC) to Paul Guill and Caryl Ingram (Duke Power Company), March 27, 1985.

2. Regulatory Guide 1.4, "Assumptions Used for Evaluating the Potential Radiological Consequences of a Loss of Coolant Accident for Pressurized Water Reactors", Rev. 2, June 1974.

3. Oconee Nuclear Station Technical Specifications, Section 4.4.1.1, July 19, 1974.

4. Oconee Nuclear Station Technical Specifications, Section 4.4.1.1.5, July 19, 1974.

5. Oconee Nuclear Station Final Safety Analysis Report, pg. 9.4-16, 1983 updated version.

6. Proposed Oconee Technical Specification 6.4.3, June 26, 1984.

7. Oconee Nuclear Station Final Analysis Report, Table 15.15-1, 1982 updated version.

1.d) Staff Position:

Proposed appropriate surveillance requirements in accordance with standard technical specifications, as requested in Generic Letter 83-36.

Duke's Response:

Technical Specifications concerning surveillance requirements for Control Room Ventillation Equipment are currently being developed. Duke anticipates that a proposed amendment will be submitted for NRC review and approval by no later than December 1, 1985.