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U. S. Nuclear Regulatory Commission
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PLANT VOGTLE - UNIT 1
NRC DOCKET 50-424
OPERATING LICENSE NPF-68
SPECIAL REPORT 87-002
CONTAINMENT TENDONS STRUCTURAL INTEGRITY

Gentlemen:

Georgia Power Company hereby submits a revision of the January 6, 1988, Special Report concerning the containment tendons. Minor changes were made as Revision 1 to Table 1 to correct errors made by the surveillance contractor in the void calculations. A copy of this submittal is being provided to the NRC Region II office for their information.

Sincerely,

R. P. McDonald

?AH/lm

Enclosure: Special Report 50-424/1987-002, Revision to Table 1

c: Georgia Power Company
Mr. P. D. Rice
Mr. G. Bockhold, Jr.
GO-NORMS

U. S. Nuclear Regulatory Commission
Dr. J. N. Grace, Regional Administrator
Mr. J. B. Hopkins, Licensing Project Manager, NRR (2 copies)
Mr. J. F. Rogge, Senior Resident Inspector-Operations, Vogtle

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Georgia Power

ENCLOSURE

PLANT VOGTLE - UNIT 1
NRC DOCKET 50-424
OPERATING LICENSE NPF-68
SPECIAL REPORT 50-424/1987-002

A. REQUIREMENT FOR REPORT

The Plant Vogtle Unit 1 Technical Specification 4.6.1.6.1, Containment Tendons, requires that the containment tendons' structural integrity shall be demonstrated at the end of 1, 3, and 5 years following the initial containment vessel structural integrity test and at 5-year intervals thereafter.

Technical Specification 3.6.1.6.b. states:

"With any abnormal degradation of the structural integrity other than Action a. at a level below the acceptance criteria of Specification 4.6.1.6, restore the containment to the required level of integrity within 72 hours and perform an engineering evaluation of the containment and provide a Special Report to the Commission within 15 days in accordance with Specification 6.8.2 or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours."

Technical Specification 4.6.1.6.1.e. states:

"Verifying the OPERABILITY of the sheathing filler grease by:

1) No voids in excess of 5% of the net duct volume,

2) Minimum grease coverage exists for the different parts of the anchorage system, and

3) The chemical properties of the filler material are within the tolerance limits as specified by the manufacturer."

Since voids in excess of 5% of the net duct volume were detected during the recent surveillance, a special report is required to be submitted to the NRC in accordance with Technical Specification 3.6.1.6.b and 6.8.2.

ENCLOSURE (Continued)

SPECIAL REPORT 50-424/1987-002

B. DISCUSSION OF THE TENDON SURVEILLANCE AND ITS RESULTS

Technical Specification 4.6.1.6.1.e.1 requires that the operability of the sheathing filler grease be assured by verifying that no voids exist that are in excess of 5% of the net duct volume. In order to assess this void percentage in horizontal tendons, hot grease is pumped in one end of the tendon until grease exits the opposite end. If no grease exits, the pumping operation is transferred to the other end of the tendon. The void is determined in vertical tendons by opening the top grease vent and pumping grease from both ends to force grease from the top vent. If no grease is emitted, hot grease is poured or pumped into the top vent to completely fill the sheathing void. Pumping pressure is limited to 150 psig on vertical tendons and 100 psig on horizontal tendons to prevent sheathing damage.

The void is calculated by taking the total grease added, subtracting the total grease lost, and dividing by the net duct volume.

The surveillance results are shown in Table 1. Horizontal tendons H-149, H-14, H-88, and H-49 exhibited voids in excess of 5%. Tendon H-69 exhibited a void of approximately 5%. The remaining tendons did not exhibit any voids in excess of 5% and are therefore considered acceptable per the requirements of the unit's Technical Specifications.

C. ENGINEERING EVALUATION

The procedure used by the Georgia Power Company Construction Department for installing the tendons assured a high degree of corrosion protection for the tendons. The tendons were handcoated with Visconorust 2090 P-4 as they were pulled into the sheathing. Additionally, the tendons were coated with a temporary corrosion preventive material at the factory. During the greasing procedure, vents were opened to allow the release of air bubbles. Hot grease was pumped until a clear flow of grease was observed exiting the appropriate vent. This process ensured that the tendons received a thorough coating of grease.

Visconorust 2090 P-4, which is manufactured by the Viscosity Oil Company, provides an effective barrier to moisture and air which retard the effect of a corrosive atmosphere. The grease provides a protective film which is not easily penetrated by free water and

which has a reserve alkalinity for long term acid neutralization. The film aids in retarding corrosion introduced by water soluble ions from chlorides, nitrates, and sulfides. (It should be noted that samples of grease taken during the surveillance tests are being tested to determine the reserve alkalinity of the grease. Test results are expected at the end of January, 1988. If the test results are not satisfactory, a supplemental report will be submitted to the NRC).

Results from the first year tendon surveillance revealed voids in excess of 5% for four of the tendons surveyed. There are several factors that could reduce the voids measured to a value less than 5%.

1) The machining tolerance on the wires, trumpets, and other machined components could have increased the void by one percent.

2) Shrinkage of grease during construction may have been higher than 7%. Visconorust 2090 P-4 has a coefficient of expansion of approximately one percent (1%) for every 20 degrees Fahrenheit. Initial filling temperature ranged between 150 and 220 degrees Fahrenheit. Cold weather conditions can cool the filler material and can cause a contraction.

3) The initial filling method may cause air entrapment in the filler material. Pumping operations can introduce air into the filler material which may add up to two percent of the net duct volume. The void value could be higher for horizontal tendons since the pumping head was lower than that used for vertical tendons.

During this surveillance, the end anchorages of these tendons were inspected for corrosion, grease coverage, anchorage cracking, and strand condition. In addition, a strand was removed from a vertical and horizontal tendon. A visual inspection revealed no evidence of active corrosion during these inspections.

Based upon the inspections performed for corrosion, the characteristics of the grease, the construction process used to initially fill the ducts, and dimensional tolerances used in calculating the net duct volumes, it can be concluded that the grease is providing adequate corrosion protection and that no abnormal degradation has occurred due to tendon sheathing grease voids in excess of 5%. The containment integrity has not been adversely affected by this condition.

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TABLE 1

FIRST YEAR SURVEILLANCE TENDONS

TENDON NO.	VOLUME OF GREASE ADDED	VOLUME OF GREASE LOST	NET VOLUME OF GREASE ADDED	
			GALLONS	% OF NET DUCT VOLUME
H-149	30.0	6.50	23.50	6.4%
H-14	36.0	13.0	23.00	6.1%
H-88	29.75	9.25	20.50	5.5%
H-49	43.25	20.25	23.00	6.0%
H-83	15.75	3.25	12.50	3.4%
H-45	32.15	13.00	19.15	5.1%
H-69	30.63	11.75	18.88	5.0%
H-126	23.75	12.25	11.50	3.1%
H-151	24.50	14.00	10.50	2.9%
H-139	20.25	7.50	12.75	3.4%
V42-144	11.75	5.50	6.25	1.1%
V58-128	104.75	105.5	-0.75	-0.12%
V4-108	6.0	8.75	-2.75	-0.47%
V18-94	8.0	8.25	-0.25	-0.04%