WOLF CREEK
NUCLEAR OPERATING CORPORATION

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July 29, 1994

WO 94-0100

U. S. Nuclear Regulatory Commission
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Washington, D. C. 20555

Subject: Docket No. 50-482: Special Report 94-002 on Containment Tendon Surveillance Deficiencies

Gentlemen:

The attached Special Report is being submitted in accordance with Technical Specifications 3.6.1.6 and 6.9.2 concerning two Containment Tendon Surveillance deficiencies.

Very truly yours,

Otto L. Maynard

OLM/jad

Attachment

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Special Report 94-002
Containment Tendon Surveillance Deficiencies

During the performance of the Wolf Creek Generating Station (WCGS) tenth year Containment Tendon Surveillance, two instances of sheathing filler grease voids in excess of 5 percent were found. These deficiencies are the subject of this Special Report which is being submitted pursuant to the requirements of WCGS Technical Specifications 3.6.1.6 and 6.9.2.

WCGS Technical Specification 4.6.1.6.1 requires that the structural integrity of the containment vessel prestressing tendons 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. This is accomplished through performance of Surveillance test procedure STS MT-044, "Containment Tendon Inspection," and approved vendor work instructions. Work Request 50971-94 implemented the tenth year inspection and the Shift Supervisor gave permission to begin work on June 6, 1994. The inspection sample included 3 vertical and 3 horizontal tendons.

The Surveillance involves removing grease cans from the tendon ends, performing various tests and inspections including examination of the grease, and refilling the tendon ducts with grease. The grease cans are then replaced and grease is pumped into each duct until grease exits the grease can opposite the injection end for horizontal tendons or the dome vents for the vertical tendons. Technical Specification Surveillance Requirement 4.6.1.6.1.d.2 stipulates that the amount of grease replaced cannot exceed 5 percent of the net duct volume when injected at a specified pressure.

Contrary to the above requirement, the net refill volumes of the sheathing filler material exceeded 5 percent of the net duct volume for two tendons:

Tendon No.	Percent of Net Grease Added	Reference Work Request No.
V39	11.4	03663-94
25CB	11.6	03788-94

These were reported to the Control Room on July 1 and July 8, 1994, respectively. An engineering evaluation of the containment, Configuration Change Package 05222, was performed in accordance with Technical Specification 3.6.1.6 Action Statement "b." That evaluation determined that the presence of voids may be attributable to a number of factors:

1. Visconorust 2090P-4 (filler material used in the tendon) has a coefficient of expansion which yields a contraction of about 1 percent per every 20°F. Initial filling temperatures of the filler material averaged 160°F. Cold weather conditions can cool the filler material to 40°F, giving a contraction of 6 percent of the net duct volume. During the tenth year inservice tendon surveillance, the temperature of filler material averaged 90°F (estimated) giving a contraction of 3 to 4 percent.

2. Voids between the wires that comprise the tendon bundle and in other areas, such as where wires are in contact with the sheathing, may yield about 7 percent, or greater, of the net duct volume.

3. Characteristics of the initial filling method may induce air entrapment into the filler material. Pumping operations can introduce air into filler material and may add up to as much as 2 percent of the net duct volume.

In summary, even under optimum filling conditions, voids ranging from 12-15 percent could be expected after the initial filling operation.

The original greasing of the tendons required that clean, clear grease exit the grease can opposite the grease injection end for horizontal tendons and the dome vents for the vertical tendons. This greasing technique coated each tendon wire with grease. The subject grease, Visconorust 2090P-4, has an affinity for steel; once applied it will not come off under normal circumstances without cleaning with a solvent. In addition, prevention of tendon corrosion is assured by individually pre-coating each wire with Amber 1601 prior to installation, and by coating the tendon anchorage components with Visconorust 2090P-4.

Preliminary surveillance inspection and test results indicate the following:

1. Visual examination of the filler material has shown virtually no change in the physical appearance of the grease, including no presence of free water.

2. Visual inspection of the different components of the anchorage system revealed proper coverage by the filler material with no signs of corrosion or moisture.

3. Visual examination of the containment's external surface revealed no cracking, spalling or grease leakage for the subject tendon.

The voids found during the surveillance, though not conforming to the WCGS Technical Specification, are consistent with what may be expected. As indicated above, the function of the filler material in protecting the post-tensioning system is being maintained. The final acceptability of the post-tensioning system will be based on an engineering evaluation of all the tendon surveillance inspection and test results including tests for chemical properties of the filler material. However, the presence of voids of the extent found is not considered a sign of degradation and has not impaired the containment structural integrity. The tendons and the containment remained capable of performing their design function. Additionally, the voids were filled by the additional grease pumped into the tendon ducts thereby correcting the non-conforming condition.