



June 30, 2008

U. S. Nuclear Regulatory Commission  
Washington, DC 20555**ATTENTION:** Document Control Desk**SUBJECT:** Calvert Cliffs Nuclear Power Plant  
Unit No. 1; Docket No. 50-317  
Containment Tendon Surveillance - 30-Day Report

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In accordance with Technical Specification 5.6.8, Calvert Cliffs Nuclear Power Plant (CCNPP) is submitting a report of abnormal degradation of the containment structure detected during performance of the periodic tendon surveillance. This report is required within 30 days of discovery of the degradation. The tendon surveillance for Unit 1 post-tensioning containment structure, required by Technical Specification 5.5.6, is currently ongoing. This report documents abnormal degradations detected to date during performance of the tendon surveillance. The first reportable abnormal degradation of the surveillance was detected on May 30, 2008.

### **BACKGROUND**

The CCNPP post-tensioning system consists of:

1. Three groups of 68 dome tendons oriented at 60 degrees to each other for a total of 204 tendons anchored at the vertical face of the dome ring girder.
2. Two-hundred-four vertical tendons anchored at the top surface of the ring girder and at the bottom of the base slab.
3. Six groups of 78 hoop tendons, each enclosing 120 degrees of arc, for a total of 468 hoop tendons anchored at the 6 vertical buttresses.

Each tendon consists of 90 high-strength steel wires 1/4-inch in diameter with stressing washers and buttonheads on each end of the wires.

### **INSPECTION PROCEDURE**

In accordance with Technical Specification 5.5.6 the tendon surveillance program for the containment post-tensioning system consists of the following:

- a. Determining that for a representative sample of at least nine tendons (three dome, three vertical, and three hoop), each tendon has a normalized lift-off force equaling or exceeding its lower limit expected range for the time of the test. If the normalized lift-off force of any one tendon in a

group lies between the lower limit expected range and the lower bound individual, an adjacent tendon on each side shall be checked for lift-off force. If both of these tendons are found acceptable, the surveillance program may proceed considering the single deficiency as unique and acceptable. If either of the adjacent tendons is found unacceptable, it shall be considered as evidence of possible abnormal degradation of the containment structure. In addition, more than one unacceptable tendon out of those selected for surveillance (from all three tendon groups) shall be considered as evidence of possible abnormal degradation of the containment structure.

If the normalized lift-off force of any single tendon lies below the lower bound individual, the occurrence should be considered as evidence of possible abnormal degradation of the containment structure.

In addition, determining that the average of the normalized lift-off forces for each sample population (hoop, vertical, dome) is equal to or greater than the required average prestress level; 536 kips for hoop tendons, 622 kips for vertical tendons, and 555 kips for dome tendons. If the average is below the required average prestress force, it shall be considered as evidence of possible abnormal degradation of the containment structure.

- b. Removing one wire from each of a dome, vertical, and hoop tendon checked for lift-off force, and determining over the entire length of the wire:
  1. The extent of corrosion, cracks, or other damage. The presence of abnormal corrosion, cracks, or other damage shall be considered evidence of possible abnormal degradation of the containment structure.
  2. A minimum tensile strength value of 240 ksi (guaranteed ultimate strength of the tendon material) for at least three wire samples (one from each end and one at mid-length) cut from each removed wire. Failure of any one of the wire samples to meet the minimum tensile strength test is evidence of possible abnormal degradation of the containment structure.
- c. Perform a chemical analysis to detect changes in the chemical properties of the sheath filler grease. Report any unusual changes in physical appearance or chemical properties that could adversely affect the ability of the filler grease to adhere to the tendon wires or otherwise inhibit corrosion.
- d. The structural integrity of the end anchorages and adjacent concrete surfaces is demonstrated by determining through inspection of a representative sample of tendons that no apparent changes have occurred in the visual appearance of the end anchorages or their adjacent concrete exterior surfaces.

#### **REPORTABLE ABNORMAL DEGRADATIONS**

During the performance of the tendon surveillance, conditions which may represent abnormal degradation of the containment structure were found for two hoop tendons. These tendons were found to have lift-off forces lower than the lower limit expected lift-off range at the time of the test.

Hoop Tendon 24H67 exhibited a lift-off force of 590.24 kips as opposed to its lower limit expected value of 605.1 kips. Adjacent tendons 24H66 and 24H68 were tested and were also found to be below the acceptable lift-off measurements of 605.1 kips. Adjacent tendon testing continued and acceptable lift-off values were found on tendons 24H63 and 24H69. After 24H63 and 24H69 were found acceptable, all

intermediate tendons were re-tensioned to acceptable values above the predicted (100%) value at the time of the test.

Additionally, hoop tendon 24H30 also exhibited a lift-off force of 560.29 kips as opposed to the lower limit expected value of 605.1 kips. Adjacent tendon 24H29 was tested and found acceptable. Due to interference, hoop tendon 24H31 was visually inspected and tendons 24H32 and 24H33 were inaccessible. Tendon 24H34 was tested and found to be below 605.1 kips as was 24H35. Tendon 24H36 was found to be above 605.1 kips (actually 678.9 kips) and acceptable. After acceptable adjacent lift-offs were found, all accessible intermediate tendons were re-tensioned to acceptable values above the predicted (100%) value at the time of the test.

No signs of abnormal degradation of the end anchorage or adjacent concrete surface of the Containment have been found in any of these areas. No water was found, nor broken/missing wires that had not been previously noted.

**CORRECTIVE ACTIONS**

All corrective actions have been completed by restoring lift-off forces to a level above the predicted value at the time of the test. Acceptable lift-off force levels have been found in tendons beyond the low-force tendons and these instances are considered isolated. Despite the lift-off force levels being lower than expected they have all been above the design basis accident load for each tendon, therefore, the Containment remains Operable.

Should you have questions regarding this matter, please contact Mr. Jay S. Gaines at (410) 495-5219.

Very truly yours,



Mark D. Flaherty  
Manager – Engineering Services

MDF/PSF/bjd

cc: D. V. Pickett, NRC  
S. J. Collins, NRC

Resident Inspector, NRC  
S. Gray, DNR