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COMMENTS BY J. M. VARELA ON THE CONTAINMENT DOME REPORT SUBMITTED BY FLORIDA POWER AND LIGHT COMPANY (TURKEY POINT UNIT NO. 3), LICENSE NO. CPPR-27, DOCKET NO. 50-250

1. Page 3-6, paragraph 3, states, "Elevations at the dome apex were measured before placement of concrete; after completion of dome tendon post-tensioning; and after completion of dome tendon detensioning. The dome apex moved downward 1-3/8" ± 1/8" as a result of dome tendon post-tensioning and concrete dead load, shrinkage, creep and temperature changes. The apex moved upward 7/8" ± 1/8" as a result of detensioning dome tendons, creep recovery, and temperature changes. As expected, the upward movement of 7/8" was closest to 2/3" of movement predicted by calculations which assumed material elasticity and did not consider the effect of delaminations. Further, the small movements confirm that the effective prestress should be as measured within the range expected."

   Comments by the Inspector

   Good engineering practices require that loads be predetermined and calculated precisely and moreover methods of analysis on prestressed post-tensioned reactor containment structures are more refined than those used in everyday concrete technology. For example, the many parameters factored into the design of a containment building are calculated in four decimal places (0.0001") or as in creep, to millionths. The inspector considers that the measurements stated in the FP&L report reflect on the integrity of the dome, and the lack of precision in making these measurements are, therefore, of concern to the inspector. (Tolerances noted are ±1/8".) The above measurements could have been made with the proper equipments to ±5 mils.

2. Page 3-7, paragraph 3.5, "Dome Removal," discusses the concrete removal from the dome.

   Comments by the Inspector

   The paragraph in question does not make reference to the problems encountered, i.e., the extensive damage to tendon sheaths, tendon wires, sheath bleed lines, concrete in tendon sheaths, cut and damaged reinforcing steel, etc.

3. Page 6-3, paragraph 6.4(3), "Repair of Reinforcing Steel, Tendons, and Sheathing," states, "An inspection window shall be opened in the sheathing for tendon inspection when the following conditions are found:

"1. A hole in the lower half of the sheathing exceeding 3/8 inch in diameter.

"2. A hole in the upper half of the sheathing exceeding 3/8 inch in diameter.

"3. A cut sheath where it is apparent that the cutting edge of the coring barrel entered the lower half of the sheathing.

"The window shall be at least 2" x 2" in size and sealed by a patch after inspection."

Comments by the Inspector

As mentioned in CO Report No. 50-250/70-8, the inspector observed many punctures (perhaps 30 or more) in the sheathing which were made by the 60-pound jackhammer (1-1/4-inch-diameter peg point steels), resulting in some visible damage to wires, which incidently are in the same hardness range (50 Rockwell C) as the peg point steels. Concrete pieces, chips, and fines were observed in some of the holes. The inspector observed that the holes were unprotected until the day after he was observed probing a concrete-filled hole with a pencil. Water of a questionable quality used for core drilling had entered the sheathing that was cut by the coring barrel. This water may have a deleterious effect on the tendons. Mr. Ben Gerwick, Bechtel consultant, on reactor structures, states, "Lastly, extreme care must be taken to prevent debris and mortar from accidently entering the tendon sheaths."

4. Page 6-4, paragraph 6.4(4), allows for the loss of 99 wires.

Comments by the Inspector

This meets with the original design factors; but, in view of the lack of criteria for wire acceptance and/or rejection, this proposal is considered to be inadequate.

5. Page 6-4, paragraph 6.4(5), states, "For any hole greater than 3/4 inch, the tendon shall be examined and the foreign material removed."

Comments by the Inspector

All the dome tendons are positioned in a "downhill" manner so that with the vibration resulting from the jackhammering, the concrete particles migrated downward from the point of entrance. The report does not discuss the procedure for removing foreign material that may have migrated some distance from the point of entry.

6. Page 6-6, second paragraph, states, "The aggregate used for the original concrete is no longer available, and the replaced concrete will use a new aggregate source. The new aggregate is essentially the same as the old aggregate. Both aggregates are mined from Oolite limestone and previous tests have verified the similarity."

Comments by the Inspector

The creep and thermal property tests of the substitute aggregate has not been completed and, therefore, a proper comparison cannot be performed.

Varela

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