J. P. O'Reilly
J. B. Henderson

RE: DRS ALTERNATIVE INSPECTION AND TEST PROGRAMS - TURKEY POINT DOME REPAIR

Maccary dropped these off on his way to Oregon and will not be available for the next several days. I understand they are the latest revisions of the DRS alternative inspection and test programs for the Turkey Point dome repair. You will note that the number of tendons to be removed in alternative 2 has not yet been determined. I believe we should discuss the revised alternatives before the meeting with the applicant.

Enclosure:
DRS - Proposed Inspection and test programs - Turkey Point

R. H. Engelken

2/17/71

OFFICE ▶	GO					
SURNAME ▶	RHEngelken					
DATE ▶	2/17/71					

2/15/71

Proposed Inspection and Test Programs
Turkey Point Containment

Alternative 1

(a) Tendon Replacement Program (Containment Dome Repair Area)

Remove all tendons whose sheaths have been punctured during concrete removal.

Perform a detailed examination of all wires and replace those wires which do not meet the tendon wire specification acceptance standards.

Re-install tendons in repaired sheaths, replace protective grease, and re-tension tendons.

(b) Proof-test and Inspection Program

Perform a proof test at 1.15 Design Pressure following completion of dome repairs.

Conduct visual examination (and record observations) of the repaired dome during and after the test, for any evidence of structural distress and crack patterns including sounding over entire dome repair areas to detect any concrete delamination. Establish acceptance criteria for this test.

(c) Inservice Surveillance Program (Containment Dome)

Install permanent structural provisions to facilitate access to the dome area for the purpose of inservice inspections.

Conduct visual examinations (as specified in (b) above) in accordance with the following schedule:

6 mo., 12 mo., and 36 mo. after initial start of plant operation.

Record observations and compare with results observed during the inspection performed in (b) above.

Dupe of ~~830490111~~

(d) Tendon Lift-off Tests

Perform tendon lift-off test in accordance with the "Tendon Sampling Procedure - Plan A", to monitor loss of prestress. These tests are to be conducted 36 months after initial start of plant operation.

(e) Tendon Wire Surveillance

Select and remove the following number of stressed tendon wires from each of the tendon groups, to detect evidence of corrosion:

Dome Tendons	- One from each of the 3 families of tendons,
Vertical Tendons	- One from each 120° sector,
Horizontal Tendons	- One from the lower third, upper third, and mid-height of shell,

Examine removed wires for visible evidence of corrosion, and perform tensile tests on three samples cut from each wire (one at each end, and one at mid-length) of a maximum length practical for testing.

Record results for evaluation purposes.

This test is to be performed after 36 months following initial start of plant operation.

(f) Submit, to the Commission, a detailed report of test results and inspections, following the 36 month tests and inspections, for the purpose of review and revision of the test and inspection programs.

Alternative 2

(a) Repair Program (Containment Dome Repair Area)

Replace (where feasible) significantly damaged wires in tendons whose sheaths have been punctured during concrete removal, and partially removed (or opened) for examination of wires in place.

Select and remove a sample of tendons with the larger number of observed defects in wires which have not been replaced. Examine individual wires of removed tendons and compare the actual number of wire defects with those observed with tendon in place.

The same acceptance criteria shall apply to the examination performed in place, and upon removal of tendon. If removed sample tendons fail to meet acceptance criteria, repeat examination from another sample of tendons. Replace defective tendon wires. Re-install tendons in repaired (or replaced sections of) sheaths, replace protective grease, and re-tension all tendons.

(b) Proof-test and Inspection Program

Same as Alternative 1

(c) Inservice Surveillance Program

Same as Alternative 1

(d) Tendon Lift-off Tests

Same as Alternative 1 except that the test schedule for the dome tendons is revised as follows:

6 mo., 12 mo., 36 mo., after initial start of plant operation.

(e) Tendon Wire Surveillance

Same as Alternative 1 except that the schedule for examining dome tendon wires is revised as follows:

12 mo., 36 mo., after initial start of plant operation.

(f) Submit, to the Commission, a detailed report of test results and inspections performed, following the 6 months, 12 months and 36 months test programs, for evaluation of the need to revise the test programs and tendon sampling procedures.

Tendon Sampling Procedure

Plan A - For 1st - 3 Years of Service

(a) Select the following number and location of tendons for the purpose of lift-off testing:

1) 12 dome tendons; each 4 located in different 120° sectors (i.e., three families of tendons) and distributed to provide representative sampling.

2) 20 vertical tendons; uniformly distributed around the shell circumference.

3) 33 hoop tendons; each 11 located in different 120° sectors, and distributed at different elevations to provide representative sampling.

(b) Measure the life-off forces (F_{st}) among each group of tendon samples of (a) above and calculate the effective prestress loss (F_{sl}) by substracting the measured value from the value at initial tensioning (F_{si}). Normalize the calculated loss to the nominal value (F_{sn}), established at time of initial tensioning.

(c) Apply the following acceptability criteria:

Criterion I - Tendons with not greater than 15% decrease in prestress force are "effectives".

Criterion II - Tendons with greater than 15% decrease in prestress force are "defectives".

Criterion III - Tendons with greater than 25% decrease in prestress force are unacceptable.

Sampling Test Acceptability Criteria

Dome Tendons

1st sampling - 12 tendons

a) If all tendons meet Criterion I, the test is acceptable.

b) If 1 tendon fails to meet Criterion II, take a 2nd sampling.

c) If 2 or more tendons fail to meet Criterion II, the test is unacceptable.

2nd sampling - 12 tendons

a) If all tendons meet Criterion I, the test is acceptable.

b) If the sum of the number of tendons which fail to meet Criterion II in 1st and 2nd samples, is 2 or larger, the test is unacceptable.

Vertical Tendons

1st Sampling - 20 tendons

a) If all tendons meet Criterion I, the test is acceptable.

b) If 1 tendons fail to meet Criterion II, take a 2nd s pling.

c) If 3 or more tendons fail to meet Criterion II, the test is unacceptable.

2nd Sampling - 20 tendons

a) If the sum of the number of tendons which fail to meet Criterion II in the 1st and 2nd samples is not greater than 3, the test is acceptable.

b) If the sum of the number of tendons which fail to meet Criterion II in 1st and 2nd samples is 4 or larger, the test is unacceptable.

Hoop Tendons

1st Sampling - 32 tendons

a) If not more than 2 tendons fail to meet Criterion II, the test is acceptable.

b) If 3 or 4 tendons fail to meet Criterion II, take a 2nd sampling.

c) If 5 or more tendons fail to meet Criterion II, the test is unacceptable.

2nd Sampling - 32 tendons

a) If the sum of the number of tendons which fail to meet Criterion II in the 1st and 2nd samples is not greater than 6, the test is acceptable.

b) If the sum of the number of tendons which fail to meet Criterion II in the 1st & 2nd samples is 7 or larger, the test is unacceptable.

In the event any test of the dome, vertical, or hoop tendons reveals a tendon which fails to meet Criterion III, or the test is unacceptable as determined by the sampling test acceptability criteria above, submit the results of all tests and an evaluation of the data to the Commission for review and revision of the tendon sampling procedure.