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THRU: A. Schwencer, Chief, PWR Branch 4, DRL

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TELECON BETWEEN DRL, DRS, CO, B&W AND DUKE POWER COMPANY CONCERNING  
INVESTIGATION, EVALUATION AND CORRECTION OF PROBLEMS ON OCONEE

A. Field Inspection

1. B&W reported that its field inspection is 90% complete and no new damage has been found.
2. The next step is to remove the thermal shield, examine the dowel pins, bolt torques, spacers and pads, and flange between core barrel and shield. All parts removed will be indexed for orientation and removed in accordance with written procedures. Photos will also be taken. This work will start next week with the actual shield lift being made about Thursday.
3. Primary pumps appeared to be in good condition based on a visual in-place examination performed by crawling through the pipes. A thermocouple wire is all that was found in one of the pumps.
4. Investigation has accounted for most of the mass. The equivalent of 1 1/2 stub tubes (2 pounds) is still unaccounted for. Inconel flakes were beaten down in steam generator tube sheets and could account for some of the missing mass. The high pressure injection line was inspected and found to be clean; the let down line had some fine deposits but no pieces. The low pressure injection line has not been inspected yet.
5. Dye-penetrant checks have revealed nothing new.

B. Failure Mode Investigation

1. Pieces removed from Oconee were taken to Alliance for examination. Evidence points toward high cycle fatigue failure. There is definite striation due to 50 cycles per second or greater fatigue. B&W has duplicated the inconel failure on rods in 200°F water with the results being similar in appearance to the tube failures at Oconee.
2. The crack initiation site on the stub tubes was on the high weld side (within 90°) and within an inch above the weld. It was possible to match up some of the broken tubes with their original positions.

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3. B&W is going to test a welded mockup of the stub tubes to evaluate whether cold straightening of the Ocone tubes after stress relieving could have produced significant strain.

C. Hydraulic Studies

1. The 1/6 scale model data was reexamined and proposals for additional tests are expected to be developed by April 17.
2. Processing of the flow data from Ocone has not been completed.
3. A 3 dimensional map of pressure and flow from inlet nozzle to core internals is in process and will be used to look for local high velocity sites. There is evidence of circumferential flow variations coming down into the vessel.

D. Vibration Testing at Barberton

1. Nearly all of the vibration data from Ocone has been analyzed. A comparison of the data obtained before and after discovery of the problem has been made. Data indicates that on February 28 something may have loosened up and on March 3 impact on core support structure was indicated by all four accelerometers.
2. Alliance tests show that the accelerometer tube could have failed by pure fatigue.
3. Barberton vibration tests on the SMUD internals show an order 3 mode shape at 48 cycles/sec., order 4 at 69 cycles/sec. and order 5 at 93 cycles/sec. This is consistent with 45 cycles/sec. order 3 mode measured at Ocone. The order 3 mode could be due to flexibility in the pad spacer blocks (nine in all). The natural frequency measured for the instrument guide tubes was 80 to 250 cycles/sec.
4. The accelerometer recordings show random spikes (off scale) indicating impact in both the radial and vertical directions.
5. Ocone data will be compared with the Barberton data and an attempt will be made to force the same bell modes at Barberton.
6. B&W indicated that the thermal shield supports both top and bottom may have to be redesigned.
7. They acknowledged also that the vibration monitoring program will have to be revised.

E. Fabrication Process

1. A review of the fabrication process and the chemistry history of the vessel and its internals revealed nothing unusual. The cold straightening of the stub tubes after heat treatment will be studied further as noted above.

F. Steam Generator Repair

1. Procedures have been written and approved.
2. Work started (April 4, 1972) on S.G.A but some of the tools were delayed arriving at the site.
3. No work has been done on the tubes in the A generator yet but smoothing up the head has proceeded well and dye-penetrant checks on the head have been completed.
4. Dye-checking in B generator tubes and some grinding has been completed. About 5000 tubes have been done. Progress is very good. No welding has started but will begin near the end of the week of April 17.

People participating in this conference call were:

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