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SUBJECT: LER 79-028/03L-0: on 790823, unit shut down for repairs to boron dilution & instrument root valves which were leaking, Caused by bonnet seal ring degradation due to boric acid exposure. Instrument root valve repacked

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DUKE POWER COMPANY
Oconee Unit 1

Report Number: RO-269/79-28

Report Date: October 5, 1979

Occurrence Date: August 23, 1979

Facility: Oconee Unit 1, Seneca, South Carolina

Identification of Occurrence: Unidentified RCS Leakage in Excess of 1.0 GPM

Conditions Prior to Occurrence: 98% Full Power

Description of Occurrence:

On August 23, 1979, Oconee 1 reactor coolant system (RCS) leakage calculations indicated a leakage rate of 1.08 gpm. The leakage was determined to be due to bonnet seal ring leakage from valve LP-103, the boron dilution valve, which had been observed to be leaking slightly during a Reactor Building survey the previous day. Pursuant to Oconee Nuclear Station Technical Specification 3.1.6.5, an evaluation of the leakage was performed, and it was determined that continued operation of the unit was safe in light of the nature of the leakage. On August 25, 1979, the leakage rate increased to approximately 4 gpm, with most of the leakage entering the drain funnel located near the quench tank. This drain collects RCS hot leg B instrument root valve packing leakoff. On August 27, the leakage had increased to approximately 6 gpm, and the unit was shut down by 2310 on that day. An attempt was made to stop the leakage from valve LP-103 on August 28 while the unit was at hot shutdown, but it could not be totally eliminated. The unit was placed in cold shutdown on August 29, 1979, and an inspection of the Reactor Building revealed that the leakage was primarily due to packing leakoff from a RCS hot leg B test pressure instrument root valve. Minor packing leakage from several other valves was also noted. The leaking valves were repacked, and startup operations were initiated on September 2, 1979. However, startup was terminated on September 3, 1979, due to reactor vessel head flange leakage (see Reportable Occurrence Report RO-269/79-29). During the period the unit was shutdown, valve LP-103 was disassembled and repaired. The unit returned to power on September 20, 1979.

Apparent Cause of Occurrence:

The RCS leakage was primarily due to packing leakoff from an instrument root valve. The leakage from valve LP-103 apparently resulted from degradation of the valve's retaining ring due to exposure to boric acid. The degraded retaining ring failed to allow a tight seal.

Analysis of Occurrence:

Prompt investigation of unidentified RCS leakage is required in order to assure that a small leak is not the result of a slight materials failure which could develop into a more serious problem. The leakage was initially determined to be from valve LP-103, and an evaluation indicated that the unit could continue at power operation. The leakage rate subsequently increased due to instrument root valve leakoff, and when it reached 6 gpm the decision was made to shut down the unit and make repairs. The leakage from valve LP-103

had no effect on the ability of the valve to function properly. In addition, the total leakage rate was small with respect to normal makeup capabilities. However, the leakage resulted in a shutdown required by a limiting condition for operation, and must therefore be reported pursuant to Technical Specification 6.6.2.1.b(2), although it is considered to be of no significance with respect to safe operation and the health and safety of the public were not affected.

Corrective Action:

The unit was shut down, and the instrument root valve and other valves which exhibited packing leakoff were repacked. When the maintenance outage was extended, valve LP-103 was disassembled and the retaining ring was replaced. The valve was cycled several times to verify its operability. No leakage from these valves was observed during the subsequent RCS pressurization. Boron dilution valves LP-103 and LP-104 for each unit will be added to the periodic maintenance program to assure that a proper bonnet seal exists.

