



Description of Event

With Unit 2 in Mode 1 and Unit 1 in Mode 5, a Service Water Supply Header to the Charging Pump Lube Oil coolers and Air Compressors for both units was isolated to repair pinhole leaks on the following occasions:

February 1, 1983 - "B" Service Water Supply Header  
(line 4"-WS-47-151-Q3)

February 8, 1983 - "B" Service Water Supply Header  
(line 3"-WS-74-151-Q3)

The redundant Service Water Supply Header to the Charging Pump Lube Oil Coolers and Air Compressors remained in service while the opposite header was isolated. These events are contrary to T.S. 3.7.4.1 and reportable pursuant to T.S. 6.9.1.9.b.

Similar events have been reported by LER's 338/81-024, 81-046, 81-071, 82-006, 82-081 339/83-014.

Probable Consequences of Occurrence

The integrity of the Service Water Piping was not jeopardized by these pinhole leaks as the failure mechanism is localized corrosion and not generalized thinning of the pipe wall. Since the leak did not affect the operability of the system, the system operability was only affected when each header was isolated to repair the leak on the two separate occasions.

The redundant Service Water Loop was operable throughout the repair work and the affected loop was returned to service well within the 72 hour action statement on both occasions; therefore, the health and safety of the general public were not affected.

Cause of Event

A study has been completed by Lehigh University to determine the cause of the pin holes occurring on service water piping. This study indicated that the corrosion was caused by a combination of "aggressive water" and bacterial reduction of the mild steel piping.

The biological investigation provided positive indication of three types of bacteria in service water which cause corrosion. These are sulfate reducers (sulfide producers), ensheathed iron bacteria and filamentous iron bacteria. The study indicated that a significant portion of the corrosion present is attributed to this bacteria.

Immediate Corrective Action

On each occasion, the affected piping was cut out and a new section was welded into place using approved procedures. The replaced welds were inspected by liquid penetrant examinations and hydrostatically tested prior to returning the header to service.

Scheduled Corrective Action

Further chemical treatments are scheduled to provide corrosion inhibition against further degradation of the service water system. Plans are now being formulated to arrest further degradation of the system and restore or replace damaged material. Meanwhile, it is felt that no gross failures will occur since failures of this nature produce small pinhole leaks which are randomly located in the piping.

Action Taken To Prevent Recurrence

A chemical treatment program has commenced based on recommendations made by the consultants to inhibit further corrosion of the Service Water System.

Generic Implications

Similar events have been reported previously. This failure is generic to both units at North Anna Power Station.