

CP&L

Carolina Power & Light Company

Brunswick Steam Electric Plant
P. O. Box 10429
Southport, NC 28461

April 30, 1981



FILE: B09-13516.2
SERIAL: BSEP/81-0901

Mr. James P. O'Reilly, Director
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, Suite 3100
Atlanta, GA 30303

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NO. 1
LICENSE NO. DPR-71
DOCKET NO. 50-325
SPECIAL REPORT ON THE LOSS OF SHUTDOWN COOLING

Dear Mr. O'Reilly:

This special report is submitted to provide preliminary information on the temporary loss of shutdown cooling at the Brunswick Steam Electric Plant, Unit No. 1 on April 25, 1981. This event will be reported under LER 1-81-32.

During a special inspection on April 19, 1981, of the 1B RHR heat exchanger, as committed to in LER 2-80-30, it was found that the baffle plate was displaced approximately 9 inches at the bottom, creating a service water flow path from the inlet to the outlet bypassing the tubes. This baffle plate is welded to the tube sheet at the top, welded to the channel assembly on both sides, and fits into a groove in the channel cover at the bottom. The pass rib is 1" thick x 44-3/4" high x 54-1/2" wide and is made of SB-402, alloy #715, (70-30 Cu Ni) material.

During the repair of the 1B RHR heat exchanger, a loss of cooling was experienced immediately following the starting of a second RHR service water pump on the 1A RHR heat exchanger. An alternate shutdown cooling path was established using the RHR System, the Fuel Pool Cooling System, and the Core Spray System. This lineup was later modified to delete the Core Spray System. Vessel temperature never reached or exceeded 212°F. To restore a normal shutdown cooling lineup as expeditiously as possible, temporary repairs were effected on the 1A heat exchanger and it was restored to service while permanent repairs were still in progress on the 1B heat exchanger. The baffle plate on the 1A heat exchanger was also found to be displaced at the bottom. Permanent repairs for the 1A heat exchanger will follow the completion of work and the return to service of the 1B heat exchanger.

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April 30, 1981

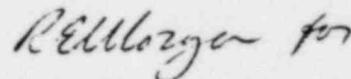
The apparent cause of damage to the heat exchanger baffles is loadings in excess of their design capability. It is unclear at this time as to whether the loadings resulted from a water hammer transient or other mechanism as no water hammer event could be recalled. A review of the heat exchanger baffle design by General Electric, as a result of the Unit No. 2 failure reported in LER 2-80-30, identified no problems. While sea shells were found inside both heat exchangers, the amounts were not unusual compared to other inspections. Investigations are in progress into the necessary design requirements for the baffle the operation and maintenance of the system, and the possible impact of the shells found.

A program is being pursued to monitor heat exchanger performance. It will consist of using available temperature, flow and differential pressure instrumentation to determine the heat transfer rates and the amount of flow that may be bypassing the tubes. This will help predict baffle plate degradation. Periodic Test 8.1.4 is currently being performed quarterly which verifies heat exchanger flow.

In researching an alternate shutdown cooling lineup, it was decided to reject from the vessel with the RHR System through the fuel pool coolers and to the condensate storage tank (CST). To return water to the vessel, the Core Spray System would take a suction from the CST and provide makeup to the vessel at a throttled flow of approximately 500 gpm for level control. Using the Control Rod Drive System for vessel return was considered, however, it was felt that the low flow rate of this system would not provide sufficient cooling and mixing to maintain reactor temperature below a desirable level.

An inspection of the sensitive portions of the core spray lines and their supports revealed no physical damage. Testing and/or inspections are being performed on the core spray pump and the valve used to throttle to ensure that they have not been degraded. Their full operability will be assured prior to returning Unit No. 1 to power.

Very truly yours,



C. R. Dietz, General Manager
Brunswick Steam Electric Plant

RMP/mew

cc: Mr. E. A. Harfield
Mr. V. Stello ✓