



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

December 30, 1987

MEMORANDUM FOR: Denwood F. Ross, Deputy Director for Research
Office of Nuclear Regulatory Research

FROM: Malcolm L. Ernst, Deputy Regional Administrator

SUBJECT: CRGR MEETING ISSUE

Enclosed, per your request of December 29, is information on AFW check valves for Farley, McGuire, and Catawba. Also, information on Harris is provided. Please advise, if you need more.

(Signed by M. L. Ernst)

Malcolm L. Ernst

Enclosure:
Info on AFW Check Valves
for Farley, McGuire, Catawba
and Harris

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ENCLOSURE

CATAWBA UNITS

IEB 85-01 - Steam Binding of Auxiliary Feedwater Pumps (Units 1 and 2) (92703)

The licensee responded to this bulletin by correspondence dated February 25, 1986. Procedures were developed to monitor fluid conditions in the auxiliary feedwater piping once per day using a hand held pyrometer. This procedure (OP/1(2)/A/6250/02) also included information to recognize steam binding and to restore the system to operable status. Hardware modifications have been made to the auxiliary feedwater system to install thermocouples that provide temperature instrumentation with alarm capability to identify leakage past the check valves. The procedures are developed and approved in accordance with the licensee's commitments and requirements. Personnel have been trained in the use of these procedures and how steam binding is precluded. Based on this review, this item is closed in Report 87-05.

The discharge check valves on the steam turbine auxiliary feedwater (AFW) pumps have not experienced significant leakage. The discharge check valves on the motor driven AFW pumps have experienced significant leakage which was attributed to the disc being hinged from the bonnet and thus being a maintenance assembly problem. These four valves per unit have been replaced with valves that have the disc internally hinged and no significant leakage has been noted. The valves were changed on Unit 1 this last outage, but the plant is still in startup and has had only a short period of operation to judge the fix. Unit 2 changed the valves during a mini-outage this fall and the valves have operated well.

MCGUIRE 1 AND 2

The discharge check valves on the auxiliary feedwater (AFW) pumps at McGuire have experienced significant leakage (as mentioned in IEB 85-01). Much of the leakage can be attributed to improper installation of the discharge check valves. Some of the check valves were installed in horizontal runs of pipe preventing proper closure of the valves which were designed to be aided by gravity in vertical pipe.

As an interim fix, the licensee installed resistance temperature detectors (RTD) in the discharge piping of each auxiliary feedwater pump. The RTD indication is a computer alarm on the operator aids computer.

During refueling outages in 1987, all the check valves on the discharge side of the AFW pumps were replaced (Walworth to Anchor/Darling). The valves have operated well.

SHEARON HARRIS

In January 1987, Region II inspectors reviewed the licensee's response dated April 29, 1986, to IE Bulletin 85-01, Steam Binding of Auxiliary Feedwater Pumps. The inspectors reviewed the following items discussed in the response.

- Monitoring of fluid conditions within the auxiliary feedwater (AFW) system is performed through the use of snap-on thermocouples which are installed on the AFW system discharge lines to monitor system temperature. Should the AFW discharge line temperature exceed the established set point, the condition will be alarmed in the main control room.
- Abnormal Operating Procedure (AOP) 010, Feedwater Malfunctions, which addresses symptoms of AFW system steam binding and corrective actions to restore the affected components to operational status. AOP-010 has been approved for use by the licensee.
- Training received by operations personnel on recognition and recovery actions for AFW system steam binding was also reviewed. These items were addressed in a lesson plan which covered AFW pump steam binding and AOP-010. The lesson plan was completed September 30, 1986.

Independent of the above effort, NRC personnel also inspected the AFW system and performed a walk through of AOP-010 with licensee operations personnel.

Based on the above inspection efforts, the inspectors determined that the licensee's response of April 29, 1986, to IE Bulletin 85-01 adequately addressed the requirements of the bulletin. Measures established to monitor AFW system temperatures, procedures which address recognizing and recovering from steam binding should it occur, and material provided for operator training all appear to be adequate.

In early 1987, the plant began to experience back leakage through the AFW downstream check valves to the extent that an AFW pump was required to be run every eight hours to maintain temperature control. In May and June 1987, a modification of the AFW piping was made to fix the problem. The modification required that an additional heavier check valve be installed in each of the three AFW lines between the two motor driven pumps and the original check valves and also in the one line from the steam driven pump. Back leakage has been since this modification and the back leakage reduced to the point where an AFW pump is operated every several weeks. At present, the licensee plans no additional AFW modifications with respect to this problem.

FARLEY

IEB 85-01 was not addressed to Farley since they were part of event described. Farley responded in a letter dated April 30, 1984, based on an AEOD report of this subject. Equipment changes included added counterweights and replacing hinge pins and bushings of AFW check valves. Thermocouples installed on AFW pipes are monitored and infrequent operation of AFW pumps is utilized to maintain AFW temperatures within administrative limits.