

400 Chestnut Street Tower II

July 27, 1981

HTRD-50-518, -519, -520, -521/81-02  
PBRD-50-553, -554/81-02



Mr. James P. O'Reilly, Director  
Office of Inspection and Enforcement  
U.S. Nuclear Regulatory Commission  
Region II - Suite 3100  
101 Marietta Street  
Atlanta, Georgia 30303

Dear Mr. O'Reilly:

HARTSVILLE AND PHIPPS BEND NUCLEAR PLANTS - REPORTABLE DEFICIENCY -  
PRESSURE DROP IN ESSENTIAL SERVICE WATER PIPING - HTRD-50-518,  
-519, -520, -521/81-02 - PBRD-50-553, -554/81-02

The subject deficiency was initially reported to NRC-OIE, Region II, Inspector R. W. Wright on December 10, 1980, as NCR's HTAMEB8001, HTBMEB8001, and PBNMEB8001. The first, second, and third interim reports were submitted on January 12, March 20, and June 30, 1981. In compliance with paragraph 50.55(e) of 10 CFR Part 50, we are enclosing the fourth interim report on the subject deficiency. TVA anticipates transmitting the final report on or before April 1, 1982.

If you have any questions, please call Jim Damer at FTS 857-2014.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills, Manager  
Nuclear Regulation and Safety

Enclosure

cc: Mr. Victor Stello, Director (Enclosure)  
Office of Inspection and Enforcement  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

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## ENCLOSURE

### HARTSVILLE AND PHIPPS BEND NUCLEAR PLANTS PRESSURE DROP IN ESSENTIAL SERVICE WATER PIPING

HTRD-50-518, -519, -520, -521/81-02

PBRD-50-553, -554/81-02

10 CFR 50.55(e) REPORT NO. 4 (INTERIM)

#### Description of Deficiency

Corrosion products have been found to be causing greater than predicted pressure drops in carbon steel raw (river) water piping in TVA power plants which were designed (sized) according to standard industry practice. Analysis of the essential service water (ESW) Division III system, also known as the high pressure core spray (HPCS) system, for Hartsville and Phipps Bend using new criteria to account for the greater pressure drops showed unacceptable water supply to some components and showed that system modifications would be necessary to ensure all components will receive minimum design flow rates over the full design life of the plant. Since some components of the ESW system would not receive adequate water supply over the full design life of the plant, the ability of the ESW system to perform its safety function would be jeopardized. This situation resulted from use of standard industry techniques in hydraulic design of raw water piping. TVA has found the standard practice to be nonconservative for carbon steel piping in such systems in the TVA service area.

#### Corrective Action

The balance of plant (BOP) ESW (Divisions I and II) and HPCS (Division III) systems have been analyzed using the revised headloss criteria defined in TVA Mechanical Design Guide DG-M3.5, Revision 1. It was found that without physical changes the system headlosses would exceed the available head of the ESW or HPCS pumps already delivered. In safety-related portions of the BOP, the corrective action will be to change to stainless steel or cement-lined carbon steel, as required.

Provisions for the cement lining shall be accomplished under TVA ECN-615 at Hartsville Plant A and ECN-287 at Phipps Bend, while the change from carbon steel to stainless steel shall be accomplished under ECN-611 at Hartsville Plant A and ECN-285 at Phipps Bend. Hartsville Plant B changes will be accomplished under a future ECN.

On November 20, 1979, TVA's report documenting results of our corrosion study was transmitted to General Electric (GE), who was asked to evaluate the reactor island piping using the new corrosion criteria and recommend changes as required. Results of GE's evaluation were transmitted to TVA on February 25, 1981, for the HPCS system, and on April 14, 1980, for ESW. GE recommended changing only portions of the reactor island piping to stainless steel.

There is also a small segment of BOP piping within the reactor island supplying nonessential coolers in the radwaste building (refer to ESW System P&ID Nos. K-121A and K-121B). This loop is currently under investigation by TVA and GE to ensure its conformance to DG-M3.5, Revision 1. However, since these coolers are nonessential, and since remote isolation capability is provided, safe shutdown would not be impacted by degradation of the supply to these coolers.

Although cement-lined carbon steel is the preferred alternative for certain segments of the piping system from a hydraulic standpoint, qualification of the liner has not been fully demonstrated. For this reason TVA has committed to a test program to investigate the structural characteristics of the lined piping. If successful, this material will be used as noted above and copies of the test results will be available at the Hartsville and Phipps Bend construction sites. A supplemental report, including a summary of the test results and any further design changes, will be provided by April 1, 1982.