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Subject: W. O. 3900/4000
Washington Public Power Supply System
WNP-2
Defect and Noncompliance
Evaluation Report No. 83-14
Standby Service Water System Flow

August 12, 1983
BRGO-83-004, Rev. 1

U.S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive
Suite 1000
Arlington, Texas 76011

Attention: Mr. J. P. Collins, Regional Administrator

Gentlemen:

In accordance with Burns and Roe Project Procedure WNP-2-ED-003, Report of Defects and Non-Compliance (Nuclear Projects), Burns and Roe has determined that the subject deficiency is reportable under 10CFR21 and notified your Mr. D. Fox on August 4, 1983. A copy of Defect and Noncompliance Evaluation Report No. 83-14 is being provided with this letter as required by 10CFR21.

Very truly yours,

F. J. Patti

FJP/pn
Attachment

F. J. Patti
Chief Nuclear Engineer

c.c.: Mr. R. T. Johnson - WPPSS - 1 w/1
Director, Office of Inspection & Enforcement - 1 w/3
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

IE:19
1/1

EVALUATION REPORT

83-14

STANDBY SERVICE WATER SYSTEM FLOW

I. Description of Deficiency

Insufficient flow to several heat exchangers in Standby Service Water (SW) loops A and B as indicated on the table below:

COOLER	REQUIRED FLOW, gpm	MEASURED* FLOW, gpm
CAC-EV-1A	50	30
CAC-EV-1B	50	10
RHR-P-2A	10	6
RHR-P-2B	10	4.5
RHR-P-2C	10	2.5
WMA-CC-53A1	60	49
WMA-CC-51B1	120	98
WMA-CC-53B1	60	30

*as of 7/14/83, per SPR-M-2807

II. Time and Method of Discovery

Date of discovery was July 28, 1983. Burns and Roe, (BRI) became aware of the low flow conditions in the Standby Service Water System (SW) loops when Start-up Problem Report SPR-M-2400 was transmitted to BRI for evaluation on May 18, 1983. At that time, BRI could not determine if the low flow conditions were caused by design error or by fouling because the SW flow calculations were not based on as-built small bore piping design. There was an immediate effort to update the calculation. By July 28, there was sufficient information to conclude that some of the low flow conditions were caused by excessive pressure drop in the small bore piping.

III. Safety Implication

Insufficient flow to SW heat exchangers could cause failure of safety-related equipment due to overheating. Failure of this equipment could preclude safe shutdown of the reactor.

IV. Cause of Deficiency

The primary cause of this deficiency is due to corrosion product buildup on the inside surface of the pipe. The material buildup reduces the pipe flow area and increases resistance resulting in a low flow condition. In addition, errors in the original system pressure drop calculations

Certified By Rheanne Clark

IV. Cause of Deficiency (Continued)

have been identified. The calculations should have been considered preliminary until all system design information was available. In revising the calculation to the latest design/as-built configuration several cases have been identified where the calculated available pressure head will not provide the required design flow rate. In these cases, either the assumed system resistance was less than the as-constructed configuration or the wrong parallel flow path was assumed to be the limiting case.

V. Action to Prevent Recurrence

A chemical treatment program is required to control water quality so as to prevent future material buildup in the pipe.

There is no action that can be taken to completely eliminate errors. However, two factors should reduce the possibility of errors in pressure drop/flow calculations in the future.

1) We are now using a computer program for such calculations. This allows modelling of all loops of large parallel systems which eliminates the need to assume that a certain loop is limiting.

2) The plant is built. There is no need to assume piping configurations.

VI. Corrective Action

The Standby Service Water System was chemically cleaned to remove the deposited material. Subsequent testing and inspection has identified that excessive fouling still exists and that additional cleanup is required.

The deposited material has been analyzed and chemical treatment to inhibit future deposits has been identified. These topics are discussed in detail in Burns and Roe Technical Memorandum Number 1300, dated June 9, 1983.

The system pressure drop calculations are being revised to reflect the latest design configuration. The calculations that have been revised to date indicate that the required pressure head can be achieved by throttling the RHR heat exchanger discharge valves (RHR-V-68A, B) and enlarging the removable orifices (SW-FE-1A, B) in the return lines located in the SW pump houses (Figure 1). If system design changes are identified as necessary to correct the deficiency, they will be implemented as required.

SIMPLIFIED STANDBY SERVICE WATER FLOW DIAGRAM

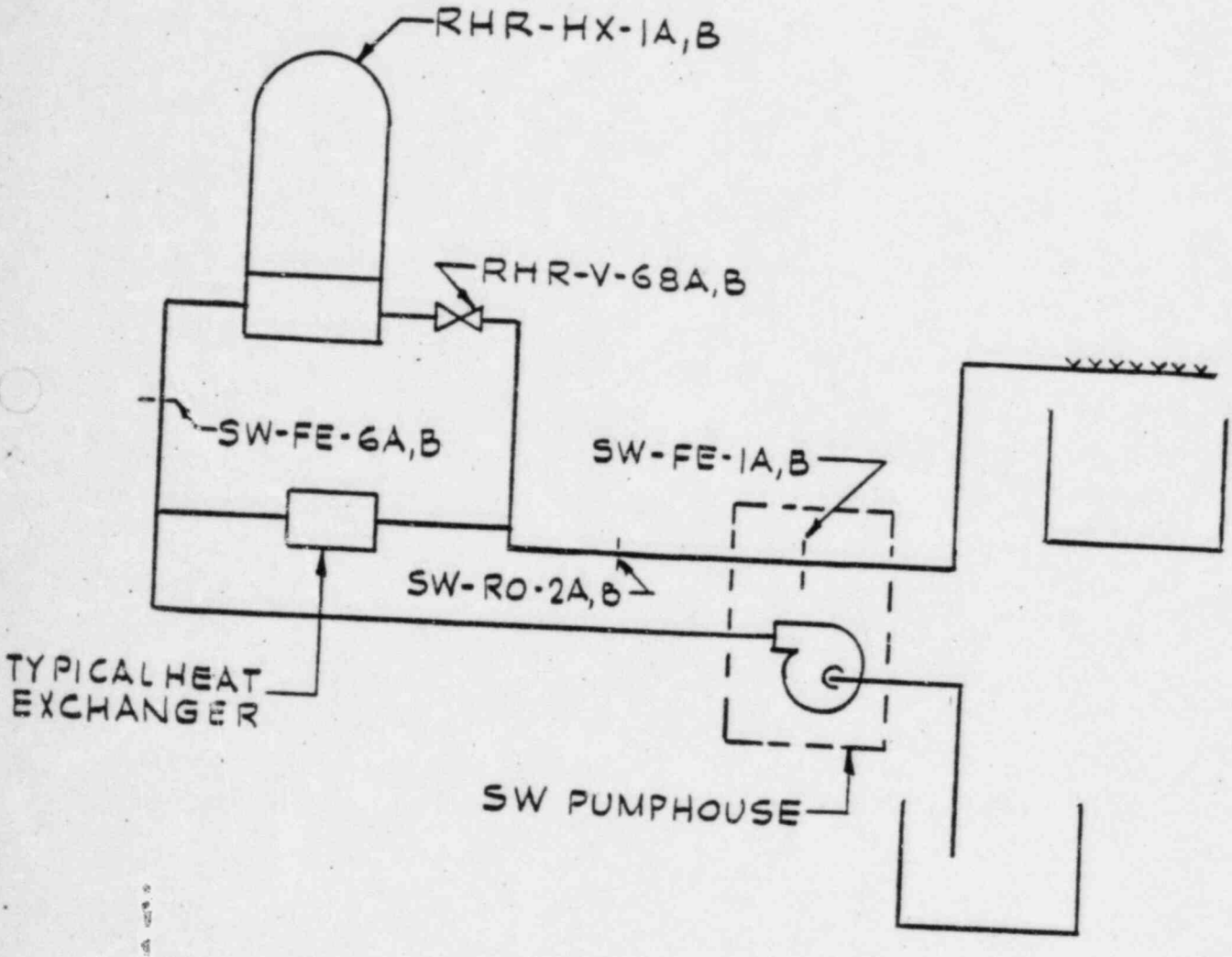

FIGURE 1