Omaha Public Power District
444 South 16th Street Mall
Omaha, Nebraska 68102-2247

May 18, 1998
LIC-98-0086

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-137
Washington D.C. 20555

References: 1. Docket 50-285
2. Letter from OPPD (S. K. Gambhir) to NRC (Document Control Desk) dated October 3, 1997 (LIC-97-0155)

Subject: Clarification and Additional Information for Application for Amendment of Operating License - Auxiliary Feedwater System

In Reference 2, Omaha Public Power District (OPPD) requested an amendment to Fort Calhoun Station (FCS) Technical Specifications Section 3.9 associated with surveillance requirements for the Auxiliary Feedwater (AFW) system. During a telephone conference call including NRC/NRR staff and OPPD personnel on April 22, 1998, OPPD clarified one of the purposes of the requested amendment and provided some performance history for the Auxiliary Feedwater pumps. As requested by the NRC, this letter documents the information provided on the conference call and provides additional detailed performance history.

Steam Driven Auxiliary Feedwater Pump (FW-10)

Testing

There are two surveillance tests normally performed for this pump. The first test verifies operability of the pump on a monthly basis, and verifies the ability of the pump to meet the (nominal) 140 psid differential pressure between the pump discharge and the steam inlet pressure to the pump turbine driver, at normal main steam pressures.

The second test verifies the operability of the pump on a quarterly basis, in accordance with the In-service Testing (IST) program. This test also verifies the ability of the pump to meet the (nominal) 140 psid differential pressure. However, in this test a steam pressure signal is injected into the speed control loop corresponding to the highest steam generator pressure that AFW would be required to operate under. This test verifies that, even under worst case conditions, the required amount of AFW flow can still be attained.

The amendment request proposes no changes to the way OPPD currently tests the pump. The request does propose removal of the incorrect discharge pressure verification criterion (≥40 psig above steam generator pressure) from Technical Specification 3.9(2); the IST program will administer and control this performance criterion. The quarterly IST surveillance test refers to an engineering calculation for the value of this differential pressure parameter.

Pump Performance History

Attached are two sets of trend graphs and data. The first set shows a brief history of the monthly tests. Trending of this data started in August of 1997. The first monthly test graph shows the As-Found differential pressure, and the second monthly test graph shows the As-Left differential pressure. Adjustment of the differential pressure controller is allowed under this surveillance test. Also, notice that the monthly test is not performed every third month. OPPD has a provision in the monthly test that, if the quarterly IST surveillance test is performed within the surveillance window of the monthly test, then the monthly test can be administratively closed out. This is because the quarterly test accomplishes everything the monthly test does, in addition to the quarterly IST requirements.

Please note the failure of the monthly test in September of 1997, in which the controller could not be adjusted into specification (178 psid). Maintenance was performed following this failure, and the pump tested satisfactorily. The maintenance included replacement of the pneumatic controller and derivative unit. The post-maintenance performance of the monthly test had an expected as-found out-of-tolerance (152 psid), but was subsequently adjusted back into specification satisfactorily (144 psid as-left).

The second set of trend graphs and data show the performance history of pump performance during the quarterly surveillance test. The graph only goes back to August of 1996, but the attached data tables show the performance back to January of 1993.

As the calculation for the required differential pressure has been revised over the years, the tolerance applied to this parameter has widened from 140 (± 5) psid, to 140 (± 10) psid, to the current 140 (+ 10, - 20) psid.

Please note the two consecutive quarters (2/11/97 and 4/16/97) where the pump failed to meet the differential pressure criterion. These failures and the failure of the monthly test on 9/19/97 were most likely caused by a piece of foreign material in the small clearances of the controller and/or derivative unit in the speed control pneumatic instrument loop. The steam driven AFW pump remains in Maintenance Rule Category (a)(1), pending completion of an action plan and an 18 month monitoring period of satisfactory performance with no functional failures.

The corrective actions and enhancements made during the current refueling outage include:

1. Addition of an isolation valve in the steam pressure sensing line, which will allow the use of an existing 0 - 200 psig differential pressure gauge. This will provide for a significant improvement in accuracy and instrument uncertainty, and subsequently allow for an even wider tolerance band on the pump dP requirement.

2. Replacement of the upstream air supply filter regulator with one that includes a 2 micron filter. This should help provide higher quality air to the pneumatic speed control loop instruments.

3. Replacement of all instrument air supply and signal tubing and fittings. This will preclude the possibility that any foreign material or particles inside the old tubing or fittings might break loose during pump operation and hamper proper operation of the pneumatic instruments.

Motor Driven Auxiliary Feedwater Pump (FW-6)

The motor driven AFW pump has performed satisfactorily. As can be seen from the trend graph and data tables, developed head (differential pressure) is very consistent. The same allowance which applies to the steam driven AFW pump applies to the motor driven AFW pump, i.e., if the quarterly test is performed within the surveillance window of the monthly test, the monthly test can be administratively closed out.

Please contact me if you have any questions.

Sincerely,

S. K. Gambhir
Division Manager
Engineering & Operations Support

TCM/tcm

Attachments

C: E. W. Merschoff, NRC Regional Administrator, Region IV
L. R. Wharton, NRC Project Manager
W. C. Walker, NRC Senior Resident Inspector
Winston & Strawn

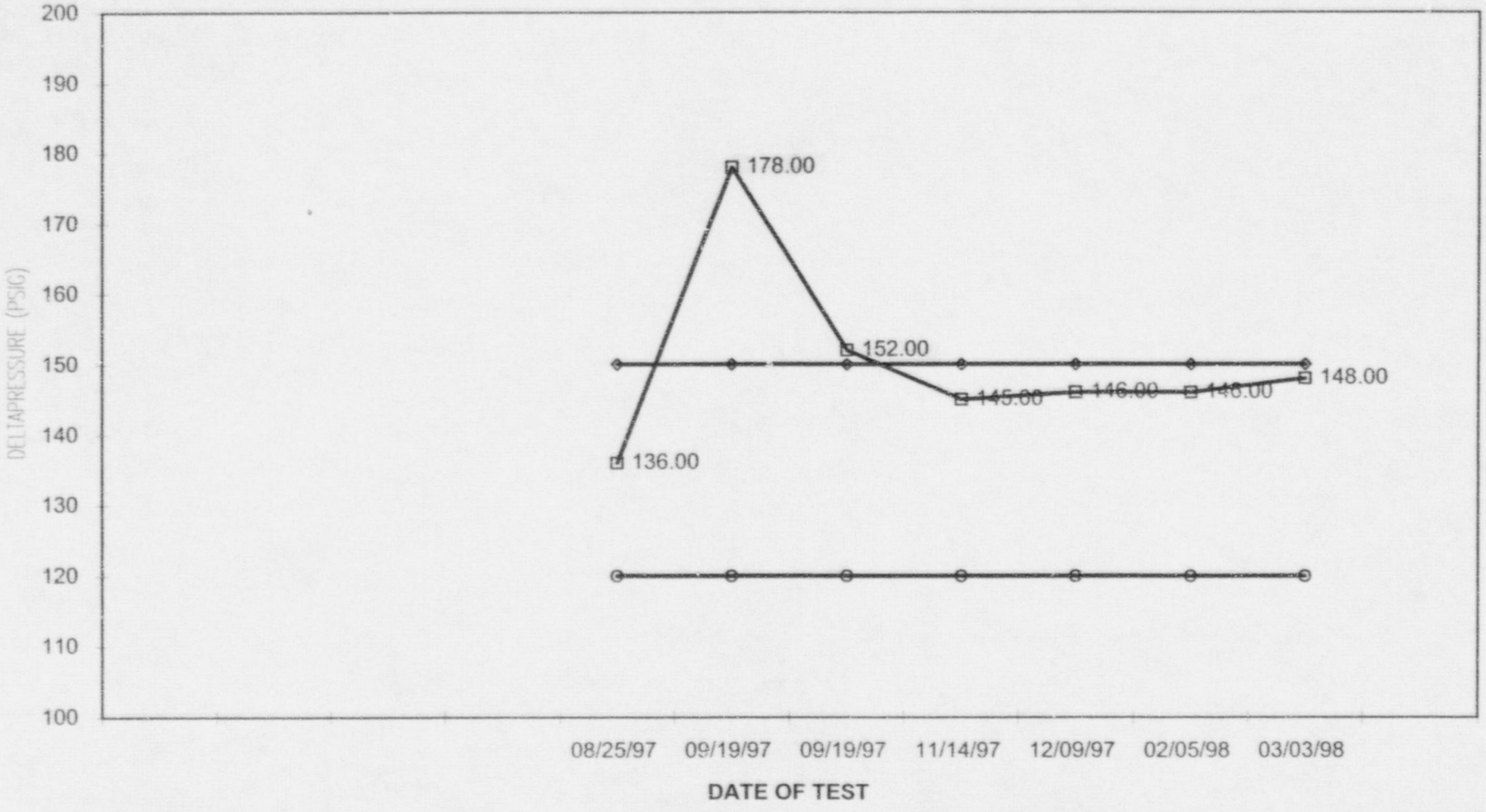
LIC-98-0066

Attachments

FW-10 Monthly Test Data
FW-10 Quarterly Test Data
FW-6 Quarterly Test Data
Annual AFW System Unavailability

(Monthly Test)

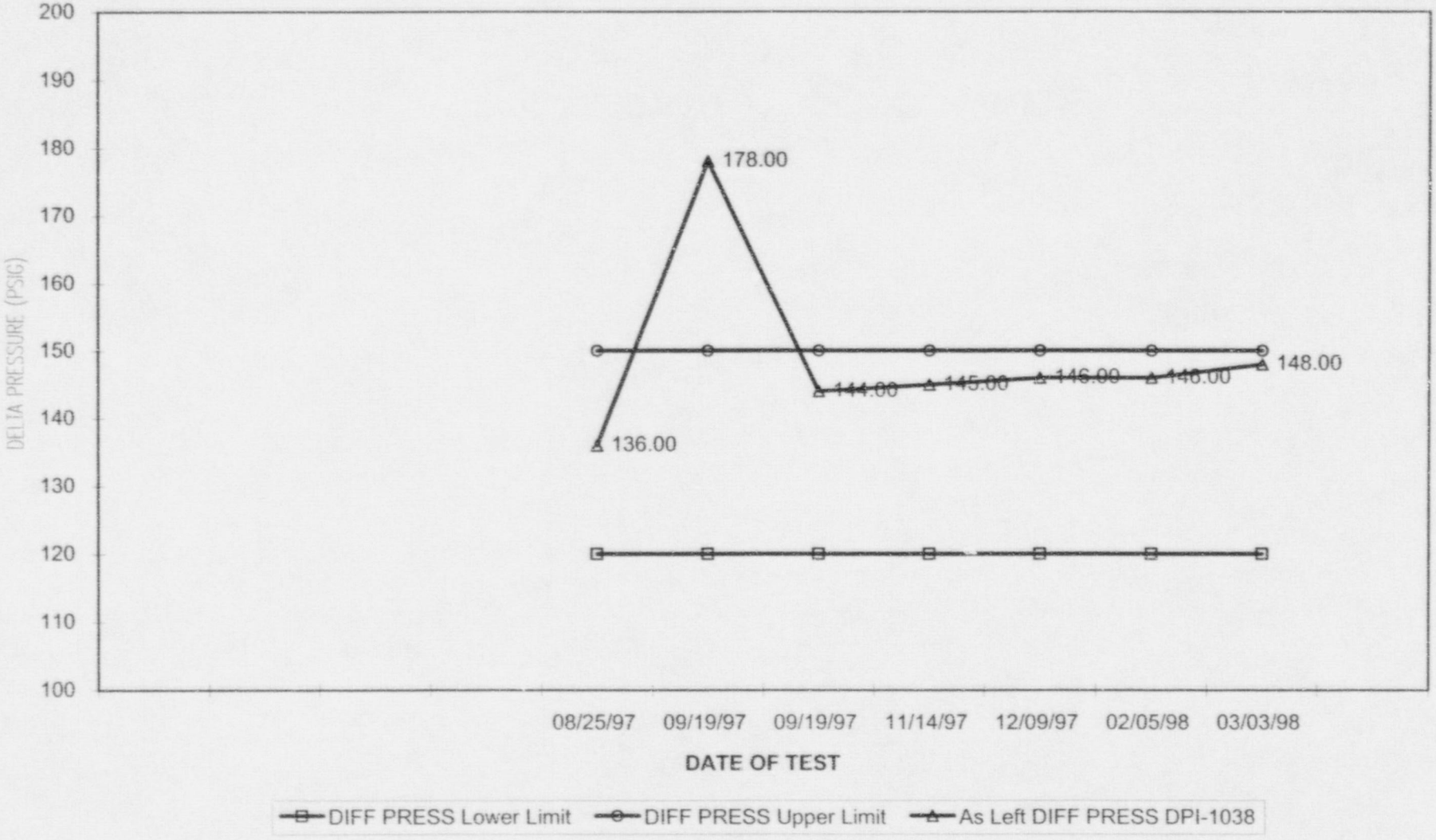
FW-10 DIFFERENTIAL PRESSURE
ST = OP-ST-AFW-0004



As Left DP

(Monthly Test)

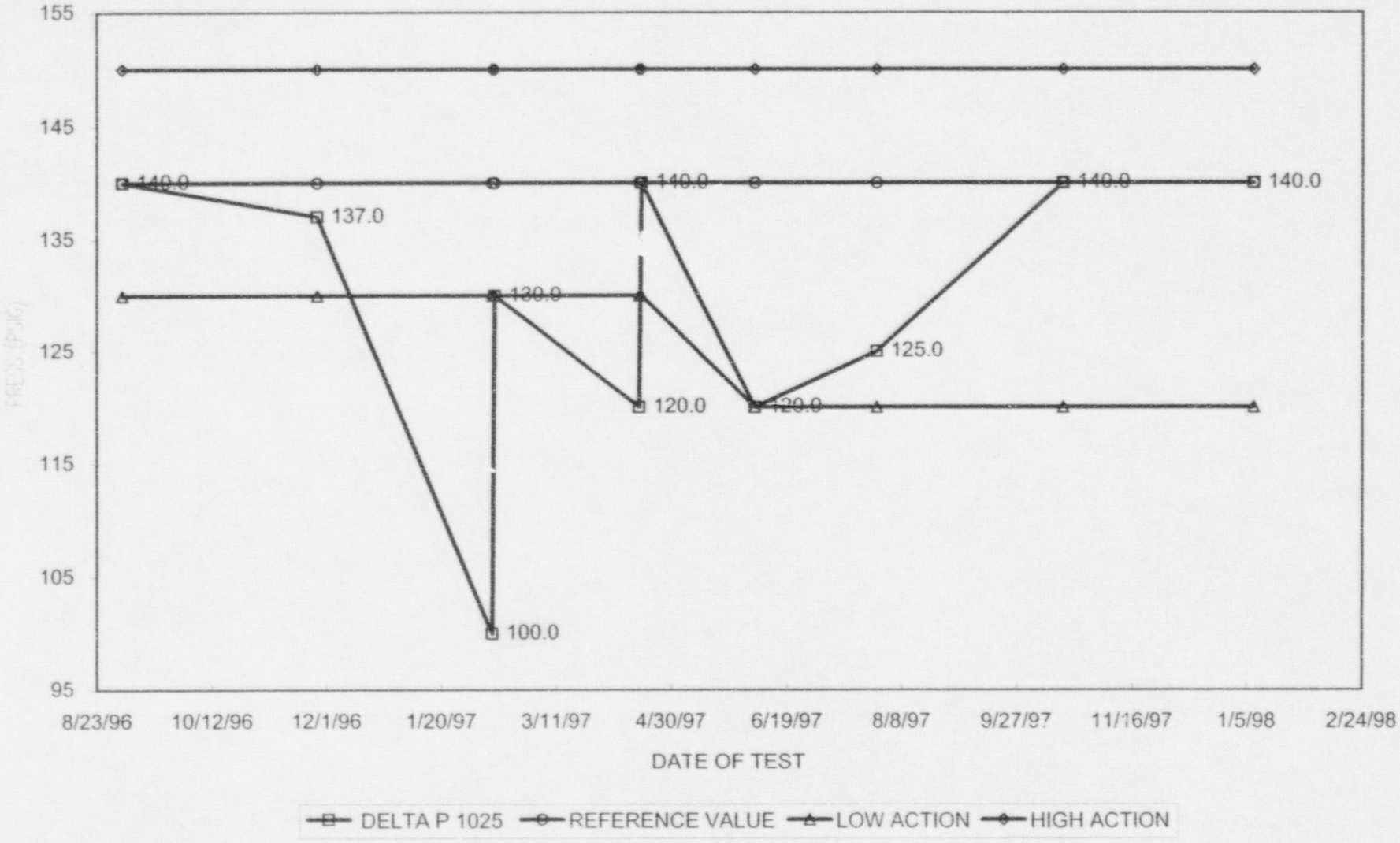
FW-10 DIFFENTIAL PRESSURE
ST = SE-ST-AFW-3005



OP-ST-AFW-0004 AUXILIARY FEEDWATER PUMP FW-10 OPERABILITY TEST DIFFERENTIAL PRESSURE FROM PUMP DISCHARGE PRESSURE AND STEAM INLET PRESSURE				
COMPLETE DATE	As Found DIFF DPI-1038 step 7.6	DIFF PRESS Lower Limit	DIFF PRESS Upper Limit	As Left DIFF PRESS DPI-1038
03/03/98	148.00	120.00	150.00	148.00
02/05/98	146.00	120.00	150.00	146.00
12/09/97	146.00	120.00	150.00	146.00
11/14/97	145.00	120.00	150.00	145.00
09/19/97	152.00	120.00	150.00	144.00
09/19/97	178.00	120.00	150.00	178.00
08/25/97	136.00	120.00	150.00	136.00

(Quarterly Test)

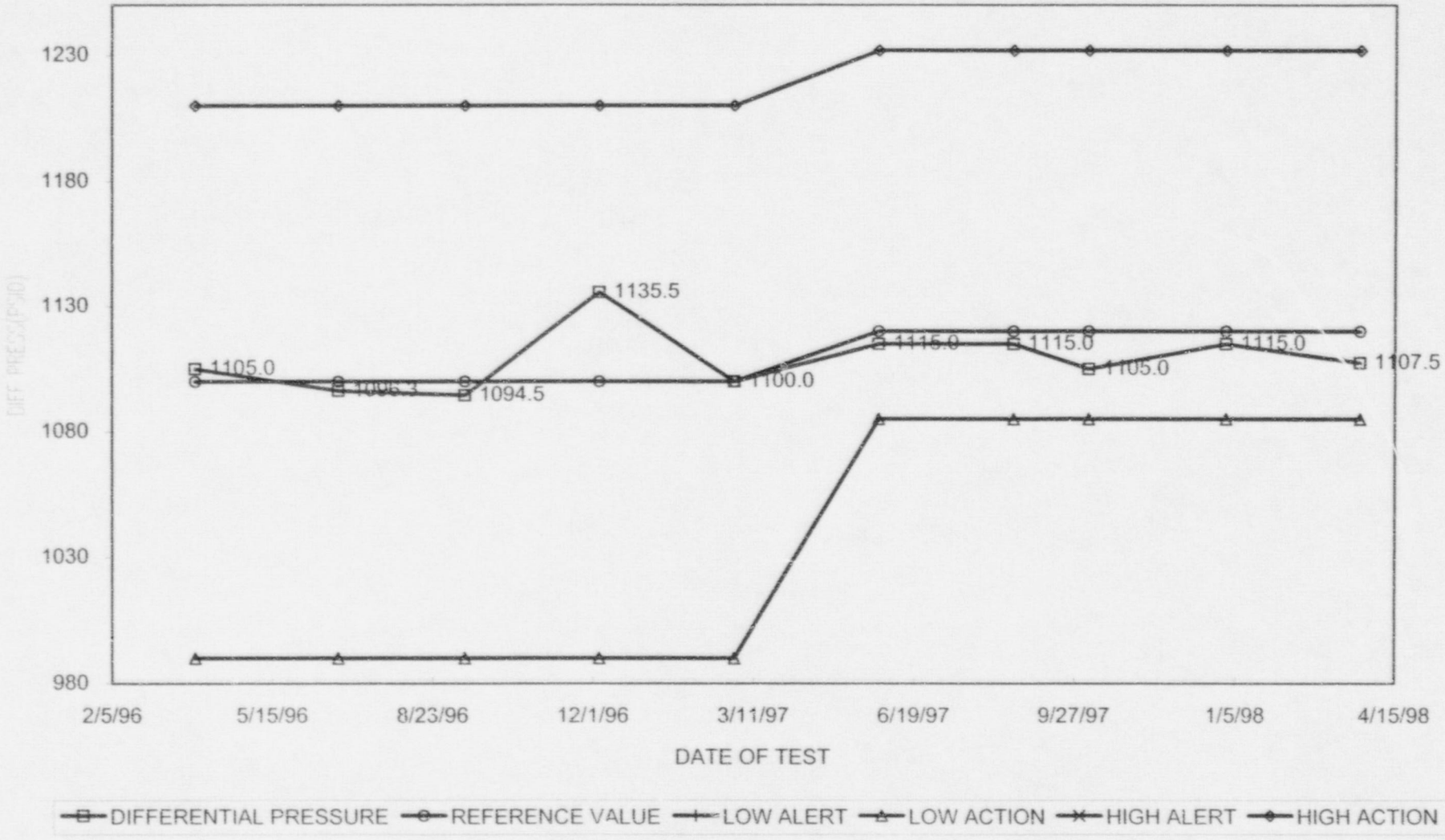
FW-10 TREND GRAPHS
SYS DIFF PRESS/1000 - FM:SE-ST-AFW-3006



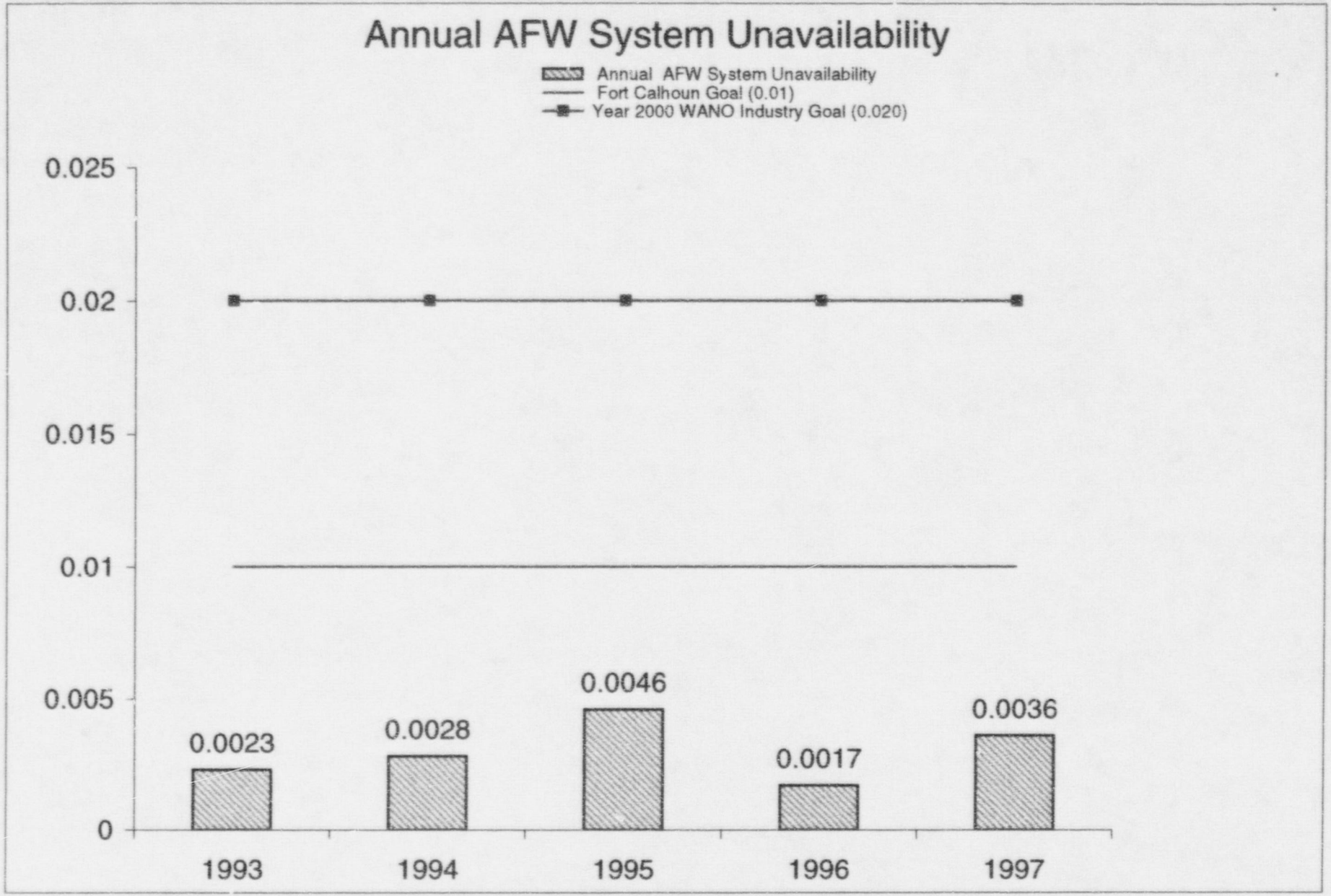
AUXILIARY FEEDWATER PUMP FW-10 TEST AND STEAM ISOLATION VALVE TEST SE-ST-AFW-3006				
COMPLETE DATE	DELTA P 1025	REFERENCE VALUE	LOW ACTION	HIGH ACTION
01/08/98	140.0	140.0	120.0	150.0
10/17/97	140.0	140.0	120.0	150.0
07/28/97	125.0	140.0	120.0	150.0
06/05/97	120.0	140.0	120.0	150.0
04/17/97	140.0	140.0	130.0	150.0
04/16/97	120.0	140.0	130.0	150.0
02/12/97	130.0	140.0	130.0	150.0
02/11/97	100.0	140.0	130.0	150.0
11/27/96	137.0	140.0	130.0	150.0
09/03/96	140.0	140.0	130.0	150.0
08/27/96	130.0	140.0	130.0	150.0
06/07/96	140.0	140.0	130.0	150.0
03/11/96	130.0	140.0	130.0	150.0
12/21/95	130.0	140.0	130.0	150.0
09/29/95	140.0	140.0	130.0	150.0
07/06/95	140.0	140.0	130.0	150.0
04/11/95	140.0	140.0	130.0	150.0
02/02/95	130.0	140.0	130.0	150.0
12/07/94	130.0	140.0	130.0	150.0
08/26/94	130.0	140.0	130.0	150.0
06/24/94	130.0	140.0	130.0	150.0
03/07/94	130.0	140.0	130.0	150.0
01/04/94	130.0	140.0	130.0	150.0
01/04/94		140.0	130.0	150.0
09/20/93	135.0		135.0	145.0
06/28/93	140.0		135.0	145.0
04/05/93	135.0		135.0	145.0
01/11/93	135.0		135.0	145.0

(Motor Driven Pump)

FW-6 DIFFERENTIAL PRESS
ST = SE-ST-AFW-3005



AUXILIARY FEEDWATER PUMP FW-6 AND CHECK VALVE TEST ST = SE-ST-AFW-3005						
COMPLETE DATE	DISCHARGE PRESSURE	SUCTION PRESSURE	DIFFERENTIAL PRESSURE	REFERENCE VALUE	LOW ACTION	HIGH ACTION
03/24/98	1132.0	24.5	1107.5	1120	1085	1232
12/30/97	1140.0	25.0	1115.0	1120	1085	1232
10/06/97	1130.0	25.0	1105.0	1120	1085	1232
08/20/97	1140.0	25.0	1115.0	1120	1085	1232
05/28/97	1140.0	25.0	1115.0	1120	1085	1232
02/27/97	1125.0	25.0	1100.0	1100	990	1210
12/05/96	1160.0	24.5	1135.5	1100	990	1210
09/12/96	1125.0	25.5	1094.5	1100	990	1210
06/25/96	1120.0	23.7	1096.3	1100	990	1210
03/28/96	1130.0	25.0	1105.0	1100	990	1210
01/05/96	1120.0	24.5	1095.5	1100	990	1210
10/09/95	1125.0	25.5	1099.5	1100	990	1210
06/29/95	1120.0	24.5	1095.5	1100	990	1210
04/07/95	1130.0	24.5	1105.5	1100	990	1210
02/02/95	1125.0	25.0	1100.0	1100	990	1210
11/08/94	1130.0	24.5	1105.5	1100	990	1133
08/18/94	1120.0	24.5	1095.5	1100	990	1133
06/03/94	1120.0	25.0	1095.0	1100	990	1133
03/01/94	1130.0	24.5	1105.5	1100	990	1133
12/09/93	1125.0	24.5	1100.5	1100	990	1133
09/14/93	1133.0	24.5	1108.5	1100	990	1133
06/22/93	1130.0	24.0	1106.0	1100	990	1133
03/30/93	1125.0	24.0	1101.0	1100	990	1133
01/05/93	1125.0	24.0	1101.0	1100	990	1133
10/13/92	1120.0	24.0	1096.0	1100	990	1133


Annual AFW System Unavailability
Annual AFW System Unavailability
Fort Calhoun Goal (0.01)
Year 2000 WANO Industry Goal (0.020)
0.025
0.02
0.015
0.01
0.005
0
0.0023
0.0028
0.0046
0.0017
0.0036
1993
1994
1995
1996
1997